

THE MAGAZINE OF EFFECTIVE COMPARTMENTATION

# Life Safety

## DIGEST

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Effective Compartmentation In Educational Occupancies  
Where is FCIA 20 years into the 'DIIM' of Firestopping?  
Fire-Resistance and Fireproofing  
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## EDITOR'S MESSAGE

**E**very issue of *Life Safety Digest* is chock full of education on fire-resistance-rated assemblies and smoke-resistant construction in buildings. Know that FCIA's *Life Safety Digest* magazines are archived at [www.FCIA.org](http://www.FCIA.org), with each magazine since 2005 posted as a resource to all those concerned with fire-resistance as an important part of a building's safety protection package.

In this issue, find out about some of the technical standards involved in firestopping and current specification trends for the industry. Learn about the incremental costs of adding fire-resistance-rated effective compartmentation to a structure. And, don't miss the article on fire-resistance either.

If you are an FCIA Member and/or *Life Safety Digest* advertiser, Thank You. Your support is needed to keep fire-resistance-rated assemblies and smoke-resistant construction working through education - through *Life Safety Digest*. 🔥



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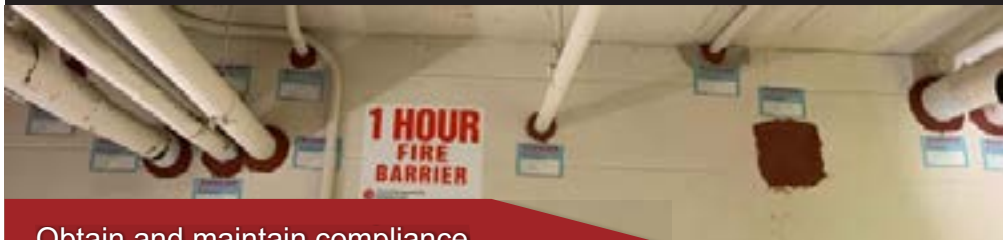
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# EFFECTIVE COMPARTMENTATION IN EDUCATIONAL OCCUPANCIES

**F**ire-resistance-rated assemblies and smoke-resistant construction is the silent protection in buildings. It sits there waiting for fire or smoke to appear, then does its job.

In educational occupancies detection and alarms - and communication systems - are key elements for safety. When threats appear, having robust walls made from gypsum boards or concrete block, plaster or clay tile block, or gypsum block, helps protect spaces.

Architects tell us they design non-fire-resistance-rated walls extending above drop ceilings to protect spaces for sound and security reasons. This barrier stops vandals, threats, and keeps teaching and student noise in the classroom.

When walls extend above ceilings, it provides a continuous barrier. It might not be fire-resistance-rated, but it will provide some protection. When built to normal standard, it seems the wall 'approximates' a fire-resistance-rated assembly. In the U900 Section of the UL Fire Resistance Directory, the designs look just like those that are built in educational occupancies.

## COSTS?

From a cost standpoint, to make these walls fire-resistance-rated is an incremental cost. The added expense is basically material costs. If the structure is built to a tested and listed fire-resistance-rated wall design, the process has been started. Then, add fire rated 5/8" Type X gypsum board instead of 5/8" gypsum wallboard, fire doors, protection for breaches made for pipes, head of wall joints with firestop systems, a fire damper for the air ducts, and it becomes a fire-resistance-rated assembly.

Is this a big deal? Maybe not. Consider that a large percentage of work in construction is transporting workers and materials to jobsites, moving the material to where it's installed, then installing the assemblies. That means that labor is a huge part of the cost of construction.

The doors are being installed anyway. The cost of upgrading to a fire door is only the cost of material for the fire door and fire-rated hardware. The labor is about the same. Penetrations and joints are protected anyway with something to fill voids and protect for sound. If labor is 70-80% of the 'sealing' operation, then what's an increase in material price really matter? Not much. What about the ductwork? That does get an increase as a fire damper is not in the non-fire-resistance-rated wall.

Why specify fire-resistance-rated and smoke-resistant walls in educational occupancies? Think of the many things that come with calling the wall, a 'Smoke Barrier'.

## WHAT'S A SMOKE BARRIER?

The smoke barrier is a defined term in the *International Building Code* (IBC).

**SMOKE BARRIER.** A continuous membrane, either vertical or horizontal, such as a wall, floor or ceiling assembly, that is designed and constructed to restrict the movement of smoke. [IBC 2018, 202]

In Chapter 7 of the IBC, section 703.9, it states the smoke barrier is a 1-hour fire-resistance-rated assembly first, with continuity provisions. Smoke movement is restricted based on the type of barrier breach protection. Smoke dampers, firestop systems, and fire doors that are smoke-resistant, all restrict the amount of smoke moving through the assembly. While it's smoke it is designed to restrict, it also restricts air and the elements that can be in the air.

## WHAT ELSE CAN A SMOKE BARRIER PROVIDE?

When the industrial hygienist at the facility and a fire-resistance-rated and smoke-resistant product manufacturer get together, they can find many other risks that can be reduced by using these continuous, quantifiably rated assemblies. The product manufacturer and building owner and manager can then determine what germs, chemicals, or other substances are prevented due to the barrier and protection type.

Controlling air movement in buildings can help reduce the spread of odors and hazardous particles, providing control of heat and air conditioning in building spaces. If air is travelling between rooms, are germs? Hospital operating rooms have positive pressure required to keep outside air from infecting vulnerable surgery patients. Protecting rooms with the features of fire-resistance and smoke-resistant assemblies keeps germs and other contaminants outside the room from getting to the patient inside the room on the operating table.

Walls that extend to the floor/ceiling assembly through hard or drop ceilings can provide security. It prevents intruders from entering rooms easily from a corridor or another classroom just by pushing up a ceiling tile and crawling over the wall to the next room. It restricts access to that area, meaning things can't be thrown into a room because there is a wall to block access. If someone starts a fire in one room, a smoke barrier keeps the next room tenable so people have time to evacuate.

## CHICAGO ADDS FIRE-RESISTANCE

Fire-resistance-rated assemblies in educational occupancies are important. In fact, recognizing the importance, a major jurisdiction's adoption of the 2018 International Building Code (IBC) went a step further and added a 1-hour fire-resistance-rated assembly for educational occupancies. The City of Chicago will move to a "Chicagoized" version of the 2018 International Building Code in August 2020. During the adoption process, groups of architects, engineers, specifiers, contractors, city personnel, and others participated in merging key requirements from the current Chicago Building Code and the IBC.

During this editing process, the City of Chicago Working Groups, Fire and Building Departments, and others agreed that 1-hour fire-resistance-rated corridors would be required in Chicago's schools. They felt strongly enough about this 1-hour fire-resistance-rated assembly to make it required.

## FCIA & FIRE-RESISTANCE-RATED ASSEMBLIES

FCIA supports the use of fire-resistance-rated assemblies in buildings and building above code required minimums. A smoke barrier gets the building owner and manager quantified resistance - fire and smoke. While it is an extra expense to build fire-resistance in structures, we feel it's an incremental cost to the building owner. The labor is already on-site. Materials are being transported, as are workers installing the assemblies and protecting breaches. What changes is the type of materials incorporated into the structure.

