

Life Safety DIGEST

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The Evolution of Fire and
Smoke Damper Testing,
Application, Inspection
and Maintenance

FCIA Project Profiles

Seven Questions Away

Testing - One, Two . . .





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Life Safety DIGEST

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On the Cover:

Whether it's Firestopping, Fire Dampers, Fire Doors, Fire Barriers, Fire Walls, Smoke Barriers, Smoke Partitions, Effective Compartmentation Components are important pieces to fire safety. Photos courtesy of Affinity Firestop Consultants, Specialty Firestop Systems, Multicon Fire Containment, Door and Hardware Institute.

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Editors' Message

Effective Compartmentation involves dividing large areas into 'boxes' (compartments) to contain fires to the room or area of origin until either automatic suppression holds the fire, firefighters extinguish the blaze, or it runs out of oxygen. The elements of Effective Compartmentation are fire, smoke or other resistance-rated floors and walls, with openings and penetrations protected by firestopping, fire and smoke dampers, swinging and rolling fire doors, and fire rated glazing systems. **Total Fire Protection** adds alarms, detection and suppression systems, coupled with education.

The Effective Compartmentation Initiative is catching on in Total Fire Protection. Compartmentation is being studied by government, building officials and fire marshals, contractors, architects and specifiers, to name a few. A large percentage of the office and education occupancy structures in the U.S. were built with compartmentation as the first line of defense, with detection, alarms and

suppression systems added later. This has produced the excellent fire safety record in buildings we currently enjoy. Removing any leg of total fire protection adds risk to life safety and property in buildings.

This issue focuses on installation and inspection of effective compartmentation. Read and enjoy articles about fire and smoke dampers, rolling fire doors, and project profiles about firestopping's importance in effective compartmentation.

Join the associations that support effective compartmentation and FCIA because, as a group, our education will establish fire and life with compartmentation as a key component. Effective Compartmentation saves lives.

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The Evolution of Fire and Smoke Damper Testing, Application, Inspection and Maintenance



Fire damper control devices are maintained to manufacturer instructions. (Photo courtesy of Ruskin)

By Rick Cravy

Increased knowledge of fire and smoke behavior has resulted in significant building design and construction changes. Fire and life safety considerations have become an integral part of the building design process. One issue that has provided impetus to some of these changes is the understanding of how the heating, ventilating and air conditioning (HVAC) system ductwork can act as a path for smoke, fire and heat to move through a building...and how to prevent it.

Many HVAC systems use dampers (fire, smoke, combination fire/smoke and ceiling) to close off the ductwork

to prevent smoke, fire and heat from spreading throughout the system and the building. This allows the occupants enough time to escape and helps contain the fire to a compartment, easing extinguishment of the fire.

One can make a case that dampers, in order to keep up with the increased knowledge of fire and smoke behavior, have undergone more significant changes than any other piece of fire, life safety equipment used in today's buildings.

Significant changes to dampers have been made in the area of testing (fire testing and inspection), application and maintenance. Testing changes have taken place in order to make sure systems perform as required in the event of a fire emergency. Most importantly, the dampers provide occupant and building protection. Proper application and in place testing is imperative to make sure fire and smoke damper protection is available for the many different fire and smoke design objectives.

Testing

There has been quite a bit written about the changes to Underwriters Laboratories Test Standards UL555 and UL555S. Some milestones include:

- 1968 - UL555 - First Edition published
- 1983 - UL555S - First Edition published
- 1990 - UL555 - 5th Edition published



Firestop may be installed, upon damper manufacturer approval. (Photo courtesy of Ruskin)

Dynamic Fire Dampers

Dynamic Fire Dampers developed as “fans on” systems became more common. A “fans on” system is one in which the fans continue to operate even when there is a fire alarm activation. An example of a “fans on” system is where the fans remain on to control smoke.

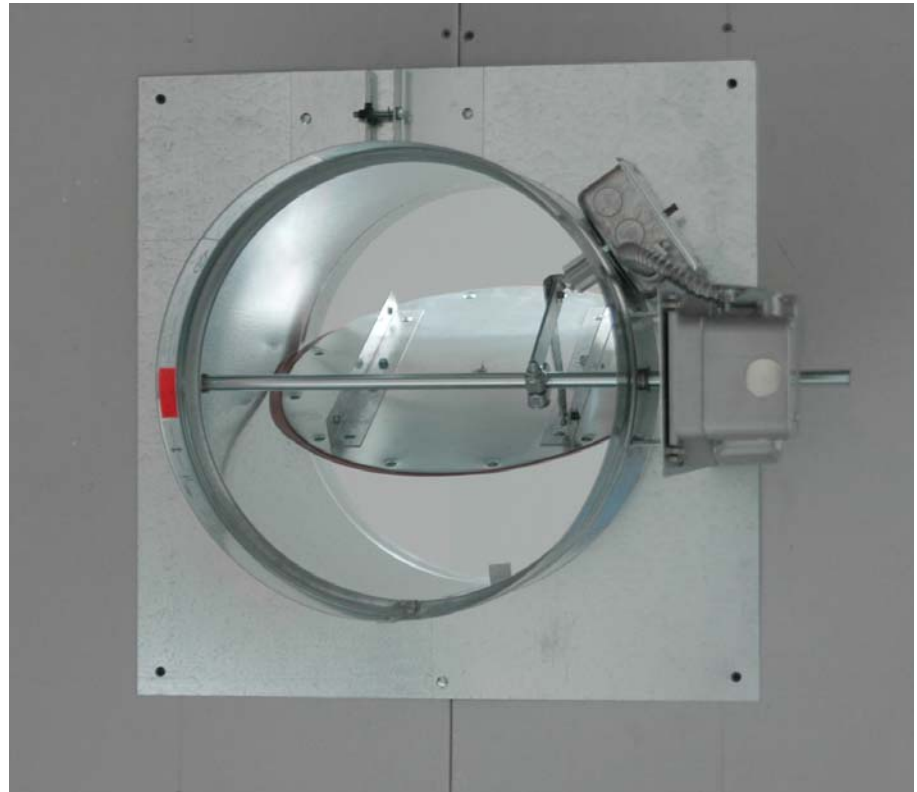
- 1999 - UL555 (6th Edition) and UL555S (4th Edition)

Heated Airflow Tests for Dynamic Fire Dampers and Smoke Dampers

When first introduced, dynamic fire dampers were not required to close against any specific minimum airflow. The Test Standards changed to require closure or operation against a minimum airflow of 2,400 ft per minute and pressure of 4.5 in. w.g. The airflow also has to be heated to a temperature that activates the heat responsive device (165° F or 212° F for fire dampers).

