



## Firestopping

**Category:** Commercial Construction

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**Responsible Bureau Section:** Plan Review  
PO Box 8120  
Portland, OR 97207-8120  
503-823-7301

Structural/Mechanical  
PO Box 8120  
Portland, OR 97207-8120  
503-823-7303

### BACKGROUND

Firestopping refers to the sealing of penetrations of fire rated walls, floors and ceilings to stop the spread of fire and/or products of combustion. Generally, materials used for firestopping must be tested and approved for this use.

This program guide summarizes the basic code requirements for firestopping of penetrations and the process through which the Bureau will review and approve firestopping and its installation. These requirements apply to all commercial construction.

The Structural Specialty Code does not contain prescriptive standards on how firestopping must be done, but requires fire stop assemblies to pass performance tests. Because there is a wide variety of penetrating items, through a variety of walls which can be protected by a variety of approved, listed firestop material/assemblies, communication between the building designer, the Bureau and the contractor and sub-contractors is essential to assure compliance with these requirements.

### A. Summary of Code Requirements

The Structural Specialty Code requires firestopping to be installed in walls and floor/ceiling assemblies as follows:

1. Walls:
  - a. Through penetrations of walls which are either:
    - (1) Bearing walls required to be of fire resistive construction; or
    - (2) Walls required to have protected openings.
  - b. Membrane penetrations, of one side of a wall, which are either:
    - (1) Larger than those made by typical steel electrical outlet boxes;
    - (2) By materials other than steel.
2. Floors: Through penetrations of floors which are not within a shaft or exit enclosure must be firestopped when the floor is either:
  - a. Required to be fire-resistive; or
  - b. Is part of a floor-ceiling assembly.

(Sections 709, 710 and 711 of the Structural Specialty Code provide a list of exceptions where penetrations don't have to be protected or can be protected by other means.)

In each instance the penetration must be protected with fire stops suitable for the method of penetration. Examples of rated wall and floor/ceiling assemblies required to have protected openings include, but are not limited to, area separation walls, occupancy separations, corridors and shaft enclosures. Historic materials such as joint compound, plaster of paris, etc.; or stuffing annular spaces around penetrations with glass or mineral fibers, are not acceptable. Concrete, grout and mortar may be used in limited circumstances for metallic penetrations of concrete or masonry walls.

Penetrations can be made for a variety of reasons with a variety of materials. Plumbing, electrical, communication, HVAC systems as well as sprinkler and detection and alarms systems each result in penetrations of these assemblies. The penetrations can be for pipe, conduit, wiring or ducts; the materials of those items can be either metal, glass or plastic, depending on other construction requirements. The penetrations of wall and floor/ceiling assemblies need to be protected at each penetration with a fire stop which is listed and approved for the particular characteristics of each penetration.

Ducts are not considered penetrations when they have fire dampers or smoke/fire dampers and retaining angles. Ducts without fire dampers must be considered as penetrations and firestopped in an appropriate manner. Where fire sprinkler heads penetrate a membrane, firestopping is not required when the penetration is covered with a metal escutcheon plate.

### 3. Penetrations

There are two broad types of penetrations: Through and Membrane.

THROUGH PENETRATIONS are penetrations that pass completely through both sides of a wall or floor/ceiling assembly.

Through penetrations of rated walls are required to be firestopped with assemblies having an F rating. In some circumstances, through penetrations will also require a T rating. Penetrations of floor/ceiling or roof/ceiling assemblies must also have firestop assemblies with a T rating.

MEMBRANE PENETRATIONS are penetrations which pass through only one side (wall, floor or ceiling membrane) of an assembly.

Typical examples of membrane penetrations are electrical outlet and switch boxes as well as plumbing pipes serving individual fixtures.

### 4. Performance Standards

Penetrations must be firestopped in order to maintain the fire-resistive integrity of a wall or other fire-resistive element of a building. Firestopping is accomplished by approved materials or an approved assembly of materials. The assembly is tested (according to UBC Standard 7-5) and if approved is given one or two ratings.

#### Firestop Ratings

There are two key ratings which firestopping are assigned as a result of testing:

F RATING is the time period that a penetration firestop system (assembly) limits the passage of fire through the penetration when tested according to UBC Standard 7-5.

T RATING is the time period that a penetration firestop system (assembly), including the penetrating item, limits the maximum temperature rise to 325E F. (163E C.) above its initial temperature through the penetration on the nonfire side, when tested according to UBC Standard 7-5.

## **B. Workmanship**

The annular space (the space around the penetrating item) shall not exceed the maximum specified for the firestopping material/assembly being used. Firestop material/assembly installations must comply with the manufacturer's installation instructions specific to the material/assembly. Coordination between trades is essential to ensure firestopping which complies with the code.

## **C. Fireblocking**

Firestopping is not the same as fireblocking. Fireblocking is achieved by installing various building materials at key construction points to resist the free passage of flame in wood frame construction. Wood frame construction is typically used in residential and smaller commercial buildings. In general, fireblocking is not a tested or rated assembly.

## **D. Process**

### 1. Application - Design Professional

The design professional provides in the project specifications a list of the types of penetrations anticipated (piping, conduit, undampened ducts, metal or plastic) and a list of acceptable manufacturers (products) to address the various penetrations and penetrating materials. (This would be found in Section 07270 of the CSI standard specifications and should also be referred to in Divisions 14, 15 & 16.)

### 2. Application Review - Bureau Plans Reviewer.

The Bureau plans examiner will verify that the permit application includes the listings required by Step 1, above. (Approval of specific firestop materials/assemblies will occur at Step 3.3, below.)

### 3. Prior to construction

#### a. Pre-installation meeting - Contractor/Building Inspector

The contractor will organize and conduct a meeting to include:

- Each contractor whose work includes firestopping installations;
- The Bureau inspector; and

- The project architect/engineer.

In most cases it may be appropriate for the design professional responsible for the design and specifications to attend as well.

The Bureau encourages contractors to arrange these meetings early in the construction which allows ample time to anticipate problems or concerns and reduce the need for corrective work later. The meeting agenda will include discussions of the anticipated penetrations, the expected firestop materials/assemblies to be used, job site conditions, expectations on workmanship and tolerances to be allowed.

b. Installation Schedules - Contractors

Each contractor will provide to the Bureau's inspector a list of firestop materials/assemblies which will be used, the type of penetrations where each material/assembly will be used; and the listing and approval information (i.e. UL or ICBO report/listing numbers.) This information must be submitted to, and approved by, the Bureau prior to any installation.

Where a firestop material/assembly was not listed in the specifications, the contractor must have a written approval from the design professional that the product is appropriate for the intended installation. A copy of this approval must be supplied to the Bureau inspector.

c. Approval of firestop materials/assemblies - Bureau Inspector

The Bureau inspector will review the list of intended firestop materials/assemblies and inform the contractor that the list or lists are approved, or if not, what additional information is needed in order to have the list(s) approved.

4. Construction - Contractors

During construction each contractor shall install firestops listed in the specifications and which were approved by the Bureau prior to construction.

Penetrations in fire-resistive assemblies shall not be concealed from view until inspected and approved by the Bureau inspector.

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### 5. Inspections - Bureau Inspector

The Bureau inspector will inspect each type of firestop installation. Within each type of firestop, the inspection is random. Inspection may require a destructive test of the installation.

If the destructive test(s) indicate non-compliance of the installations, additional tests will be required.