In existing buildings, breaches in assemblies need to be fixed for sound and security reasons. Doors need to be inspected annually to be sure they work. The same annual visual inspection is required by the International Fire Code. The increase to the building owner and manager is for fire-damper testing. This fire-damper testing can now be performed via remote electronic methods. This is due to continuous improvement innovations from the damper manufacturers.



Fire Dampers get tested at installation, commissioning, 1st year, then in hospitals every 6 years, and other occupancies every 4 years.  
Ruskin Photo

As with any item that needs maintenance in buildings, there are some key things to know. FCIA's Barrier Management Symposium (BMS) helps building owners and managers keep the fire-resistance maintained. The FCIA BMS has been presented to thousands of hospital engineers, and many educational occupancy facility directors. Each time we present, action happens at facilities with a focus on the tested and listed wall, floor, firestop systems, fire and smoke dampers, fire doors, fire-rated glazing, the products and listings that make this work.

## CONCLUSION

Fire-resistance-rated and smoke-resistant assemblies protect people in educational occupancies, and many other types of buildings. If the building code does not require these assemblies, consider building above code requirements and including a smoke barrier. It's a great value for the safety provided. 🔥

Bill McHugh has been FCIA's Executive Director since the association started over 20 years ago. He can be reached at [bill@fcia.org](mailto:bill@fcia.org).



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## WHERE IS FCIA 20 YEARS INTO THE ‘D’ESIGN ‘I’NSTALLATION ‘I’NSPECTION ‘M’AINTENANCE ‘M’ANAGEMENT OF FIRESTOPPING?

This year the FCIA celebrates our 20 year anniversary, giving the organization a chance to look back, and plan forward.

Looking back, FCIA's Accreditation Committee and Leadership collaborated with FM Approvals on the November 2000 launch of FM 4991, *Standard for the Approval of Firestop Contractors*, and 2006's introduction of UL's *Qualified Firestop Contractor Program*.

FCIA's Standards Committee hired a standards formatting expert to help draft ASTM E2174, *Standard Practice for On-Site Inspection of Penetration Firestops*, launched in 2001. Then, ASTM E2393, *Standard Practice for On-Site Inspection of Fire-Resistive Joints and Perimeter Fire Barriers* was developed. As the proponent for both standards, we worked with leading manufacturers at ASTM and the International Code Council to get the standards approved and into the International Building Code (IBC). As a result, the 2012 through the 2021 IBC has a mandate for penetration and joint firestop systems inspection.

There is a specific specification section in the Construction Specifications Institute and Construction Specifications Canada (CSI/CSC) MasterFormat, 07-84-00 Firestopping, that addresses all three disciplines in one place - penetrations, joints and perimeter fire-barriers. We at FCIA have seen a trend growing where a label is required by specifications for firestop assemblies - using 'identification systems' from tags to stickers and more.

What are the current trends in firestopping specifications when it comes to labeling, firestop special inspection and the FM 4991 Approved / UL-ULC Qualified Firestop Contractor Programs?

FCIA's Marketing Committee & President Ben Urcavich worked with Dodge Data Analytics to research and find answers to these questions. The objective was to build data that shows how these FCIA 'DIIM' programs have impacted specifications - and the industry - over the 20-year period. In addition to gathering baseline data, the purpose of FCIA's study was to find answers to the following questions:

- How often are FM 4991 Approved / UL-ULC Qualified Contractor Programs specified?
- How many projects require 3rd party firestop inspection to ASTM E2174 - ASTM E 2303?
- How often is labelling required?

We conducted a database analysis, researching projects that contained a MasterFormat Division 7 project specifications containing the key words...

- Firestop
- fire stop
- firestopping
- fire stopping
- fire resistive joints.

...Which narrowed the total projects to 15,500 during a 3.5 -year period (2016, 2017, 2018, mid-2019.) We then added variables to the search, such as...

- Where are these buildings, by Region, State, Market Service Area (MSA)?
- What type of Building?
- What Project Value is more likely to have firestopping?
- What type of work -Alteration, Addition, New Construction?
- What type of building owner gets firestopping?
- How often is labeling required?

Following is a summary of the study's findings as well as some unanswered questions we are left with -- including some new ones sparked by the study's results.

### LABELING IN SPECS

Since 2001, the FM 4991 standard includes a procedure to follow when labels with FM Logos are used. This is one of the reasons that there are specifications for labels in Division 7 Specifications. The Labels are to be numbered, tracked and have certain language, as shown.



FM Labels require an FM Procedure. FM Approvals Image

Firestop installation contractor management systems control labels as does the FM 4991 Standard. Many firestop installation contractors have their own processes to control labels. FCIA's Recommended Professional Practice for Identification Systems (labeling) covers this procedure well.

We analyzed projects with Division 07 00 00, Thermal and Moisture Protection, where Firestopping is a subset, for a variety of terms related to firestop labels (for example: firestop labeling, joint identification, wall marking. For a complete list of search terms, please reach out to the authors).

The results show that labeling is on an upward trajectory - from 2016 to 2019, specification of firestop labels increased steadily from 14% of the time in 2016 to 2019's 18% of the time. Projects greater than \$100,000,000 (\$100m) in value specified labels 26% of the time, while projects \$5m to 10m had labels specified 17% of the time. Manufacturing, offices, healthcare facilities, and government buildings all had specifications for labels 24% of the time or greater. Labels were specified about 15-25% of the time throughout the USA, depending on region.

FCIA proposed adding labeling to the 2021 International Building Code (IBC). While we were unsuccessful, the concept had some support. We are building a new ASTM Labeling Standard on which a new code proposal might be based.

## SPECIAL INSPECTION IN SPECIFICATIONS

With the 2012 to 2021 IBC's Chapter 17 requiring Firestop Special Inspection to ASTM E2174 & ASTM E 2393 Standards for High Rise buildings 75' and higher above lowest fire department access, and critical occupancies in Table 1604.5, we were quite interested in this area. Again, we performed a keyword analysis on projects with a Division 7 section, which included keywords related to firestop inspection. These included terms such as "firestop special inspection(s)", "inspect fire-resistant joint system(s)", "inspect penetration(s)".