Cycle Tests

The original cycle test requirement for smoke dampers was 5,000 cycles. The latest requirement for two position (open/close) operation is 20,000 cycles. The increase in the cycle test has resulted in much more reliable damper assemblies.



Round fire dampers. (Photo courtesy of Ruskin)

Actuator Mounting

Actuators now are to be factory mounted securely in position. That was not always the case. Originally, the actuator could ship loose for field mounting which may have resulted in quality control problems.

Those are just a couple of the Test Standard milestones. The conclusion one can, and should, reach from the improvements to the Test Standards is that they have kept up with the increased knowledge of fire and smoke behavior in buildings.

Application, Inspection & Maintenance

Some of the significant changes in the area of application include:

- **Single retaining angle installation** - Until recently, all fire and fire smoke dampers required full perimeter retaining (mounting) angles on both sides of the wall. This made the installation difficult (especially in finished shaft wall applica-

tions) and costly. Single continuous retaining angle on one side of the wall, or on top of the floor, make the installation easier without compromising fire or life safety.

- **Firestop installation** - Another significant change is the ability to install fire and fire smoke dampers with firestop materials around the annular space between the wall and damper. The firestop materials can be installed around the mounting angles or in the gap between the damper sleeve and inside of the wall or floor opening. Consult manufacturers for documentation showing how the firestop materials were tested and listed in the specific damper construction.

- **Break-away sleeve to duct connections** - A lot of testing has been done with various add-on or roll form flange connections. The

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result is the installer can use any flange type and not worry about the damper remaining in the wall or floor if a fire causes the duct to fall down.

• **Out of the wall installations** -

Fire and fire smoke dampers can now be installed “out of the wall or floor.” For years, the installations were “UL Approved” only if the damper blades were in the wall or floor. That is no longer the case as there are dampers to accommodate installation “out of the wall or floor” by an additional 8 in. To accomplish the out of wall design, the damper sleeve is “wrapped” with a heat resistant material that extends the rating of the wall or floor to the damper, as specified by the manufacturer of the damper. Out of the wall or floor installations mean fire life safety does not need to be compromised when “hidden” items like piping, other ductwork, cables, etc. cause “problems” with a normal installation. Out of the wall or floor dampers make just about any application possible; they also make renovation of older buildings a lot easier.

• **Shaft wall installations** - Shaft wall applications with grilles have always been difficult with respect to access of the actuator and control components on a fire smoke damper. Front access dampers have solved the access problems by making the actuator and control components accessible through the grille. No additional openings through the shaft wall for access to the actuator are needed.

• **“True round” fire and fire smoke dampers** - Before true round fire and fire/smoke dampers, there was the square to round enclosure that housed the damper. “True round” dampers cost less to install and perform better than their square



Rectangular fire damper (Photo courtesy of Ruskin)

to round counter parts. The “true round” fire smoke damper is a Leakage Class 1 damper and is the best performing life safety damper in the industry.

• **Maintenance** - Routine maintenance is a necessity to ensure the damper will perform as intended.

> • **Fire dampers** - Newer designs of fire dampers make dynamic curtain type fire dampers as easy to maintain (re-open after testing) as their static counterparts. Multi-blade dynamic fire dampers are easily re-opened, after testing, from outside the duct.

> • **Fire smoke dampers** - Fire smoke dampers require a regular cycling test. One manufacturer has developed a “system” that automates the cycling test and gives the operator a lot of flexibility regarding when the test is scheduled. The “system” can be interfaced with the Building Management System (BMS). It will

even track all the testing events so a report can be generated for the authority having jurisdiction.

Summary

These are just a few of the testing, application and maintenance highlights that support the premise that dampers have undergone more significant changes than any other piece of fire, life safety equipment used in today’s buildings. New fire and fire smoke damper designs have been introduced that give the designer and installer more flexibility without compromising fire life safety...keeping effective compartmentation a key part of protection. 🔥

Richard Cravy is Product Marketing Manager, RUSKIN Company, in Grandview, Mo. He can be reached at rcravy@ruskin.com

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Life Safety Digest Project Profiles From Pizza to Airplanes

Editor's note: Effective Compartmentation is an important discipline for fire and life safety. Fire and smoke resistance rated construction is continually penetrated for service items from plumbing, heating and air conditioning, electrical, communications and other piping and cable transmission systems. Firestopping is a small, but important part of effective compartmentation. This article features project profiles of Firestop Contractors International Association (FCIA) members with Florida operations.

The Town of Ave Maria

Domino's Pizza tycoon Tom Monaghan had a vision: Create an institute of Catholic higher education, which blossomed into a planned community and college town complete with residences, a university and shopping. Nestled in the \$240 million first phase of the campus is the "Oratory of Ave Maria," a 60,000-sq-ft church with aluminum and glass arches.

As the anchor of this 5,000-acre venture, the church was one of the first buildings Fire Containment Systems of Cape Coral, Fla. and an FCIA member since 2002, began firestopping in fall 2006. This nine-year-old firm is owned by president Lee Miller and vice president Mark Costello. They provided three- and four-man teams throughout the project to firestop the heating, ventilating and air conditioning (HVAC), plus plumbing penetrations using mostly Specified Technology, Inc., (STI) and 3M Fire Protection Products firestop systems throughout

the project. Both STI and 3M have been FCIA members since 1999.

