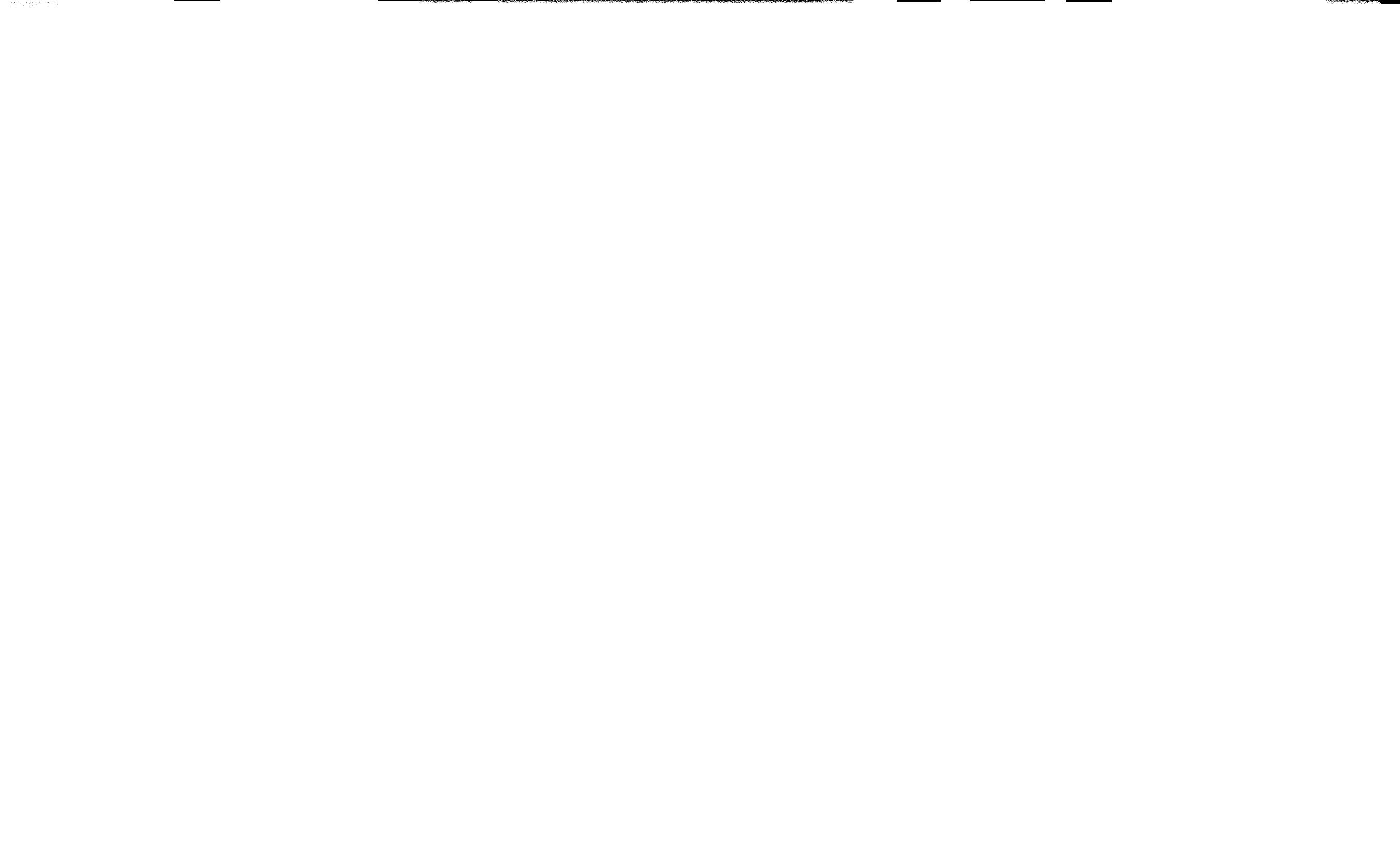


# Sealing Cable Openings and Penetrations – Fire Protection Measures

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# 1 . General

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- 1.1 Purpose** This practice:
- Describes the administrative and technical issues.  
AND
  - Establishes the material and installation procedures for sealing cable openings and penetrations in all GTE Network Services:
    - Buildings.
    - Walls.
    - Floors.
- 1.2 Filing Instructions and Supersedures** Discard all previous issues and associated addenda of this practice and file this issue numerically in your GTE Network Services practices set.
- This practice supersedes and cancels:
- All policies, procedures, general instructions, letters, and memoranda which address this subject.
  - Any document which provides information contrary to the information contained in this practice.
- 1.3 Reason for Reissuing** This practice has been reissued to incorporate multiple changes in the content. Read this entire practice to ensure your familiarity with the new information.
- The changes include:
- Label Item ID in Sections 3.4 and 6.1 and Exhibit 3.
  - Stirrup ordering information in Section 7.3.
  - Clarified verbiage in Sections 2.3 and 7.4.
  - Removed Fire Dam 150 Caulk in Sections 6.1 and 7.2.
- 1.4 Responsibility** This practice was published by the GTE Network Services Enterprise Services Department. For more information about this practice, contact the GTE Network Services Headquarters Building Services – National Building Services and Technologies Group.
- 1.5 Disclaimer** This practice was prepared solely for the use of GTE Network Services. It must be used only by its employees, customers, and end users when installing, operating, maintaining, and repairing GTE Network Services' equipment, facilities, and services. Any other use of this practice is forbidden. The information contained in this practice may not be applicable in all circumstances and is subject to change without notice. By using this practice the user agrees that GTE Network Services will have no liability (to the extent permitted by applicable law) for any consequential, incidental, special, or punitive damages that may result.

## 2. Overview

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- 2.1 Introduction** All cable holes and penetrations must be properly sealed so that, in the event of a fire, they will not act as flues that promote the transfer of smoke, toxic vapors, and flame from one floor or room to another. Firestop systems described in this practice are designed to provide a rated method of sealing cable holes and penetrations in building walls and floors.

## 2.2 Definitions

The following chart provides definitions for the acronyms and terms used in this practice.

Acronym or Term	Definition
ASTM	American Society for Testing and Materials
AC	Alternating Current
AWG	American Wire Gauge
BF&E	Buildings, Fleet, and Energy
BOCA	Building Officials and Code Administrators
Cable Openings	<p>Openings in walls, partitions, ceilings, and floors that are used for:</p> <ul style="list-style-type: none"><li>• Communications, data, power, control, and grounding cables.</li><li>• Cable trays.</li><li>• Runways.</li><li>• Ducts.</li><li>• Conduits.</li></ul> <p>These items are specific to the telephone industry.</p> <p>Cable openings can be:</p> <ul style="list-style-type: none"><li>• Partially or fully filled.</li><li>• Blank, with no penetrations.</li></ul>
CO	Central Office
COE	Central Office Equipment
COEI	Central Office Equipment Installation
DC	Direct Current
EMI	Electromagnetic Interference

(continued)

## 2. Overview, continued

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### 2.2 Definitions, continued

Acronym or Term	Definition
Fire-Resistance Rating	The time in hours that a material or assembly of materials can withstand passage of flame and transmission of heat when exposed to fire under specified conditions of test and performance criteria.
Fire Separation	A construction assembly that: <ul style="list-style-type: none"><li>• Acts as a barrier against the spread of fire.</li><li>• Might or might not:<ul style="list-style-type: none"><li>- Have a fire-resistance rating.</li><li>- Be of combustible construction.</li></ul></li></ul> Examples of fire separations include wall, partitions, and floors.
FM	Factory Mutual
HVAC	Heating, Ventilation, and Air Conditioning
IEEE	Institute of Electrical and Electronic Engineers
IPC	International Protective Coatings
M D F	Main Distribution Frame
MSDS	Material Safety Data Sheet
NBC	National Building Code
NRTL	Nationally Recognized Testing Lab
OSHA	Occupational Safety and Health Administration
OSP	Outside Plant
Penetrations	Piping, tubing, ducts, electrical wires, cables, etc., that are part of building services and penetrate fire separations.
PPD	Plastic Pipe Device
RFI	Radio Frequency Interface
SBCCI	Southern Building Code Congress International Incorporated
UBC	Uniform Building Code
UL	Underwriter's Laboratories

(continued)

## 2. Overview, continued

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### 2.2 Definitions, continued

Acronym or Term	Definition
UPS	Uninterruptible Power Source
UV	Ultraviolet

### 2.3 References

The following chart provides sources of supplementary information relating to this practice. The documents could be required for performing certain tasks.

See...	For Information About...
117-200-002	Communications Hazards
200-001-000	Safety Precautions - Central Office
220-001-002	Safety Precautions - High-Risk Activity
<b>628-020-202</b>	Underground Cable Conduits - Rubber Plugs
<b>628-020-203</b>	Underground Cable Conduits - Sealing Kits
795-805-071	Grounding
ASTM E84*	Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM E814*	Fire Tests of Through-Penetration Firestops
IEEE 634?6	Standard Cable Penetration Firestop Qualification Test
PSB 4843, Rev 03 + †	Fire Barrier Materials
UL1479**	Fire Tests of Through-Penetration Firestops

\* Published by the American Society for Testing and Materials (ASTM).

\*\* Published by Underwriter's Laboratories (UL).

† Product Standardization Bulletins (PSBs) are published by the GTE Network Services Standardization Management Department.

†† Published by the Institute of Electrical and Electronic Engineers (IEEE).

### 2.4 Implementation Requirements

Seal all new cable openings and penetrations with an approved firestop assembly as specified in this practice. Upgrade existing openings to the standards of this practice when cable work (adding or deleting cable) occurs.

### 3. Administrative and Technical Information

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#### 3.1 Fire Safety in Buildings

Fire safety measures in the design and construction of buildings must minimize the risk of fire and loss in terms of:

- Property damage.
- Danger to the health and life of people in and around buildings.

Active fire safety measures include:

- Fire detection.
- Alarm and suppressions systems.
- Sprinklers.
- Stand pipes.
- Fire-fighting equipment.
- Halon systems.
- Smoke control.
- Exhaust systems.

Passive fire safety measures are achieved by:

- Limiting the size of buildings.
- Providing spatial separation between buildings.
- Using noncombustible construction.
- Compartmentalizing and sealing building areas.
- Using fire-rated assemblies for fire separation of areas.
- Providing adequate and well-protected means of evacuation.

#### 3.2 Responsibilities

The responsibilities for ensuring that cable openings and penetrations are properly sealed are as follows.

<b>The Following Departments...</b>	<b>Are Responsible For...</b>
COE Engineering, COE Construction, and Switch Maintenance	<ul style="list-style-type: none"><li>• Active openings (with cables) in walls and floors.</li><li>• Openings where cables have been removed, but the opening will be used in the future.</li></ul>
OSP Construction and Switch Maintenance	Openings in floors and walls separating cable vault and MDFs.
OSP Construction	OSP cable entrance openings.
BF&E and Building Services	Abandoned cable openings.
BF&E	Other types of existing openings and penetrations.

(continued)

### 3. Administrative and Technical Information, continued

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#### 3.2 Responsibilities, continued

me Following Departments...	Are Responsible For..
Building Services Engineering	Cable openings and penetrations in new construction and renovations.
OSP Construct ion	OSP cable entrance openings.

The department responsible for sealing cable openings and penetrations must close all cable openings at the end of each day (or immediately upon completing cabling operations), even if more cables will be placed in the cable opening the next work day. This is required to ensure proper fire protection. See Section 5.11 for instructions.

In renovation projects, the various groups responsible for sealing cable openings and penetrations must coordinate their activities with:

- Each other.
- The CO coach/supervisor.

The CO coach/supervisor must maintain a Cable Hole (Firestop) Open/Close Schedule (Form 000789PS, see Exhibit 1) to monitor cable hole opening and closing activities. Specifically, he or she must:

- Establish the number for each cable opening and enter it on the form.
- Complete the form according to the instructions in Section 3.3.
- Review the schedule for accuracy quarterly.
- Locate the schedule near the fire control panel.

If new openings are created or old ones abandoned, the responsible department must notify the CO coaches/supervisors to update the form.

