FIRESAFETY

GENERAL FIRESTOPPING CONSIDERATIONS FOR FLOOR AND WALL PENETRATIONS AND PROTECTION OF CABLE RUNS

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1. GENERAL

1.01 This section states the requirements for firestopping floor and wall penetrations and the requirements for the protection of cable runs.

1.02 This section is being reissued to reflect the most recent refinements of the Firesafety Practices. Revision arrows are used to identify the revised paragraph(s).

1.03 The firestopping requirements for floor penetrations in this document are based on testing to the 2-hour fire conditions of ASTM E-119 tests performed at Bell Laboratories, Chester, N. J. The criteria for assessing these fire-stops are as follows:

(a) The closure assembly (inclusive of cabling) shall maintain its structural integrity throughout the period of the fire test.

(b) There shall be no passage of visible flame through the closure assembly, nor passage of gases hot enough to ignite the materials constituting the cabling, the fire-stop, and any equipment contiguous to the cable closure.

(c) Transmission of heat through the cable closure (including cabling) shall not raise the temperatures on the nonfire exposed surfaces of the metal sheathing above the floor, nor of the plastic jackets on the cable strands along the perimeter of the cable bundle at or above the closure cover plate, to within 200°F below the self-ignition temperature of the plastic. The self-ignition temperature of the plastic shall be determined by ASTM D 1929-77, Ignition Properties of Plastics.

1.04 In the context of this document, ***occupied cables holes*** pertain to openings in floors and walls which have cable passing through and ***unoccupied cable holes*** pertain to openings which do not, presently, have cables passing through.

1.05 Epoxy paste and silicone foam, although they are effective fire-stops, are not generally recommended, except for special applications where no other firestopping alternate exists. The difficult and time-consuming application of epoxy paste and the cost of silicone foam limits their use to only special conditions.

2. CABLE OPENINGS

Floors

Occupied Cable Holes and Cable Slots

2.01 The closing of occupied cable holes and cable slots can be accomplished by completely packing all voids around the cables at the perimeter the cable bundle to the full depth of the opening with overlapping layers of KS-5048 mineral wool bags. These bags must contain mineral wool and should weigh over 24 ounces. ***It is desirable to obtain an optimum depth of 12 inches wherever practicable. However, as a minimum, the packing shall be to the depth of the slab.*** All cable holes and slots shall be overfilled by a minimum of one layer of bags and the cover plate forced down and fastened.

2.02 Ceramic fiber in bulk or blanket form, while more costly than mineral wool batting or KS bags, is also an acceptable closing material in that it is a high quality material with a high-temperature rating. It is easily packed into spaces of odd shapes and sizes much like loose cotton. The installation procedure is very similar to that of mineral wool batts.

2.03 Smoke stopping is accomplished with high-temperature caulking compound as follows:

Cables and the openings between cables should be packed with high-temperature caulking compound (AT-8832) at the point they pass through the top cover plate. The compound should extend at least 2 inches deep into the closure below the plate. The cables should then be tied together with plastic cable supports (straps) to compress the compound and eliminate any voids. (This step is not required if the vertical stubs are not bundled but are in a row where they pass through the cover plate.) Seal any spaces between cover plates or between cover plates and stub cables with high-temperature caulking compound. Any other small holes or voids in the closure system may also be sealed with caulking. The use of the caulking compound eliminates the need to configure the cover plate around the perimeter of the cabling; rough shaping is adequate.