Using silicone firestop sealants in penetrations and in combustibile penetrations with collars in the floors to combat moisture was a conscious choice by Fire Containment Systems. Silicone firestop systems are good choices for water resistance. However, Costello advises specifiers, architects and contractors to make certain the silicone is compatible with penetrating items, such as pipes and plastic drains before application.

As the project progressed, so did Fire Containment's scope. La Piazza, the Town Center, embraces the massive church like a giant horseshoe. They worked on six three-story condos over retail shopping units with 200,000 sq ft of space in La Piazza, again firestopping all HVAC and plumbing penetrations. The college dorms of this university were addressed next. The hollowcore concrete floors had many penetrations to firestop, with systems specifically designed for this type of concrete floor system.

Challenges

One of Fire Containment's biggest challenges was getting to this remote site. Ave Maria, the first town believed to be built around a university, is located approximately 20 miles east of Naples and five miles south of Immokalee on land donated by the Barron Collier Family in Collier County. Costello explains that employees parked at a central location and were bused on trucks and trolleys by the general contractor. "We didn't have any technical



Firestopping around penetrations, head of wall joints and perimeter joints keeps compartmentation working. (Photo courtesy of Fire Barrier Installations, Inc.)



Miami Airport firestopping is a continuous project. (Photo courtesy of Fire Barrier Installations, Inc.)



Labels used for identification of firestop system. (Photo courtesy of Fire Barrier Installations, Inc.)

FCIA Firestop Industry Conference & Trade Show **Nov. 7-9, 2007**



The Firestop Contractors International Association Firestop Industry Conference and Trade Show is the event for the Firestopping and Compartmentation Industry. Join

firestop contractors, inspectors, manufacturers and associates for timely education seminars. Specifiers, Architects, Building Officials and Fire Marshals are welcome to the Trade Show Thursday Afternoon.

FCIA Member Firestop Contractors have reported that both the new UL Qualified Firestop Contractor Program and FM 4991 Approved Contractor Programs require complete quality manuals for firestop contractor operations. Both FM & UL audit the firm based on these quality manuals, which outline the firms' firestop contractor quality policies and procedures. To meet contractor needs, FCIA is offering free of charge to members an education program to help develop quality manuals. Non members cost \$350 for this portion of the Conference. In

addition, UL & FM DRI Education occurs just before the UL and FM DRI Testing for DRI Candidates.

The FCIA Firestop Industry Conference & Trade Show seminars include Firestopping & Compartmentation, code strategies, Building Information Modeling, Legal and Specification Development issues, plus some real fun.

The Ray Usher Memorial Golf Outing to benefit firestopping and compartmentation education is featured Wednesday afternoon, plus a firestop and compartmentation trade show Thursday and Friday.

Join us at the Hollywood Beach Marriott, Hollywood, FL for this annual FCIA event. Visit <http://www.fcia.org> for details.

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 - Firestop Education Powerpoint CD's
 - FCIA Firestop Industry Manual of Practice (\$295 members)
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problems with the job, but it was a challenge getting to the site. Now, of course, the roads are completed and access is easy," he said.

Partnerships

The construction of this unprecedented community was an effective collaboration of all the trades. "Everyone worked very well together," Costello said. For instance, Scott Chaplin, Florida's territory manager for STI, was instrumental throughout the project. "We worked with Mark early in the project, critical for the progressive designs in the church that created interesting annular spaces on each side of the I-beams," he explained.

Miller and Costello were brought into the project through their long-term relationship with the HVAC and plumbing professionals. They expect their involvement to continue as the University grows to eventually accommodate 5,000 students.

From the Ground to the Air

For the past eight years, Fire Barrier Installations, based in Coral Springs, Fla. and an FCIA Member since 1999, has worked on the building and expansion of Miami International Airport (MIA). Additionally, Firestop Specialties, Inc., of Miami, and FCIA member since 1999 and Superl, Inc., of Fridley, Minn. and FCIA members since 1999, have worked at the project as well. Whether the firestopping was assigned to the many trades or through the general contractor/construction manager, most of it has been performed by a specialty firestop contractor.

MIA is the third-busiest airport with respect to international passengers and, in 2006, flew 32.5 million

people throughout the U.S. and around the world. To make this southern airport more passenger-friendly and to accommodate the growing airline industry, MIA has undertaken a \$6.2 billion capital improvement program adding 2.7 million sq ft of space expanding outdated terminal facilities. American Airlines uses MIA as its international hub, with 15 other domestic airlines plus 31 international airlines servicing the airport.

Fire Barrier was contracted through the mechanical, electrical and plumbing contractors (MEPs) to design and build all mechanical, electrical and plumbing penetration firestop systems throughout the main airport control tower, the Miami Port Authority airport warehousing, and Terminal J, which is still under construction. Additionally, ASTM E 2174 inspection method was specified and contracted with a third party independent inspector hired by the airport authority.

A Five-Step Process

The specialty firestop contracting firm, co-owned by Tracy Fields and Steve MacMillan, followed this five-step process:

1. Working with W.R. Grace & Co. (FCIA member since 2001) architectural representatives, they assisted specifiers and an international team of engineers and designers to assemble the products and firestop systems designs for piping, electrical and other penetrations.

2. This team approach continued with Grace's local architectural reps attending jobsite meetings with designers, on-site firestop inspectors and other trade contractors.

3. Firestop systems recommendations were submitted to the local field offices of the MEPs, construction managers, on-site inspection

teams and building departments.

4. Mock ups were installed complete with firestop system labels placed on piping for both wall and floor penetrations.

5. The full firestop systems installation then took place.

6. Inspection by independent firestop inspection firm was continuous.

Challenges

According to Fields, the most challenging element of the job is the rigorous field inspections performed by the third-party independent inspection required for the project. The company went through approximately three inspections for every penetration. Once the mineral wool was installed in the annular space, it needed to be inspected before they were sealed with firestop caulks. Twenty-eight days after installing the firestop system sealant, the penetration seals were checked for bond of the sealant to the substrates. Sixty days later they were inspected for shrinkage. "With this meticulous inspection schedule, we were assured of superior quality firestopping throughout the buildings, adding value to the effective compartmentation in the airport," added Fields.

