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The Magazine of Effective Compartmentation



# Life Safety DIGEST

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**How Much is a Life Worth?**

**Sustainability, Fire Resistance,  
and Concrete Masonry in Schools**

**Firestop Systems  
and School Construction**

**Gypsum Board in Schools**

**Life Safety Digest**

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**On the Cover:** Fire rated glazing offers design flexibility, yet safety in education occupancies. – TGP Photo

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# Life Safety DIGEST

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# Editor's Message

## FCIA Celebrates Education...

FCIA and *Life Safety Digest's* goal is to bring information about firestop systems, Effective Compartmentation and the "DIIM" Method (proper Design, Installation, Inspection and Maintenance) to you to help build and maintain buildings that are safe for all who enter them. This issue focuses on an important resource, education occupancies.

Education occupancies have special people, namely our future, inside. As a society, we work hard to protect them while in school. First and foremost, schools are where we learn. But, there are threats to address when there are so many people in one place. That's why fire, tornado drills, and other threats have planned and practiced responses by administration, with staff and students taking action when notified.

It seems schools are very safe, but we can do more. TGP's Jeff Razwick reviews the debate about requiring fire resistance rated corridors in schools. IBC currently exempts the fire resistance if the building is sprinklered.

Additionally, are we doing enough to educate our kids about their own personal safety once they leave school and are on their own? What more can we do? How much should be taught during these drills about alarms, sprinklers, compartmentation, structural fire resistance, or smoke resistance?

What our children learn in schools can affect their personal safety for their whole life...so maybe we have an opportunity. And, kids are smart. If we teach them to identify fire barriers, they'll know there's a haven for safety. If we teach them that once on their own, there's an immediate response

required to alarms, they'll form habits and move quickly.

FCIA supports fire-resistance-rated and smoke-resistant compartmentation – fire rated swinging and rolling doors, fire rated glazing, fire dampers, fire rated walls and floors –and work together to build and maintain safer buildings for students, and for all.

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# How Much is a Life Worth?

## Why fire-rated corridors are critical in educational occupancies

By Jeff Razwick

Each year, there is an average of 14,700 school fires across the U.S. requiring a fire department response. These fires result in approximately 100 injuries and \$85 million in property damage, according to the U.S. Fire Administration (USFA). Of those fires, 6,300 (or 43%) are structural.

For years, a debate has raged over the appropriate level of fire protection in schools. There are two primary camps: those advocating fire sprinklers as a fully sufficient solution, and those calling for fire-rated corridors, either with or without sprinklers. From a life safety perspective, the best approach is for codes to require both sprinklers and fire-rated exit corridors in order to provide back-up protection in those incidences where sprinklers do not perform as required. This is especially true for schools, where the special needs of students require adequate time for safe evacuation.

Whether explicitly stated or not, the argument against a dual approach comes down to money. In a world of limited resources, it is clearly not monetarily feasible to make buildings perfectly safe. But where does the balance lie between costs and safety, and who decides?

### Code Trade-Offs: Solution or Problem?

Because sprinkler systems are expensive to install, the International Building Code (IBC) now allows schools to have exit corridors with no fire rating when sprinklers are in place<sup>1</sup>. The theory with the code trade-off is that shifting dollars from building compartmentation to sprinklers provides students and teachers effective and affordable protection against fire. But, this is short-changing safety given the fallibility of sprinklers.

Sprinklers save many lives and have played a major role in improving fire safety. It makes sense that they be required by code. But setting up sprinklers and fire-rated corridors as an either/or choice is a recipe for disaster.

Over the years, the National Fire Protection



Fire rated glazing isolates corridors – TGP Photo

Association (NFPA) has conducted a number of studies of sprinkler performance and repeatedly emphasized that sprinklers should not be used in isolation. For example, one NFPA study states, “Even a well-maintained, complete, appropriate sprinkler system is not a magic wand. It requires the support of a well-considered, integrated design for all the other elements of the building’s fire protection.” Amplifying this point, another NFPA report concludes, “Sprinklers are considered to be one of the most important parts of life safety, but they are far from the only part. Adherence to code provisions for factors such as number of occupants, control of heat sources, flammability of furnishings, and availability and capacity of exits are essential” (emphasis added).

The reason for not relying on sprinklers alone is their approximate 10% failure rate.<sup>2</sup> Applying this figure to the 6,300 annual school structural fires statistic cited earlier could mean the possibility of 600 plus school fires each year in which sprinklers either do not operate when needed or are not effective in controlling fire. According to the NFPA, most of these failures (65%) are from the system being shut off before the fire, while other causes include turning sprinklers off prematurely (16%), lack of maintenance (11%), presence of the wrong type of system (5%), and damage to system components (3%).



## Special Needs in Schools

While providing fire-rated corridors as supplemental protection to sprinklers is important in public facilities of various types, schools have several sets of conditions that make such corridors essential.

First is the nature of the primary users – students. In a fire, children may panic or not fully be aware of the most appropriate exits to take. Schools also typically operate with relatively small amounts of adult supervision, with student to teacher ratios of 20 to 1 or greater being common. As such, students need to be able to exit on their own, without teacher guidance. Further, since most schools now educate physically and intellectually challenged children in the same classes as others, the difficulties of a smooth and coordinated exit during fire are compounded. All of these factors argue for providing a protected egress that is fire-rated for an adequate amount of time.

Second, many school fires are deliberately set or are otherwise suspicious. USFA data show that these fires account for 25% of structure fires in kindergarten and elementary schools and 47% of fires in middle and high schools. Further, 55% of fires on school property occur between 8 a.m. and 5 p.m., the times students are most likely to be in school. The risk is relatively great that a large number of people will be in the building during a fire.

Third, as with other modern facilities, schools rely on lighter building materials than in years past. The building itself provides less inherent protection against the spread of fire, making the need for designated fire-rated corridors key.

Fourth, increased cabling for communications, computers and other equipment raises the potential for fire. Coupled with other causes of school fires such as arson and cooking accidents, the risk of fires will not necessarily decrease over time.

## School Lockdowns

Post-Columbine and post-9/11, school systems throughout the country have had to backtrack from fire drill procedures, calling on students to immediately exit school buildings the moment a fire alarm is sounded. Out of growing concern that a fire will be deliberately set or a fire alarm falsely initiated in order to draw students out of their classrooms into the open where they are vulnerable to violent acts, schools have begun to institute “lockdowns” when fire alarms are sounded. These new lockdown procedures typically require students to be locked in their classrooms until authorities can sound an “all clear” after determining that no intruder is present in the school.

Such lockdown procedures increase significantly the length of time that students must remain in the school building before exiting. This, in turn, significantly increases the risks posed by fire. These





Fire rated glazing provides an open space feel to buildings – TGP Photo

risks can only properly be mitigated by requiring the redundancies of automatic sprinkler systems and one-hour fire-resistance rated corridors.

### Benefit Versus Cost

School districts are notoriously short on adequate building funds, so there is a strong pressure to build cheaper. Yet, the decision to weigh relative levels of safety versus cost is usually not made at the local level. By providing a trade-off, the codes have essentially removed this as a point of discussion on school project funding.