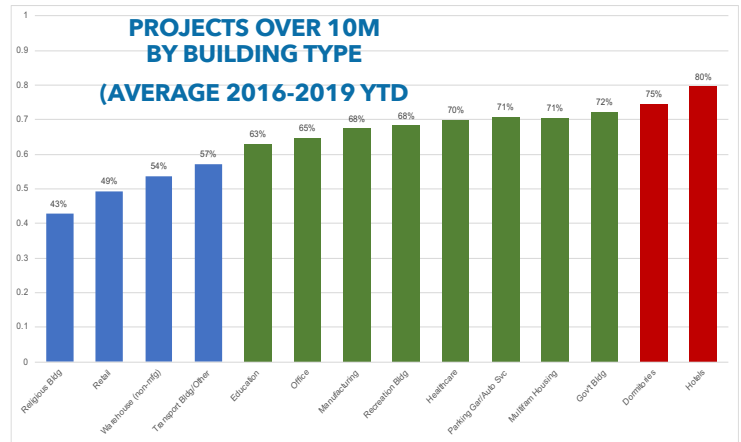


Firestop Inspection is required by the IBC. ICC Image

Results from 2016 to 2019 for special firestop inspection in the Thermal and Moisture Protection Section, 07 00 00 held steady at approximately 55% of the time. Project size yielded expected results, with projects of greater than \$100 million requiring special inspection 81% of the time. Surprisingly, even smaller projects, \$1m-5m, had inspection specified 51% of the time.

When we further analyzed the data by building type for projects over \$10 million, we saw some very interesting results. Special inspection is specified from 50-80% of the time in most occupancies.

## SPECIAL INSPECTION IN 07 00 00 SPECS



Firestopping Specs have Inspection. FCIA Image

We expected to see special firestop inspections specified often. Starting in 2002, FCIA visited major specification agencies, which specified the firestop inspection standards ASTM E2174 and ASTM E2393, and in 2012, this was mandated by the IBC. However, it was extremely interesting to see the data broken out by different subsets including building type. We also looked at the data by region, determining that the East North Central and New England regions specified special firestop inspection the most often at 76% and 85%, respectively, in projects over \$10 million.

## FM 4991 & UL-ULC'S QUALIFIED FIRESTOP CONTRACTOR PROGRAMS

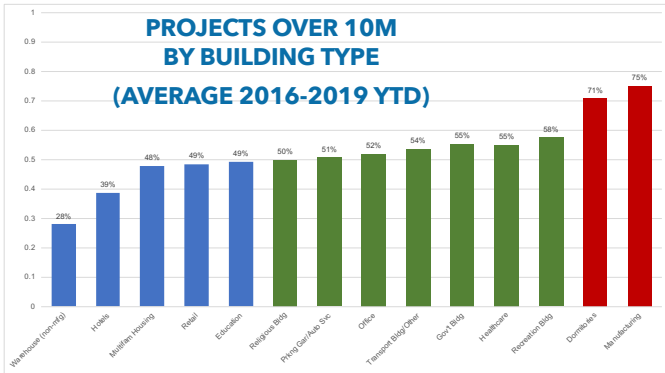
These results were the most anticipated as the FCIA created this initiative and has championed both the FM 4991 and UL-ULC Qualified Firestop Program as part of its mission since each program's inception. For this analysis, we searched for a variety of keywords related to these 3rd party accreditation programs, including "FM Approvals 4991", "FMG 4991", "UL Qualified Firestop Contractor", and "ULC Qualified Firestop Contractor".

The results were extremely positive in FCIA's opinion because there is no code mandate for either the FM 4991 or UL QFCP Programs. We found that FM and/or UL contractors were specified on 4 out of 10 projects between 2016 and 2019, or about 40% of the time. When further analyzed by project size, we found that FM/UL contractors are being specified on a majority of projects over \$10million - on half (50%) of projects between \$10 - 50 million; and more than 6 out of 10 projects over \$50million (61% for projects \$50-100 million and 62% on projects over \$100 million).

We further analyzed projects over \$10million by building type, building owner, and region. From a building type perspective, Dormitories and Manufacturing specified FM or UL Contractors most often - 71% and 75% of the time, respectively. This makes sense since FM Approvals has recommended FM 4991 Contractors in its Data Sheets for Maximum Foreseeable Loss Walls, which are mainly in industrial structures. Healthcare specified FM or UL Contractors 55% of the time, while education held strong specifying FM or UL Contractors 49% of the time.



## FM/UL CONTRACTOR SPECS



FCIA Image. Avg. 2016-2019 YTD

FM & UL Contractor specifications by building owner types were highest in Military (83%), Federal (66%) and State (61%) buildings. The private and municipal sectors held steady at just under 50% of the time (48% and 49% respectively).

From a regional perspective, FM/UL specifications were present nationwide, with East North Central, South Atlantic and New England regions having the highest rates of specification (55%, 55%, 56% respectively). The full region breakdown is shown below.

### FM 4991, UL QFCP IN SPECS, WHAT'S NEXT?

FM 4991 and UL Qualified Firestop Contractor Specifications are quite well specified in the USA. The evolution is quite impressive when looking back across our history to see that the I&I, Installation and Inspection, from FCIA's 'DIIM' - an objective started 20 years ago, is well entrenched in specifications.

While we explored many data points and learned a lot about what is showing up in our projects' specifications, we were left with a lot of questions. One burning question that we

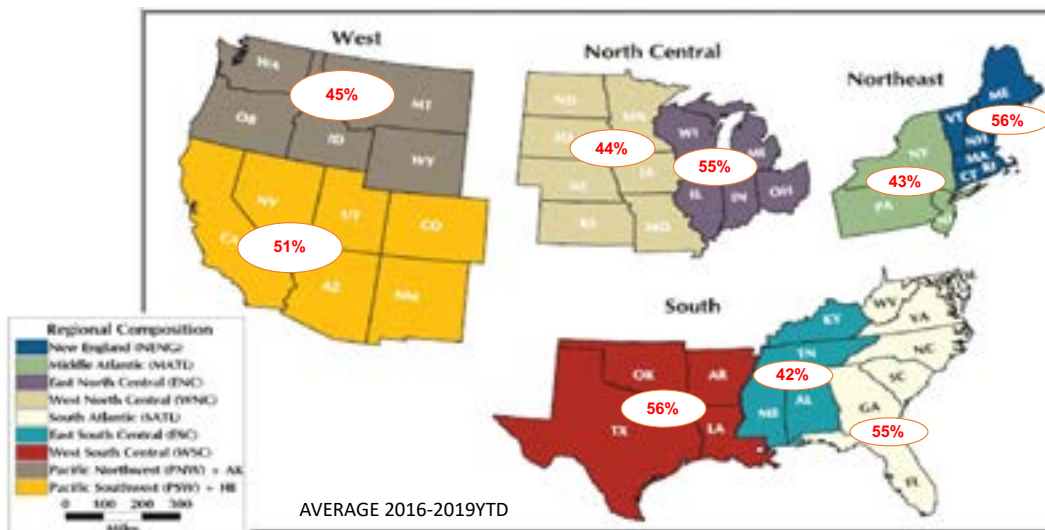
would all like to know the answer to is -- how often do these specifications result in a FM 4991 or UL QFCP Contractor performing firestopping on a project? Because of the way the database analysis was structured, this question was outside of the scope of our research. However, we were left more curious than ever - how did these projects get bought out? Was it the 'He or She who Pokes the Hole, Fills the Hole' method of firestopping or a Single Source Contractor?