For every firestopped penetration, Fire Barrier placed an informational label including the company name, phone number, Underwriters Laboratory (UL) system listing and the date the label was placed. "Since every penetration needed a label/marker, we installed about 20,000 labels," explained Fields.

Professionalism and Certification

Fire Barrier was initially contacted for the job more than eight years ago because of the company's certification in 11 different manufacturers' firestop



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systems. The firm is also FM 4991 Approved and is progressing through the UL Qualified Firestop Contractor program. "Not only does certification assure clients of a high-quality service, it brings us to the forefront when bidding jobs," said Fields. "Every trade involved at MIA had to reach this high level of professionalism to be included in the project."

The airport's Capital Improvement Program is an on-going project and so is Fire Barrier's firestopping expertise. They continue to work with W.R. Grace representatives and airport personnel to assure quality firestopping throughout MIA's several construction projects.


Firestop Specialties, Inc., of Miami, also participated in MIA projects performing penetration, head of wall and curtainwall firestopping for various trades on

Terminal J, the hotel renovation, and also at the south terminal. According to Mike Dominguez, Firestop Specialties, Inc. owner and FCIA 2007 president, "although not all firestopping was performed by a specialty firestop contractor, a large percentage was...which bode well for fire and life safety for those who walk through the terminal day in and day out."

Dominguez believes that firestopping installed by specialty firestop contractors' is a growing industry, and not just in Florida. "The FCIA has been increasing contractor membership surpassing 100 contractor members, with 151 members in all...the largest membership base in its eight-year history. The FCIA Manual of Practice is being distributed to firestop contractors, firestop inspectors, as well as architects, spec-

ifiers and engineers.

FCIA member, FM 4991 approved contractors are being specified, while the ASTM E 2174 & ASTM E 2393 Firestop Inspection standards are starting to be specified and used. This strong evidence of interest in the association, contractor certification, education, standards, code and specification development driven by FCIA provides a solid foundation for specialty firestop contractors.

Fire and life safety through firestopping installed by specialty firestop contractors brings efficiencies that only specialization in a trade, the firestopping trade, brings to effective compartmentation...and better safety for our families," he explained. 

Evie Caprel is Associate Director, Membership, at FCIA. She can be reached at evie@fcia.org.

Turnkey Firestopping

The Orange County Convention Center, owned and operated by the Orange County Government, is the second largest U.S. convention facility, hosting one million delegates annually and providing 26,000 jobs in the area. When management decided to upgrade the convention center a few years ago, they turned to Firestop International, and Ted Smith, as construction manager.

Firestop International (FCIA members since 2001) provided turnkey firestopping for Phase 5 of the construction project. The

convention center is flanked by three floors of meeting rooms, a total of three million sq ft. Firestop International firestopped all these areas...heating, ventilating and air conditioning ductwork and piping, electrical and head of wall penetrations.

The largest penetrating item included exhaust duct work in an excess of 100 in x 100 in, very challenging for the manufacturer and firestop experts. "You could fit the nose of a car in those massive holes," explained Smith. "We worked closely with 3M Fire

Protection Products to develop the firestop systems and satisfy the exacting standards of the engineers and inspectors."

Even though this project was one of the largest the company has encountered, they are now moving on to the tallest building in the world, the Burj Dubai Tower.

Seven Questions Away Specifying, installing and inspecting the correct fire-rated glazing

By Jerry Razwick

No one would deny that the recent boom in fire-rated glass choices has been a positive development. Although wired glass performed admirably for decades as the only option on the market, the newer materials have opened a tremendous array of possibilities. Safety has increased, design flexibility has multiplied, and the combination of performance characteristics in a single piece of glass is astounding. Testing is constantly underway, with more change always on the horizon.

The opportunities are exciting. At the same time, moving from an industry with a single choice in glass to one with dozens has meant something else: It's hard to keep up. Designers, contract glaziers and inspection safety professionals have their hands full trying to stay current with the latest developments. Given the critical nature of fire protection, the stakes are high for getting it right.

As intimidating as the task may seem, it is possible to confidently specify, select or approve/inspect fire-rated glazing systems. By stopping to ask a few key questions regarding each application, designers, specifiers, contractors and inspectors can avoid costly mistakes and ensure a safer building by selecting the appropriate fire resistance rated glazing system for the application.

1. What is the Fire Rating Required?

Fire ratings are given in time increments, from 20 minutes to three hours. They vary by application and are generally determined by the length of time needed for occupants to evacuate a building. For example, you might have a lower fire rating for a one-story office building than you would for the 4th floor of a hospital with bed-ridden patients.

Not all fire-rated glass carries the same fire ratings. If you're glazing a two-hour corridor, you can eliminate some fire-rated materials immediately (such as specially-tempered glass) because it hasn't earned an adequate rating.

2. What is the Size of the Opening?

A product's fire rating is closely tied to the size in which it was tested. Most industry professionals are aware that traditional wired glass carries a fire rating of 45 minutes. However, many people do not realize that that rating is only valid when the glass is no larger than 1,296 sq. in. (9 sq. ft.). How many times have you seen a large window or door opening filled with wired glass? Chances are good that either the glazier or the architect only saw a fire-rated label and didn't check to see what size was allowed.

What's important to realize is that not all products with the same fire rating have the same size limitations. It pays to shop around. Some of the glass ceramic products with higher

fire ratings than wired glass can be specified in sizes up to 3,325 sq. in. (over 23 sq. ft.), and glass firewalls can offer floor-to-ceiling, wall-to-wall glass. Generally speaking, there's no longer a need to settle for a material that isn't rated for large sizes. Having a clear handle on the project needs will guide you to the products best suited to the opening.