**NOTE: The Cable Hole (Firestop) Open/Close Schedule can be ordered through the local print shop.**

### 3. Administrative and Technical Information, continued

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#### 3.3 Form Completion Instructions

The following chart provides instructions for completing the Cable Hole (Firestop) Open/Close Schedule.

In the Block Entitled...	Enter...
Central Office Name	The name by which the CO is known.
Cable Hole/Opening #	The number established for the opening, where XYZZ means the following: <ul style="list-style-type: none"><li>• X- Floor of the building: 1, 2, 3, B for basement, etc.</li><li>• Y-Direction the wall is located: N, S, E, W, or F for floor.</li><li>• <b>ZZ</b>- A number (1-99) that represents each hole on the wall or floor for each floor level of the building.</li></ul> <b>EXAMPLE: A single story building has five cable openings, one on the north wall and four on the west wall. The north wall opening is labeled 1 N01 , and the west openings are labeled 1W01 through 1W04.</b>
Rated Opening Per Practice 742-200-070	Y for yes or N for no.
Contact Name	The name of the person responsible for opening the cable hole.
Contact Tel. No.	The telephone number where the contact name can be reached.
Open Date	The date the cable opening is opened for cable activity.
Tentative Close Date	The date the cable work is anticipated to be complete and the cable opening closed. <b>NOTE: The hole must be temporarily closed after each work activity. See Section 5.11.</b>
Actual Close Date	The date the cable work is complete and the hole is closed.
C.O. Supervisor Approval	The signature of the CO coach/supervisor. Obtain this at the time the cable hole is closed.

## 3. Administrative and Technical Information, continued

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3.4 All cable openings and penetrations must be:

**Sealing of Cable  
Openings and  
Penetrations:  
Firestops**

- Sealed to:
  - Prevent flame.
  - Minimize the transmission of smoke and heat from one room or floor to another.
- Contain halon, if provided, within the space.

Firestop systems and assemblies used for sealing cable openings and penetrations must have fire ratings as specified in Section 3.5.

Identify all cable opening firestop installations by a prominent notification/warning label, Item ID 372761, indicating:

- A warning.
- Use of a firestop barrier.
- The proprietary name.

See Exhibit 3.

Building Services and COE Construction are responsible for placing the label when:

- A new opening is established.
- An existing opening is upgraded.

**NOTE: Service penetrations do not require notification/warning labels.**

**3.5  
Approval  
Authorities**

Materials and methods of sealing cable openings must meet the requirements of jurisdictional authorities such as:

- UBC.
- BOCA.
- SBCCI.
- NBC.
- Federal, state, and municipal authorities.
- Building inspectors.
- Fire marshal.
- Worker's Compensation board.
- OSHA.
- FM.

### 3. Administrative and Technical Information, continued

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#### 3.6 F/T Ratings

Firestop assemblies are assigned a fire rating of either F or T when tested in accordance with the standard method of fire tests of firestop systems. The following chart explains the criteria for assigning these two ratings.

Rating	Criteria
F	<ul style="list-style-type: none"><li>• No flame occurrence on the unexposed surface during the test period.</li><li>• No projection of water beyond the unexposed side during the hose stream test.</li></ul>
T	In addition to the criteria for the F rating: <ul style="list-style-type: none"><li>• No flame occurrence.</li><li>• Temperature rise on the unexposed surface does not exceed 325°F.</li></ul>

When no rating for the firestop assembly is specified, it is designated as F.

#### 3.7 Testing Agency Certification

All sealing assemblies and materials must be listed and certified for F/T ratings by approved testing agencies, such as:

- . UL.
- ASTM.
- FM.
- Any other NRTL.

#### 3.8 Firestop Standards

Acceptable and approved firestop assemblies must be qualified based on testing requirements of the following standards:

- . ASTM E814.
- UL1479.

#### 3.9 Other Combustibility Standards

The following standards apply to building materials:

- . ASTM E84.
- IEEE 634.
- FM standards.

## 3. Administrative and Technical Information, continued

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### 3.10 Governing Requirements

Different codes, standards, recommendations, and authorities having jurisdiction can have differing and sometimes conflicting requirements. In general, the most stringent requirement governs the choice and acceptability of:

- Sealing materials.
- Assemblies.
- Method of installation.

### 3.11 Health and Safety Precautions

Take all safety precautions during work on cable opening covers and sealing operations to prevent:

- Materials or tools from falling:
  - Through cable openings to the floor below.
  - To the other side of the wall partition.
- Injury caused by the hazards of cable openings and slots in floors.

See GTE Telephone Operations Practice ZOO-001 -000 for general safety precautions against personal injury and equipment damage.

In accordance with GTE Telephone Operations Practice 117-200-002, MSDS pertinent to the material must be provided and used to determine which products might cause problems (odors, etc.) during installation. Take action (ventilation, etc.) as required.

**CAUTION: Strictly follow manufacturer's recommendations and instructions in using firestop materials.**

### 3.12 Exceptions

Small sites of less than 1,000 square feet are exempt from the requirements of this practice. Walls installed between a switch area and a frame area in a small site generally serve other purposes than as a fire barrier.

In some cases, Halon 1301 fire suppression systems protect small sites. In these sites, seal cable openings and penetrations to maintain halon concentrations necessary to extinguish a fire.

## 4. Sealing Penetrations

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### 4.1 Building Services Penetrations

Building services penetrations include:

- Domestic cold and hot water lines.
- Chilled/condenser water lines.
- Steam/hot water heating pipes.
- Sanitary, drain and vent pipes.
- Sprinkler lines.
- HVAC ducts.
- Electrical bus duct and conduits.
- Gas lines.

## 4. Sealing Penetrations, continued

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### 4.1 Building Services Penetrations, continued

Tightly fit (e.g., cast in place) building services that penetrate a fire separation required to have a fire-resistance rating. Use of combustible drain, waste, and vent piping, however, might have limitations placed on it by code requirements. If not tightly fitted, seal penetrations by a firestop system with an F rating equal to the membrane or fire separation's resistance rating (no less than 1 hour).

### 4.2 Duct Penetration

Equip with a fire damper a duct that connects two fire-rated compartments or that penetrates an assembly required as a fire separation with a fire-resistant rating. The following chart shows the proper closure ratings based on the fire-resistance rating of the separations.

Fire-Resistance Rating of Fire Separation	Required Fire-Protection Rating of Closure
45 minutes	45 minutes
1 hour	45 minutes
1.5 hours	1 hour
2 hours	1.5 hours
3 hours	2 hours
4 hours	3 hours

**NOTE:** Check local codes for branch ducts penetrating a fire separation where fire damper provisioning might not be required.

## 4. Sealing Penetrations, continued

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### 4.3

#### Functional Requirements

All firestop materials and assemblies used for sealing building service penetrations must be:

- Tested in accordance with firestop standards (see Section 3.7).
- Listed by FM or UL as an approved product or assembly.
- F/T rated to meet maximum requirements of:
  - The authority having jurisdiction.
  - Codes and regulations.
  - Surrounding fire-separation ratings.
  - F-ratings as follows:
    - One hour F for penetrations in general building areas.
    - Two hours F for sprinkler line penetrations into electronic **equipment** rooms in the CO and data center buildings.
- User-friendly; no offensive odors or fumes, low toxicity.
- Nonhazardous to health.
- Non-releasing of toxic or corrosive vapors under fire conditions.
- Non-reactive with penetrate or surrounding materials.
- Sealed against smoke and halon leakage in non-fire conditions.
- Easy to apply and rework; reuse desirable.
- Able to withstand:
  - Thermal expansion and contraction.
  - Vibration and seismic shocks.
- Rodent- and vermin-resistant.
- Easy to check for correct installation and application.
- Non-dusting during installation, use, and removal.

All firestop materials must also have:

- Flame spread and smoke development of less than 25.
- Minimum cutting, working, and waste.
- No deterioration caused by aging, UV rays, or the environment.
- Continuity of thermal and vapor barrier.
- Shelf life of one year or longer.

### 4.4

#### Product Acceptability Criteria

Acceptability of a firestop system and penetration-sealing devices is based on the following criteria:

- Satisfies functional requirements listed in Section 4.3.
- Cost-competitiveness, both initial and ongoing.
- Suitability of system to application.
- Documentation of:
  - Successful usage and track record.
  - Test configuration in accordance with Section 3.6.

For a list of manufacturers and products acceptable for sealing penetrations in COs and other buildings, see Section 6.1.

## 4. Sealing Penetrations, continued

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### 4.5

#### Installation

#### Responsibilities

Outside contractors generally seal building service penetrations in new and retrofit construction in accordance with specifications and details included in the contract. Building Services Engineering ensures correct specification and installation.

BF&E inspects and monitors the integrity of the seals:

- After installation.
- For ongoing maintenance and repair as necessary.

BF&E might also be involved in installing firestop assemblies for minor projects.

## 5. Sealing Cable Openings

---

### 5.1

#### Cable Openings

Equipment changes in COs require frequent cabling additions, removals, and rerouting. Therefore, numerous cable openings are required in walls and floors of COs to facilitate installing and routing cables and accompanying hardware. Cable openings can accommodate the following in combination or individually:

- OSP Cables.
- CO/network/communication cables.
- DC power cable and bussing.
- UPS power cables.
- Grounding cables.
- Cable trays/runways/grids.
- Metallic and nonmetallic ducts.
- Riser cables.

### 5.2

#### Cable

#### Openings- Categories

Cable openings can be categorized by various characteristics, as listed in the following chart.

Category	Description
Activity	<ul style="list-style-type: none"><li>• Active cable openings are involved in ongoing or frequent activity.</li><li>• Inactive cable openings might not be accessed for long periods of time.</li></ul>
Percentage Fill	<p>Cable openings can be:</p> <ul style="list-style-type: none"><li>• Blank without any cables passing through.</li><li>• Partially or totally full of penetrant cables.</li></ul> <p>Percentage fill is calculated by dividing the aggregate cross-sectional area of cables by the area of the opening.</p>

(continued)

## 5. Sealing Cable Openings, continued

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### 5.2

#### Cable Openings- Categories, continued

Category	Description
Size	Varies from small openings (1" in diameter) for individual small cable to large openings (2'0" to 3'0") carrying large cable bundles or tiered runways.
Shape	Generally round or rectangular, but can be any shape to suit specific requirements.
Location	Can be located in: <ul style="list-style-type: none"><li>● Walls.</li><li>● Floors.</li><li>● Ceilings.</li><li>● Partitions.</li></ul> These openings can be: <ul style="list-style-type: none"><li>● Fire separations, with or without fire-resistance ratings.</li><li>● Non-fire-rated partitions.</li></ul> <b>NOTE: Floor assemblies are considered fire separations requiring fire-resistance ratings of 1, 2, or 3 hours.</b>
Accessibility	Can be accessible from one or both sides.
Material of Construction	Can be located in poured concrete, masonry, drywall, etc., depending on construction of the building elements.

### 5.3

#### OSP Conduit Entrances

OSP conduits are sealed to keep gases and water out of the building. Seal OSP entrances in accordance with GTE Telephone Operations Practices 628-020-202 and 628-020-203.

### 5.4

#### Determining Rating

The fire-resistance ratings of existing wall and floor assemblies considered as fire separations vary depending on:

- Separation of occupancies.
  - Areas.
  - Exits.
  - Codes.

This information is generally not readily available or apparent from site inspection. In the interest of safety, all fire separations are considered to have a two-hour fire-resistance rating.

- Walls and floors separating storage garages from other occupancies must be sealed with assemblies having a minimum 2-hour T rating.
- All other sealing systems of cable openings must have a minimum two-hour F rating.

## 5. Sealing Cable Openings, continued

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### 5.5 Installation Responsibility

The following chart explains the installation responsibilities for new and existing installations.