Unoccupied Cable Holes and Cable Slots

2.04 These cable holes may be packed with KS-5048 bags as described for occupied cable holes.

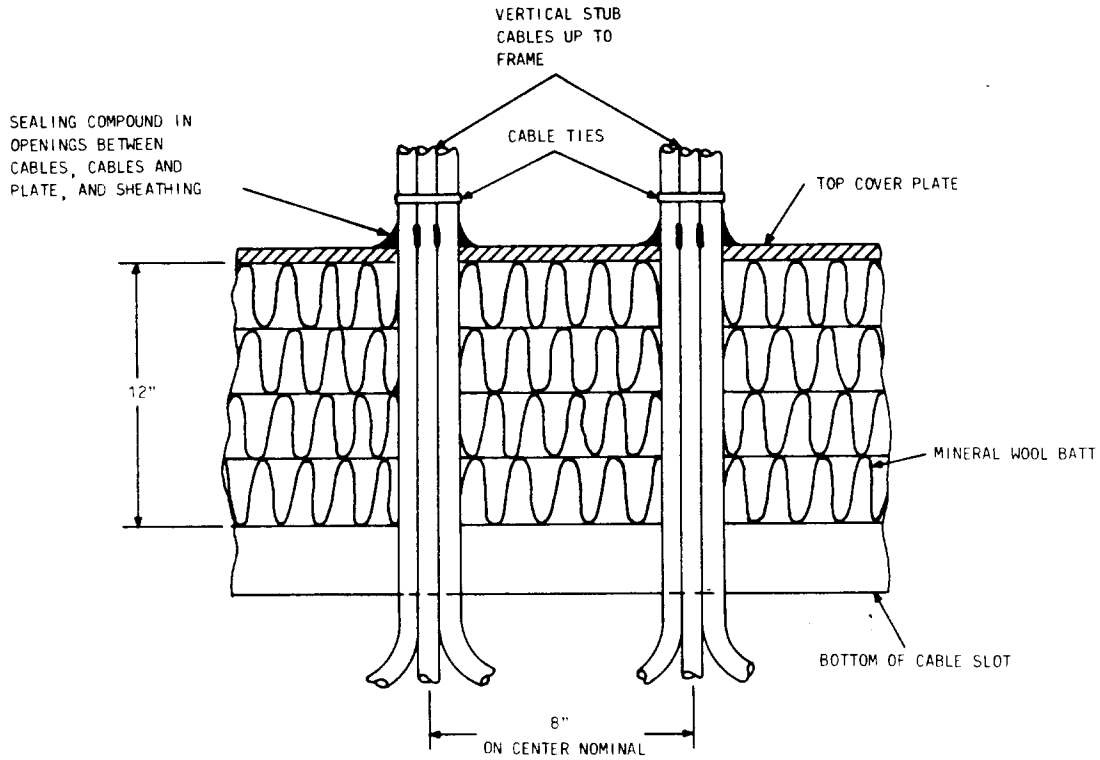
2.05 Another acceptable procedure for packing would be to use two overlapping layers of 3- or 4-inch mineral wool batting. When a hole which has been packed in this manner is activated, the batting should be removed and the procedure for treatment of occupied holes followed.

Occupied Distributing and Protector Frame Slots

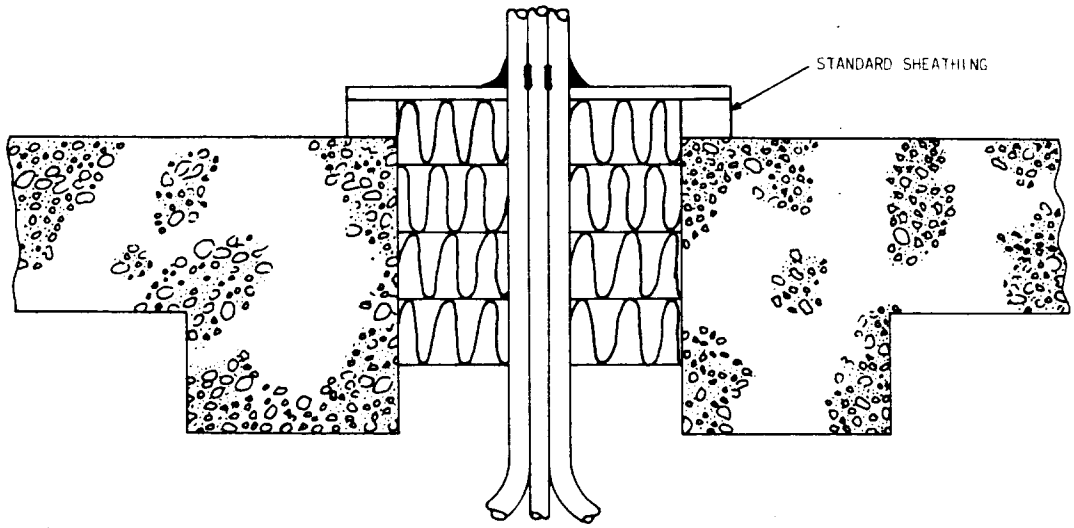
2.06 The recommended firestopping method consists of filling all spaces in cable slots between vertical bundles of stub cables (tip cables) with mineral wool batting material of either 3- or 4-inch thickness. The spaces between the stubs and between the stub bundles and cover plates should be sealed with high-temperature caulking compound. No bottom plates are required with this method. With top covers in place and working from below, the mineral wool batt should be forced into the slot and rammed up against the top plate. Mineral wool should be added to full depth of slot or 12 inches. Care must be taken to see that the mineral wool forms itself tightly around the vertical stub cables and that no voids are formed. The batts must be forced into position so that there are no vertical joints except at the stub cables. ***Eye protection and dust masks are recommended for this operation.*** (See Fig. 1.)