3. Will Heat Transfer be an Issue?

The majority of fire-rated products are designed to stop flames, gases and smoke (since most fire fatalities are caused by smoke inhalation rather than burns). But on some occasions, the additional factor of heat transfer through the glass needs to be taken into consideration.

This is not a matter of interpretation: Codes will tell you specifically if a product that serves as a barrier to heat is needed. For the most part, the application would normally be one that required a solid wall (such as concrete block) that protects occupants. That will limit your choice in glazing materials to those that have actually been tested as a wall using test standards such as ASTM E119.

Glass fire walls are readily identifiable: They are made up of multiple layers of glass with interlayers of clear intumescent or gel in between. During a fire, the interlayers foam up and block heat. You can safely touch one side of the glass while a fire is raging on the opposite side.

Occasionally, more traditional fire-rated glass is marketed as "greatly

reducing heat transfer," even though it is not a wall. But if heat is a concern, the codes are very clear: Nothing less than a glass firewall should be specified.

4. Is Impact Safety a Concern?

Hopefully, fire is a very rare occurrence. For the majority of the time, fire-rated glass isn't stopping fire - it's providing visibility. As such, it may be in a setting that needs more than simply fire protection - it needs impact protection.

Whether it's installed in a door in a busy school corridor or a sidelite in a commercial building, fire-rated glass often does double duty by providing impact safety. However, just because glass is good at stopping fire doesn't mean it is good at stopping humans. That's why wired glass usage has been curtailed so severely, particularly in educational facilities. Too many students were getting injured by putting their hand or foot through a piece of wired glass and getting caught on the broken wires.

As with fire ratings, not all impact ratings are the same. Wired glass meets the lowest impact standard (ANSI Z97.1), which means it can be expected to stop a small child from going through it. Other products, such as glass fire walls, meet CPSC 16CFR1201 (Cat. II), indicating they can withstand the impact of a running adult.

There are plenty of products on the market that offer both high impact safety and high fire ratings. If you're glazing a high traffic area or a "hazardous" location (near the floor, in a door or sidelite, etc.), be sure to select a material that offers impact safety protection.

5. What Does the Product Listing Really Say?

You've reviewed the manufacturer's promotional literature, but have you taken the time to look at the listing from the test lab? It may sound tedious, but it can be eye opening.

One product on the market today is being promoted as carrying ratings up to 60 minutes. But when you look a little closer, you discover some rather disturbing caveats. For example, the product hasn't passed a portion of the REQUIRED testing to earn the 60-minute rating! It endured the furnace test, but it is unable to withstand the hose stream test, which is mandatory in North America. This would be like giving someone a driver's license for passing the written portion of the exam, but not the driving portion.

The product is also directional, meaning it only offers fire protection on one side of the glass. You have to accurately predict on which side of the glass a fire will occur.

Some products may require a local authority to make exceptions so it can be allowed. But again, given the wide range of high-performance products available today, there's no need to risk it. If the local authority improperly allowed a non-conforming product, you may not be off the hook. Potentially, you could spend a lot of time and money defending the use of an improper product.

6. What Additional Performance Requirements are Needed?

At this point, you've probably begun to narrow down your options. Now it's time to see what else you can wrap into the package. There are all kinds of "extras" the newest crop of fire-rated glass has to offer.

For instance, in a post-9/11 world, security is an increasing concern.

Some fire-rated openings may also need to guard against a stray bullet or other form of attack. But most bullet-resistant glasses are made with polycarbonate, which is highly flammable. Now there are glass firewalls that also carry bullet resistance ratings, giving you two products in one.

Maybe the setting requires acoustic control or energy code compliance. Maybe you want to add design features such as beveled edges, sandblasting or etching. Or maybe you'd like to feature a one-way mirror, tinted glass or art glass. All that and more is possible without compromising fire safety.

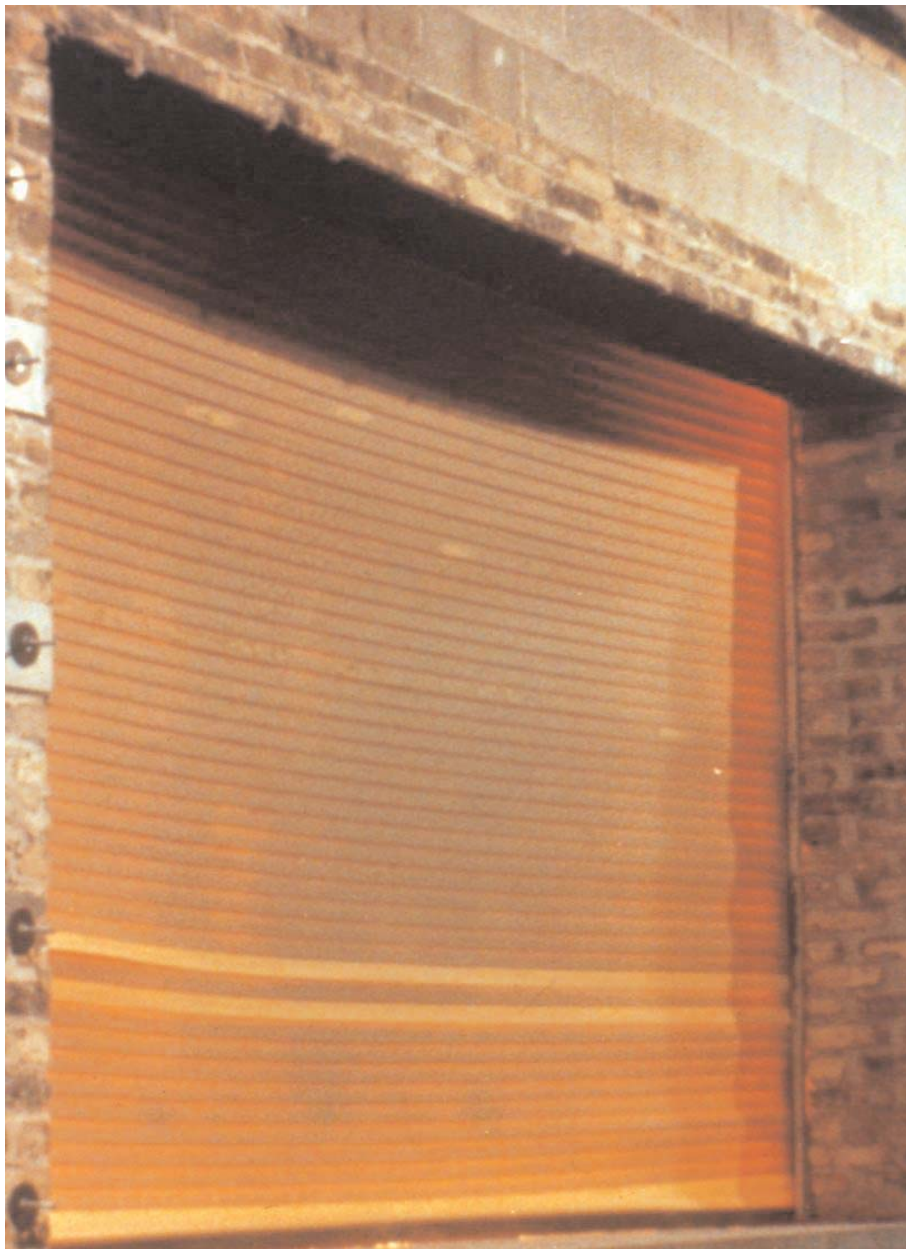
7. Does the Entire System Offer the Same Rating?