Parents should be very concerned to know that schools frequently rely on one fire protective measure (sprinklers) without providing a passive back-up (fire-rated exit corridors) to protect their children while exiting the building in the event of fire. If the question of life safety benefit versus cost were posed to them, it is likely there would be an increased call for providing both types of measures.

Putting costs in perspective, it is also important to consider that schools typically are in service for 30 to 60 years. This provides a lengthy time to amortize the marginal costs of using both sprinklers and fire-rated corridors.

And, in the event local jurisdictions believe such complementary protection is not needed in their situation, it is appropriate that this issue be considered through a local building code variance, rather than it being automatically assumed at the national code level.

### Current Code Change Proposals

The International Code Council (ICC) will be revisiting the issue of fire-rated school corridors during its 2009/2010 round of Final Action Hearings in Dallas this May. One of the submitted proposals (E113-09/10) calls for requiring one-hour fire-resistance rated corridors even when sprinklers are present. With modern multi-story school designs, this is important since more classrooms are either well above ground level, or underground, unlike schools from past decades where nearly every classroom had a door leading directly to the outside.

### Conclusion

Although deaths from school fires are rare, the USFA reports that the injury rate is slightly higher than the average for all non-residential structures. There continues to be a high number of school fires, and the ramifications of sprinkler failure can be dire. Without passive protection such as fire-rated corridors, fire can potentially spread unchecked through a building, or occupants can be trapped in spaces without adequate means of egress.

The building industry today has a wider range of fire-protective and fire-resistive materials than ever before, with multiple performance and cost options. In light of this, it is time to put aside code trade-offs and ensure that schools are adequately protected from fire. 🔥

*Jeff Razwick is vice president of Technical Glass Products (TGP), a supplier of specialty architectural glazing products and fire-rated glass and framing systems. He writes frequently about the design and specification of glazing systems for institutional and commercial buildings. He can be reached at [www.fireglass.com](http://www.fireglass.com) or (800) 426-0279.*

*1. Chapter 9 of the International Building Code (IBC) only requires automatic sprinkler systems in schools with fire areas that are greater than 12,000 sq. ft. Unsprinklered schools with fire areas less than 12,000 sq. ft. must have one-hour fire-resistance rated corridors.*

*2. See "The Latest NFPA Statistics on Sprinkler Performance," by John R. Hall, Jr., NFPA Journal, March/April 2008 and "Reliability of Automatic Sprinkler Systems," by William E. Koffel, PE, commissioned by the Alliance for Fire and Smoke Containment and Control, Inc., September 2005.*





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Fire resistance rated concrete training towers are used over and over again. — IL Masonry Institute Photo



Concrete block walls and concrete floors provide environment for fire service training. — IL Masonry Institute Photo

# Sustainability, Fire Resistance, and Concrete Masonry

By Chuck Ostrander and Harry Junk

**Sustainability is a word that has grown in recognition in recent years due to the increased public awareness about green buildings.**

Concrete masonry units, and buildings made with concrete masonry units, have many inherent green qualities. From the materials that make up the block and throughout the lifecycle of a building, concrete masonry is resource- and energy-efficient.

While the words “sustainable building” popularly equates to “energy efficient,” it also pertains to many other attributes including permanence—the ability of a building to withstand and endure.

In schools and school dormitories, one of the most important sustainable aspects of a building is its ability to resist fire. According to the U.S. Fire Administration, the overwhelming majority of residential fires are caused in the kitchen or by heating equipment. Schools and dormitories, as multi-unit and multi-discipline structures, are therefore more prone to fires since they contain multiple fire-prone areas and appliances. Regardless of the cause, however, it’s the structural composition of the building that will largely determine how well the blaze is contained and compartmented.

And while industry-standard fire testing deems materials such as gypsum drywall to be fire-resistant, the fact is that it cannot offer the same protection as masonry products such as concrete block.

Industry-standard testing allows materials such as wood frame and gypsum drywall to be rated fire-resistant (the Gypsum Association cites fire-resistance ratings of up to four hours). After a certain amount of time, however—two-hours is a typical testing threshold—these materials will burn.

Concrete block, however, is not merely fire-resistant; it’s non-combustible. When subjected to the 1,800°F (982°C) temperatures that other building materials are exposed to—and then put to the test of a fire hose gushing at a pressure of 30 lb. per square inch (PSI) (208 kPa)—the concrete block remains intact.

The transition in recent years to objective-based building codes may be part of the problem. Previously, the codes were prescriptive, in essence describing what had to be done. In new building codes, the objective-based format adds “why” to the equation, describing the desired outcome. The intent is to promote flexibility in design and construction through the use of what the code refers to as “acceptable solutions”—alternatives that achieve the same desired results.

Unfortunately, these alternatives don’t always achieve the same results where fire testing is concerned. Swaps can be made that meet the letter



of the code, but may more heavily favor the owner's needs over the inhabitant's needs.

Many locations have mandated sprinklers in many occupancies, including schools, and multiple-unit residential dwellings over a certain height and size. This is a good thing. Sprinklers will no doubt help improve the fire safety of buildings and increase the chances that occupants get out safely.

However, rather than simply take the reactionary approach of legislating sprinklers, why not implement building-code improvements more proactively—from the ground up? Why not mandate the use of materials that don't burn?

Experience shows that while wood frame and drywall receive acceptable "fire resistance" ratings in industry testing, in real-life situations these materials burn. The tragic consequences of recent fires are all the more reason to re-think the status quo on codes and testing and look at mandating the use of non-combustible materials such as concrete block.

### Concrete Masonry Designs in Compartmented Designs

A movement is underway to increase the level of fire protection in the codes by using the total fire protection design approach to construction, which considers four components:

- Containment and compartmentation with structural walls, floors and ceilings of masonry and concrete products that will not burn and provide two to four hours of protection;
- Detection with smoke detectors to alert occupants to action, possibly evacuation;
- Suppression using sprinklers to control the fire until the emergency responders arrive on the scene and
- Education of occupants through emergency, fire and tornado drills.

Detection and suppression are active systems that require an electrical or water source and a mechanical and/or electrical system to activate. Containment with compartmentation is a passive system that does not require anything to activate, it sits there waiting to be put into service.

During emergency, malfunction, or just from nature, power may be lost. Whether due to outage or malicious intent, power can be interrupted. A few years ago, Cleveland was without power for several days due to a massive power failure. Although Lake Erie sits right on the city's front door, there was no way to pump water to supply suppression systems, leaving un-compartmented buildings vulnerable.

The importance of containment and compartmentation with concrete-based products that will never burn and will maintain structural integrity can not be stressed enough. If a fire were to start within a given room or compartment of a building,

the noncombustible walls, floor and ceiling with protected openings, penetrations and joints, would contain the fire and to allow time for fire fighters to arrive and suppress the fire, or for active protection such as sprinkler systems to deploy.

Currently, the building codes provide for detection, suppression and some compartmentation, but they do not require non-combustible compartmentation.