> ***Note 1:*** When there is no bottom plate, this material should be cut 1 inch oversize in this application to assure tight fit.
>
> ***Note 2:*** Mineral wool batting which is to be installed over equipment areas should be wrapped in aluminum foil or plastic film to minimize dusting problems. It is recommended that cutting and wrapping be done in an area other than the telephone equipment area.

2.07 As a modification to filling the entire space with mineral wool batts, KS-5048 bags (filled with loose mineral wool) may be used to fill the space above the concrete slab and under the cover plate. This approach is useful for protector frames and similar frames with large base enclosures which are wider than the slot in the concrete. The mineral wool batt is used to pack the slot only,



LONGITUDINAL SLOT SECTION



CROSS SECTION OF SLOT

Fig. 1—Recommended Method—Cable Slot Firestopping

and the KS-5048 bags are used to tightly pack the base enclosure.

2.08 An alternate method that may be considered is the use of lightweight concrete as shown in Fig. 2. Because of congestion below or where top covers are missing, the slot should be filled to a minimum depth of 6 inches or depth of slab with lightweight concrete fill, perlite, or vermiculite using a 4-inch slump. Maximum 1/2-inch mesh wire expanded metal lath attached to the slot sheathing should be fitted closely around the cabling and against the slot walls. As shown in Fig. 2, stirrups and spreaders are needed to support the form and are wired in place. One layer of KS-5048 bags should then be laid on the wire mesh (or a layer of very dry concrete troweled onto the mesh) effectively blocking the slot. The concrete mix is then poured over this retainer to the full 6-inch depth or depth of slab and allowed to harden. Where standard slot framing is provided above the finished floor, the plate may be eliminated. Any rework of the slot can be done by drilling holes at the appropriate location and sealing with high-temperature, fast-setting grout.

2.09 Another concept in firestopping of distributing and protector openings is through the use of cast-in-place cable penetration modules (KS-21947, L1) ***in new equipment buildings or building enlargements.*** These modules are covered in Section 760-630-420—Modular, Cast-In-Place, Firestop for Distributing Frame Openings.

2.10 Smoke stopping by use of high-temperature caulking compound is covered under paragraph 3.

Unoccupied Distributing and Protector Frame Slots

2.11 Where no cables pass through slots, mineral wool batting to a depth of 6 inches with staggered joints is adequate.

Occupied and Unoccupied Cable Sleeves

2.12 The recommended firestopping method for unoccupied sleeves, for sleeves with cable passing through them, or for small holes up to 4 inches by 10 inches consists of filling all spaces with ceramic fiber and topping with water plug or other fire retardant material (AT-8832). (See Fig. 3). In order to properly pack these openings, a temporary method of containment must be provided on one side so that material can be packed against it.

