

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.

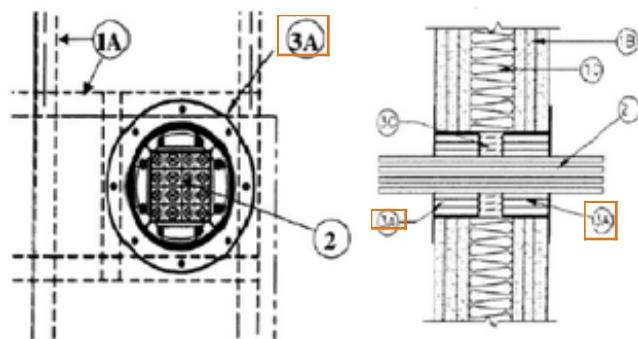
All joint systems shall be subjected to a cycling test conducted in accordance with ASTM E1966 prior to the fire resistance and hose stream test. Three (3) movement ratings are available – Type 1, Type 2 and Type 3.

Fire Stop Design 643

F Rating – 3 HR

T Rating – 2 HR (see item 3)

T_{FM} Rating – 3 HR (see item 3)



- 1. WALL ASSEMBLY.** One or two hour fire rated gypsum wall assembly constructed with steel channel studs.

- Steel studs are channel shaped, min 3-5/8 in. (92 mm) deep and 1-5/8 in. (41 mm) wide with 1/2 in. (13 mm) folded back

flanges. Fabricated from 20 MSG galvanized steel, spaced a max of 16 in. (400 mm) on center. Additional framing members are to be installed to form a rectangular box having dimensions which are a max ¼ in. (6 mm) greater than the width and height of the firestop device frame (Item 3A), excluding mounting flanges. Max area of framed opening is 90 in² (580 cm²) [R-200 Device]. Max dimension of the opening is 9-1/2 in. wide x 9-1/2 in. high (240 mm x 240 mm) [R-200 Device].

- b. Gypsum Board. Min three (3) layers of ½ in. (13 mm) thick Type C gypsum wallboard.
 - c. Mineral Wool. Mineral wool batts or blankets shall completely fill the stud cavity.
2. **CABLES.** Aggregate cross-sectional area of the cables in each device shall be from 0 to 100% fill. Cables shall be rigidly supported on both sides of the wall assembly.
- Max 3/C No. 14 AWG MC type copper conductor power cable with XLP insulation and PVC jacket material.
 - Max 2/C No. 14 AWG metal clad or Tech 90 type copper conductor power cable with XLP insulation and PVC jacket material.
 - Max 4/C No. 8 AWG copper conductor power cable with cross linked polyolefin insulation and neoprene jacket materials.
 - Max 19/C No. 14 AWG TC or TC-ER type copper conductor control power cable with ethylene propylene rubber (EFR) insulation and chlorinated polyethylene (CPE) jacket materials.
3. **FIRESTOP SYSTEM.** The firestop system shall consist of the following:
- a. **Firestop Devices – Circular firestop device for use in preformed openings.** The firestop device shall be inserted into the framed opening and friction fit on one side of the wall assembly. Each device consists of a single/multi-diameter elastomeric sealing module and a steel compression plate. The square openings of each device frame shall be filled with a single elastomeric sealing module with a max of one (1) cable per sealing module. The steel flange of each firestop device shall be secured to the steel stud framing of the wall assembly through the gypsum wallboard layer by means of No. 8 x 3 in. (75 mm) long self-drilling, self-tapping steel screws through the predrilled holes in the device frame mounting flange. The sheets of the multi-diameter sealing module halves are removed one by one until a max gap of 0.04 in. (1 mm) is formed between the two modules halves. After installation of the modules into the device, the bolts of the compression unit are tightened to form an effective seal around the cables. The firestop device shall be installed in accordance with the manufacturer's written installation instructions.
 - b. **Silicone RTV Sealant (not shown) –** A min ¼ in. (6 mm) diameter bead of silicone RTV sealant shall be applied as a gasket between the device frame mounting flange and the gypsum wallboard. The sealant bead shall be located between the edge of the opening and the line of fasteners around the entire perimeter of the framed opening.
 - c. **Packing Material –** Pieces of minimum 3 in. (75 mm) thick, min 2.8 lbs/ft³ (45 kg/m³) density mineral wool batt insulation cut to line the four (4) sides of the through opening within the wall cavity. Pieces are cut to length and tightly friction fit between the framing of the wall opening and cables and in-between cables flush with the wall surface.

3a.

Frame, Sealing Modules

Frames

Types R-70; R-75; R-100; R-125; R-127; R-150 and R-200 and their corresponding flanges SLFR70; SLFR75; SLFR100; SLFR125; SLFR127; SLFR150 and SLFR200.

Types R-70 EMC; R-75 EMC; R-100 EMC; R-125 EMC; R-127 EMC; R-150 EMC and R-200 EMC and their corresponding flanges SLFR70; SLFR75; SLFR100; SLFR125; SLFR127; SLFR150 and SLFR200

Sealing Modules

RM, RM ES, RM PE, RM ES B or RM PE B Sealing Modules

*When RM ES B or RM PE B sealing modules are used, the T and T_{FM} ratings are 0 Hr.

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| Company Name: | Roxtec International AB |
| Company Address: | Box 540, SE-371 23 Karlskrona, Sweden |
| Company Website: | http://roxtec.com |
| New/Updated Product Listing: | No |

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|----------------------------|-----------------------------------|
| Product Type: | Misc Firestopping Devices |
| Listing Country: | Sweden |
| Certification Type: | FM Approved |
| Class of Work: | 4990-Penetration Seal & Fire Stop |