A common argument made for not using compartmentation has been the misperception that it is cost prohibitive for the building owner and manager.

### Cost Comparison Study

The Fire Safe Construction Cost Comparison Study was commissioned by three Fire Safe Construction Advisory Council (FSCAC) groups—Pennsylvania, Mid-Atlantic, and New York/New England—and the Northeast Cement Shippers Association (NECSA).

The study was commissioned to be able to address cost for construction of multi-residential structures using concrete-based products vs. wood and steel with gypsum.

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With this new study there is now documentation that the cost difference is much lower than perceived. In many cases, the cost differential was 3–5% or less. (read the in-depth study follow-up in the multi-family issue of *Life Safety Digest* later in 2010)

Materials like concrete masonry, precast concrete, and cast-in-place concrete have many other advantages beyond their inherent fire performance.

The performance of concrete block when subjected to impact-resistance testing, bullet resistance, and tornado resistance, is very impressive. Plus, sound and smoke resistance are maximized, when openings, penetrations and joints are protected as well.

In many cases, concrete masonry construction results in reduced insurance premiums and less risk for school districts that self insure. Most importantly, if subjected to a fire or security event, the damage outside of the fire compartment is minimal, and occupants inside the compartment may be safe from outside risks.

When properly protected with fire-resistance-rated systems classified for air leakage, concrete block assemblies provide excellent smoke protection for

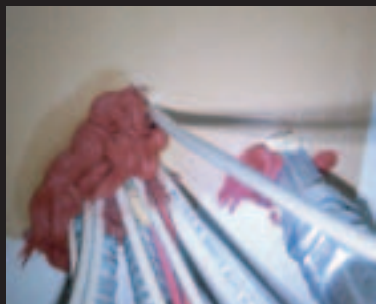
occupants of adjacent compartments. (See firestopping article in this issue)

When the sustainability of a structure, permanence, density, fire resistance, are all important, concrete masonry units are the way to go. For many reasons, concrete masonry provides protection for our valued treasures, the students, teachers and parents who occupy these structures. 🔥

Go to [www.pafscac.org](http://www.pafscac.org), for complete information on the cost comparison studies at 41 U.S. cities.

Chuck Ostrander is Executive Director of the Illinois Masonry Institute, and Harry Junk is Market Development Manager, National Concrete Masonry Association, Herndon VA. Contact Chuck at [chuckostrander@yahoo.com](mailto:chuckostrander@yahoo.com) and Harry, [hjunk@ncma.org](mailto:hjunk@ncma.org).

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# Firestop Systems and School Construction

By Bill McHugh

Standards for firestop installation and inspection quality are catching on in specifications for many occupancies, including schools. A recent search of specifications found school construction had qualified or approved contractors and independent inspection specified for firestop systems about 30% of the time. Why? Read on!

## DIIM – Design, Install, Inspect and Maintain

FCIA has invested in “looking inward at itself” over the past few years. In order to deliver fire and life safety to building occupants when they need it most, FCIA looked at the complete *system* installation process for firestopping, including Design, Installation, Inspection and Maintenance.

### Design

Specifiers use firestop systems protocol as the basis for specifications. There are over 8,800 firestop systems in the UL Directory alone, with up to 30 variations of each system, meaning a wide array of available systems to cover a multitude of construction conditions.

Firestop testing produces ratings for resistance to various fire spread threats. Fire resistance (F), which measures the amount of time it takes for fire to poke through the assembly to the non-fire side, is the first. Temperature rise on the cold side of the fire assembly (T) assesses how long it may take to spread fire to combustibles located close to the penetrating items, allowing fire to spread without flame poke through. Air leakage (L) simulates smoke movement, while water resistance (W) simulates the ability of the firestop to prevent water leakage.

The greatest concern in schools seems to be “F, T and L” ratings. Firestop systems with these ratings limit spread of fire and smoke from room or area of origin in these important occupancies.

When specifying the resistance ratings for corridor and classroom walls in schools, the International Building Code does not currently require fire ratings in most cases. Regardless, some design firms and their client school districts choose to specify fire-resistance-rated construction with smoke-resistant systems for maximum safety and security in these buildings.

“The trick to firestopping is the company, top to bottom, and understanding how to select firestop systems that match the specific conditions,” states FCIA Vice President Bob Hasting. Not only does the

contractor need to know what kind of penetrating items, joints, and annular space sizes, etc., the firm also must be able to understand what number ‘L’ rating is required in a smoke barrier; which ‘T’ rating is acceptable, and if a ‘W’ rating is needed, what system will provide protection during the systems selection process,” according to Hasting. “A hallway needs to stay tenable if there’s fire on the other side. The right firestop system, fire dampers, doors tested for the application, all help get that done.”

Why build walls separating classrooms so that they extend the full height to the floor/ceiling above? First, it costs less to build them upon installation. “Economies of scale are accomplished because the labor is there, materials are shipping anyway, and the extra few feet above the ceiling line is a small incremental cost,” states FCIA Accreditation Co-Chair Tom Hottenroth. “Since the labor is already there, and deliveries are coming anyway, the incremental cost for building walls to the floor/ceiling assembly for continuity is not as much as if it were to be built later when there are ceiling tiles, pipes, ducts and cables in the way.”

Second, it allows elimination of the ceiling tiles in certain areas, allowing higher ceiling heights. Most importantly, it allows flexibility for changing the use of the space at some later date, without astronomical costs to build walls above a ceiling in an operating building.

In Illinois, the Chicago Building Code still requires fire-resistance-rated corridors in schools. Chicago remembers the tragedy of the Our Lady of the Angels Fire over 50 years ago. (See *Life Safety Digest*, Spring ‘09 issue for details). Fire-resistance-rated and smoke-resistant assemblies would have slowed fire spread, and saved lives. Certainly sprinklers could have controlled the fire had a system been present and operating properly.

### Engineering Judgments

FCIA’s Firestop Manual of Practice states that classified systems should be used first even if it means a change in manufacturer for that situation on a project.

Since most specifications call for “single manufacturer to the greatest extent possible,” it allows for more than one manufacturer’s products to be used within reason.

We have heard that states may view ‘engineering judgments’ as the practice of engineering. Some jurisdictions including states, may require an engineer, and in some cases a fire protection engineer licensed in that state to stamp engineering judgments. In the state of Nevada for instance, it was determined that creation

of an engineering judgment is 'engineering' under state law. Therefore, in Nevada we have heard that Engineering Judgments must be prepared by a Nevada-licensed fire protection engineer.

At the ICC Committee hearings, comments were heard from building officials and fire marshals that this concept needs real work from the industry. FCIA's ICC 2009-2010 Code Proposal FS 74 attempts to provide clear direction on this issue, and attempts to bring an acceptable format to present for approval that is required by code. (see Code Corner in this issue)

### **Install - FM & UL, ULC Contractor Quality Management Approval/Qualification Programs**

"FM Approvals' FM 4991, Standard for the Approval of Firestop Contractors, has been listed in specifications for over eight years now due to FCIA's efforts," states FCIA's Accreditation Chair Aedan Gleeson. "FM Approved contractors are active in over 60 locations worldwide. Plus, there are FM Approved Contractors within three hours of every regional city in the U.S., and several in the Middle East," states Gleeson. "This truly is a worldwide program."