Type of Installation	Responsibility
New construction	<ul style="list-style-type: none"><li>• Outside contractors generally seal cable openings in accordance with specifications and details in the contract.</li><li>• Building Services Engineering is generally responsible for ensuring correct specification and installation in accordance with this practice.</li></ul>
Existing: <ul style="list-style-type: none"><li>• CO buildings for new openings</li><li>• Sealed cable openings requiring re-entry</li></ul>	<p>The department opening a sealed closure ensures that openings are sealed in accordance with this practice.</p> <p><b>NOTE: See Section 3.2 for more information.</b></p>

### 5.6 Functional Requirements

All firestop systems and devices used for sealing cable openings must be:

- Tested in accordance with firestop standards (see Section 3.7).
- Listed by FM or UL as approved products or assemblies.
- F/T rated to meet maximum requirements of:
  - The authority having jurisdiction.
  - Codes and regulations.
  - Surrounding fire-separation ratings.
  - Two-hour F rating (or a two-hour T rating for parking garage separations).
- User-friendly; no offensive odors or fumes, low toxicity.
- Nonhazardous to health; MSDS information required.
- Non-releasing of toxic or corrosive vapors under fire conditions.
- Non-reactive with penetrant or surrounding materials.
- Sealed against:
  - Smoke and halon leakage in non-fire conditions.
  - Water in cold conditions after a fire.
- Easy to apply and rework; reuse desirable.
- Able to withstand:
  - Thermal expansion and contraction.
  - Vibration and seismic shocks.
- Rodent- and vermin-resistant.
- Easy to check for correct installation and application.
- Non-dusting during installation, use, and removal.

## 5. Sealing Cable Openings, continued

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### 5.6 Functional Requirements, continued

All firestop materials must also have:

- Flame spread, smoke development of less than 25.
- Minimum cutting, working, and waste.
- No deterioration caused by aging, UV rays, or the environment.
- Continuity of thermal and vapor barrier.
- Shelf life of one year or longer.

The following additional requirements are specific to CO buildings:

- Ease of re-entrance.
- Minimum ampacity derating problems.
- No effect on capacitance of coaxial cables.
- No RFI/EMI interference problems.
- Acceptance of materials as common waste for disposal purposes.

### 5.7 Product Acceptability Criteria

Acceptability of firestop materials and assemblies for sealing cable openings is based on the following criteria:

- Satisfies the functional requirements listed in Section 5.6.
- Cost-competitiveness, both initial and ongoing.
- Suitability of system to application.
- Documentation of:
  - Successful usage and track record.
  - Test configuration in accordance with Section 3.6.

For a list of manufacturers and products acceptable for sealing cable openings in COs and other buildings, see Section 6.1.

### 5.8 Cable Hole Casing and Closing Details

All cable openings in:

- Floors must have casings of welded metal construction.
- Walls must have casings of sheet metal or welded metal construction.

A contractor supplies and installs these casings in accordance with Region Building Services specifications. Exhibit 2 shows details of casing and cover for cable openings in floors. Sections 7.5 and 7.6 shows details of cable openings in walls.

**NOTE: In COs, small openings of less than one square foot might require the metal frames to be grounded if grounding cables pass through the opening. See GTE Telephone Operations Practice 795-805-071.**

### 5.9 Curbs/Covers for Cable Openings in Floors

Due to the possibility of water pipe leaks, sprinkler discharge, or other causes, water might accumulate on the floor and run down cable openings. To prevent water from cascading and minimize water damage, curb all openings in floors to a height of 3", as illustrated in Exhibit 2.

In a CO application, Building Services and COEI must coordinate having the welded curb manufactured and installed. For example, Building Services could have the curb manufactured through its resources, and COEI could install the curb. The cost of the curb and installation labor would be charged to the COE order.

## 5. Sealing Cable Openings, continued

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### 5.9 Curbs/Covers for Cable Openings in Floors, continued

In case of round holes or square slots located under a CO's MDF, where curb installation can be extremely difficult, use 3M Fire Barrier Moldable Putty and CS-195 Composite Sheet to achieve water-tightness (see Sections 7.8-7.14). Ensure that the putty is packed tightly and sloped up above floor level to shed water away from the cables.

Cover plates are required over large cable openings to prevent the collapse of firestop assemblies subjected to superimposed loads. Cover plates must:

- Safely carry all expected loads.
- Span across the opening.
- Extend a minimum of 1" beyond the edge of the opening.
- Be fastened with screws or bolts.

Fire retardant-treated (NONCOM) plywood,  $\frac{3}{8}$ " thick, is generally adequate to cover large floor hatches up to 24" x 36". Small openings or inaccessible locations might not require cover plates.

**NOTE: Fire-retardant plywood must have a UL rating for flame spread, and smoke generation of less than 25.**

### 5.10 Enlarging, Reducing, and Abandoning Existing Openings

When existing cable openings require enlargement, it is best to cut new, separate openings, if possible, rather than disturb the existing sealed openings. Use the following steps to enlarge an existing cable opening.

---

Step	Enlarging Cable Openings
1	Carefully remove the existing seal and firestop assembly.
2	Remove pan of the casing as necessary.
3	Enlarge the opening. <b>NOTES:</b> • In concrete construction, core drilling using special bits is generally easier than saw cutting. • Avoid overcutting.
4	Smooth out the sides of the enlarged opening and/or cover with sheet metal before restoring the casing.
5	Reseal the opening using the recommended firestop materials and assembly (see Section 7).

---

Take all precautions against dust, dirt, water, and accidental damage to cables and equipment. In addition, follow requirements listed in GTE Telephone Operations Practice 220-001-002.

**NOTE: Cutting new openings and enlarging existing ones must be referred to Building Services Engineering.**

## 5. Sealing Cable Openings, continued

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5.10

### **Enlarging, Reducing, and Abandoning Existing Openings, continued**

When existing cable openings are too large for any future cabling requirements and must be reduced or abandoned, fill them in with new material compatible with the existing surrounding material, such as:

- Gypsum board.
- Masonry.
- Reinforced concrete.
- Nonshrinking grout.

A new concrete plug might require using dowels or grooves cut into the existing structure.

**NOTE:** Maintain the integrity of the fire separation with the required fire-resistance rating.

**WARNING:** Do not reuse or cut asbestos board.

## 5. Sealing Cable Openings, continued

5.11

### Temporary Sealing

This section explains how to apply firestop for:

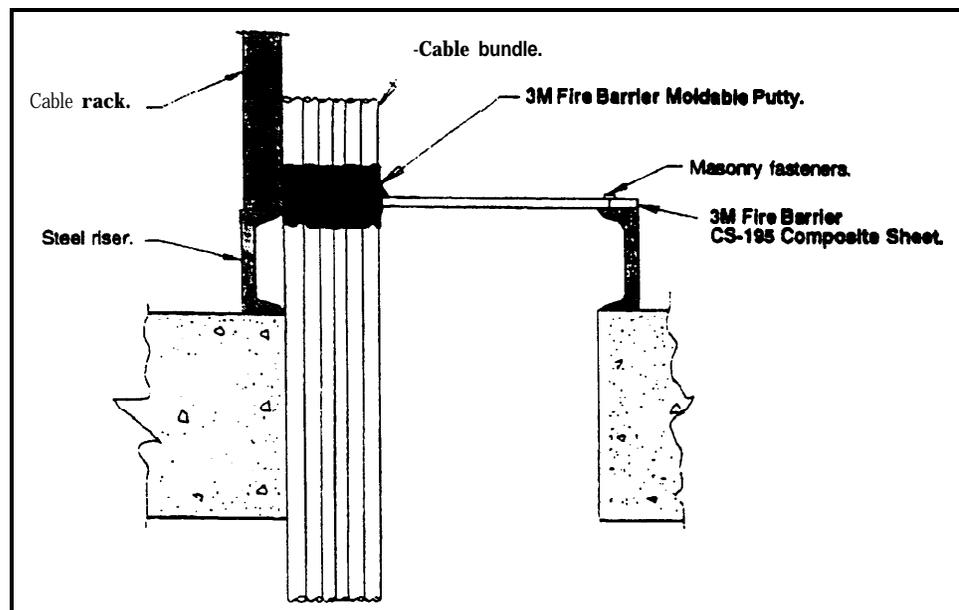
- Very active cable openings requiring frequent reentry.
- Temporary firestopping for work that must resume the next day.

The following materials are required to perform this task:

- CS-195 Composite Sheet.
- Fire barrier moldable putty (stick).

Step	Applying Temporary Sealing
1	Cut a piece of CS-195 Composite Sheet to: <ul style="list-style-type: none"><li>• Closely fit around the cables.</li><li>• Fit onto the top of the steel riser around the opening.</li></ul>
2	Install the composite sheet with the foil/mesh side towards the opening. A $\frac{1}{2}$ " gap between the composite sheet and the cables is acceptable.
3	Fasten the composite sheet to the steel riser with five $\frac{1}{4}$ " x $\frac{3}{4}$ " bolts. Place the bolts in each corner and the midpoint of the longest side.
4	Apply a 1" depth of moldable putty around the cable bundle by pressing putty into all voids between the cable bundle and the composite sheet. Work the putty between the individual cables while installing the composite sheet so that all voids are filled.

**NOTE:** As additional cables are added to the opening, the composite sheet can be recut and reused. The moldable putty can also be reused.



## 6. Recommended Sealing Materials, continued

### 6.1 Sealing Cable Openings and Penetrations

The following chart lists 3M® products acceptable for sealing penetrations and cable openings in COs and other buildings. See PSB 4843 for more information.

**NOTE:** Products used must meet the acceptability criteria listed in Section 5.7.

**WARNING:** Do not mix products from different manufacturers.

Product	Item ID	Specifications
Restricting Collar, RC-1	528739	28 gauge sheet metal, 4' x 25'
Plastic Pipe Device PPD-2-150	369185	1½"
PPD-2-200	369186	2"
PPD-2-300	369187	3"
PPD-2-400	369188	4"
Label (Exhibit 3)	372761	Decals Package
Fire Barrier Moldable Putty	315891	6" x 7" x ⅛" -pad
	315507	1 ½" x 12" -sticks
	315506	4" x 8" x ⅛" -pad
	528730	¼" x 2" x 24" -strips

(continued)

## 6. Recommended Sealing Materials, continued

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### 6.1 Sealing Cable Openings and Penetrations, continued

Product	Item ID	Specifications
Fire Barrier Composite Sheet CS 195	528729	¼" x 2' x 3' -bulk (10) sheets
	<b>520372</b>	¼" x 2' x 3' - <b>individual</b> sheets
	520373	¼" x 3' x 3' – individual sheets
	520374	¼" x 3' x 41" -- individual sheets
	528751	¼" x 3' x 3' -bulk (10) sheets
	528752	¼" x 3 x 41' –bulk (10)
	869189	¼" x 16" x 28" – individual sheets
	869190	¼" x 16" x 28" - <b>individual</b> sheets
WB Caulk CP 25	315889	1 gallon can
	315890	5 gallon can
	315888	10.5 ounce tube

### 6.2 Supplier/ Technical Contacts

For more information about 3M products, write or call:

3M Company  
3M Centre Building  
St. Paul, MN 55144-1000  
214/401-4179  
1-800/328-1 687

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All marks are the property of their respective owners.

# 7. Firestop Installation Procedures

## 7.1 Introduction

The following sections provide instructions for installing firestop in penetrations and cable openings in varying situations. Refer also to:

- The manufacturer's specifications and details for applications not covered by the following sections.
- Exhibit 2.

**NOTE:** Some of the illustrations in the following sections show:

- A steel channel the reverse of that found in some GTE sites (see Exhibit 3).
- Stirrups for cases where access to the bottom of the opening is impossible because of equipment or cabling. In such cases, use 12 gauge, 2" wide steel stirrups.

## 7.2 Application Specifications

The following chart lists specifications for each firestop application in Sections 7.3-7.14.