Finally, be sure to check the entire system for proper compliance. The necessary fire rating should apply to the framing and any sealant, in addition to the glass. And just as glazing options have expanded, framing options have multiplied greatly over the last several years. You should have no trouble finding a suitable framing system for your rating requirements.

Fortunately, today there are a number of products available that meet the fire and related requirements. Questions such as these can help designers, specifiers, contractors and inspectors navigate to the best choices and ensure that the project will have reliable fire protection for years to come. 🔥

Jerry Razwick is founder and president of Technical Glass Products (TGP), a distributor of specialty glass and framing as well as architectural products. He has been a glass factory agent in foreign and domestic markets for over 25 years. Razwick has served on the Industry Advisory Committee for Underwriters Laboratories, Inc. and is an active member of AIA, CSI, NGA and GANA. www.fireglass.com

Testing - One, Two . . .



Visit www.dasma.com for information about rolling fire doors.
Photo courtesy of Lawrence Doors, Inc.

By Steve Hahn

For quite a few years now, NFPA 80 and model building codes have mandated the annual inspection and drop testing of rolling fire doors. Unfortunately, fire doors are too often drop tested by untrained persons that lack the knowledge, ability

or tools to properly inspect, test and reset them. When that happens, there is an opportunity for a fire door that might close successfully during a drop test to then be reset incorrectly afterwards - leaving it unprepared to do its job and a risk of a potential tragedy in the event of a fire.

As a result of those concerns, the 2007 edition of NFPA 80 Standard for Fire Doors and Other Opening Protectives now requires that rolling fire doors be drop tested twice - once to demonstrate proper operation and full closure, and a second time to verify that the automatic closing device has been reset properly.¹ Additionally, testing must be done by persons with knowledge about, and an understanding of, the operating/closing system of the door being tested.²

What does this inspection and drop test process involve? Chapter 5 of the 2007 edition of NFPA 80 addresses the entire topic of care and maintenance of fire doors. Section 5.2 deals with inspections and testing, and sub-sections within 5.2 cover requirements applicable to specific types of fire doors as well as other general requirements.

Visual Inspection

A rolling fire door must be visually inspected to evaluate its overall condition prior to being drop tested.³ Following are the more common items to be inspected.⁴

- Slats must not be bent, cracked, torn, separated, have open holes, or otherwise be damaged.
- Endlocks cannot be missing, broken, bent or loose.
- Bottom bar must not have bent angles, missing or loose assembly bolts.*

- Guides cannot have bent angles or channels, missing or loose assembly or wall bolts.* Curtain entry at the top of the guides must be unobstructed.

- Some door designs require “special” washers - such as fiber, plastic, hot-dipped galvanized steel (not just plated steel) - on assembly and wall bolts.

- Expansion clearance must be provided in accordance with manufacturers' installation instructions. Most older fire doors were designed with downward expansion, requiring the guides to be set above the floor, with a specified clearance beneath the guides, and with wall bolts installed in the bottom of the slots in the wall angles. Many newer doors are designed with upward expansion, allowing the guides to be set on the floor, but requiring expansion clearance above the door, with wall bolts installed in the top of the slots in the wall angles.

- Hood - and flame baffle or fascia if provided - cannot be bent, dented, have holes, or otherwise be damaged. If the hood is provided with slots in the top flange, it must be attached to the wall with appropriate fasteners in all slots. If intermediate hood supports are required, they cannot be missing.

- Automatic closing device, governor, and operating mechanisms cannot have missing, broken or misaligned parts. Drop out arms/levers cannot be blocked, wedged or otherwise prevented from releasing.

- Fusible links (and detectors) must be properly installed and located where required per NFPA 80.5 A door must close automatically upon separation of any one of the fusible links. Fusible links must be in their original condition - they cannot be painted, otherwise coated, or have an accumulation of dust, grease, or

other debris because it may prevent them from separating at the intended temperature. Sash chains/cables cannot be kinked, pinched, twisted or otherwise restricted from being flexible and moving freely.

Any damage that could compromise the performance of the door in a fire condition must be repaired without delay⁶ and with parts obtained from the original manufacturer of the door.⁷ And any conditions that may effect the operation of the fire door during the drop test must be corrected prior to the drop test.

Operational Check

After the door is visually inspected, it's a good idea to open and close the door in normal operation - by manual push/pull, hand chain, crank or motor - to verify that it is free of any obstructions, is properly balanced, and doesn't have any “hidden” problems that might adversely effect the operation of the door during the drop test. If a fire door doesn't roll up and down properly in normal operation, there's a pretty good chance it won't pass a drop test. Not only may it not pass, but there's an increased chance of the door or the building being damaged or of someone being hurt in the process.