UL and UL Canada have 17 Firestop Contractors qualified, 15 in the U.S. and two in Canada, with many more in the process of qualification. "FCIA worked with UL in 2004-2005 to develop the Firestop Contractor Qualification Program," adds FCIA's Hottenroth. "The UL and ULC Firestop Exam for DRI Status takes place at FCIA Conferences and UL locations several times yearly."

The UL and ULC Qualified Firestop Contractor Program company audit affirms that the sub-contractor quality management process is working in the office and field, providing better quality contractors, with safer buildings the result.

Both the FM 4991 and UL Programs quality management system audits of the firestop contractors' quality management processes are mandatory. Coupled with office and field visits to verify compliance to the FM 4991 Standard and UL or ULC Qualified Firestop Contractor Program, the result is better contractors and ultimately better fire and life safety.

### **Contractor Quality Manuals**

"Quality Manuals seem to be the hardest thing for the firestop contractor to assemble," states FCIA's Hottenroth. That's why FCIA has hired a quality management guru to develop a quality management 'template' for contractors to use as an outline to help write their quality manuals. "The quality management system templates are not meant as their procedures. They are meant to help the contractor get started," states Gleeson. These templates are used by the contractor to write *their own* procedures that make sense for *their own* company. (See Industry News for FCIA education seminar for contractors.)

### **Inspection - ASTM E 2174 & ASTM E2393**

The ASTM E 2174 and ASTM E 2393, 2009 versions "Standard for On-Site Inspection of Installed Penetration/Joint System Fire Stops" is an important part of the circle of Firestop Systems installation quality. From a Design Professional and Certified Construction Specifier (CCS) or Registered Specification Writer (RSW) writing specs perspective, independent inspection of firestopping brings another verification that the quality management system is working for the building owners' benefit.

ASTM E 2174-09 and ASTM E 2393-09 have been reissued by ASTM after successful ballot to bring the format in conformance with code requirements.

Effective quality management systems describe production (FCIA Members, and FM 4991 & UL/ULC Contractors) while sampling (ASTM E 2174 & ASTM E 2393 Inspection) exists to be sure the production process works as described.

At the ICC Committee Action Hearings in Baltimore in October 2009, the Fire Safety Committee voted for incorporating these standards into Special Inspections, in Chapter 17 of the International Building Code. "We scoped this for special construction types, high-rise buildings 75 feet above the highest level of fire department access, which would include larger school structures," states FCIA Code Chairs Gary Hamilton and Bob LeClair.

To assure quality inspections by people who have quantifiable firestop education, FCIA submitted a successful proposal to the board of directors at the International Accreditation Services (IAS). IAS has a program for qualification of Special Inspection Agencies, Accreditation Criteria, AC 291. <http://www.ias-online.org>. "AC 291's new section on firestopping states that the inspector must in all cases pass the UL or FM Firestop Exam," states FCIA Firestop Consultant Member Patrick Tesche, of Telgian Corporation in Philadelphia. "This means the inspection agency has personnel with the same qualifications as the FM Approved or UL / ULC Qualified Firestop Contractor."

### **Maintenance**

Once installed, firestop systems may need maintenance over the life cycle of the building as prescribed by the manufacturer of the firestop products in the firestop system.

Cables for communication systems, electrical services, plumbing, heating/cooling systems, are all subject to alteration in all building occupancies. Schools are no different. "That's why the International Fire Code, Section 703.1 was added by the National Association of State Fire Marshals," states FCIA's 2010 President Randy Bosscawen.



International Fire Code in Chapter 7 states:

**703.1 Maintenance.** The required *fire-resistance rating* of fire-resistance-rated construction (including walls, firestops, shaft enclosures, partitions, *smoke barriers*, floors, fire-resistive coatings and sprayed fire-resistant materials applied to structural members and fire-resistant joint systems) shall be maintained. Such elements shall be visually inspected by the *owner* annually and properly repaired, restored or replaced when damaged, altered, breached or penetrated. Where concealed, such elements shall not be required to be visually inspected by the *owner* unless the concealed space is accessible by the removal or movement of a panel, access door, ceiling tile or similar movable entry to the space. Openings made therein for the passage of pipes, electrical conduit, wires, ducts, air transfer openings and holes made for any reason shall be protected with *approved* methods capable of resisting the passage of smoke and fire. Openings through fire-resistance-rated assemblies shall be protected by self- or automatic-closing doors of *approved* construction meeting the fire protection requirements for the assembly.

Section 703.1 clearly states that building owners shall maintain and visually inspect fire-resistance-rated construction annually, and repairs shall be made to keep systems working in buildings. It is there to provide occupants the fire and life safety intended by fire and smoke protection features in buildings.

### Best of the Best

Architects, specifiers, engineers, building code officials, and fire marshals have agreed and shown support by specifying tested and listed firestop systems made by quality manufacturers, installed by a (FCIA Member) Specialty Firestop Contractor and/or FM 4991 Approved or UL – ULC Qualified Firestop Contractor, inspected to ASTM E2174 and ASTM E2393, and maintained to the International Fire Code 703.1. This complete cycle approach brings the quality management process to firestopping and the construction industry for fire and life safety in buildings. 🔥

*Bill McHugh is Executive Director of the Firestop Contractors International Association. He can be reached at [bill@fcia.org](mailto:bill@fcia.org).*

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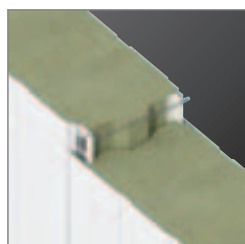
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# Gypsum Board Delivers Safety and Value in School Construction

By Harry Lubitz

While we are surrounded by walls and ceilings made of gypsum board everyday, we rarely take time to contemplate what a unique and valuable product gypsum board is for society. It remains the lowest cost life safety element in school construction. Yet, its benefits expand far past safety. Along with ease of construction, sound control and low long-term maintenance, it provides a pallet for architects and decorators to create an aesthetically pleasing environment for students to learn and play in everyday.

## Fire Protection

Gypsum, the backbone of the product, is a very unique material. It occurs naturally as a sedimentary rock or can be chemically created. It has a crystalline structure that naturally contains approximately 21% chemically combined water. This stored water greatly contributes to its ability to retard the spread of fire.

When the gypsum board surface is exposed to fire, the chemically combined water is released as steam, and acts as a thermal barrier to reduce heat transmission. The process of releasing this chemically combined water is called calcination. This process is generally quite slow and allows materials covered by gypsum board to be protected for a period of time.

Think of heating a block of ice. While the surface of the ice exposed to heat is melting, the opposite surface continues to stay cool. During the gypsum calcination process, the temperature directly behind the plane of calcination elevates slightly higher than the boiling point of water. This is far lower than the temperature required to ignite wood or reduce the strength of steel.