We know that the FM 4991 and UL QFCP Programs mean that an organization that specializes in firestopping - is - in fact, installing firestopping on projects where these programs are bought. We know that both the FM and UL-ULC programs are growing and that our fellow FCIA members find tremendous value in both programs. We hear that on the projects where these programs are specified, that FM 4991 Approved and UL -ULC Qualified Firestop Contractors are successfully getting projects. But we also hear about times when the specs are not held. How often is this happening? We have an idea anecdotally, but we don't know the actual statistics yet.

These are the kind of questions we hope to tackle in follow up discussions and future research initiatives. We welcome reader's thoughts and comments on these results and this project, including ways we can use the data in everyday and long-term industry planning. As with any study, we know there are limitations to the research we were able to do, and that there are opportunities for improvement and to add additional parameters to future research.

Thanks to FCIA's Accreditation and Marketing Committees for all their work gathering this valuable industry information. We feel confident in the results we were able to garner and look forward to gathering additional data through future research initiatives. Don't miss FCIA's Education and Committee Action Conference in Kansas City May 11-14 and attend the session on "How Specs Get Broken and Held". 🔥

*Aideen Doneski is Executive Vice President at Gleeson Powers, Inc. and a member of FCIA's Marketing Committee. She can be reached at Aideen@GPI-Firestop.com. Ben Urcavich is President of Performance Firestop, Inc., current FCIA President, and can be reached at ben@performance-firestop.com.*



## FM/UL CONTRACTOR SPECS

### PROJECTS OVER 10M BY REGION



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## FIRE-RESISTANCE AND FIREPROOFING

**T**he objective of structural fire-resistance is to keep the building standing during fire exposure and limit fire spread to the area or room of origin.

Structural fireproofing is important to educational occupancies, as they are in other occupancies. In Chicago for instance, a 1-hour fire-resistance-rated corridor is required in the new 2018 adoption of the International Building Code. The defined term for this wall is a fire barrier. Fire barriers require that the supporting construction - horizontal assembly, columns and beams - be equal to or greater than the wall it supports. The supporting construction can be built of many items. If it is steel construction, it needs some type of fireproofing applied to maintain structural integrity for the time period assigned. For fireproofing, there is a science behind what looks like an easy paint job.

### FIRE-RESISTANCE

Fire-resistance starts with a fire resistance-rated-assembly. According to the International Building Code's Chapter 7, Fire-Resistance-Ratings can be determined through tests in conformance with UL 263, *Standard for Fire Tests of Building Construction Materials* or ASTM E 119, *Standard Test Methods for Fire Tests of Building Construction and Materials*. These tests provide a standard fire exposure to restrained and unrestrained assemblies, beams and horizontal assemblies with a load applied and columns as well. In Canada, the test standard referenced is CAN-ULC S101, *Standard Methods of Fire Endurance Tests of Building Construction and Materials*.



Spray fire resistive materials. Wohl Photo

The ASTM E119, ULC-S101 and UL263 standards are used to fire-test horizontal assemblies, columns and beams for structural fire-resistance. The listings answer the question, "what do we need to do to get a "X" hour fire-resistance-rating for the beam, column or horizontal assembly?". After testing, the laboratories publish listings in directories. More on that later.

In order to gain a fire-resistance-rating for steel or other materials in a building, the fireproofing needs to be applied as it was tested in every way. Fireproofing is much more than applying the spray or paint-like product. It's about application of the specific products to the listing and manufacturer's installation instructions that results in a fire-resistance-rated building element or assembly.

### FIRE TESTING

In the fire-test standards the furnace temperature rises based on a standard "time and temperature curve". The fire-exposure used in the furnace represents a cellulosic-type fire. The cellulosic fire represents the combustibles expected to be in the building that would provide fuel to the fire. All products that become fireproofing are subjected to this same test to see if the materials will protect the steel for the time-period - in minutes or hours - required by the building codes. Temperatures in the furnace start at zero, move to about 1,000°F at 10 minutes, and 1700°F after 2 hours.



UL Wall Fire-Resistance Testing Furnace, Rosenheim, Germany. FCIA Photo

Fireproofing is critical to protecting steel (or other types of building elements or assemblies) from reaching the temperature at which it will lose its structural loading capabilities. When load resistance is lost due to heat, the steel can warp and sag causing connections to possibly break and fall, resulting in progressive collapse of the building.

There are many types of products used to treat structural assemblies to bring fire-resistance properties to building elements like bare steel. The products can be grouped into categories:



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## SFRM

Spray Fire-Resistive Materials, SFRM, is supplied in bags and mixed at the project site. The products are either a cementitious or fibrous type, spray applied to coat the steel at thicknesses as shown in the fire-resistance design listings from a test laboratory.

SFRM's are sprayed onto beams, columns, floors, roof decks and other assemblies to provide an hourly fire-resistance-rating to the assembly. This helps keep the building standing during fire conditions. The cementitious materials use the latent moisture in the fireproofing to protect the steel or concrete building element from overheating and losing its structural loading capability. The fibrous materials use their high temperature insulating properties to perform the same actions.



Martin Bros. Photo



Raymond Group Photo

SFRM's are applied to steel to keep temperatures under the steel's softening point.

## IFRM

Intumescent Fire-Resistive Material, IFRM, is supplied in a liquid form and sprayed, brushed or rolled on to an assembly. Many call these products coatings or paints. While they might look like paint, they are actually very complex fireproofing products. These products have an intumescent agent in the liquid matrix that stays in the fireproofing quietly until activated. When heated using the ASTM E 119/UL 263 furnace fire-test conditions described above, the IFRM activates and expands several times its original state providing an insulating char. The char then protects the steel from heat transfer.

The IFRM insulative char is critical to protecting steel and keeping it from reaching the temperature at which it will lose its structural loading capabilities. When load resistance is lost due to heat, the steel can warp and sag causing connections to possibly break and floors to fall onto each other, resulting in progressive collapse of the building.



IFRM on a column in New York. Wohl Photo



IFRM exposed in Lobby Carboline, K Building Specialties Photo

There are many differences between paint and fireproofing. IFRM Fireproofing needs to be installed to a listed system design from a laboratory directory. Minimum and maximum thicknesses need to be controlled or the product might not perform as intended. Too much IFRM and the material might not stay adhered to the substrate. Too thin an application and the fire-resistance rating is compromised.

Paint might be thinned. IFRM Fireproofing can't be thinned.

## BOARDS & ENDOTHERMIC WRAPS

There are many types of boards that are used to surround beams, columns and horizontal assemblies using various methods. Whether Type X or Type C Gypsum Wallboard, Calcium Silicate Board, Mineral Wool Boards, or Endothermic Wraps, the products can also be used to protect structural building elements and assemblies. The boards use latent moisture in the product to protect for a period of time.