Type of Opening or Penetration	Materials Required	Maximum F/T Rating Hole Size (Hours)	Refer to Section...
Concrete floor opening-blank	<ul style="list-style-type: none"> <li>• cs-195 Composite sheet</li> <li>• Fire barrier moldable putty</li> </ul>	12"x24" 2 F	7.3
Signal cables in a cable rack through a concrete floor	<ul style="list-style-type: none"> <li>• CS-195 Composite Sheet</li> <li>• Fire barrier moldable putty</li> </ul>	12"x24" 2 F	7.4
Insulated cables in a cable rack through a concrete floor	<ul style="list-style-type: none"> <li>• CS-195 Composite Sheet</li> <li>• Fire barrier moldable putty</li> </ul>	2F	7.5
Blank cable opening wall seal	cs-195 Composite Sheet		7.6

(continued)

## 7. Firestop Installation Procedures, continued

### 7.2

#### Application Specifications, continued

Type of Opening or Penetration	Materials Required	Maximum F/T Rating Hole Size (Hours)	Refer to Section...	
Cable tray cable hole seal in a wall	<ul style="list-style-type: none"> <li>cs-195 Composite Sheet</li> <li>Fire barrier moldable putty</li> </ul>	1 or 2 F	7.7	
Cables through a concrete floor or wall	<ul style="list-style-type: none"> <li>Fire barrier moldable putty</li> <li>Ceramic fiber or mineral wool batting</li> </ul>	6¼" 2F	7.8	
Single fiber optic/inner duct through concrete	<ul style="list-style-type: none"> <li>FS-195 wrap/strip</li> <li>Fire barrier moldable putty</li> </ul>	4" 2ForT	7.9	
Multiple fiber optic/inner duct through concrete	<ul style="list-style-type: none"> <li>FS-195 wrap/strip</li> <li>Fire barrier moldable putty</li> <li>RC-1 restricting collar</li> <li>OR</li> <li>PPD based on pipe size</li> </ul>	5" 2ForT	7.10	
Multiple fiber optic/inner duct through a large opening in concrete	<ul style="list-style-type: none"> <li>cs-195 Composite Sheet</li> <li>FS-195 wrap/strip</li> <li>Fire barrier moldable putty</li> </ul>	8" x 30" 240 sq. in.	<ul style="list-style-type: none"> <li>2 F with one CS-195 sheet (top)</li> <li>2 F and T with two cs-195 sheets (top and bottom)</li> </ul>	7.11

(continued)

## 7. Firestop Installation Procedures, continued

### 7.2

#### Application Specifications, continued

Type of Opening or Penetration	Materials Required	Maximum F/T Rating Hole Size (Hours)	Refer to Section...	
Single riser cable through concrete	<ul style="list-style-type: none"> <li>• FS-195 wrap/strip</li> <li>• Fire barrier moldable putty</li> </ul>	4"	<ul style="list-style-type: none"> <li>• 2 F and ½ T with 900 pair cable</li> <li>• 0 T with 1, 800 or 3,600 pair cable</li> </ul>	7.12
Multiple riser cables through a large opening in concrete	<ul style="list-style-type: none"> <li>• cs-195 Composite Sheet</li> <li>• FS-195 wrap/strip</li> <li>• Fire barrier moldable putty</li> </ul>	8" x 30" 240 sq. in.	<ul style="list-style-type: none"> <li>• 2 F and ½ T with 900 pair cable</li> <li>• 0 T with 1, 800 or 3,600 pair cable</li> </ul>	7.13
Insulated cables through concrete	<ul style="list-style-type: none"> <li>• CP 25 WB caulk</li> <li>• Ceramic fiber or mineral wool damming</li> </ul>	8"	Depends on the percentage fill	7.14
Service penetrations	Ceramic fiber or mineral wool damming, and one of the following: <ul style="list-style-type: none"> <li>• Fire barrier moldable putty</li> <li>• CP 25 WB caulk</li> </ul>	Depends on the percentage fill	1 or 2 F	7.15

## 7. Firestop Installation Procedures, continued

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7.3

### Concrete Floor Opening – Blank

The following chart and illustration explain how to install firestop for an opening in a concrete floor.

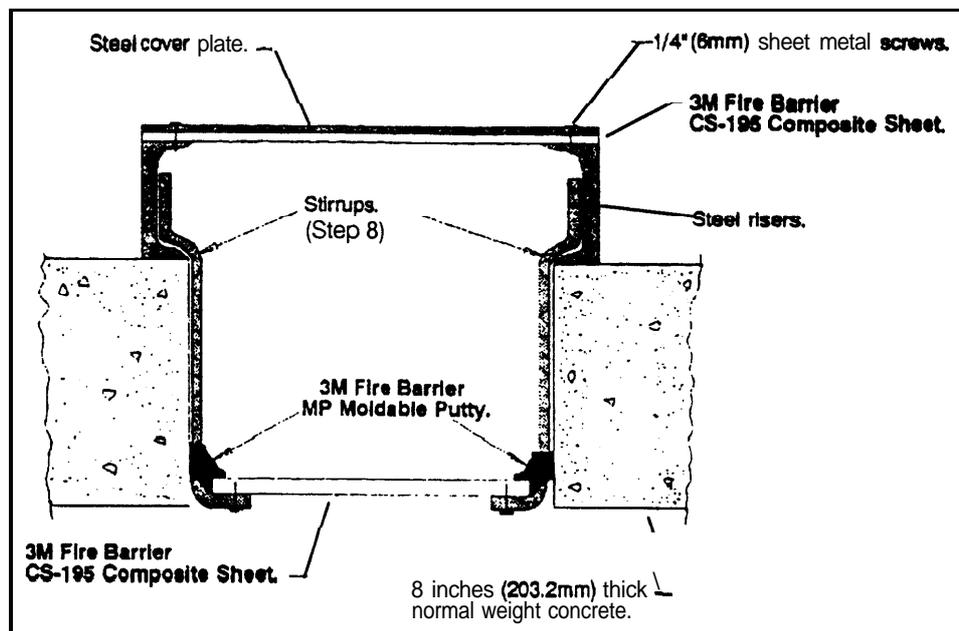
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Step	Installing Firestop in a Blank Opening Through a Concrete Floor
1	Cut a piece of CS-195 composite sheet to: <ul style="list-style-type: none"><li>• Fit in the bottom of the opening.</li><li>• Rest on the stirrups.</li></ul>
2	Install the composite sheet with the foil/mesh side of the sheet facing toward you. A $\frac{1}{4}$ " to $\frac{1}{2}$ " gap between the composite sheet and the stirrups is acceptable.
3	Use $\frac{1}{4}$ " x $\frac{1}{2}$ " sheet metal screws to fasten the composite sheet to the stirrup legs in the bottom of the opening.
4	Apply a 1" depth of moldable putty by pressing the putty around the perimeter of the composite sheet.
5	Cut a: <ul style="list-style-type: none"><li>• Piece of composite sheet to fit on top of the steel risers.</li><li>• IO-gauge steel cover plate to go on top of the composite sheet.</li></ul> <b>OR</b> <ul style="list-style-type: none"><li>• Fire retardant-treated (NONCOM) plywood <math>\frac{3}{8}</math>" thick for floor hatches up to 24" x 36" (see Section 5.9).</li></ul> A maximum of $\frac{1}{2}$ " gap between the composite sheet and the cable is acceptable.
6	Install the composite sheet with the foil/mesh side of the sheet facing toward the opening.
7	Use $\frac{1}{4}$ " x $\frac{3}{4}$ " sheet metal screws or $\frac{1}{4}$ " x $\frac{3}{4}$ " bolts to fasten the composite sheet and the steel cover plate to the steel riser around the opening. <b>NOTE: Install these no greater than 8" on centers.</b>
8	Stirrup Kit, Item ID 387318 from quality metals 9070893, has been developed by Florida personnel and consists of: <ul style="list-style-type: none"><li>• 6 Stirrup brackets.</li><li>• 12 <math>3/16</math>" x <math>1/4</math>" concrete screws</li><li>• 6 Fender washers.</li><li>• 6 #10 X <math>3/4</math>" sheet metal screws.</li><li>• 12 <math>1/4</math>" X <math>1/4</math>" hex head cap screws.</li><li>• 12 flat washers.</li></ul>

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## 7. Firestop Installation Procedures, continued

### 7.3 Concrete Floor Opening— Blank, continued



### 7.4 Signal Cables in a Cable Rack Through a Concrete Floor

The following chart and illustration explain how to install firestop for signal cables in a cable rack through a concrete floor.

Step	Installing Firestop – Signal Cables in a Cable Rack Through a Concrete Floor.
1	Cut a piece of CS-195 composite sheet to: <ul style="list-style-type: none"> <li>• Closely follow the contours of the cables.</li> <li>• Fit into the bottom of the opening.</li> </ul>
2	Install the composite sheet with the foil/mesh side of the sheet facing toward you. A $\frac{1}{4}$ " to $\frac{1}{2}$ " gap between the composite sheet and the cable bundles is acceptable.
3	Use $\frac{1}{4}$ " x $\frac{1}{2}$ " sheet metal screws to fasten the composite sheet to the stirrup legs in the bottom of the opening.
4	Press a 1" depth of moldable putty: <ul style="list-style-type: none"> <li>• Into the void between the cable bundle and all openings where the sheet meets the floor.</li> <li>• Between the individual cables.</li> </ul>
5	Cut a piece of composite sheet to: <ul style="list-style-type: none"> <li>• Follow the contours of the cables. A <math>\frac{1}{2}</math>" maximum gap is acceptable.</li> <li>• Fit onto top of the steel risers around the opening.</li> </ul>
6	Cut a lo-gauge steel cover plate to go on top of the composite sheet.

(continued)

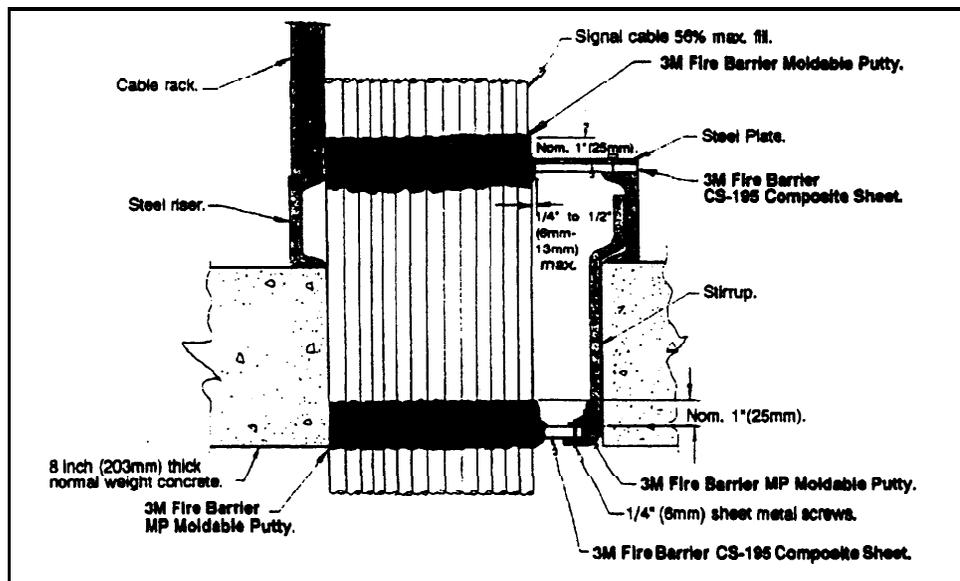
## 7. Firestop Installation Procedures, continued

7.4

### Signal Cables in Step a Cable Rack Through a Concrete Floor, continued

#### Installing Firestop – Signal Cables in a Cable Rack Through a Concrete Floor.

- 7 Install the composite sheet with the foil/mesh side of the sheet facing toward the opening. A  $\frac{1}{4}$ " to  $\frac{1}{2}$ " gap between the composite sheet and the cable bundles is acceptable.
- 8 Use  $\frac{1}{4}$ " x  $\frac{3}{4}$ " sheet metal screws or  $\frac{1}{4}$ " x  $\frac{3}{4}$ " bolts to fasten the composite sheet and the steel cover plate to the steel riser around the opening.  
NOTE: Install these no greater than 8" on centers.
- 9 Press a 1" depth of moldable putty:  
  - Into the void between the cable bundle and the composite sheet.
  - Between each newly installed layer of cable (not each cable).Also apply a layer to any portion of the last layer of cable run.  
NOTE: Existing cable bundles do not have to be cut loose and putty applied. The procedure (Step 9) is only for new cable installation.