And even when the gypsum board is fully calcined, it remains as a barrier to protect the underling products from direct exposure to the fire.

Gypsum board is a passive protector that acts as a measure of safety and retards fire to allow students and teachers time to escape the school building. It does not require anything to engage this measure of safety, like a person or machine turning it on or off. It remains after the students have escaped to encapsulate the fire and save the building contents. As it limits the spread of fire, it allows fire fighters time to control the blaze and save additional portions of the structure from destruction.



Gypsum wallboard is widely used in schools – LaFarge Photo



Gypsum wallboard is lightweight – LaFarge Photo

Gypsum board is tested for fire resistance in assemblies which allow classification by time of fire resistance (i.e. one hour, two hours, etc.). Tests are conducted by recognized independent laboratories in accordance with Test Standards ASTM E 119 or CAN/ULC-S101. These classifications are the result of specific tests conducted on systems constructed in a specified manner and detailed by the laboratory. Details of these publicly-available tests can be referenced by laboratories in printed manuals and on websites. Another reference to locate fire resistance design information is the Gypsum Association publication GA-600, *Fire Resistance Design Manual*, which is available for free download or hard copy purchase at [www.gypsum.org](http://www.gypsum.org).

### Fire Resistance Rated Construction

Regular gypsum board partitions and their fire-rated counterparts don't differ much in their raw materials and construction. The distinction lies in whether a fire test was performed and whether they are listed by an independent laboratory. These fire tests explicitly detail how the materials were used (i.e. horizontally or vertically), on what substrate they were attached and at what spacing (i.e. wood studs, metal studs, etc.), how they were attached (i.e. type of fastener and position of each fastener) and specific details on other materials that were included to obtain the test results (i.e. gauge of metal studs, use/type of insulation, spacing of fasteners, taping of joints, etc.).

The fire resistance-rated assembly must be constructed exactly like the test assembly in order to be representative of the tested system, and accepted by the architect and building code official and/or fire marshal. The specifics like board thickness, board orientation, stud thickness and fastener spacing are detailed in the fire test listing details and must be duplicated in the field by the installer.



Gypsum Mineral – LaFarge Photo

However, the assembly can be enhanced in the field and still be representative of the tested assembly. For example, if a 25 gauge stud is specified, a 20 gauge stud can be substituted, as it is heavier steel. Or, if the stud spacing is specified at 24 in. o.c., the spacing can be decreased to 16 in. or 12 in. o.c. and still be representative of the tested assembly. This is important when adding abuse resistance to partitions, discussed later in this article.

Additional thickness or layers of gypsum board can be also be added and not affect the original tested assembly, as long as the original assembly is constructed as tested and the fastener length is increased to provide penetration into framing that is equal to or greater than that achieved with the specified gypsum board thickness and fasteners.

Here are some typical questions we often receive regarding fire-rated construction:

#### ***“What is the fire rating on 5/8” Type X gypsum board?”***

Answer: In a word...none. Individual components are not tested. An assembly constructed and tested with specific components as a *system* is what constitutes a fire-rated system.

#### ***“Can I substitute screws for nails in a specific fire-rated assembly?”***

Answer: Yes. Screws meeting ASTM C1002 and ASTM C954 can be substituted for nails, one for one, when the head diameter, length, and spacing are equal to the requirements for the specified nails.

#### ***“Can I orient gypsum vertically or horizontally in a fire-rated assembly?”***

Answer: The gypsum board must be oriented as stated in the tested system details.

Note: Some designs may allow either vertical or





Joint taping for fire resistance continuity – LaFarge Photo

horizontal orientation. The test details will detail this in its description.

**“Do I have to finish joints in a fire-rated system?”**

Answer: Unless otherwise specified in the specific design, gypsum board systems that are not covered with metal or predecorated must have joints taped, and joints and fastener heads covered with one coat of joint compound (minimum “Level 1” as described in Gypsum Association publication GA-214, *Recommended levels of Gypsum Board Finish*). Base layers in multi-layered systems are not required to have joints taped or fasteners covered with joint compound. Some exceptions can be made for joints above suspended ceiling systems that are properly backed by gypsum board or framing members, unless used for smoke or sound control.

**“How should butt joints be staggered?”**

Answer: Horizontal butt joints on opposite sides of the studs in single-layer applications should be staggered a minimum of 12 in. unless otherwise stated in the individual assembly. Horizontal butt joints in adjacent layers on the same face of the assembly in multiple layer applications should be staggered a minimum of 12 in. unless otherwise stated in the individual designs.

For additional details, you can always refer to the “General Explanatory Notes” section of Gypsum Association publication GA-600, *Fire Resistance Design Manual*.

## Smoke Barriers

While gypsum board acts as an effective component of a fire-resistance-rated system, it can also shield students and teachers from smoke and its toxic components. Smoke can migrate down hallways, through open penetrations in gypsum board systems and through un-dampened ductwork, shafts, etc.

Designing, constructing and maintaining gypsum board systems with smoke migration in mind can enhance life safety.

Constructing gypsum board systems to achieve fire protection and sound control and reduced air movement, with penetrations protected with UL 1479 Classified firestop systems with “L” Ratings will also achieve reduction on smoke migration.

## Abuse and Impact Resistance

Abuse resistant gypsum boards are manufactured to have greater resistance to surface damage and impacts. This is particularly important in schools where students are contacting walls on a daily basis. Abuse resistant boards are tougher to damage, yet easy to repair which reduces long-term maintenance costs and keeps walls looking good for a long time.

Besides having enhanced abuse resistant properties, they are stronger than regular boards with improved dimensional stability and reduced sound transmission.

Abuse resistance is classified in Levels (1, 2 and 3) according to ASTM C 1629 – *Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels*. Abuse is measured on surface abrasion, surface indentation, soft-body impact and hard-body impact. Level 1



classified gypsum boards offer moderate resistance and are recommended most often for school applications. However many school jurisdictions have opted for Level 3 classified boards for places where impact damage could be experienced (i.e. gymnasiums, detention areas).

Additional advantages of abuse resistance gypsum board systems are low installation cost and design flexibility. Gypsum board partitions do not need additional floor support due to their lightweight nature contrary to CMU's previously specified in schools. And as discussed earlier, gypsum board partitions can be easily erected and relocated cost efficiently, and can be decorated and redecorated numerous times.