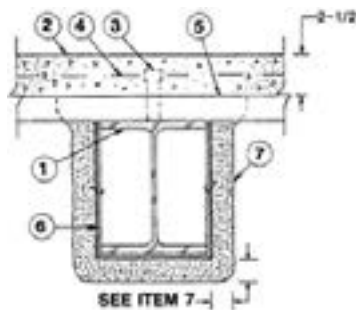
## LISTINGS ARE CRITICAL

It is critical for the IFRM and SFRM fireproofing installation contractor to follow the fire-resistance system design listing from the FM Approvals Guide, Intertek Directory or UL Fire-Resistance Directory and the specific manufacturer's installation instructions. By following both, the material applied to the correct size and type of beam, column or horizontal assembly is deemed as fireproofing and fire-resistance is accomplished, protecting buildings and people in them as they egress during fire conditions or events.

Structural fire-resistance using Fireproofing proves its resistance ratings when tested and listed based the ASTM E 119, ULC-S101, and UL 263 test standards. Fire-resistance-rated SFRM and IFRM installations look easy. But, it's not.

Fire-resistance-rated construction is actually a very complex assembly with specific listings from the UL Fire-Resistance Directory at UL's Product iQ, <https://iq.ulprospector.com/en/>, the FM Approval Guide [www.ApprovalGuide.com](http://www.ApprovalGuide.com), or other directory.

The partial listing below illustrates some of the complexity when it comes to fireproofing. After the image would be one to several pages of text describing all the elements of the listed system design.



UL Image of UL Design No. N738. Do not use without referencing the complete listing at <https://iq.ulprospector.com/en/profile?e=14439>.

Note that there is specific instruction for applying the product to the beam, with limitations stated in the design and manufacturer's installation instructions. The beam is limited to a W8x28 minimum size, with a matrix as part of the design describing restrained and unrestrained beams, and with the fireproofing thicknesses varying based on hourly fire-resistance-rating and restraint type.

(Continued on page 19)

# A'20

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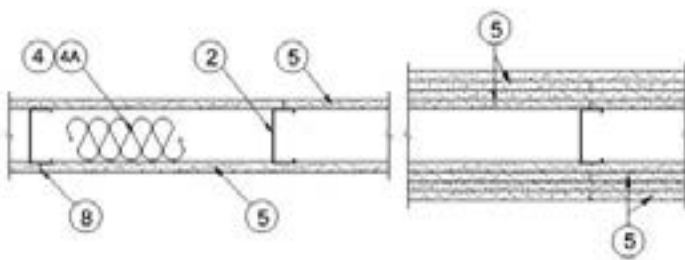


# ARCHAIC ASSEMBLIES & FIRE-RESISTANCE/ FIRESTOPPING

**E**ducation systems throughout the world are a mix of old and new buildings, and combination old/new buildings. In existing buildings, there are tested and listed horizontal floor/ceiling and vertical wall assemblies. These assemblies are listed in directories such as the UL Product iQ database.

Selecting and analyzing wall and horizontal assemblies is like firestop systems. In fire-resistance-rated assemblies used in educational and other occupancies fire-resistance testing exposes the assembly to fire for a specified period of time. There is a temperature rise limit on the side of the wall unexposed to the fire, and a hose stream test administered at test conclusion. The hose stream test is strictly for impact testing after the fire has occurred, simulating ceilings, light fixtures, and other items falling and hitting the wall. A breach of the assembly on the unexposed side constitutes failure of the assembly. The hose stream test is for the wall only. It is also used for the features of fire-resistance such as doors, firestop systems, fire-dampers, and much more. The result of fire-resistance testing is a listing - as shown in Design No. U419, and thousands of other assemblies.

**Design No. U419**  
**September 13, 2019**  
**Nonbearing Wall Ratings – 1, 2, 3 or 4 Hr**  
**(See Items 4 & 5 through 5K)**



\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

*UL Listed Wall Assemblies are published in UL's Product iQ Database. Refer to listing for complete information.*

*Reprinted from the Online Certifications Directory with permission from UL.*

There are assemblies that have fire-resistance-ratings determined by codes, calculations and other organizations such as the US Housing and Urban Development.

Some assemblies might be known as 'archaic assemblies'. These assemblies might have been declared hourly fire-resistance-rated through testing 75-100 years ago, but are not listed in the UL, FM Approvals [www.ApprovalGuide.com](http://www.ApprovalGuide.com) database, or Intertek Directory.



*FM's ApprovalGuide.com website has firestopping and many other products tested for performance. FM Approvals Image*



*UL's Product iQ website has listings for walls, floors, and those disciplines that protect breaches such as firestop systems, fire doors, fire dampers and more. UL Image*

These assemblies could be concrete, concrete block, clay tile block, gypsum block, lath and plaster, etc.

When firestopping breaches in fire-resistance-rated assemblies at an older educational (or other type) building, a listing cannot be found for the wall or floor that is part of the firestop system. Tested and listed firestop systems typically use concrete block of various thicknesses, gypsum wallboard, combination wood/gypsum floor-ceiling assemblies, or concrete as the assembly material. If the material in the



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## UL's Firestop Special Inspection Service

The proper installation of critical life safety systems helps protect buildings and their occupants against the spread of fire, heat, smoke and toxic gases should a fire occur.

A UL Firestop Inspection assists building owners in compliance with Section 1705 of the 2012 and later editions of the International Building Code. Using ASTM Standards E2393 and E2471 for special inspections of joints and firestop systems, this service can help your contractors use the correct systems and check that those systems are properly installed.



Contact us at [Fire.Inspection@ul.com](mailto:Fire.Inspection@ul.com) or at [UL.com/firestop](http://UL.com/firestop).

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existing building is made of gypsum block or clay block, there seem to be no tested and listed firestop systems available in the public directories. Therefore, the archaic assembly is not part of a tested and listed firestop system.



*Gypsum Block Assembly, with firestopping.  
C. Zussman, Pepper Constr. Photo*



*Gypsum block and clay tile wall assemblies have fire-resistance-  
ratings. C. Zussman, Pepper Constr. Photo*



*Clay tile and concrete horizontal assembly. C. Zussman,  
Pepper Constr. Photo*

Because the archaic assembly is not part of a tested and listed firestop system, Engineering Judgements (EJ's) or Equivalent Fire-Resistance- Rated Assemblies (EFRRAs) are required whenever such an assembly is encountered in firestopping. The reason is because there is no listing that encompasses the specific archaic fire-resistance-rated assembly.

## **FCIA'S LEADERSHIP HAS ASKED THE QUESTION, 'WHY IS AN EJ/EFRA' REQUIRED?**

In discussions in early 2019, FCIA's Standards Committee brainstormed key points about how to reduce the number of EJ's using 'Archaic Assemblies' as a possibility. In November, FCIA's Standards Chairs and Board of Directors met with the firestop product manufacturers to see if they would eliminate the requirement for EJ/EFRRAs and sanction the archaic assembly as equal to a listed assembly. We had a good discussion and made some progress, but more research is required on their part. This substitution of a tested and listed assembly for an archaic assembly is not allowed.