## 7, Firestop Installation Procedures, continued

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7.5

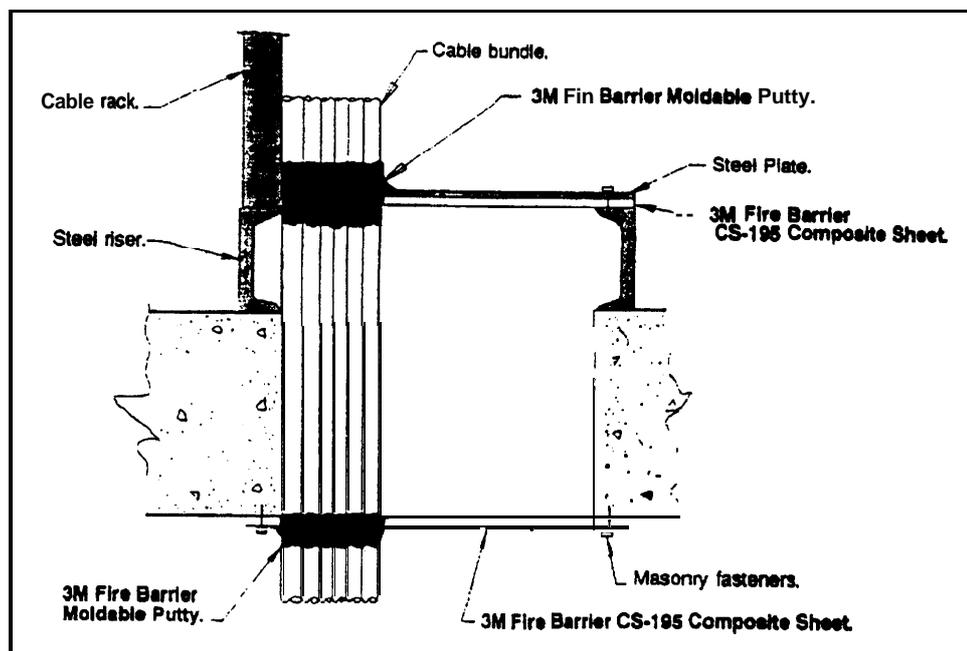
### Insulated Cables in a Cable Rack Through a Concrete Floor

The following chart and illustration explain how to install firestop for insulated cables in a cable rack through a concrete floor.

Step	Installing Firestop – Insulated Cables in a Cable Rack Through a Concrete Floor.
1	Cut a piece of CS-195 composite sheet to: <ul style="list-style-type: none"><li>• Closely follow the contours of the cables.</li><li>• Overlap the bottom of the opening by a minimum of 2" onto the concrete in all directions.</li></ul>
2	Install the composite sheet with the foil/mesh side of the sheet against the concrete. A $\frac{1}{4}$ " to $\frac{1}{2}$ " gap between the composite sheet and the cables is recommended.
3	Use $\frac{1}{4}$ " x $1\frac{1}{2}$ " minimum masonry fasteners with $\frac{1}{4}$ " x $1\frac{1}{4}$ " fender washers to fasten the composite sheet to the concrete. <b>NOTE: Install the masonry fasteners no greater than 6" on centers.</b>
4	After the composite sheet is installed, press a 1" depth of moldable putty around the cable bundle so that all voids between the cables are filled.
5	Cut a piece of composite sheet to: <ul style="list-style-type: none"><li>• Follow the contours of the cables.</li><li>• Fit onto top of the steel riser around the opening.</li></ul>
6	Cut a lo-gauge steel cover plate to go on top of the composite sheet.
7	Install the composite sheet with the foil/mesh side of the sheet facing toward the opening. A $\frac{1}{4}$ " to $\frac{1}{2}$ " gap among the composite sheet, plate, and cable bundles is acceptable.
a	Use $\frac{1}{4}$ " x $\frac{3}{4}$ " sheet metal screws to fasten the composite sheet and the steel cover plate to the steel riser around the opening. <b>NOTE: Install these no greater than 8" on centers.</b>
9	Press a 1" depth of moldable putty: <ul style="list-style-type: none"><li>• Into the void between the cable bundle and the composite sheet.</li><li>• Between the newly installed cables and the back of the penetration seal.</li></ul>

## 7. Firestop Installation Procedures, continued

### 7.6 Insulated Cables in a Cable Rack Through a Concrete Floor, continued



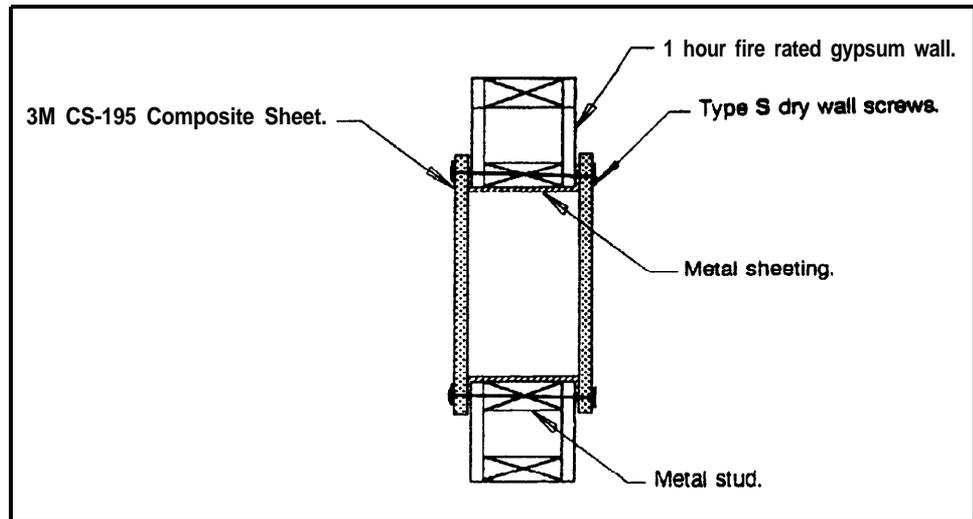
### 7.6 Blank Cable Opening Wall Seal

The following chart and illustration explain how to install firestop for a blank cable opening in a gypsum wall.

Step	Installing Firestop – Blank Cable Opening
1	Cut a piece of CS-195 composite sheet a minimum of 2" larger than the cable opening on all sides.
2	Place the composite sheet against the drywall, clearing the cable opening. Ensure that the foil and mesh sides of the composite sheet are towards the wall.
3	Use 2" type S drywall screws and 1/4" x 1/4" fender washers to fasten the composite sheet to the metal studs.
4	Repeat Steps 1-3 on the opposite side of the wall.

## 7. Firestop Installation Procedures, continued

### 7.6 Blank Cable Opening Wall Seal, continued



The following chart and illustration explain how to install firestop in a cable tray cable hole seal in a wall.

Step	Installing Firestop – Cable Tray Cable Hole Seal in a Wall
1	Cut a piece of CS-195 composite sheet to fit closely around the cable tray and bundle. A $\frac{1}{4}$ " to $\frac{1}{2}$ " gap between the composite sheet and the cables is acceptable.
2	Install the composite sheet in two sections to ensure that the sheet clears the cable: A. Place a section of the composite sheet against the drywall with the foil and mesh side toward the wall. B. Use 2" type S drywall screws and $\frac{1}{4}$ " x $1\frac{1}{4}$ " fender washers to fasten the two sections of composite sheet to metal studs. <b>NOTE: Install the studs no greater than 8" on centers.</b>
3	Cover the seam between the two sections of composite sheet with moldable putty.
4	Apply a 2" wide, 28-gauge steel strip over the moldable putty. Be sure that the metal strip extends the full length of the seam, including above and below the cable tray.
5	Secure the steel strip to the composite sheet with $\frac{1}{4}$ " sheet-metal screws. Spread at 3" on center, each side of the seam.
6	Press a 1" depth of moldable putty: <ul style="list-style-type: none"><li>• Into the void between the composite sheet, cable tray, and cable bundle.</li><li>• Between the newly installed individual cables.</li></ul>

(continued)

## 7. Firestop Installation Procedures, continued

7.7

### Cable Tray Cable Hole Seal in a Wall

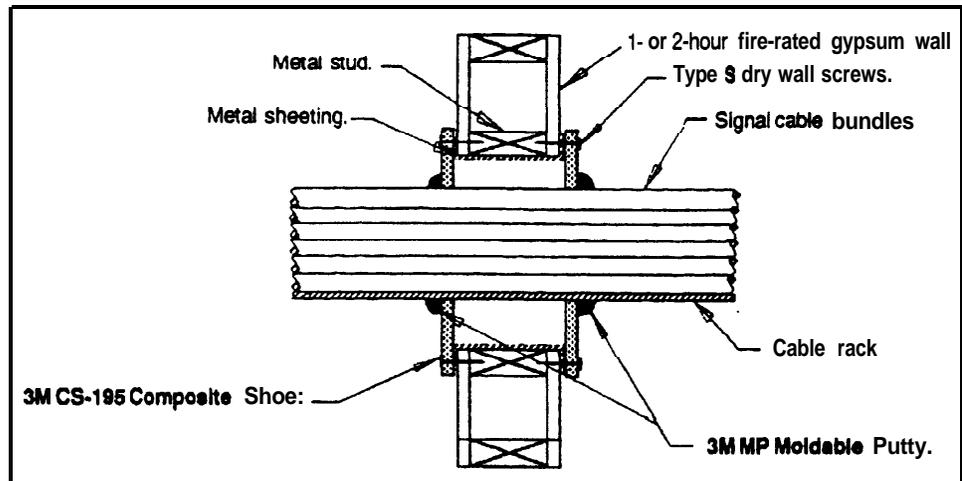
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Step	Installing Firestop – Cable Tray Cable Hole Seal in a Wall
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Repeat Steps 1-6 on the opposite side of the wall.

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7.8

### Cables Through a Concrete Floor or Wall

The following chart and illustrations explain how to install firestop for:

- Insulated cables through a concrete:
  - Floor.
  - Wall.
- Fiber optic and signal cable bundles through concrete.

---

Step	Installing Firestop – Cables Through a Concrete Floor or Wall
------	---

---

1 Install a 1" thick damming material, such as ceramic fiber or mineral wool batting, into the annular space around the cables. Press down to leave a 1" depth for the moldable putty.

---

2 Press a 1" depth of moldable putty:

- Into the annular space around the cable bundle, flush with the top of the floor.
- Around each cable inside the bundle to improve the smoke seal.

NOTE: **Allow 1528% cable fill area per opening.**

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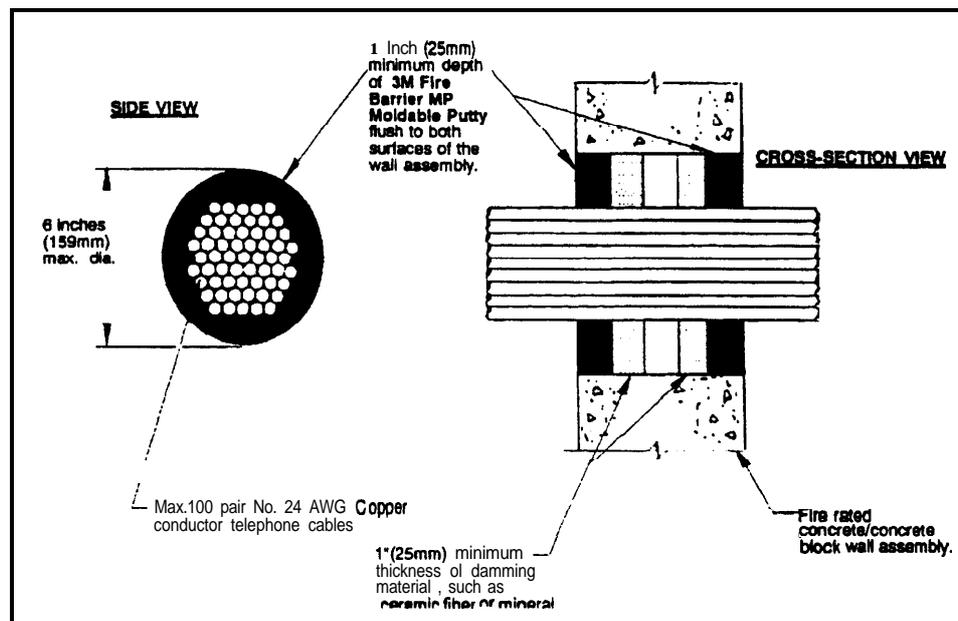
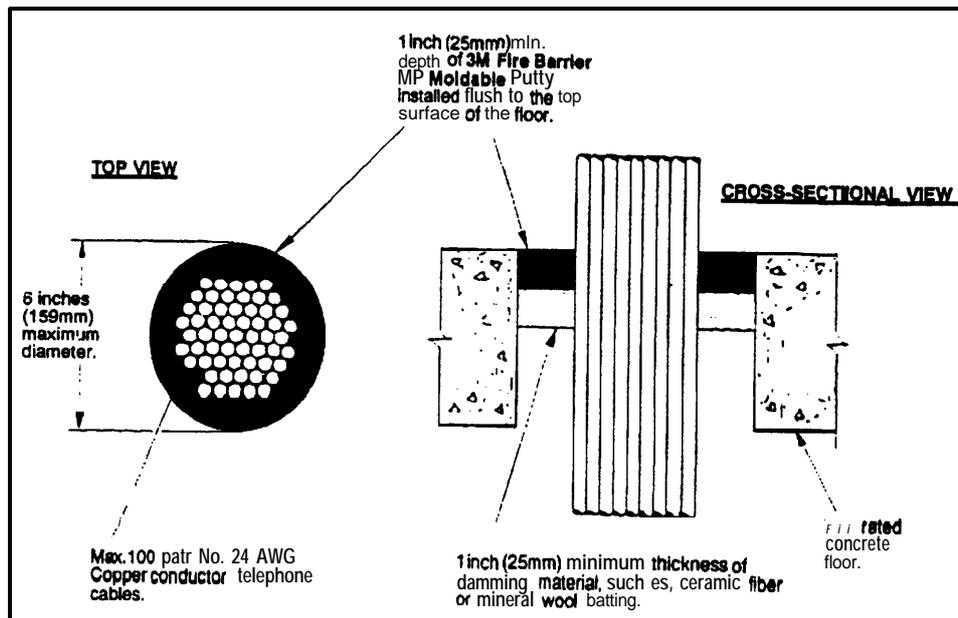
3 For wall applications, repeat the previous step on the other side of the wall.