2.13 Smoke stopping by use of high-temperature caulking compound shall consist of spreading all cables (where practicable) and packing between cables at the top of the sleeve as shown in Fig. 3.

B. Adjustable Ceiling Covers

2.14 An adjustable ceiling cover is available through Western Electric (details are shown on ED-92116-72) for safety and labor saving purposes. The installation of this ceiling cover plate permits the same optimum firestopping capability as a "fixed" plate, but allows considerable labor savings for both temporary and permanent closing. This sliding cover may not be applicable to all existing cable holes because of ceiling obstructions. These situations should be minimal; however, if encountered, a drop-in ceiling plate option is also available. This design incorporates a series of steel hangers that attach to the inner portion of the channel sheathing and support the drop-in plate at the ceiling elevation. The drop-in plate is also accessible from the floor side, however, the plate must still be cut whenever cabling is added to the opening.

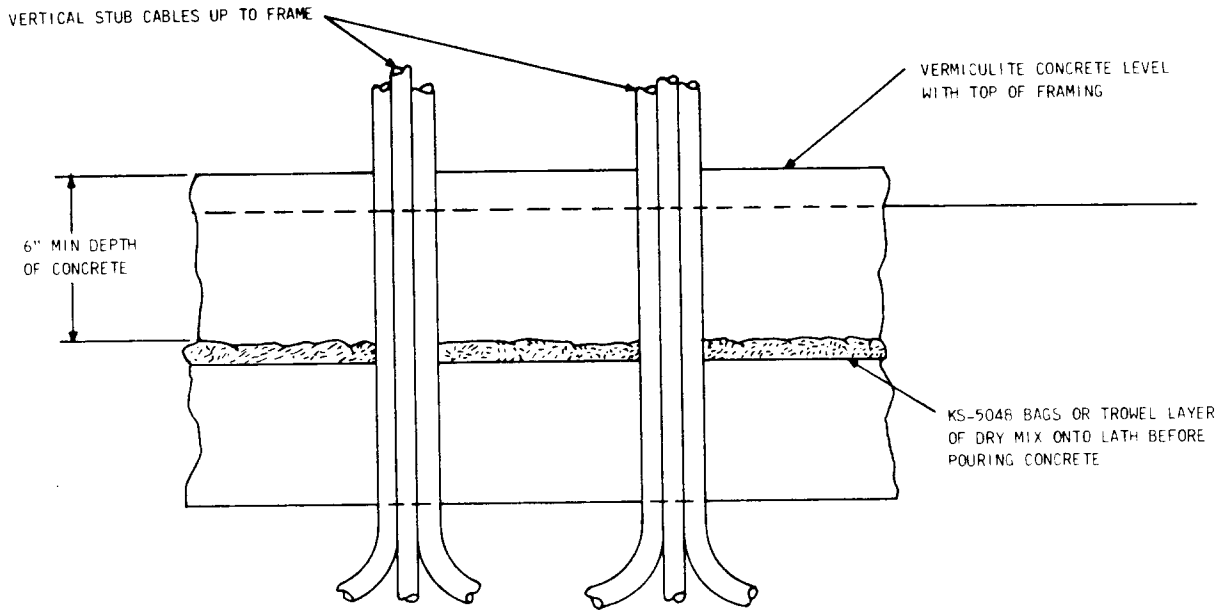
2.15 The adjustable ceiling cover should be used as a standard for all new 1- to 2-foot cable openings between columns and 2- by 2-foot cable openings in cable shaftways. (See Fig. 4.) Retrofitting existing cable holes not fully utilized should also be given serious consideration.