Drop Tests

The next step is to drop test the fire door.

- A rolling fire door must be drop tested from the fully open position.

- For a door with fusible links, it is generally accepted that it be tested from the release point the furthest from the door. The Authority Having Jurisdiction (AHJ) may require that a fusible link be heated to separate - rather than just disconnecting it from the cable/sash chain - and then replaced.



Rolling fire doors are largest openings in fire resistance rated construction. (Photo courtesy of Lawrence Doors, Inc.)

- For a door with other types or multiple means of activation, the AHJ may require that it be tested by most or all activation means. In other words, if a fire door can be activated by fusible links and detectors, then the AHJ might require that it be tested from the fusible links, as well as from detectors at the door opening.

- The door must automatically close at an average rate of no faster than 24 in. (2 ft.) per second but no slower than 6 in. (1/2 ft. per second).⁸

- The bottom bar must come to rest in the closed position (on the floor or counter top).⁹

After the first drop test, open the door and reset the automatic closing device per the manufacturers' installation instructions.¹⁰ If the drop test was successful, reset the door the way it was prior to the test. If the drop test was not successful, make necessary adjustments - if there are any available to be made.

Then, drop test the door again. If both drop tests were successful, then open and reset the door again and consider testing complete. If not,

reset the door, make adjustments, and test again. Two successful drop tests are required. If the door cannot be successfully drop tested twice, then the door requires repair or replacement. (Remember that the use of a labeled retrofit fire door operator may be a suitable solution for an improperly operating fire door. Its use is permitted by NFPA 80)11

Written record

The final step in the inspection and drop test process involves documentation. A written record must be maintained and made available to the AHJ.12 The Door and Access Systems Manufacturers Association (DASMA) has inspection and drop test forms and labels available for this purpose. DASMA also publishes a

number of technical data sheets (TDS) that can be a valuable resource for information about fire doors and are available on their website www.dasma.com.

Inspecting and drop testing fire doors is a serious business. It truly is not something that just anyone can do. It can be very complex and potentially dangerous and is definitely best handled by a trained door systems technician. A rolling fire door may be the largest piece of moving equipment in a facility, and that potentially very large and heavy piece of equipment will be moving even faster than normal when it is drop tested! 🔥

- 1 NFPA 80, 5.2.14.3.3
- 2 NFPA 80, 5.2.3.1

- 3 NFPA 80, 5.2.3.2
- 4 NFPA 80, 5.2.5.2 and DASMA TDS-271
- 5 NFPA 80, 4.7
- 6 NFPA 80, 5.1.5.1
- 7 NFPA 80, 5.2.15.3
- 8 NFPA 80, 11.4.1.5
- 9 NFPA 80, 11.4.1.3
- 10 NFPA 80, 5.2.14.3.1
- 11 NFPA 80, 5.3
- 12 NFPA 80, 5.2.14.3.2

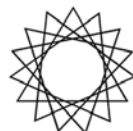
Steve Hahn is Product Manager for Los Angeles based Lawrence Roll-Up Doors, Inc. He has been in the rolling door industry for more than 30 years, is a member of the NFPA-80 Standard for Fire Doors and Other Opening Protectives Technical Committee, and serves on three UL Standards Technical Panels.

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Industry News

Testing & Qualification News

FCIA at US DOL

FCIA had the opportunity to visit the US Department of Labor (DOL). The DOL attended the FCIA Effective Compartmentation Symposium and visited with FCIA after the new Apprenticeship Program Development for Firestop/Containment Workers at the CSI Show in Baltimore, Md. The federal DOL standards affect Bureau of Apprenticeship Training States (BAT) which follow DOL national standards. There are State Apprenticeship Committee States (SAC) that can already implement the standards, as has taken place in Washington and Oregon. FCIA's Bob Hasting has been moving this along at the US DOL, and is working with FCIA members in other states to help make Firestopping a "trade."



The Architectural Openings Resource

DHI Door Inspection Education

The Door and Hardware Institute Annual Conference and Exposition, Oct. 13-20 focus will be the Annual Fire Door Assembly Inspection Program. The Fire Door Assembly Inspection Class sessions will focus on the new inspection process guidelines affected by the National Fire Protection Association's (NFPA) publication Number 80, Standard for Fire Doors and Other Opening Protectives, 2007 Edition. "This course will also provide insight into the certification process for companies and individu-

als," DHI CEO Jerry Heppes reports. <http://dhi.org/education/>

FCIA Symposia

FCIA'S Effective Compartmentation Symposium is a great way to educate fire marshals, building officials, architects and specifiers about the importance of our industry. It's been well received at the CSI National Convention and FCIA Firestop Industry Conference, and is a vital part of the FCIA / UL Total Fire Protection Systems Symposium. FCIA / UL Total Fire Protection Systems Symposia are being scheduled for California; Toronto, Ontario, Canada; and the Northeastern U.S. Watch <http://www.fcia.org> for schedules.



Underwriters Laboratories Inc.

Qualified Firestop Contractor Program



UL & FM DRI Testing

The UL Qualified Firestop Contractor Program DRI and FM 4991 DRI Testing is being offered at the FCIA Firestop Industry Conference and Trade Show Nov. 7. Each of the testing opportunities are open to firestop contractors (FCIA members and non-FCIA members), interested in pursuing FM 4991 Approval or UL Qualified Firestop Contractor status, firestopping inspectors, building officials and fire marshals.



For More Information

Call

708-202-1108

or visit

www.fcia.org

Code Corner

Industry News

FCIA at ICC Height and Area Meetings

FCIA attended the ICC Code Technology Committee Features (Height and Area Table) meetings in Chicago in early August. There was much discussion about increasing the number of compartments required in buildings. The group was working on concepts for 2009 ICC Code changes for the Aug. 20 submission deadline. Portland Cement Association's Jim Messersmith brought a wealth of information on height and area issues, IFC's executive director Sean DeCrane spoke from the fire service perspective.

