

## Wall & Floor Penetration Fire Stops (FM Approval Class Number 4990)

An important technique in property loss control is the subdivision of a building into compartments and sub-compartments. This subdivision is usually accomplished by erecting physical barriers that will limit the damage caused by an event to the room of origin. The loss caused by the spread of fire damage can be minimized when effective compartmentation is incorporated into a building's design.

One method of combating the spread of fire through openings in or around barriers is to properly design and install firestopping. Firestopping is intended for use in openings in or between fire resistant walls, floor/ceiling assemblies at head of walls and at construction joints between floors and walls.

Through penetrations submitted for Approval shall be evaluated for their ability to prevent the passage of flame through or around openings in fire rated walls and floor/ ceiling assemblies and their ability to limit the transmission of heat through the assembly. In addition, no openings shall develop that permit a projection of water beyond the unexposed surface during the hose stream test.

All through penetrations shall be subjected to a fire resistance test conducted in accordance with ASTM E814 (08) "Standard Method for Fire Tests of Through-Penetrations Fire Stops" followed by a hose stream test conducted in accordance with ASTM E2226 (07), "Practice for Application of Hose Stream". An hourly rating will be assigned based on the time period for which it successfully met the performance criteria.

Through penetrations that meet the fire resistance and hose stream test criteria shall be assigned three (3) separate ratings. They are called the F rating, the T rating and the  $T_{FM}$  rating.

**The F rating** denotes the period of time which the firestop:

- Withstood the fire resistance test without developing any through openings through which flames can pass;
- Withstood the fire resistance test without the occurrence of flaming on the unexposed side of the assembly;
- During the hose stream test, did not develop any opening that allows the projection of water during the hose stream test from the stream to the unexposed side.

**The T rating** shall denote the period of time which the firestop:

- Met all the criteria of the F rating;
- Limited the transmission of heat through the assembly, as measured by thermocouples located on the unexposed side of the test assembly, as specified in ASTM E814, from exceeding a 325°F (181°C) rise above ambient temperature.

**The  $T_{FM}$  rating** shall denote the period of time which the firestop:

- Met all the criteria of the F rating;
- Limited the transmission of heat through the assembly as measured by an individual thermocouple placed on the unexposed side of the fire stop material positioned 1 in. (25 mm) from the penetrating item from exceeding a 325°F (181°C) rise above ambient temperature.

FM Approvals does not consider the performance of the thermocouples placed directly on the penetrating item for purposes of determining the  $T_{FM}$  rating as it is not viewed as part of the firestopping materials provided in trying to protect the opening.

All joint systems between adjacent floor, wall or top of wall sections shall be subjected to a fire resistance and hose stream test conducted in accordance with ASTM E1966, "Standard Test method for Fire Resistance Joint Systems". If successful, the assembly will be assigned an Assembly Rating based on the time period in which it has successfully met the performance criteria. Floor-to-floor and floor-to-wall joint systems shall also be subjected to the same fire test but are not required to be subjected to a hose stream test.

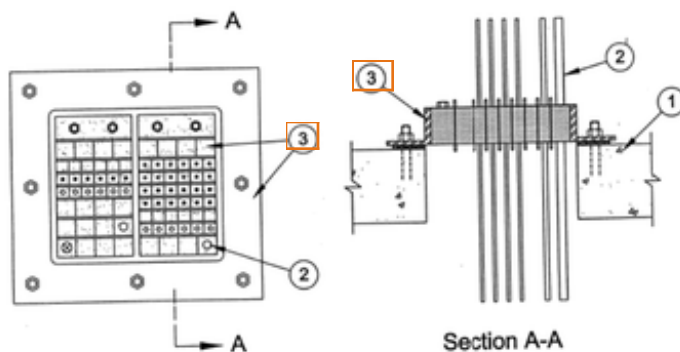
All joint systems shall be subjected to a cycling test conducted in accordance with ASTM E1966 prior to the fire resistance and hose stream test. Three (3) movement ratings are available – Type 1, Type 2 and Type 3.

### Fire Stop Design 676

**F Rating – 1 HR**

**T Rating – 0 HR**

**$T_{FM}$  Rating – 1 HR**



1. FLOOR OR WALL ASSEMBLY. Min 4-1/2 in. (114 mm) thick lightweight or normal weight concrete floor or wall, or minimum 8 in. (200 mm) thick concrete block wall. Maximum size of the opening shall not exceed the outside dimensions of the firestop device frame (Item 3) excluding the mounting flange. Max area of the opening is 100 in<sup>2</sup> (0.064 m<sup>2</sup>) with a maximum dimension of 11-5/8 in. (300 mm).

2. CABLES. Cables are to be rigidly supported on both sides of the floor or wall assembly. The following types and sizes of cables may be used.
- Max 12 pair No. 22 AWG copper conductor communication cable with polyvinyl chloride insulation and jacket materials.
  - Multiple fiber optical communication cables jacketed with polyvinyl and having a max outside diameter of ¼ in. (6.4 mm).
  - Max 100 pair No. 24 AWG copper conductor communication cable with polyvinyl chloride insulation and jacket materials. A max of 100 pair or two 50 pair No. 24 AWG communication cables may be used in each firestop device steel frame module.
3. The firestop system shall consist of a rectangular steel frame with a steel mounting flange, multi-diameter elastomeric sealing modules, steel stay plates and a compression unit consisting of a Roxtec Wedge. The firestop device shall be installed on the top surface of the floor and on both sides of the wall assembly in conjunction with elastomeric gaskets in accordance with the manufacturer's installation instructions. The steel frame of the firestop system shall be secured to the floor or wall surfaces with 3/8 in. (10 mm) diameter steel anchor bolts in conjunction with nuts and steel washers through pre-drilled holes in the steel frame mounting flange. The rectangular opening(s) of the device shall be filled with multiple rows of multi-diameter elastomeric sealing modules with a max of one cable in each sealing modules. The sheets of the multi-diameter sealing module halves are removed one by one until a max gap of 0.04 in. (1.0 mm) is formed between the two modules halves when the module halves are installed around the individual cable. When the number of sealing modules exceeds the number of cables, the solid cylindrical cores of the unpenetrated multi-diameter sealing modules shall be left in place or "blank" (solid) sealing modules shall be used. During installation of the elastomeric sealing modules, thin stay plates shall be used to separate the rows of sealing modules and to retain the sealing modules within the steel frame. After installation of the modules, the bolts of the compression unit are tightened to form an effective seal around the through penetrants and insert modules.

### 3. Frames, Sealing Modules

#### Frames

G-2x1; G-2x2; G-4x1; G-4x2; G-6x1; G-6x2; G-8x1; SF-2x1; SF-2x2; SF-4x1; SF-4x2; SF-6x1; SF-6x2 and SF-8x1.

#### Sealing Modules

RM 20 and RM 30 Multi-Diameter Sealing Modules

<b>Company Name:</b>	Roxtec International AB
<b>Company Address:</b>	Box 540, SE-371 23 Karlskrona, Sweden
<b>Company Website:</b>	<a href="http://roxtec.com">http://roxtec.com</a>
<b>New/Updated Product Listing:</b>	No
<b>Product Type:</b>	Misc Firestopping Devices
<b>Listing Country:</b>	Sweden
<b>Certification Type:</b>	FM Approved
<b>Class of Work:</b>	4990-Penetration Seal & Fire Stop