## Sustainability

School Boards all over the country have been embracing the LEED® (Leadership in Energy and Environmental Design) rating system and designing new schools to LEED criteria. Gypsum board assists schools in contributing to the attainment of LEED credits in three major areas:

- Recycled content – Gypsum boards are made with 100% recycled paper facers and post-industrial recycled gypsum cores
- Regional materials – Gypsum boards are often manufactured close to school construction jobsites saving resources in transportation

- Indoor Air Quality – Many gypsum boards have been tested to certify them as a low-emitting material and assure indoor air quality in schools to protect students and teachers (as listed with GREENGUARD® and other agencies)

Gypsum is often called the “miracle mineral” for a reason – it provides beauty, economy and life safety all in one package by way of gypsum board. Gypsum board manufacturers continue to develop products that expand the use of gypsum board and replace materials that are less cost effective and less environmentally friendly. Building schools with gypsum board assures the highest level of student and teacher protection and the best environment for learning. 🔥

## EDITORS NOTE:

*Independent laboratories list fire rated assemblies in directories, print and on-line.*

*<http://www.ul.com> – click on “certifications,” search the U, V, or W 400 - 599 series for gypsum board partition listings for many gypsum manufacturers.*

*<http://intertek.com> – search “fire testing”*

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# Industry News

## Industry News

### **FCIA Continues International Expansion**

FCIA's 2009 Middle Eastern Seminar was a huge success, with AHJ's, contractors, distributors and manufacturers attending a full-day program. For 2010, FCIA is planning a Firestop Education Program in Abu Dhabi, UAE, to educate building officials, architects, engineers and contractors. Look for information about sponsorships for FCIA members to use as an outreach for AHJ's. Thanks to UL's Betsy Titus for bringing FCIA back in May 2009 to present at UL's Education Seminar. We had 10 FCIA members attending the FCIA Education Program prior to the UL Firestop Exam for DRI's in the UAE as well.

### **FCIA Firestop Systems Existing Building Survey Standard**

FCIA's Accreditation and Standards Committees have been working on a standard for surveying existing building conditions related to firestopping. The standard will be published by FCIA. Come to FCIA's conference in San Francisco to hear all about it.

### **Key Industry Sessions at FCIA Education and Committee Action Conference**

Listen to quality management consultant Steve Lerman teach how to build your quality manual. Whether applying for FM 4991 Contractor Approval, the UL or ULC Firestop Contractor Qualification, or International Accreditation Services IAS AC 291 Accreditation, you will want to attend this session.

### **New Life Safety Organization**

The Life Safety Organization, announced at FCIA's Firestop Industry Conference, will chart new ground in 2010. Look for a meeting of the group in the fall, and improved content on <http://www.lifesafetyorganization.org> over the next several months.

### **Fire Dampers**

At FCIA's Firestop Industry Conference, Greenheck's Mark Belke presented the key points a firestop contractor should understand when performing fire damper inspections. FCIA member contractors provide this service routinely as a way to keep the fire and smoke from spreading from the compartment of origin to other parts of buildings.

### **Fire Rated Glazing**

The Fire Rated Glazing Industry came to a consensus on glass labeling formats in 2008, in time for the 2009 International Building Code. The coalition consisted of

Koffel Associates' Bill Koffel, and the complete glazing industry. The 2009 Code language brings a uniform labeling system for fire-rated glazing that identifies fire-resistance ratings, hose stream, and other key qualities.

### **NCMA**

The National Concrete Masonry Association has a series of Tek Aids for architects, specifiers, building officials and fire marshals, including a series on fire resistance. NCMA has been a frequent speaker at FCIA's Total Fire Containment Systems Symposiums nationwide. For more information, visit <http://www.ncma.org>.

### **FCIA Education to CSI, ICC Chapters**

FCIA's education programs have been well received by the Construction Specifications Institute (CSI), International Code Council (ICC) Chapters. Our fall program in Denver brought great comments and new friendships.

### **AWCI**

The Association of Walls and Ceilings Institute Annual Convention brings important information to contractors about gypsum assemblies for fire resistance, including stud spacing, framing, taping, fastener frequency requirements, and much more. For more information, visit <http://www.awci.org>.

### **DHI Offers Education**

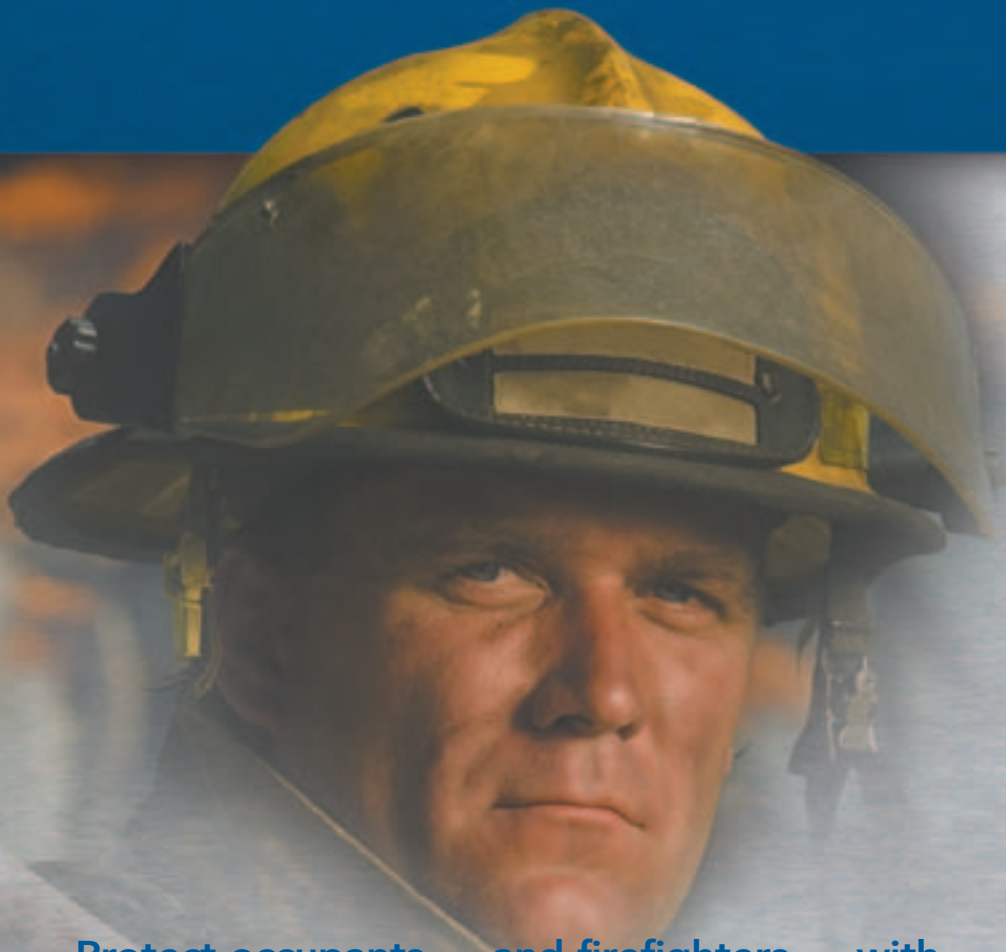
The Door and Hardware Institute's Fire Door Annual Inspection Program (FDAI) seems to be growing. Swinging doors are one of the most important fire-resistance-rated components to maintain in buildings because they are used all the time, allowing entrance and egress in buildings. The FDAI program, administered by Intertek with education from DHI, verifies that inspection personnel have a quantified minimum level of knowledge about swinging doors and hardware, plus fire resistance of the assembly as well. Visit <http://www.dhi.org> for class schedule.