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## 7. Firestop Installation Procedures, continued

### 7.8

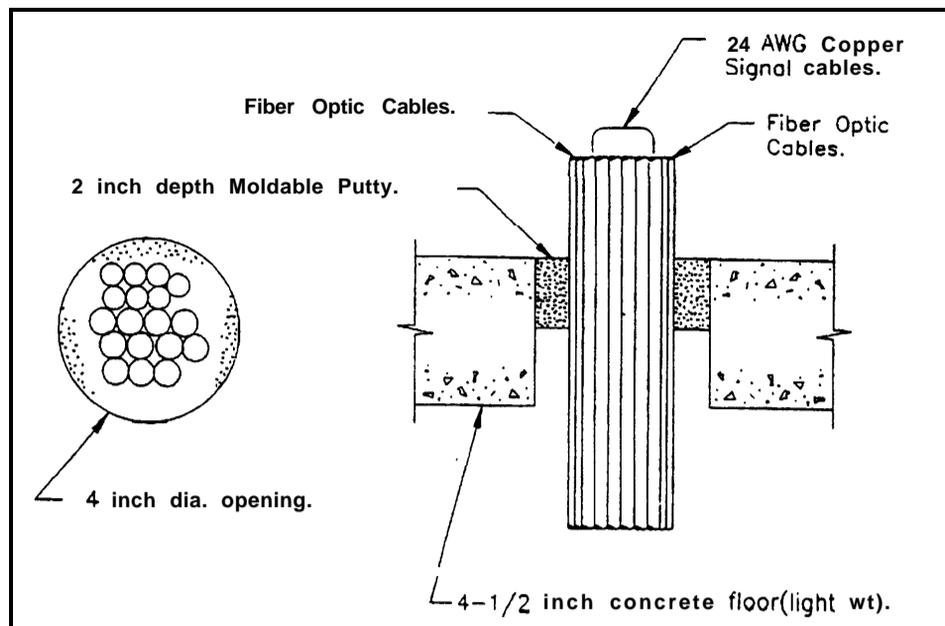
#### Cables Through a Concrete Floor or Wall, continued



When fiber optic cables and signal codes pass through a fire-rated assembly, a 2" depth of moldable putty is required.

## 7. Firestop Installation Procedures, continued

### 7.8 Cables Through a Concrete Floor or Wall, continued



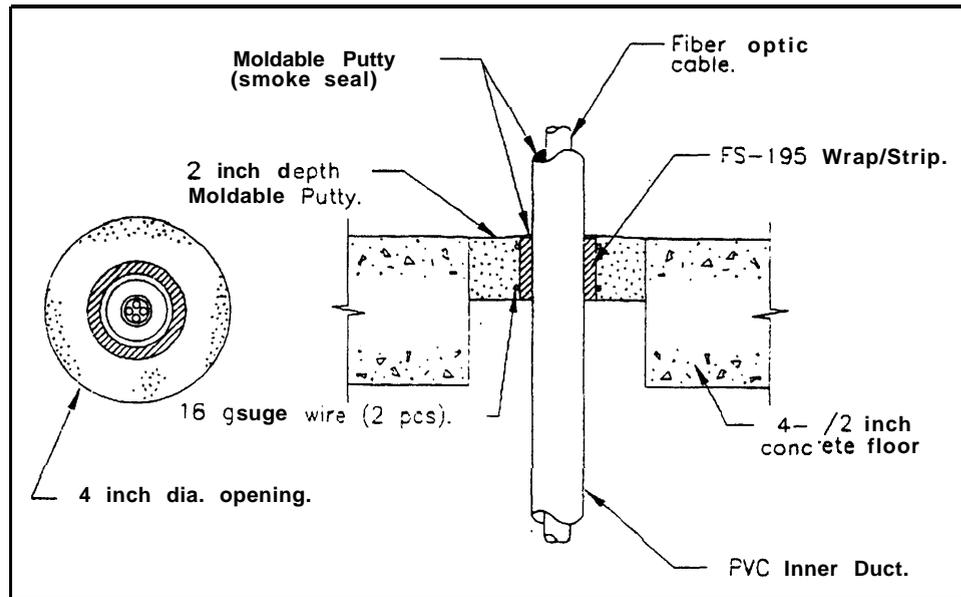
### 7.9 Single Fiber Optic/Inner Duct Through Concrete

The following chart and illustration explain how to install firestop for fiber optic/inner duct through concrete.

Step	Installing Firestop – Single Fiber Optic/Inner Duct Through Concrete
1	Tightly wrap a single layer of FS-195 Wrap/Strip around the inner duct. Ensure the top of the wrap/strip is even with the top surface of the floor.
2	Secure the wrap with 16-gauge steel tie wire.
3	Press a 2" depth of moldable putty into all voids.
4	Use moldable putty to: <ul style="list-style-type: none"><li>• Seal the interface between the wrap/strip and the inner duct.</li><li>• Plug the end of the inner duct.</li></ul>
5	For wall applications, repeat Steps 1-4 on the other side of the wall.

# 7. Firestop Installation Procedures, continued

## 7.9 Single Fiber Optic/Inner Duct Through Concrete, continued



## 7.10 Multiple Fiber Optic/Inner Duct Through Concrete

The following chart and illustration explain how to install firestop for fiber optic/inner duct through concrete.

### Step Installing Firestop – Multiple Fiber Optic/Inner Duct Through Concrete

- 1 At the ceiling, press a 2" depth of moldable putty:
  - Into the voids within the bundle of the inner duct.
  - Around the exterior of the bundle in a circular form.
- 2 Select the proper number of FS-195 Wrap/Strips as listed in the following chart:
 

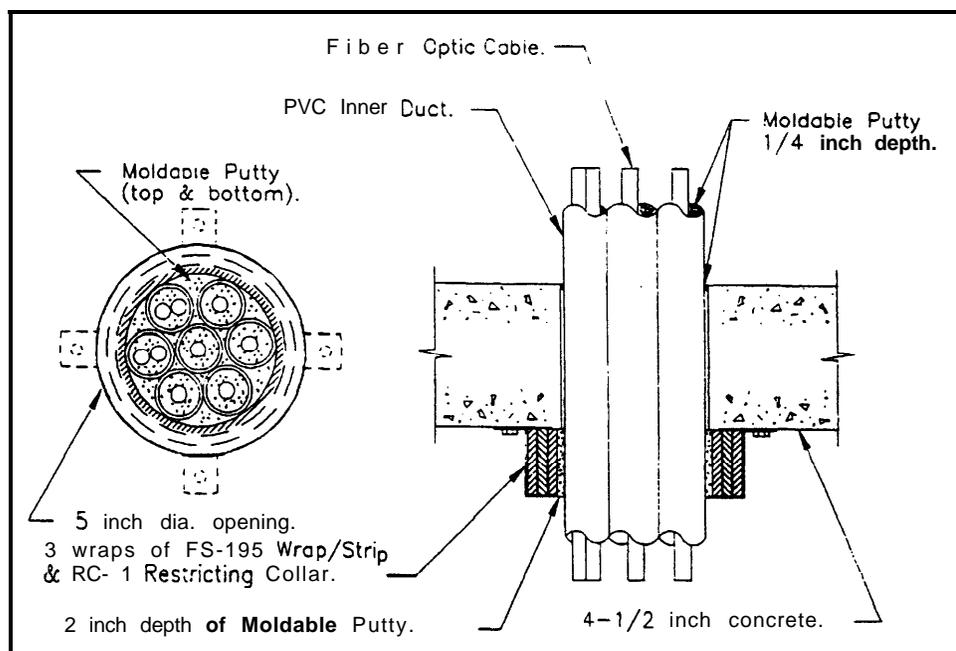
Bundle Diameter	Minimum Number of Wrap/Strips
2½"	1
3½"	2
4½"	3
- 3 Tightly wrap the wrap/strip, foil side out, around the inner duct and temporarily secure it with tie wire or tape.
  - Butt the secured wrap/strip against the underside of the concrete floor.
  - Stagger the butted seams if more than one layer of wrap/strip is required.

(continued)

## 7. Firestop Installation Procedures, continued

### 7.10 Multiple Fiber Optic/Inner Duct Through Concrete, continued

Step	Installing Firestop – Multiple Fiber Optic/Inner Duct Through Concrete
4	Apply the fire barrier restricting collar as follows: <ul style="list-style-type: none"><li>• Remove enough of the restricting collar to make one wrap around the applied wrap/strip with a minimum 1" overlap.</li><li>• Bend the mounting tabs away from the inner duct bundle at right angles, flush with the underside of the floor.</li></ul>
5	Fasten the restricting collar tightly around the inner duct bundle with a steel hose clamp, centering the clamp on the collar assembly.
6	Secure the restricting collar to the floor with $\frac{1}{4}$ " x $1\frac{1}{2}$ " steel expansion bolts or equivalent masonry fasteners, with minimum $\frac{1}{4}$ " steel fender washers.
7	Fasten the collar assembly to the ceiling using four symmetrically located tabs.
8	Seal the system with moldable putty at the: <ul style="list-style-type: none"><li>• Ceiling surface.</li><li>• Wrap/strip bundle interface.</li></ul>
9	Bend the retainer tabs toward the bundle to lock the wrap/strip in position.
10	For wall applications, repeat Steps 1-9 on the other side of the wall.