## **FURTHER FCIA ANALYSIS**

Many archaic assemblies used in older existing buildings are listed in Chapter 7, section 721 and 722 of the 2018 International Building Code (IBC). Archaic assemblies are also included in the US National Bureau of Standards document BMS92, Fire Resistance of Structural Clay Tile Partitions BMS113, Fire Tests of Brick Walls (Building materials and Structures Report 143) , Fire Resistance of Hollow Load Bearing Wall Tile, and the US Housing and Urban Development (HUD) document, "Guideline on Fire Ratings of Archaic Materials and Assemblies". The fire-resistance-ratings of these assemblies with minimum thicknesses, type of aggregate, etc., are stated in several different documents.

## **FCIA'S REQUEST**

With fire-testing and ratings shown in referenced documents, FCIA's Firestop Contractors have requested that the industry - firestop manufacturers, the testing laboratories, and / or others - conclude about the use of firestopping in these assemblies, without an EJ/EFRA.

We hope the firestop product manufacturers and testing laboratories agree on a formula for firestop installation contractors to use to allow systems tested with fire-resistance-rated gypsum wallboard assemblies to be used on plaster fire-resistance-rated assemblies. This would be only allowed with enough depth of wall to install the firestop products to the assembly tested and listed assembly. Acceptable fastener charts for the various assemblies and devices could be specified by the firestop manufacturer as well.

What about other assemblies? Would gypsum block or clay tile block be treated like a concrete block assembly? There are many documents that a design professional can use to document fire-resistance-ratings. Once documented, the firestop contractor could then select a tested and listed firestop system to maintain the fire-resistance of the assembly at the breach where penetrating item(s) or joint(s) exist - without an EJ/EFRA.

However, we need the firestop manufacturers, testing laboratories, and other authorities familiar with the testing and fire performance of the materials and assemblies, to declare that this is an appropriate practice. From the firestop installation contractor's perspective, once the building owner identifies the substrate and fire-resistance-ratings through their existing Life Safety Drawings, the rating has been declared.



Concrete block assemblies for walls, shafts, can be found listed in the U900 series designs in the UL Product iQ Database.  
C. Zussman, Pepper Constr. Photo.

Why try to reduce the number of EJ/EFRRAs required for archaic assemblies? It would reduce the workload on the firestop contractors that adhere to the rules of firestopping. The rules of firestopping dictate that if there's ANY deviation from the tested and listed system, they seek an EJ/EFRA from the firestop product manufacturer. Reducing the number of EJ's takes some load off the manufacturers technical personnel so they can invest in more testing to provide safer buildings through innovations.

For now, FCIA continues to recommend that firestop installation contractors work with their manufacturer partners to come up with the right EJ/EFRA to fit the 'archaic construction'. Rest assured, FCIA's Standards Committee is working on this key topic.

Want to learn more? Check out FCIA's Archaic Assembly Resource area at [FCIA.org](http://FCIA.org), Members Only. 🔥

(Continued from page 14)

The listings are what determines how much fireproofing material is required to protect the steel. There is no formula used to determine thickness of fireproofing to provide fire-resistance ratings. The basic concept is that the restrained building elements require less fireproofing than unrestrained elements. And, the amount of fireproofing required can change based on the heated perimeter size of the steel.

When properly designed, installed, inspected and maintained, fire-resistance-rated construction provides safe buildings for people and property to be protected. It takes a fireproofing installation contractor that understands the advantages and limitations of the products and their listings, as well as manufacturers' installation instructions, to get this done right. NFCA Member, NFCA Accredited SFRM and or IFRM Contractors have this 'listing' mentality as part of their everyday operations. Join NFCA to learn from the best fireproofing instructors to get your company accredited. 🔥

*Paul Steele Sr. Estimator at the Raymond Group and a NFCA Past-President. He can be reached at [PaulS@Raymondgroup.com](mailto:PaulS@Raymondgroup.com). Martin Rodriguez is Superintendent at Martin Brothers, Inc., and is Vice President at NFCA. He can be reached at [MartinR@martinbros.net](mailto:MartinR@martinbros.net). Reach the National Fireproofing Contractors Association (NFCA) at [info@nfca-online.org](mailto:info@nfca-online.org).*

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# BRIGHT IDEAS



## 3M LAUNCHES NEW ONLINE TOOL FOR PASSIVE FIRE PROTECTION SYSTEMS

3M Fire Protection Products recently introduced an improved System Selector and Submittal Wizard. The mobile-friendly, free online tool offers multiple features, including newly available PDFs for download that feature compilations of all UL systems, all designed to increase efficiency for contractors, architects, and building officials when reviewing systems applications for installing, specifying, and inspecting firestop products.

The System Selector features a wide-range of categories and attributes, allowing users to quickly navigate 3M's extensive library of tested and listed systems and determine which option is best-suited and can be evaluated for their specific applications. In addition to being able to quickly select the appropriate systems using the System Selector, the user can also compile these systems into one package using the Submittal Wizard.

For more information on the new Fire Protection System Selector and Submittal Wizard, please visit <https://submittalwizard.3m.com/>.

## ALBION RELEASES CAULK TOOLING SPATULAS...WITH A TWIST!

Albion recently introduced a new line of Caulk Tooling Spatulas with an offset between the blade and handle. Designed to protect a user's knuckles on deep and rough substrates joints, the spatula handles are raised or offset from the blade to provide better hand clearance from the substrate and improve visibility for the user during the critical tooling phase of installing wet sealants.

These seven new tools are a nod to their popular model 258 Classic hardwood handle caulk spatulas. With tips ranging in width from 3/8" to 1-1/2" and stainless-steel blades, these tools can handle all variety of joint sealing situations found in the field. Additionally, they are unaffected by solvents, which means easy clean-up.

Visit [www.albioneng.com](http://www.albioneng.com) to see their complete line of caulk tooling solutions.



## RUSKIN® EXPRESS EXPANDED TO OFFER SAME-DAY BUILD-AND-SHIP

Ruskin® has expanded its Ruskin® Express program to offer same-day build-and-ship for Ruskin® products. Orders received by 12 p.m. CST will be shipped the same day.

With six North American production facilities, Ruskin® provides express delivery across North America. Additional express production options include next day, 72-hour, 5-day, 7-day and 10-day delivery. The Ruskin® Express program is available through local representatives across North America. For more information about Ruskin®, visit [www.ruskin.com](http://www.ruskin.com).

# CODES AND STANDARDS NEWS

## NFPA 101/5000 DEVELOPMENT PROCESS

According to NFPA, The Life Safety Code is the most widely used source for strategies to protect people based on building construction, protection, and occupancy features that minimize the effects of fire and related hazards. Unique in the field, it is the only document that covers life safety in both new and existing structures.

The final stages of the 2021 Life Safety Code are underway. The second draft has been reviewed, with the Notice of Intent to Make a Motion (NITMAM's) deadline already passed, where they will be heard at the NFPA Technical Meetings this June in Orlando.

There were several changes submitted for the firestopping and fireproofing industries. In firestopping, a section in Chapter 8 now states that "firestop materials shall be installed to the listed designs and manufacturers installation instructions", tying the two together in the code.