C. Walls

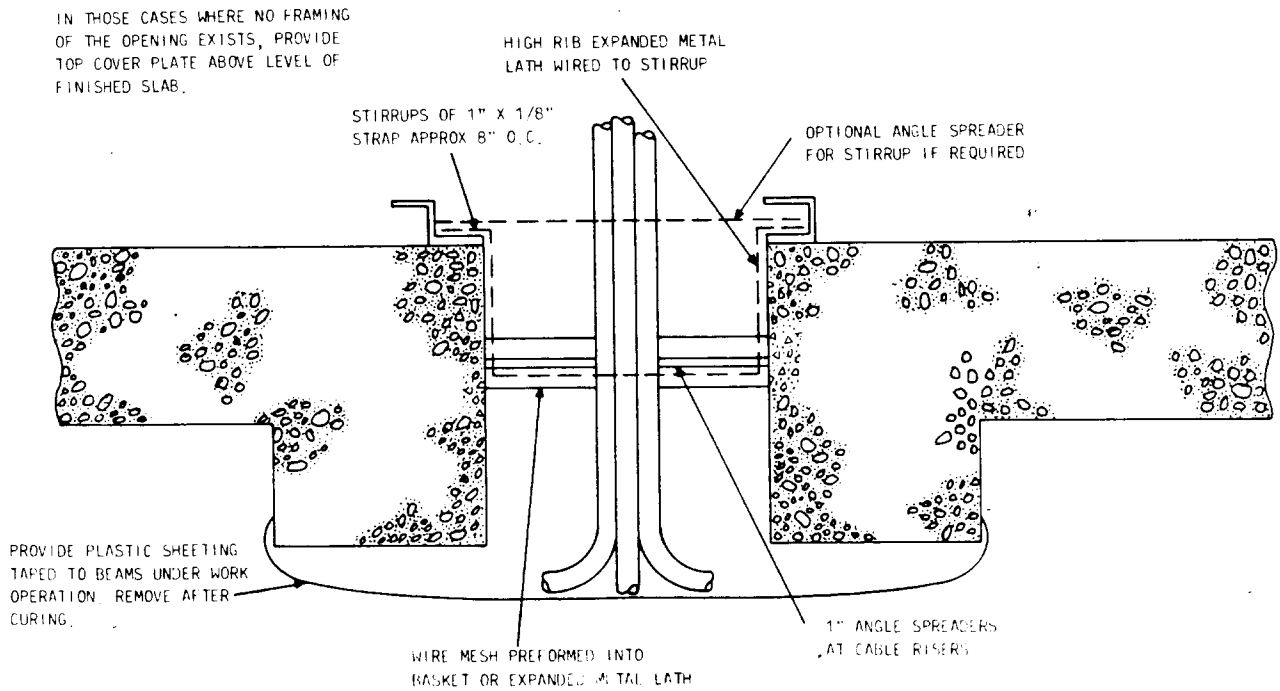
2.16 Firestopping of wall cable openings shall be provided by the following guidelines for all types of fire-rated walls and partitions:

(a) Provide covers of a noncombustible material for both sides of the cable opening. Install cover on one side of the opening prior to firestopping.

(b) Pack mineral wool batting, KS-5048 bags, or similar fire-rated material to the thickness of the wall. Cut the batting 1/2 to 1 inch larger than the cable openings. Trim the batting to fit around the cable rack and cable bundle. The material should fit snugly around the cable rack and cable bundle.