## 7. Firestop Installation Procedures, continued

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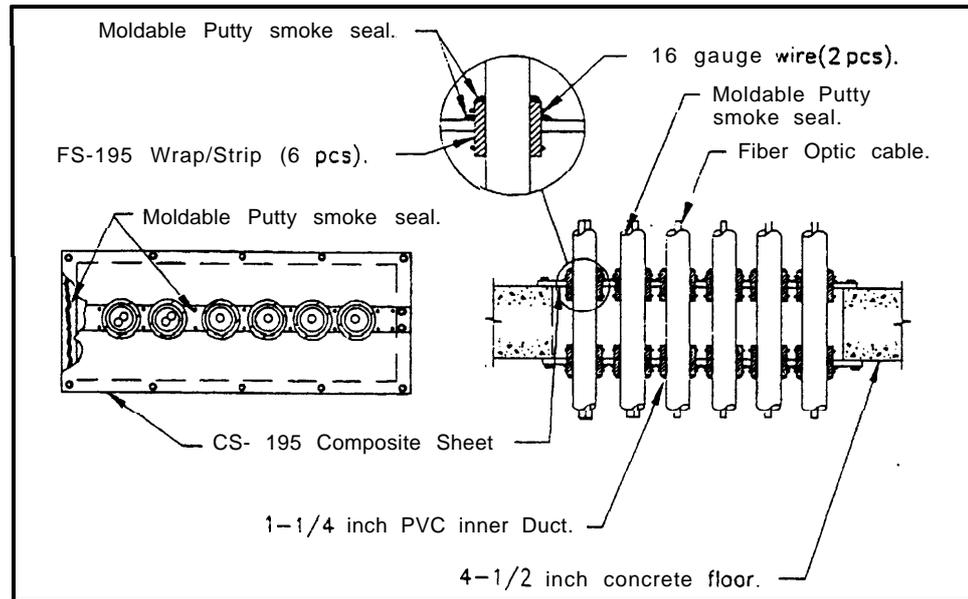
### 7.11 Multiple Fiber Optic/Inner Duct Through a Large Opening in Concrete

The following chart and illustration explain how to install firestop for fiber optic/inner duct through a large opening in concrete.

Step	Installing Firestop – Multiple Fiber Optic/Inner Duct Through a Large Opening in Concrete
1	Tightly wrap each inner duct with one layer of FS-195 Wrap/Strip and secure with 16-gauge tie wire. Place the wrap/strips so that the plane of the top surface of the floor bisects the wrap/strip. <b>NOTE: For a top and bottom installation:</b> <ul style="list-style-type: none"><li>• Place another layer of wrap/strip so that the plane of the surface of the ceiling bisects the wrap/strip.</li><li>• Only one layer of wrap/strip is required for a maximum 2" diameter inner duct.</li></ul>
2	Apply a ¼" bead of moldable putty around the perimeter of the opening.
3	Install CS-195 Composite Sheets: A. With the foil side facing the opening. B. On the top and bottom of the floor. C. Placed and cut so that they: <ul style="list-style-type: none"><li>• Overlap the edges of the opening a minimum of 2".</li><li>• Fit tightly around the wrap/strips (¼" or less).</li></ul>
4	Anchor the composite sheets with: <ul style="list-style-type: none"><li>• Masonry fasteners.</li><li>• 1¼" fender washers.</li></ul> <b>NOTE: Install these no greater than 6" on centers.</b>
5	Apply a ¼" bead of moldable putty to all seams in the composite sheet.
6	Cover the seams with a 2" wide steel strip (minimum 28 gauge).
7	Fasten the cover strip to the composite sheet with sheet-metal screws spaced no more than 3" on centers on both sides of the strip.
8	Apply a generous amount of moldable putty into the annular spaces between the composite sheets and the wrap/strips.
9	Apply a minimum ¼" bead of moldable putty to the interface between the wrap/strips and inner ducts.
10	Place a plug of moldable putty into the end of the inner duct, around the cable(s), to complete the smoke seal.
11	For wall applications, repeat Steps 1-10 on the other side of the wall.

## 7. Firestop Installation Procedures, continued

### 7.11 Multiple Fiber Optic/Inner Duct Through a Large Opening in Concrete, continued



### 7.12 Single Riser Cable Through Concrete

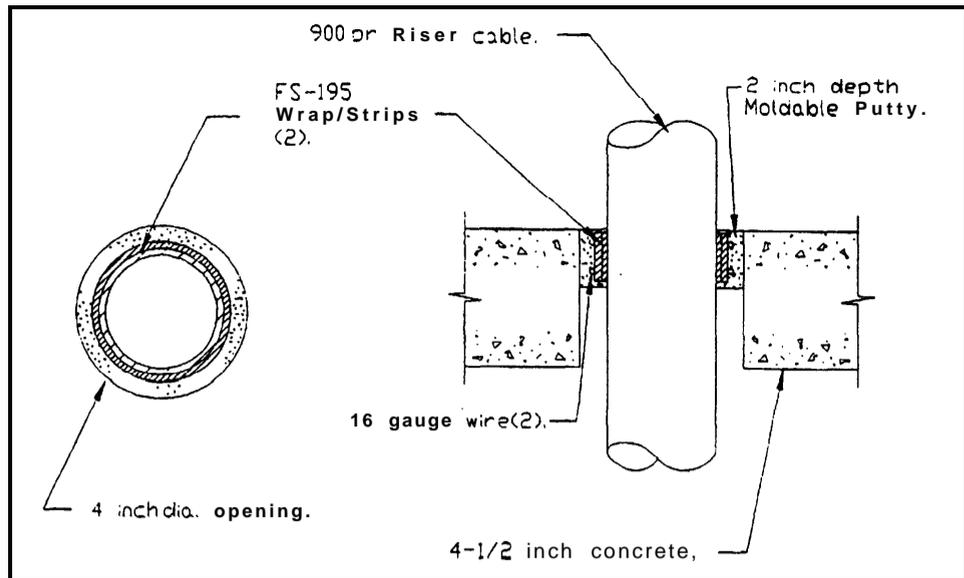
The following chart and illustration explain how to install firestop for a single riser cable through concrete.

Step	Installing Firestop – Single Riser Cable Through Concrete
1	Tightly wrap 2 layers of FS-195 and secure with 16-gauge tie wire. Place the wrap/strips so that the top of the wrap/strip is slightly below the top surface of the floor.
2	Press a 2" depth of moldable putty into the annular space between the wrap/strips and the sides of the openings.
3	Cover the penetration and wrap/strips with 1/8" to 1/4" depth of moldable putty to complete the smoke seal.
4	For wall applications, repeat Steps 1-3 on the other side of the wall.

## 7. Firestop Installation Procedures, continued

7.12

### Single Riser Cable Through Concrete, continued



7.13

### Multiple Riser Cables Through a Large Opening in Concrete

The following chart and illustration explain how to install firestop for multiple riser cables through a large opening in concrete.

#### Installing Firestop – Multiple Riser Cables Through a Large Opening in Concrete

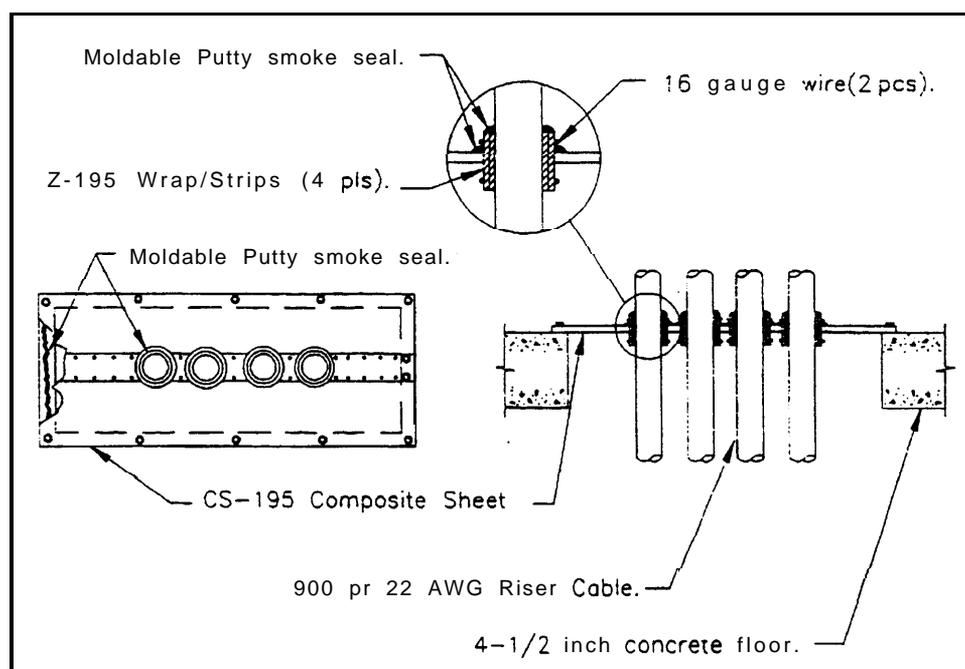
Step	Installing Firestop – Multiple Riser Cables Through a Large Opening in Concrete
1	Tightly wrap each cable with two layers of FS-195 Wrap/Strip and secure with 16-gauge tie wire. Place the wrap/strips so that the plane of the top surface of the floor bisects the wrap/strip.
2	Apply a 1/4" bead of moldable putty around the perimeter of the opening.
3	Install CS-195 Composite Sheets: A. With the foil side facing the opening. B. Placed and cut so that they: <ul style="list-style-type: none"> <li>• Overlap the edges of the opening a minimum of 2".</li> <li>• Fit tightly around the wrap/strips (1/4" or less).</li> </ul>
4	Anchor the composite sheets with: <ul style="list-style-type: none"> <li>• Masonry fasteners.</li> <li>• 1/4" fender washers.</li> </ul> <p><b>NOTE: Install these no greater than 6" on centers.</b></p>
5	Apply a 1/4" bead of moldable putty to all seams in the composite sheet.
6	Cover the seams with 2" wide steel strips (minimum 28 gauge).

(continued)

## 7. Firestop Installation Procedures, continued

### 7.13 Multiple Riser Cables Through a Large Opening in Concrete, continued

Step	Installing Firestop – Multiple Riser Cables Through a Large Opening in Concrete
7	Fasten the cover strips to the composite sheet with sheet-metal screws spaced no more than 3" on centers, both sides of the strip.
8	Apply a generous amount of moldable putty into the annular spaces between the composite sheets and the wrap/strips.
9	Apply a ¼" layer of moldable putty over the wrap/strips and seal around the cable.
10	For wall applications, repeat Steps 1-9 on the other side of the wall.



## 7. Firestop Installation Procedures, continued

7.14

### Insulated Cables Through Concrete

The following chart and illustrations explain how to install firestop for insulated cables through concrete, including concrete floors and walls.

**NOTE:** The following maximum cable sizes are acceptable:

- 2/0 AWG multiconductor power cables.
- 12 AWG multiconductor control cables.
- 150 pair 24 AWG telephone cables.

**NOTE:** The following jacket and insulation types are acceptable:

- Cross-linked polyethylene.
- Polyvinyl chloride.
- Neoprene rubber.
- Hypalon.
- Silicone rubber.

#### Step Installing Firestop – Insulated Cables Through Concrete

- 1 If using the optional metal sleeve, it can be placed:
  - Flush with the floor/wall.
 OR
  - Extending a maximum of 2" above the floor/wall surface.

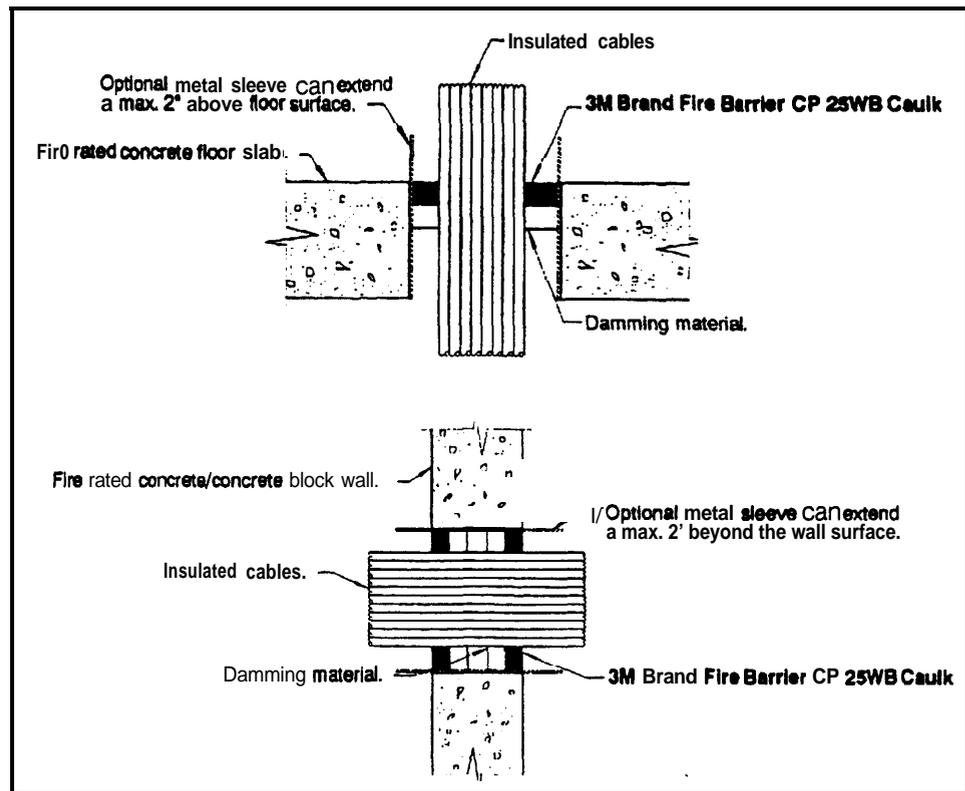
**NOTE:** The maximum diameter of the metal sleeve can be no more than 8".
- 2 Recess a minimum of 1" thickness of ceramic fiber or mineral wool damming material 1" from the top surface of the floor/wall.
- 3 Apply a minimum 1" depth of CP 25WB Caulk to the top surface of the floor/wall. Fill the gaps and voids between the cables to the maximum extent possible by forcing the caulk into the cable bundle.
 