In Fireproofing, a section will be added to the appendix section bringing attention to the material manufacturers' installation instructions and the tested and listed systems from the various directories, UL, FM Approvals, Intertek, etc. Visit [www.NFPA.org](http://www.NFPA.org) for info.



NFPA Image

## ICC STRATEGIC PLAN REVISITED



The International Code Council (ICC) has grown significantly over the past 10 years without losing its roots in code development and serving its members. A new 2025 Vision plan was developed through a thorough process and incorporates contributions from staff, members, partners, the Board of Directors and past presiding officers.

"We plan to build upon our strengths and work together with all stakeholders to achieve our fullest potential as an association. Vision 2025 allows us to assess the effectiveness of our work and manifest

our goals into reality", states ICC's President William Bryant and CEO Dominic Sims.

- Four key items are part of the plan, available at [ICCSafe.org](http://ICCSafe.org) :
1. Fortify the Code Council's mission, brand and public awareness.
  2. Increase value for members and the building safety community.
  3. Ensure financial sustainability and growth.
  4. Assess the organizational structure.

It's clear through these objectives the ICC plans to keep the organization vibrant and forward looking. Congrats to all involved.

## ICC GROUP B PRELIMINARY RESULTS AVAILABLE.

The 2019 Group B Online Governmental Consensus Vote was conducted November 19th through December 6th. Preliminary results are available at ICC's Code Development website, [www.CDPACCESS.com](http://www.CDPACCESS.com). These results contain only the preliminary action

on the Group B changes - including changes heard by the IBC's Structural, and Energy Conservation Code Committees. Publication of the documents is scheduled this summer, 2020.



## ICC CODE DEVELOPMENT CYCLE STARTS NEXT YEAR

Since 2020 is an off year for the International Code Council's Code Development Cycle, there's not much to report on. Code proposals for the International Family of Codes are due in early

January 2021. FCIA's Code Committee will be meeting over the next several months to determine what FCIA's Code Proposals will be.

## FIRE-RESISTANCE AND BARRIER MANAGEMENT

As part of the 2018 International Fire Code, FCIA's Code Committee and consultant Bill Koffel, Koffel Associates, added the term 'Inventory' identifying fire-resistance-rated and smoke-resistant construction in buildings. The 'Inventory' is the product and assembly manufacturers installation instructions and tested and listed systems. If there is no fire-resistance or smoke-resistant

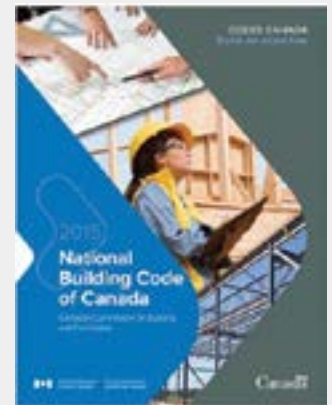
'Barrier Inventory', how is the building owner or owner's agent to determine if the barriers are free from breaches? Installed correctly?

Look for more about this concept in future issues of *Life Safety Digest*. Need a contractor to look at your barriers? Visit FCIA's Barrier Management Services Section of [www.fcia.org](http://www.fcia.org)

## NBCC 2020 WRAPPING UP

With final comments to change the 2015 version into the 2020 National Building Code of Canada (NBCC) due March 13, the final steps towards the new code are moving along. The National Building Code of Canada code development process is managed by the Canadian Commission on Building and Fire Codes, part of the National Research Council of Canada, a governmental organization. The NRC's CCBFC consensus process works through committees, organized by discipline.

There were quite a few fire-resistance proposals that worked their way through the process. Both the firestop and fireproofing industries had key proposals that attempted to add independent inspection by a 3rd party to the NBCC. Watch for more on the NBCC 2020 in future issues of *Life Safety Digest*. 🔥



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# INDUSTRY NEWS

## FCIA'S EDUCATION AND COMMITTEE ACTION CONFERENCE (PLACE ECA LOGO IN BEST FIT)



Head to Kansas City, MO May 11-14 for FCIA's ECA '20, the FCIA Education & Committee Action (ECA) Conference.

FCIA's ECA '20 is a three-and-a-half-day event focused on educating and engaging the firestop & effective compartmentation industry.

Filled with technical industry education, FCIA Education for and the FM & UL-ULC Firestop Exams, the FCIA Committee round table meetings, and various networking events, FCIA's ECA '20 is the ideal opportunity to

expand your knowledge and contribute to the development of the firestop industry.

**Note: This year's event has a Monday-Thursday pattern.**

FCIA Education for the FM & UL-ULC Firestop Exams take place Monday afternoon, May 11. The FM & UL-ULC Firestop Exams are Tuesday morning, May 12, followed by the FCIA ECA '20 opening events that afternoon. The Conference wraps up at noon on Thursday, May 14.

Hone your firestop and barrier management services expertise with FCIA this May 11-14 at the InterContinental Kansas City at the Plaza in Kansas City, MO. FCIA ECA '20 Inform. Engage. Inspire.

## FCIA @ ASTM



FCIA's Executive Director, Bill McHugh, is the chair of the ASTM E 2174 and ASTM E 2393 Firestop Inspection Standards Task Groups. As Task Group Chair, he submits ballots on behalf of, and that have been approved by, the Task Group, and reviewed by the Subcommittee Chair to the voting process.

Several proposals were submitted to harmonize requirements in ASTM E 2393 Standard Practice for the On-Site Inspection

of Fire-Resistive Joint Systems with ASTM E 2174, Standard Practice for the On-Site Inspection of Installed Firestops. While we recognize there are differences between penetrations and joints, there are many common elements that should be the same.

The FCIA Standards Committee Chair, Jay McGuire, and Bill McHugh attend ASTM Committee Meetings every six months. The first meeting of 2020 is in Boston, March 29-April 1, 2020. Watch for more on what happened there in the April/May newsletter.

## NEW ASTM LABEL STANDARD DEVELOPMENT

FCIA's Standards Chair Jay McGuire will be the new Chair at ASTM's new Task Group on Identification Systems - Labelling

- for both penetration and joint firestop systems. The new task group meets in early April.

## FCIA WEBINARS

FCIA's webinars are a great way to earn Learning Units (LUs) for CEUs required by various organizations including UL, FM Approvals, and other licensing bodies.

Earlier this year, FCIA's deep dive into the 'DIIM' concept and systems analysis saw almost 200 attendees tuned-in for the session. The engaged group brought great questions from the audience as the program was being delivered. Don't miss

these sessions that cover Firestopping, Fire-resistance-rated assemblies and smoke-resistant construction assemblies. We keep the questions and answers going sometimes long after the initial session is complete.



## FCIA FRIENDS RETIRE AND...



Rich Walke



Jeff Gould

At FIC '19, the FCIA Firestop Industry Conference and Trade Show in Miami, both FM's Jeff Gould and UL's Rich Walke were honored with Honorary Membership Status as they were retiring. FCIA's partnership with both men has spanned years. The work we've accomplished together has helped to develop and shape the industry. We appreciate the long-term partnership with both these professionals.