### **FCIA/UL Total Fire Containment Systems Symposiums**

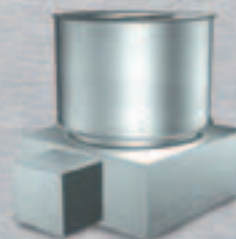
Look for four of these to take place in 2010 in strategic locations throughout North America. FCIA & UL Total Fire Containment Systems Symposiums attract building officials and fire marshals, specifiers and building owners to be educated about our industries. Visit <http://www.fcia.org> for the schedule.



Keep [ a i r ] smoke-free for everybody.



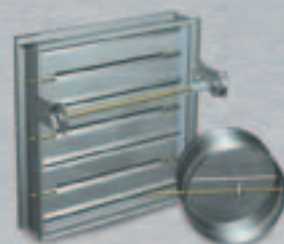
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## UL Announces New Firestop Engineer

Although not new to the firestopping industry, Luke Woods is new to UL as the "Primary Designated Engineer," or PDE. A Fire Protection Engineer, Luke has experience with W.R. Grace's Firestopping and Fireproofing Systems. Best wishes Luke in your new role at UL.

## FCIA Members Celebrate Anniversaries

FCIA member Specified Technologies, Inc., celebrates 20 years in 2010, while Thermafiber, Inc., is recognized for 75 years service to contractors worldwide. Congratulations STI and Thermafiber, from FCIA.

## FCIA Offers Condolences

With great sadness, we learned of the death of Guylene Proulx, who passed away in December. She was 48. Guylene was with the NRC in Ottawa, Canada. Ms. Proulx was a world renowned expert in human behavior in emergency situations including egress. She spoke to FCIA's Montreal FCIA Education and Committee Action Conference and had us pinned to our seats for her session.

Her unending passion for researching both the psychological response of people in emergency situations and relating this to building physical characteristics was very unique. We'll never forget how she charmed us with a very simple example... "Where's our way out," she asked? Most of us pointed to the way we came into the room and hotel. Much to our surprise, she showed us the room emptying right into an alley through a back door. This was a much faster safe egress than the way we came into the building. FCIA's membership offers condolences to her family and friends.

# Code Corner

## FCIA and ANSI, IAPMO, ASME, ASSE

FCIA participated in the IAPMO (International Association of Plumbing and Mechanical Officials) Code Development Process testifying against a code proposal that required ASME A 112.20.2, the Standard for the Qualification of Installers of Firestop Systems around Piping. ASME A 112.20.2 requires the use of plumbers with four years documented experience in the installation of PIPING, for all firestopping applied around piping. The concept was proposed by Sid Cavanaugh, a former employee of the United Association of Plumbers, Pipefitters International Union.

FCIA protested the ASME A 112.20.2 requirement in the code at IAPMO's Committee Meetings and 2008 Annual Conference during debates for the IAPMO Uniform Plumbing Code, UPC -1-2009.

FCIA also protested to the IAPMO Standards Council and IAPMO Board of Directors. Additionally, FCIA petitioned the American National Standards Institute's (ANSI) Board of Standards Review (BSR) on the issue, that four years piping experience and some education qualifies a firestop worker.

The ANSI BSR stated in its letter to FCIA, "...a journeyman plumber is not required by IAPMO's Plumbing Code because the appendix of the ASME A 112.20.2 standard states that the certification is optional."

To verify this, FCIA requested formal interpretations from IAPMO and ASME regarding the requirement for a worker with four years documented experience in the installation of piping systems.

IAPMO stated that a four-year plumber was not required. ASME stated they could not produce a formal interpretation because they transferred the standard to the American Society of Sanitary Engineers (ASSE).

Based on these actions, FCIA contractors now have statements from both IAPMO and ANSI that a person with four years experience in the installation of piping systems *is not required*, and that they can use labor as assigned by the employer.

Does this story seem complicated? Contact the FCIA office if you have questions, and watch FCIA.org, members only, for a packet to be used when jurisdiction disputes take place about firestopping.

## The ICC 2009/2010 Code Development Cycle is halfway through its process

The Committee Action Hearings took place in Baltimore, Oct. 24 – Nov. 11, 2009.

FCIA participated in the Baltimore hearings, and with very significant accomplishments to bring better Design, Installation, Inspection and Maintenance (DIIM) to firestopping.

William E. Koffel, of Koffel Associates, Inc., and Bill McHugh, FCIA Executive Director represented FCIA at the hearings testifying on code proposals advocating our industry. Here's a summary of what happened:

ADM12-09/10), IBC 107.2.6 (New), was the most interesting of the group. Several fire marshals, building officials and others supported the requirement for "Fire Resistance Designs from Approved Sources," (the Systems Directory Listings), approved prior to start of firestop installation. Yet, when the committee voted, it was DISAPPROVED. FCIA and others will public comment on this proposal to be heard in Charlotte in September.

FS72 and FS73, 713.2 (New) proposed that FM 4991 and/or UL contractor qualifications be required for contractors installing firestopping in buildings having occupied floors located more than 75 ft (22,860 mm) above the lowest level of fire

department vehicle access or buildings assigned an Occupancy Category of III or IV in accordance with Table, 1604.5. Our public comment will focus on programs administered by approved agencies rather than naming the FM/UL programs directly, and show the growth of the available contractors in the areas in question. FS 85 and FS 86 are similar, but pertain to joints using the same concepts as FS 72 and FS 73.

Firestop Engineering judgments were attempted to be clarified in FS74–09/10, 713.2.1 Alternative Methods. The proposal language states, “Where the configuration of a penetrating item or group of items is such that listed penetration firestop system tested in accordance with ASTM E 814 or UL 1479 is determined to be non-existent and reconfiguration of the penetrations or fire-resistance-rated assembly is determined to be impractical or impossible, alternative methods for maintaining the integrity of the required fire-resistance rating of the assembly shall be permitted to be established by any of the following methods or procedures.

1. Designs documented in approved sources but not in public directories.
2. Calculations performed in an approved manner.
3. Engineering analysis based on a comparison of approved penetration firestop systems tested in accordance with ASTM E 814 or UL 1479 that extrapolate specific similar features from these systems and combine them to formulate an equivalent fire-resistant-rated assembly as specifically designated by the manufacturer’s technical representative of the systems specified within the referenced approved penetration firestop system.
4. Alternative protection methods as allowed by Section 104.11.”

The same type of change was also in FS83–09/10, section 713.4.2.3, for Joints. Both proposals were DISAPPROVED. The public comment focuses on the need for this passage, because it can give the building official a procedure and acceptance criteria.

In S128–09/10, a proposal requiring independent inspection of firestopping to the ASTM E 2174 & ASTM E 2393 Inspection Standards was APPROVED. (See firestopping article, this issue for more information about the standards).

With new 2009 versions of ASTM standards E 2174-09 Standard Practice for On-Site Inspection of Installed Fire Stops and E 2393-09 Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barrier, the standards were approved. This is a very positive thing for fire and life safety, as both a high performance specialty firestop contractor and inspection complete the circle of quality needed for fire and life safety.

