Construction Concerns: Firewall Penetrations

Article and photos by Gregory Havel

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Fire-rated partitions and floor-ceiling assemblies as described in National Fire Protection Association (NFPA) 101, Life Safety Code, and in the NFPA and International Code Council (ICC) building and fire codes are used to separate hazards and areas of buildings from each other. In schools and health care facilities, they separate classrooms, patient rooms, and treatment rooms from each other and from corridors and stairways. In multifamily residential buildings, they separate individual apartments from each other and from corridors and stairways (the means of egress).

In any building, fire-rated partitions must be penetrated by pipes, electrical conduits, cables, and other utilities so that the building can function. Each of these penetrations must be protected so that the fire rating of the floor-ceiling assembly or wall will not be compromised.

Photo 1 shows a pipe penetrating a fire-rated masonry wall that was exposed during a remodeling project. On this side of the wall, a rated fire caulk has been installed over backing material, sealing the space between the pipe and the masonry.
Photo 2 shows the other side of one of the many firewalls in this building. Even though one side of the wall may be protected properly at each penetration with backing material and fire caulk, the other side of the wall is unprotected. There was no attempt to seal the space between the pipes and the masonry, concrete, or gypsum board drywall on both sides of the wall.
Penetrations of firewalls are usually inspected by the building officials; fire inspectors are often not in the building until it is ready to be issued an occupancy permit, at which time the penetrations are often concealed above suspended ceilings.

Following are two pages from the Underwriters Laboratories (UL) On-Line Certifications Directory, System Number W-J-1007, a through-penetration firestop system for a single pipe four inches in diameter or smaller that passes through a concrete or masonry wall. Please note that this and most other systems require backing material and fire caulk on both sides of the wall, as they were designed and tested by UL (or another independent testing lab).
**ONLINE CERTIFICATIONS DIRECTORY**

**System No. W-J-1014**

**XHEZ.W-J-1014**

Through-penetration Firestop Systems

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**Design/System/Construction/Assembly Usage Disclaimer**

- Authorities Having Jurisdiction should be consulted in all cases as to the particular requirements covering the installation and use of UL Certified products, equipment, system, devices, and materials.
- Authorities Having Jurisdiction should be consulted before construction.
- Fire resistance assemblies and products are developed by the design submitter and have been investigated by UL for compliance with applicable requirements. The published information cannot always address every construction nuance encountered in the field.
- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the General Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
- Only products which bear UL’s Mark are considered Certified.

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**Through-penetration Firestop Systems**

See General Information for Through-penetration Firestop Systems

**System No. W-J-1014**

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F Rating — 2 Hr

T Rating — 0 Hr

1. **Wall Assembly** — Min 5 in. thick reinforced lightweight or normal weight (100-150 psf) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Max dim of opening is 5 in.

   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Through Penetrants** — One metallic pipe, conduit or tubing to be centered within the firestop system. Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. A non annular space of 1/4 in. is required within the firestop system. The following types and sizes of metallic pipes, conduits or tubing may be used:

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A firestop system that is installed on only one side of the wall will not perform as it was designed and tested; it will likely fail early in its fire exposure. This can compromise the safety of building occupants who depend on the corridors and stairways to exit the building and for firefighters who depend on the same corridors and stairways for rescue and access to fight the fire and for their emergency evacuation routes.

Firefighters and fire inspectors must become familiar with firestop methods and materials, tour buildings under construction and remodeling to observe the installation of firestop materials, and develop a working relationship with their municipal building department so that deficiencies and omissions can be communicated and corrected.

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