LONGITUDINAL SLOT SECTION SHOWING CONCRETE



CROSS SECTION SHOWING SUPPORT FOR CONCRETE

Fig. 2—Alternate Method—Cable Slot Firestopping

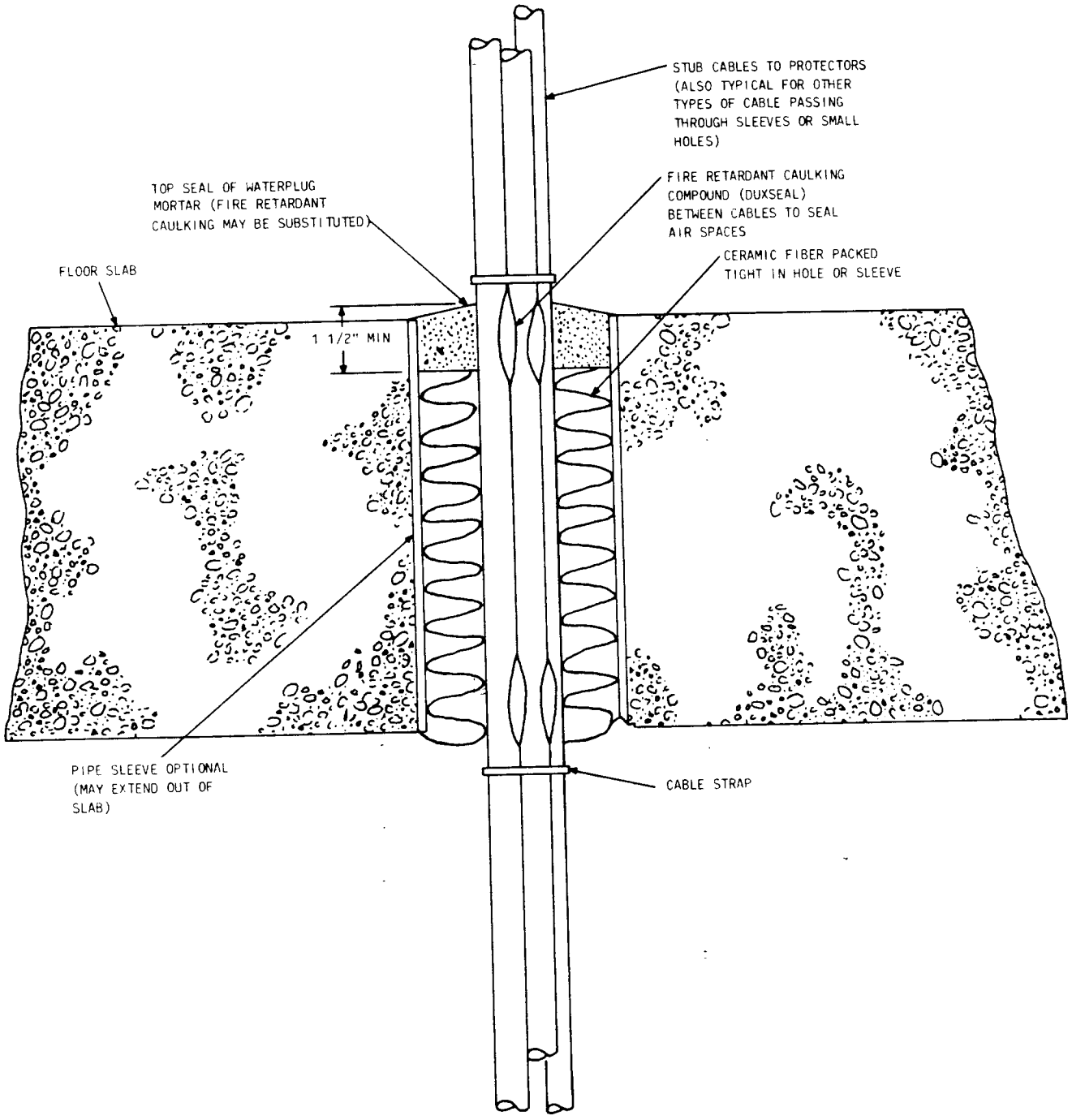


Fig. 3—Firestopping of Cables Passing Through Sleeves or Small Holes (up to 4 inches by 10 inches)

(c) Insert the batting or bags and secure cover over the opening.

Note: For this application, the KS bags are more readily formed to the shape of the cable penetration and should be the first choice.

D. Temporary Closing

2.17 All cable holes shall be temporarily closed and packed with KS-5048 bags at the end of each working day or whenever it is anticipated that no additional cable will be run that same day.