And...Rich Walke is now working with FCIA for some critical assignments. It's great to have Rich onboard continuing to partner with FCIA. All at FCIA look forward to continuing the partnership with him.

## BARRIER MANAGEMENT VIDEOS ONLINE NOW!

FCIA worked with The Joint Commission, the American Society for Healthcare Engineering, and UL to develop and deliver the Barrier Management Symposium. Part of the mission of this initiative was to provide a 'compendium of knowledge'. That compendium is a key part of FCIA's initiative to educate about the details required to construct, install, inspect, and manage fire-resistance-rated and smoke-resistant assemblies. FCIA's Barrier Management Services section is a result of this effort. Check out the videos from FCIA's Events page, go to Barrier Management Symposiums.



Included on the videos are presentations broken into 20 minute segments from The Joint Commission and ASHE on the importance of barriers, the code requirements, testing and

listings of the assemblies to protect people, understanding how to repair fire-resistance-rated gypsum wallboard assemblies, fire, smoke and fire/smoke dampers, fire doors and builders hardware, fire-rated glazing, and of course, firestopping. It's a complete package all in one place.

## FIRE-RATED GLASS & FRAMING

The fire-rated glass industry manufacturers have several articles on the technical nature of their industries. Check out [www.Safti.com](http://www.Safti.com), [www.fireglass.com](http://www.fireglass.com), [us.schott.com](http://us.schott.com) for information about how the glass and framing come together as a system. UL's fire-resistance directory at the UL Product iQ has listings for fire-rated glazing in the section for walls, floors,

beams and columns, tested to UL263, *Standard for Fire Tests of Building Construction and Materials* or ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*. It's important the listings are followed to gain true fire-resistance.

## FIREPROOFING INDUSTRY MEETS IN AUSTIN, TX

The National Fireproofing Contractors Association (NFCA) has their Annual Fireproofing Education Conference coming up in Austin, April 15-17 with keynote speakers Charlie Carter, CEO of the American Institute of Steel Construction, on the new faster way to build steel buildings and Dr. Ali Morovat of Thornton Tomasetti, on the issues of Restrained/Unrestrained

fire-resistance ratings.

April 13-15, NFCA offers IFRM SFRM Fireproofing Education and Exams for Special Inspectors and NFCA DRI Contractor Accreditation Program. Questions? Contact [info@nfca-online.org](mailto:info@nfca-online.org)

## ANNUAL FIRE DOOR INSPECTION DHI'S SPRING SCHOOL

In educational occupancies, fire doors provide compartmentation to protect people in buildings. NFPA 80, *Standard for Fire Doors and Other Opening Protectives*, is a referenced standard in the International Fire Code. NFPA 80 states that the individual inspecting fire doors must have knowledge about fire door inspections. Knowledge is proven

through education and exams. The Door & Hardware Institute classes kick off in Lansdowne, VA April 19. Check out their Fire and Egress Door Assembly Inspection class April 23-26 if you are interested in fire door inspections - and proving knowledge. [www.DHI.org](http://www.DHI.org) 🔥

# FCIA INDUSTRY CALENDAR

## MARCH

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### March 9-12

Association of General Contractors  
Annual Convention  
Las Vegas, NV  
[www.AGC.org](http://www.AGC.org)

### March 22-25

ASHE Planning Design & Construction  
Summit and Exhibition  
San Antonio, TX  
[www.ASHE.org](http://www.ASHE.org)

### March 22-26

AWCI Annual Convention & INTEX Expo  
Las Vegas, NV  
[www.AWCI.org](http://www.AWCI.org)

## APRIL

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### April 6-9

Building Innovation 2020 Conference  
& Expo  
Arlington, VA  
[www.buildinginnovation.org](http://www.buildinginnovation.org)

### April 13-17

NFCA Annual Conference & CAP  
Training  
Austin, TX  
[www.nfca-online.org](http://www.nfca-online.org)

### April 14-16

International Facility Managers  
Association (IFMA) Facility Fusion  
San Francisco, CA  
[www.facilityfusion.ifma.org](http://www.facilityfusion.ifma.org)

## MAY

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### May 11-14

FCIA ECA '20 - Education and  
Committee Action Conference  
Kansas City, MO  
[www.fcia.org](http://www.fcia.org)

### May 14-16

AIA Conference on Architecture  
Los Angeles, CA  
[www.conferenceonarchitecture.com](http://www.conferenceonarchitecture.com)

### May 20-24

Construction Specifications Canada  
Conference  
Montreal, QC  
[www.CSC-DCC.ca](http://www.CSC-DCC.ca)

## JUNE

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### June 2-4

FCIA Fire Code and Fire & Smoke  
Barrier 'DIIM' Symposium  
FM & UL Firestop Exams  
Doha, Qatar  
[www.FCIA.org](http://www.FCIA.org)

### June 3-7

RAIC 2020 Conference on Architecture  
Edmonton, AB  
[www.raic.org](http://www.raic.org)

### June 7-9

FCIA Fire Code and Firestop & Effective  
Compartmentation Membership  
Meeting  
FM & UL Firestop Exams  
Dubai, UAE  
[www.FCIA.org](http://www.FCIA.org)

### June 15-18

NFPA Conference & Expo  
Orlando, FL  
[www.NFPA.org](http://www.NFPA.org)

### June 27-30

BOMA International Conference & Expo  
Philadelphia, PA  
[www.BOMA.org](http://www.BOMA.org)

## JULY

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### July 27-29

NASFM Annual Conference  
Stowe, VT  
[www.firemarshals.org](http://www.firemarshals.org)  
Cleveland, OH  
[www.DHI.org](http://www.DHI.org)

## AUGUST

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### August 1-3

APPA Annual Conference and  
Exhibition  
Boston, MA  
[www.appa.org](http://www.appa.org)

### August 2-5

ASHE Annual Conference and Technical  
Exhibition  
Chicago, IL  
[www.ASHE.org](http://www.ASHE.org)

## SEPTEMBER

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### September 20-22

Canadian Healthcare Engineering  
Society (CHES) Annual Conference  
Halifax, NS  
[www.ches.org](http://www.ches.org)

### September 23-25

FCIA 'DIIM' Symposium Canada  
Halifax, NS  
[www.fcia.org](http://www.fcia.org)

### September 30-October 2

CSI CONSTRUCT Expo  
Grapevine, TX  
[www.constructshow.com](http://www.constructshow.com)

### September 30-October 2

International Facility Managers  
Association (IFMA) World Workplace  
Chicago, IL  
[www.worldworkplace.ifma.org](http://www.worldworkplace.ifma.org)

## OCTOBER

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### October 11-12

ICC Annual Conference and Building  
Safety & Design Expo  
St. Louis, MO  
[www.ICCSAFE.org](http://www.ICCSAFE.org)

## NOVEMBER

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### November 10-13

FCIA FIC '20 - Firestop Industry  
Conference & Trade Show  
San Diego, CA  
[www.fcia.org](http://www.fcia.org)

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