**NOTE:** Do not place the caulk flush to the top edge of the sleeve unless the top of the sleeve is flush with the top surface of the floor/wall.
- 4 See the following chart to determine the hourly fire rating of this firestop system, based upon a maximum opening or sleeve size of 8".
 

Sleeved or Nonsleeved	Percent Cable Fill	Maximum Fire Rating
Nonsleeved	15-40%	2 hours
Nonsleeved	10-15%	3 hours
Sleeved	10-40%	3 hours
- 5 For wall applications, repeat Steps 1-4 on the other side of the wall.

# 7. Firestop Installation Procedures, continued

## 7.14 Insulated Cables Through Concrete, continued

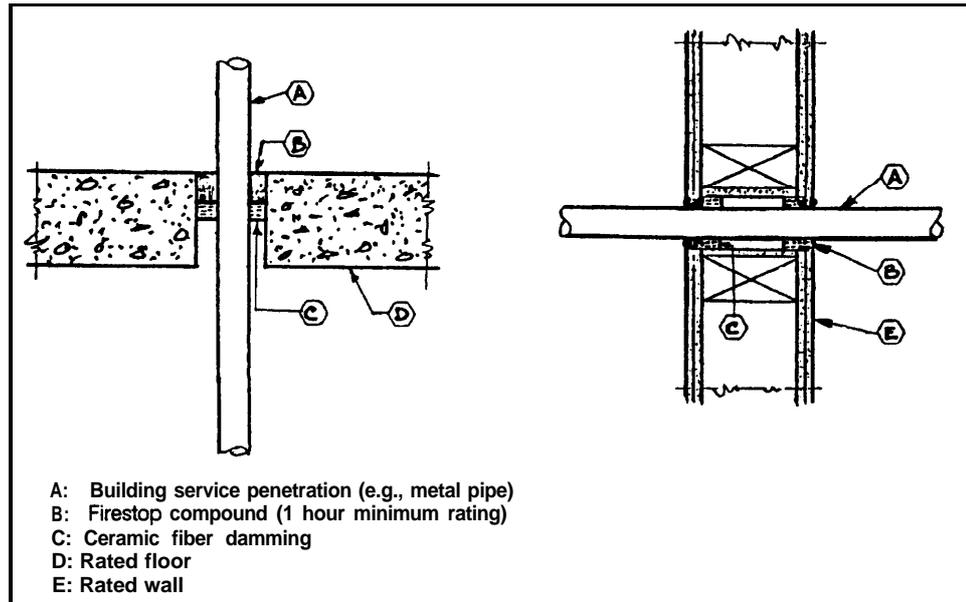


## 7. Firestop Installation Procedures, continued

### 7.15 Service Penetrations

The following chart and illustration explain how to install firestop for service penetrations through concrete floors and gypsum walls.

Step	Installing Firestop – Service Penetrations
1	Install a 1" thick damming material, such as ceramic fiber or mineral wool batting, into the annular space around the pipe, conduit, and cable. Press down to leave a 1" depth for the firestop compound.
2	Apply a minimum 1" depth of moldable putty, FD 150, or CP 25WB Caulk to the top surface of the floor/wall. Force the putty or caulk to fill all voids and gaps.
3	For wall applications, repeat Steps 1-2 on the other side of the wall.





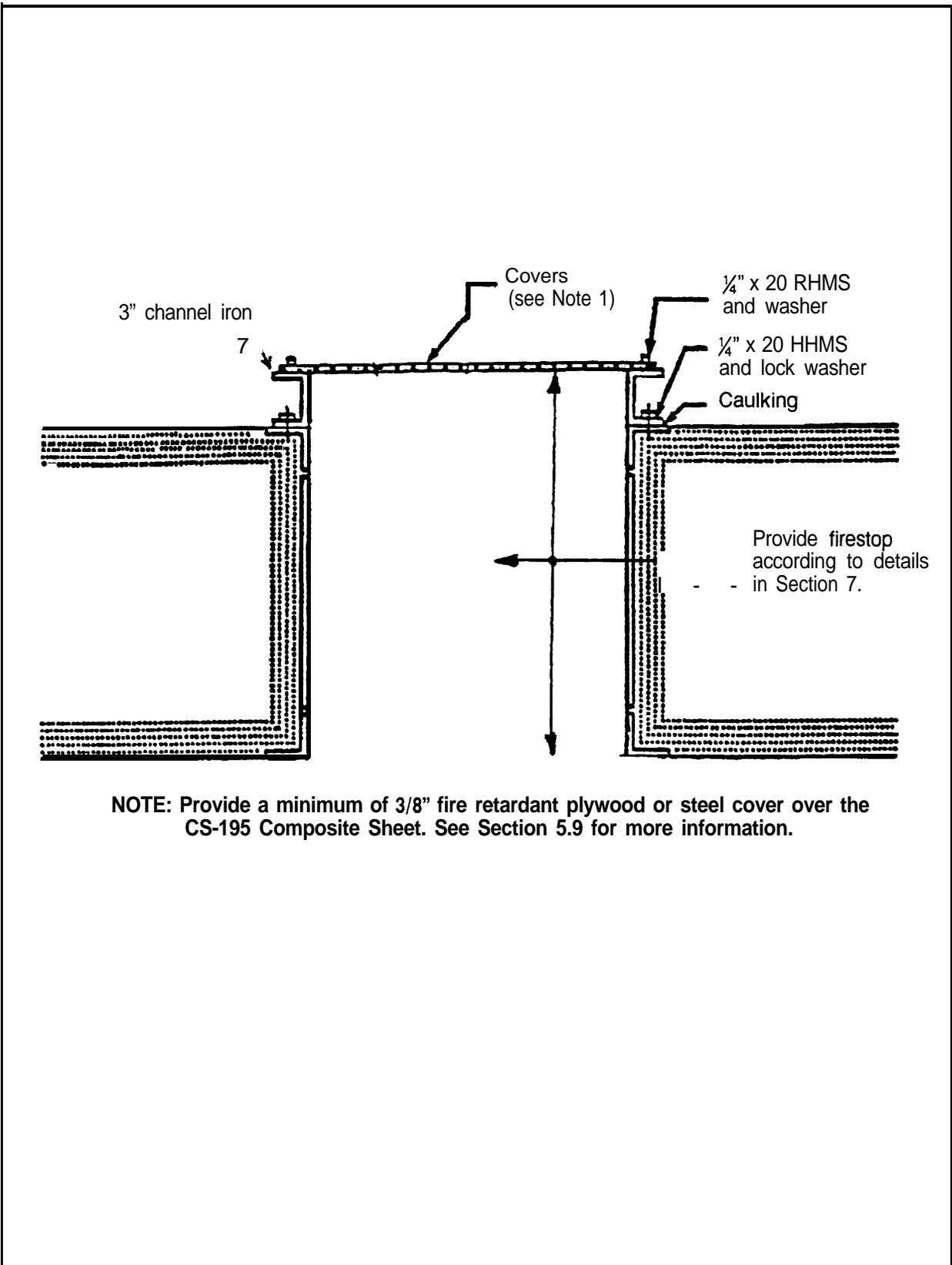


Exhibit 2 - Floor Opening and Cover Details

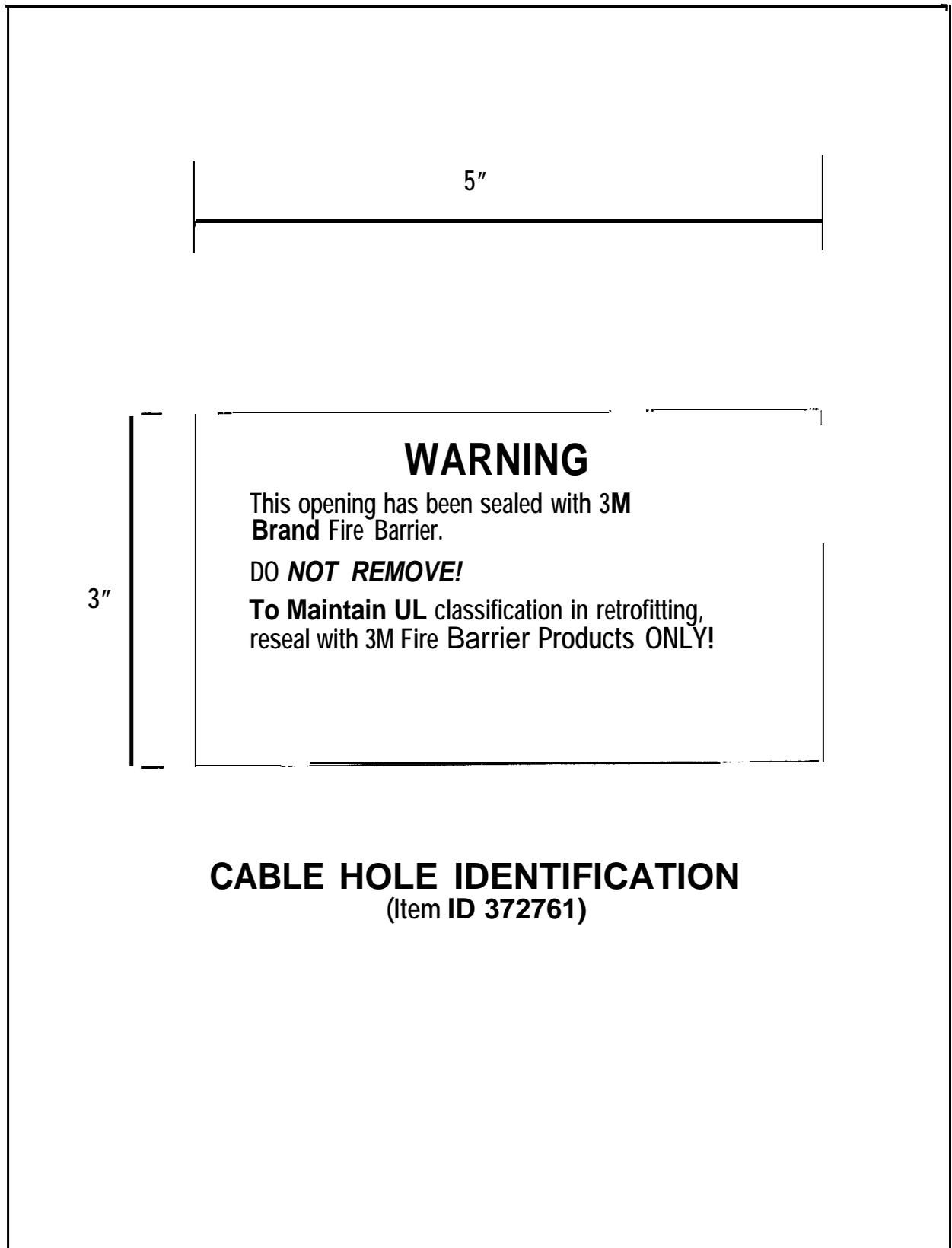


Exhibit 3 - Cable Hole Firestop Identification