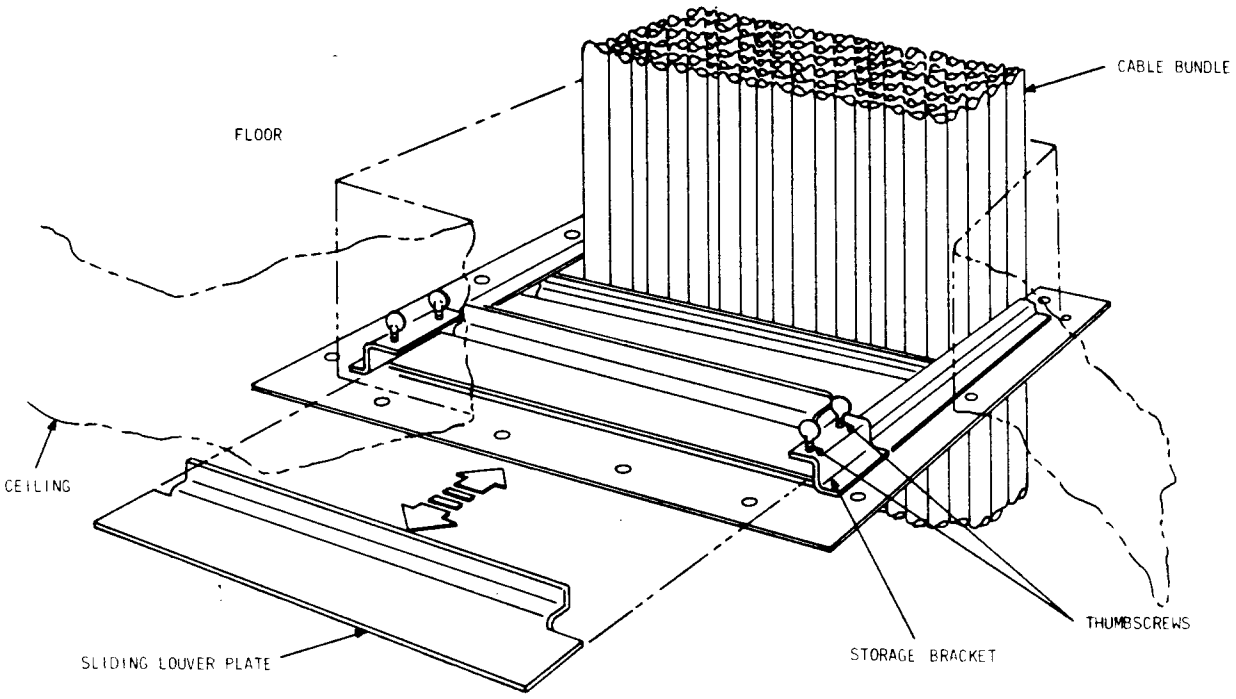


Fig. 4—Adjustable Cable Hole Ceiling Plate (See ED-92116-72)

2.18 If no bottom plate is in place, use wire cloth of sufficient length and width to allow for forming into the cable hole and for folding over top and sides of sheathing. Insert the basket 6 inches into the hole and fold the remaining edges of the wire cloth over the sides of the cable-hole sheathing. Bolt the wire basket to the sheathing and pack KS-5048 mineral wool bags in the basket to a depth of 6 inches. Place the top closure over the hole.

E. Protection of Cable Runs

2.19 ***Where telephone cables are routed through nonequipment areas such as office space, storage rooms, lounges, etc, protection for the cable can be achieved with the installation of early warning fire detection in lieu of cable rack enclosures (see Section 760-650-100, Fire Detection Systems).*** Where telephone cables are run through nonequipment areas and no early-warning fire detection is provided, protection for the cables may be achieved by enclosing the cables with a noncombustible material. It should be recognized under this arrangement that there is no protection afforded the cables from a fire originating within the cable rack. It is of importance that when occupancy changes, particularly from equipment areas to areas where the amount of combustibles would normally be greater, the cable run protection should be carefully engineered.

2.20 Some areas such as corridors, vestibules, and toilets would ***not*** normally require cable rack protection due to the absence of combustible materials.

F. Concealed Cable Runs

2.21 Cables enclosed in shafts, concealed ceilings, and under floor spaces with combustible cable insulation (waxed, varnished, polyethylene, etc) shall be protected with smoke detection equipment. (See Section 760-650-100, Fire Detection Systems.)

