



Passive firestop systems critical for building occupants

By Gregg Stahl

Instruments of active fire protection, such as sprinkler systems and fire extinguishers, are a common sight in most buildings – they are always located where building occupants can easily see and access them, if needed. Not as much attention is given to passive fire protection systems, embedded into interior building assemblies, away from public view. However, they are just as integral to the protection of the structure and its occupants in the event of a fire.

A key component of commercial building design, passive fire protection's aim is to contain a fire at its source and prevent the spread of flames and smoke throughout a building to allow occupants more time to safely evacuate the structure. The most important area of concentration for these passive fire protection design strategies is the wall assembly, and the most effective mode of passive fire protection is the passive firestop system.

Passive firestop systems

Fire and smoke can travel through gaps in wall assemblies. Therefore, it is necessary to seal off any wall perimeter joints or penetrations for switches, electrical boxes, power outlets or the passage of pipes, cables or HVAC ductwork with firestop materials. Typically, these materials include: sealants, intumescent materials, sprays, mechanical devices and foam blocks or pillows. It is important to remember that there isn't one universal product that will work for every firestop application. It is also important to select products that have been tested appropriately to meet applicable fire safety standards.

The two materials most commonly used in passive firestop systems for today's commercial building projects are sealants and intumescent materials. The latter can also be incorporated into integrated firestop systems, a newer passive firestop system option that is quickly becoming popular with building and design professionals.

Sealants

Sealants are the most recognized group of firestop products due to their versatility, with a variety of potential uses on construction projects, including the sealing of penetrations and construction joints. These products are available in various forms and chemical formulations. Firestop sealants in caulk, self-leveling and spray grade are readily available in silicone, latex and solvent-based products. On the downside, they often require the addition of a backing material in the system for support. Typically, the effectiveness of their application is governed by the ambient temperature of the space, and in unheated spaces during construction, this may be an issue. In addition, any overlapping work from other subcontractors, such as previously installed mechanical ductwork, piping, etc. can interfere with the sealants' application and inspection.

Intumescent materials

Intumescent materials are firestop products that expand in volume when exposed to heat or flames exceeding a specified temperature. They are one of the primary groups of products utilized in applications where one of the assembly components will deteriorate or burn away during fire exposure or where surfaces are uneven

and a tight fit is not possible. The expansion of the material closes the void that is created when the item melts or burns away, thus maintaining the integrity of the fire-rated assembly. Intumescent firestop materials come in various forms, from caulks to metallic collars with intumescent strip linings, with each product being designed for a specific purpose.

Integrated firestop systems

The integration of intumescent fire stop materials onto steel framing members is one of the most recent high-performance firestop innovations. In many of today's commercial and institutional projects, architects and specifiers are now using steel tracks manufactured with a factory-metered dosage of intumescent material applied in a controlled environment to the track flanges. These products help architects specify product and assembly solutions for both hidden and exposed aesthetic conditions where fire, smoke, and sound resistance ratings are required. Single-source construction of wall assemblies and installation of joint protection can now be achieved by drywall contractors, thereby eliminating any subcontractor overlap issues, common when installing traditional firestop materials. Track members having the intumescent material already integrated can provide up to 3 inches of movement and 3-hour fire-rated protection.

Integrated firestop products are easier to install than traditional firestop materials.

Contractors simply install the track member, which includes the intumescent tape, at the top, bottom or sides of the wall. This eliminates the need to return and install intumescent caulking at a later time, therefore eliminating multiple labor and material operations.

A case study in integrated passive firestop systems

Last year, New England Finish Systems, LLC, of Salem, N.H., was tapped to install the exterior cladding, exterior and interior framing, and drywall of Riverview Suites, a six-story, 173,000-square-foot, new student residence hall at the University of Massachusetts Lowell. Tasked with finishing all seven floors – five of which having 22 units a piece – in less than a year, the contractor was faced with a tight timeframe and budget. While the exterior framing and cladding portion of the project was comparatively straightforward, the contractor needed products that would help them to meet the tight turnaround for the framing and construction of the building code-required 3-hour fire-rated interior wall assemblies.