In FS76–09/10, Table 503 limits most buildings with nonrated floor assemblies to heights less than

three stories unless an automatic sprinkler system is provided. A void or cavity material that is tested and classified for use in through penetration firestop systems is an effective method for preventing the passage of fire and toxic gas. Very often this limitation in the code relating to the number of stories of penetrating items is overlooked because the floor is not required to be fire-resistant and as a result penetrations are left inadequately protected. This was DISAPPROVED.

FS84–09/10, 714.2 (New), was APPROVED. Joint systems are not systems until they’ve been installed in accordance with the system from an approved source such as Underwriter’s Laboratories, FM Approvals, Intertek and others.

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

The proposal for Separation Requirements to IBC Table 508.4 in G 118 was also approved. After considerable debate spanning multiple years, an entirely new table for fire separation requirements of mixed-used occupancies was APPROVED at the Committee Hearings in Baltimore.

As long as there is not public comment to overturn the committee action, this new fire separation requirement will receive final approval by ICC’s voting membership at the ICC Final Action Hearings, May 14 - 23, 2010, Dallas.

FS3–09/10, 702.1, proposed modifications for the definition for a joint, and was DISAPPROVED.

There are many more code changes focusing on fire safety, fire code, egress, structural, height and area, as well as occupancy separations from various organizations. To see what’s what, download the 2,700-page document, use the PDF search to find code changes by person, organization, or section, then get involved or watch the process. Find the resources at <http://www.iccsafe.org/cs/codes/2009-10cycle/ProposedChanges.html>.







## NATIONAL UNION INSULATION CONTRACTORS ALLIANCE (NUICA)

The NUICA supplies union workers to install firestop materials across the country and Canada.  
Contact NUICA for qualified contractors in your area.

Our members hire union trained workers from the International Association of Heat and Frost Insulators and Allied Workers who train the workers in safety, installation skills, and blue print reading skills.

Our contractors supply a single source solution to the general contractor with one contractor, one material, one responsible party, and one labor source trained in the application of Firestop materials and systems.

**TEL: 847-619-9528 FAX: 847-619-9556**  
1515 E. Woodfield Road, Suite 118, Schaumburg, IL 60173

# Life Safety Digest 2010 Industry Calendar

#### March 17 to 21

International Concrete Exposition (ICON Expo)  
and NCMA Convention  
San Antonio, TX

#### April 12 to 14

International Firestop Council, Tampa

#### April 19 to 24

AWCI's Convention & Intex Expo 2010  
Denver, CO

#### April 25 to May 2

DHI's National School, Lansdowne, VA

#### April 27 to 30

FCIA Education & Committee Action Conference,  
San Francisco

#### May 12 to 14

CONSTRUCT2010, CSI Convention, Philadelphia

#### May 14 to 23

ICC Final Action Hearings, Dallas  
(Visit [iccsafe.org](http://iccsafe.org) for schedule)

#### May 26 to 30

Construction Specifications Canada, Saskatoon

#### June 7 to 10

NFPA Conference & Expo, Las Vegas

#### June 10 to 12

AIA National Convention, Miami

#### June 23 to 26

Royal Architectural Institute of Canada, Saskatoon, Saskatchewan

#### June 27 to 29

BOMA Annual Conference, Los Angeles

#### Oct. 25 to Nov. 1

ICC Annual Conference and Final Action Hearings, Charlotte  
(Visit [iccsafe.org](http://iccsafe.org) for schedule)

#### Sept. 14 to 23

DHI's 35th Annual Conference & Exposition,  
Chicago

#### October 3 to 8

Society of Fire Protection Engineers Annual Meeting, New Orleans

#### Nov. 9 to 12

FCIA Firestop Industry Conference & Trade Show, Phoenix

# Save Space. Save Time. Save Lives.



**FyreWrap® Elite 1.5**  
Duct Insulation provides fire  
protection you can count on,  
when it counts the most.



FyreWrap® Elite™ 1.5 Duct Insulation is ideal for the insulation of grease and HVAC duct systems in densely populated areas such as hotels, schools, restaurants, high rise condos, medical facilities, research labs, and sports arenas and stadiums. This lightweight, flexible material also saves valuable building space and minimizes labor and installation time. FyreWrap Elite 1.5 Duct Insulation offers:

- 2 hour fire-rated duct protection
- Space-saving shaft alternative for grease and HVAC ducts
- Thin, lightweight flexible blanket for faster, easier installation
- Zero clearance to combustibles
- Complies with NFPA 96, ICC and IAMPO Codes

- Solutions for building design and complex job configurations
- Offers both fire and insulation performance; made in USA

A FyreWrap product specification in several formats is available at [www.arcat.com](http://www.arcat.com); search using keywords Unifrax, FyreWrap or [www.unifrax.com](http://www.unifrax.com). For additional information on FyreWrap Elite 1.5 or other products, certifications, code compliance, installation instructions or drawings, contact Unifrax Corporate headquarters USA at 716-278-3800.



[www.unifrax.com](http://www.unifrax.com)

# Abuse Resistant Drywall ?

"You can't replace an 8" concrete block with 1/2" of "abuse resistant" drywall unless you write ad copy for USG !"

-Charles Ostrander  
Executive Director - Masonry Advisory Council

Any School Board, which allows a construction manager to sell them on the idea of a guaranteed maximum project cost, should be required to visit previously constructed "guaranteed maximum" school projects. Then everyone could see the extent of damage and associated increases in necessary repair costs. They would see taxpayers' investments disappearing in the name of "value engineering". Schools should be an investment in durability and quality. Skin deep abuse resistance does not belong in schools. School walls should be abuse resistant to the core!

THEY SHOW YOU PRETTY ADS . . .

WE'LL SHOW YOU A REAL PROJECT. . .



## Chicagoland High School

Interior Walls: "High Impact Drywall"  
Date Built: 1997



Was this corner abuse resistant?

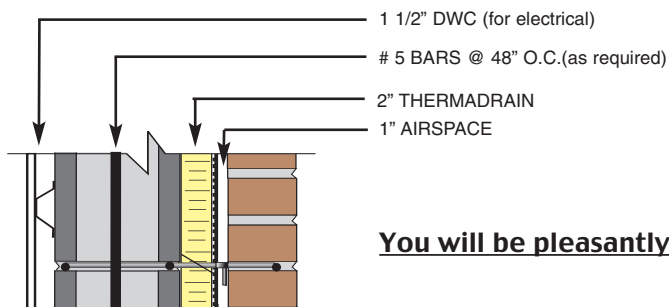


Why does this doorstop need a wood backing?

After you have been asked to value engineer out the CMU backup (supposedly for substantial initial dollar savings) and after you have properly designed a steel stud backup system with the following elements:

- Studs designed for 1/600 deflection limit.
- Double studs at windows and openings
- Dens Glas Gold exterior sheathing
- Building wrap
- Exterior closed cell rigid insulation with drainage mat
- No Batt insulation
- Special Brick ties

Also have the General Contractor bid, at the same time, the originally designed and desired wall system as follows:



**You will be pleasantly surprised!**



Why is there an extra wood protector (1x4) at the base of this gyp. wall & why have all the walls been repaired at desktop height?



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