2.22 Power and communication cables should be separated.

2.23 In older installations involving heavy concentrations of combustible insulation, as much of the older cabling as possible should be removed before the area is concealed.

2.24 Convenient and accessible openings should be provided for all concealed cable spaces to permit prompt firefighting.

G. Certification

2.25 The intent of certification is to provide visual indication that the cable hole on which the label is fastened has been properly fire-stopped in accordance with Bell System Practices.

2.26 The certification label (KS-22228, L1) is 3 inches high by 6 inches long, pressure sensitive, and features black printing on a white background with a red border. (See Fig. 5.)

2.27 The label shall be applied to the cover plate and onto the sheathing in such a manner as to tear on removal of the cover plate.

3. MISCELLANEOUS PENETRATIONS

A. Bus Runs

3.01 ***Ventilated Bus Way:*** Ventilated bus ways which penetrate fire-rated walls and floors are not recommended. However, where they presently exist, the opening outside the duct should be packed with mineral wool batting.

3.02 ***Unventilated Bus Way:*** The installation of unventilated bus ways through fire-rated floors and walls shall be such that no void exists between bus way enclosure and bus way opening. Any void shall be fully packed with fire-resistive grout and packing material to assure fire-rated integrity of floor and/or wall.

B. Other Penetrations

3.03 All other penetrations of fire-rated barriers such as sleeves, collars, etc, for purposes of sleeving ground conductors, water piping, etc, shall be packed in accordance with paragraphs 2.12 and 2.13 of this section.

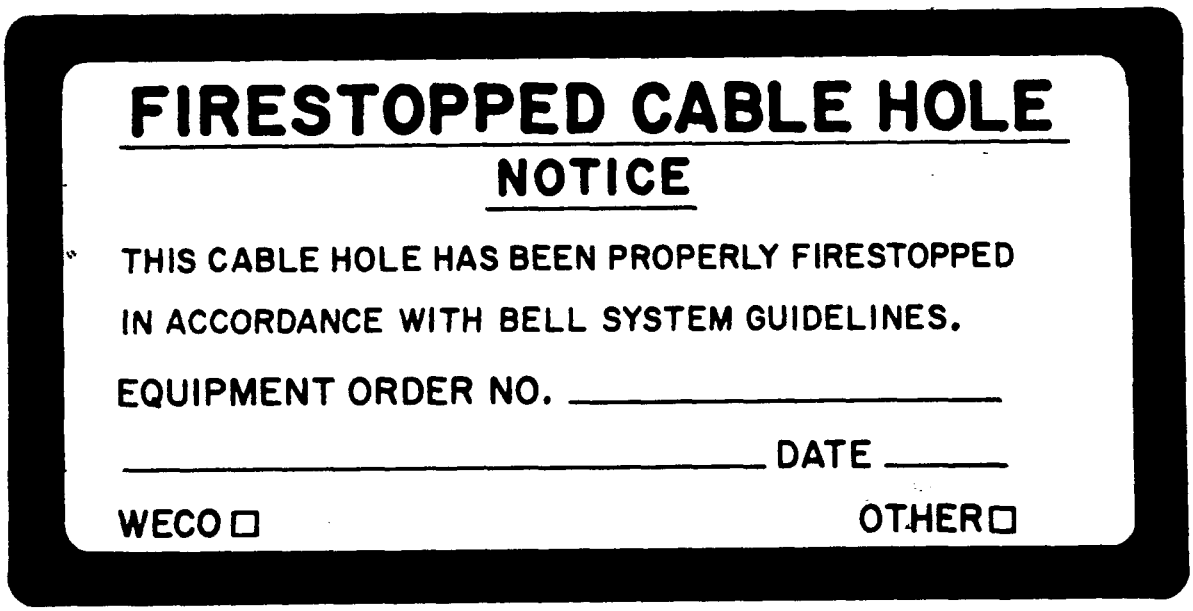


Fig. 5—Certification Label