The Alliance for Fire and Smoke Containment and Control's Vickie Lovell and Rick Thornberry participated as well in various study task groups, with smoke control and vertical fire and smoke spread being studied. FCIA continued to provide common sense input on issues, including how assemblies are really constructed in the field, and why approved and qualified contractors and inspection are needed in this industry.

At recent ICC Code Technology Committee Meetings, three groups met to discuss important issues to Effective Compartmentation - Balanced Fire Protection, Height and Area, and Vertical Openings.

ICC Balanced Fire Protection Study Group

In Balanced Fire Protection, the group is trying to develop a methodology to study what constitutes "balanced fire protection."

HILTI's John Valiulis recruited a professor from Worcester Polytech Fire Protection Engineering School for methodology examples and possible consulting.

Features Study Group

During the Height and Area (Features) discussions, significant debate continues about the need for Effective Compartmentation in buildings. There are paradigms in existence that since sprinklers are in buildings, other features are not needed. FCIA brought to the group's attention that statistical inferences declaring "safe buildings" were based on performance including BOTH Effective Compartmentation and sprinklers, plus alarms and detection systems technologies in buildings.

Vertical Openings

The Vertical Fire and Smoke Spread group discussed whether openings made for penetrating items such as pipes, cables, and ducts, need to be protected with firestopping or dampers in floors right next to a transmitting stairway allowed by code.

Although the study group decided not to move forward with a code change on this topic, group leader Greg Keith has submitted a proposal to ICC for further public debate.

Watch future issues of Life Safety Digest for 2008/2009 ICC and NFPA Code Cycle Code Change Proposal detailed discussion from all the compartmentation industries.

New SBCC Group

The Safe Building Coordinating Committee (SBCC) was first funded by a grant from the Department of Homeland Security in 2006, and administered by the National Association of State Fire Marshals (NASFM). The committee's original mission was to implement a new safe buildings initiative to help the U.S. Fire Administration reduce firefighter

fatalities by 25% within five years and 50% within 10 years. With this fire prevention and safety funding, the SBCC's goal was to more effectively assess and reduce the risk of structural collapse in occupancies where rescue operations are all but inevitable.

The SBCC brought together building and fire officials, industry experts, and members of the scientific and academic community. The body of work encompassed review and evaluation of existing model codes and the development of specific proposed code changes to the model codes.

The SBCC reinvented itself as a forum in which members of the code enforcement community could come together for research, code evaluation, code amendment preparation, advocacy for new technology and procedural changes, and non-adversarial discussion of divisive topics.

The SBCC recognizes that a growing body of scientific research exists on the fire performance of building contents, building materials, types of construction and human behavior affecting exiting - but little of this important knowledge has been considered and organized in ways that might provide guidance to code officials or incident commanders. This is one way in which the SBCC believes it can serve safety. In addition, the SBCC wants to provide objective technical and policy guidance to the public safety community on matters before the Model National Codes Organizations, and to promote greater cooperation among building and fire code enforcement officials. http://www.saferbuildings.org/articles/lock_the_barn_door.php

Life Safety Digest 2007-2008 Industry Calendar

Sept. 30 to Oct. 3

ICC Annual Conference and Education Program, Reno, Nev.

Oct. 1 to 5

NFPA 101 and 5000 ROC Meetings, Providence, RI

Oct. 14 to 19

Society of Fire Protection Engineers Professional Development Conference and Exposition, Las Vegas

Oct. 15 to 20

Door and Hardware Institute Conference & Exposition, Nashville, Tenn.

Oct. 21 to 25

SMACNA Annual Convention, Phoenix

Oct. 30 to 31

National Code Documents - Standing Committee on Fire Protection, Vancouver, British Columbia, Canada

Nov. 7 to 9

FCIA Firestop Industry Conference & Trade Show, Hollywood, Fla.

Nov. 6 to 7

UL and FM DRI Education & Testing at FCIA, Hollywood, Fla.

Nov. 7 to 13

National Fire Prevention Week

Feb. 7 to 9

NCMA Annual Convention & Expo, Denver

Feb. 18 to March 2

ICC Code Development Hearings, Palm Springs, Calif.

March 23 to 26

AWCI, Las Vegas

April 30 to May 2


FCIA Education and Committee Action Conference, Seattle

June 2 to 6

NFPA World Safety Conference & Exposition, Las Vegas

Sept. 17 to 23

ICC Final Action Hearings, Minneapolis, Minn.




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2"	SONNEBORN NP-2 PECORA DYNATRED PECORA DYNAFLEX	LYMTAL 880 LYMTAL 881 LYMTAL 830	SIKA 2 CNS GE PENSIL 300 GE PENSIL 300 SL
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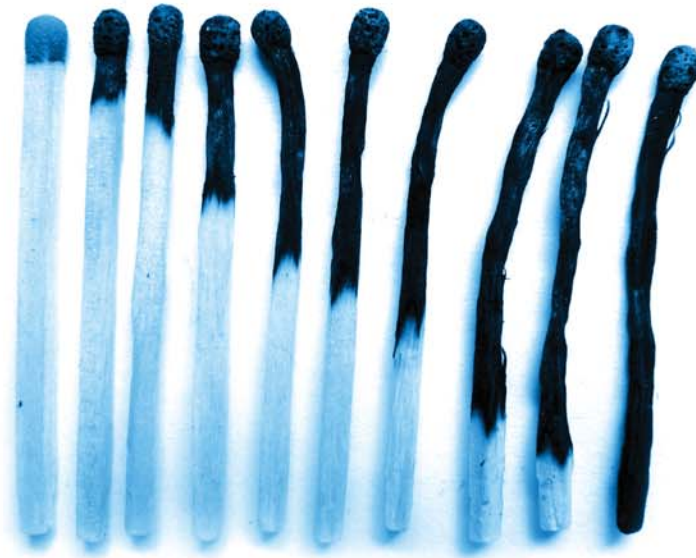
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