The contractor usually used a combination of intumescent caulking sprays and mineral fiber strips to seal top-of-the-head joints and penetration openings in fire-rated wall assemblies. However, using these products would have added time and expense onto the project.

"Our standard passive firestopping methods would have produced extra work for us on this project, with its non-typical flat metal roof and floor decking," said Frank Murphy, general foreman for New England Finish Systems. "Plus, the caulking sprays are not cheap. Using them on a project of this scale and remaining within the project budget would have been difficult."

Their firestop product search led them to BlazeFrame, an innovative, new integrated firestop system from ClarkDietrich Building Systems. After a presentation from ClarkDietrich on the product, New England Finish Systems opted to use BlazeFrame for passive firestopping on the project. Offering several performance and installation benefits, it was an ideal fit.

How BlazeFrame works

BlazeFrame is an innovative steel framing-passive firestop combination product that features a factory-installed intumescent strip affixed to steel profiles, which allows contractors to simultaneously frame, fire-

stop and acoustically seal both the dynamic and static joints of interior walls. This eliminates the need to use specialty intumescent caulks and sprays in the construction of fire-rated wall assemblies, as well as drywall ribs and contour drywall "castle" cuts throughout the joint system. The elimination of these factors can save contractors considerable time and money.

The 2 millimeter-thick cured intumescent strip is odor-free, effective immediately and remains unaffected by freezing, wet or humid conditions. It provides air, smoke and sound seals, and when exposed to heat above 375° Fahrenheit, it expands up to 35 times its size. This provides protection from heat and flame passage during a fire. BlazeFrame also offers protection and support of wall framing materials for up to 3 in. of movement capability. This UL-classified system is fire-rated for 3 hours and provides positive attachment of wall framing, 100 percent unencumbered movement, smaller installed joints and acoustic control with no fatigue or degradation.

BlazeFrame complies with all building codes, and the product has been evaluated to meet applicable safety standards in accordance with UL 2079: Standard Test Method for Building Joint Systems, ASTM E 1966: Standard Test Method for Fire Resistive Joint Systems and ASTM E 814: Standard Test Method for Fire Tests of Firestop Systems.

BlazeFrame installed

New England Finish Systems began the interior framing layout in August 2012, with a crew of three. One carpenter would install the BlazeFrame head of wall deflection tracks on each floor, and after HVAC ductwork was hung, the rest of the framing crew returned to construct the remainder of the wall assembly with 3-5/8-in. ClarkDietrich precut light-gauge steel studs. Stud spacing for interior walls and area separation firewalls was 16 in. on-center.

The crew found that BlazeFrame was easier and faster to install and a better fit for this installation than their typical firestopping methods. On average, the crew was able to complete a floor in a week's time.



"Most of the time in buildings like this, you have steel I-beams spanned by corrugated steel decking, but the property owner preferred flat metal decking instead," Murphy said. "We found that the BlazeFrame product lends itself very well to a flat decking installation like this, and it saved us plenty of labor and caulking. We also had fewer safety risks because there wasn't as much time spent on the ladder installing the tracks and sealing joints. BlazeFrame helped us shave several days off our schedule and finish earlier than expected, so we were very pleased with it."



All told, the project required 12,000 lineal feet of the BlazeFrame 3-5/8-in. track, 500 lineal ft. of BlazeFrame expansion joint and 24,000, 4- by 9-foot sheets of 5/8-in. drywall. Riverview Suites opened this August for the 2013-14 school year at University of Massachusetts Lowell, with all rooms occupied.



Conclusion

Passive firestop systems are crucial to the design of all commercial buildings, helping to increase occupant safety and allow project teams to meet building code requirements. Combined with active fire protection methods and occupant education, these passive fire protection techniques provide a safer, more balanced strategy for protecting a building and the people inside.

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