CABLE HOLE SHEATHING
EQUIPMENT DESIGN REQUIREMENTS
COMMON SYSTEMS

1. GENERAL

SCOPE

1.01 This section, together with the supplementary information listed herein, covers the equipment design requirements for sheathings to be used for cable openings in floors, walls, or partitions. It also covers the closing of shafts around power cable runs at floor lines.

1.02 This specification is reissued as a general revision to introduce new materials, closure designs, and fire stopping procedures for cable penetrations in telephone equipment buildings. In addition, in order to eliminate redundancy in the number of closure designs available and to standardize the fire resistance performance of cable penetrations, many closure designs have been rerated A&M Only and Mfr Disc. so that only one cable closure sheathing will be utilized for each type of cable penetration.

DESCRIPTION

Cable Openings

1.03 Purpose, Shape, Size, Location: Cable openings are required for cable runs through floors, walls, or partitions. Each opening is made large enough to accommodate the ultimate size and quantity of cable to be installed and also to provide proper access for installing these cables. Openings, in the past, have been either holes or slots of a variety of dimensions. Tests to establish the fire protection afforded by insulating closures and NEBS (800-610-164) studies to determine efficient configurations for floor penetrations have led to new standards for cable openings. Henceforth, in new construction, cable openings will conform to the following:

(a) ***circular*** with thin wall steel sleeve inserts, 4 inches inside diameter, for use in all cases for outside plant cable or small quantities of power and switchboard cable (Fig. 1);

(b) ***rectangular***, 12 inches wide by 24 inches long, for all cable holes between columns or in walls or partitions (Fig. 2);

(c) ***rectangular***, either 2 or 4 inches wide by 6 inches long for use in all cases where holes are to be located beneath protector or distributing frames (Fig. 3); and

(d) ***square***, 24 inches by 24 inches, for all cases where holes are required for cable shafts in corners or adjacent to columns.

Portions of the floor surrounding the sleeves and the holes will be cast concrete of Fire-Resistive Construction-Type B for buildings of steel or concrete construction. Continuous voids or slots between adjacent holes are not permitted.

1.04 Fascia Angles: All new rectangular cable holes or new square shaft holes will be constructed without fascia angles in Fire-Resistive Construction-Type B walls and floors. Sheathing will be of the self-supporting type which will employ tie rods and angles to clamp the bottom and top sheathing of the closure to the wall or floor as shown in Fig. 2.

1.05 The ***cutting or opening*** of cable holes will be arranged for by the telephone company, unless otherwise specified. When holes have to be cut in an existing floor self-supporting sheathing as per 1.04 should be used. The actual opening for a hole will be the same as the dimensions shown on the floor plan. In new buildings, holes between columns should be provided by precast concrete plugs placed regularly, as shown in BSP Section 800-610-164, in column rows parallel to equipment frame lineups in all building bays that eventually may contain equipment. Also, plugged cable holes are provided where cable runs eventually may pass through nonequipment space. The tapered plugs used for cable openings are made of precast concrete. Each tightly wrapped in two layers of 0.008-inch thick polyethylene sheeting and bolted to the framework of the floor slab. The slab is

then poured around the positioned plugs as shown in Fig. 4. When, at some later time, a plugged cable hole is to be opened, the loosened plug is pulled out of the floor with a chain hoist attached to the inserts embedded in the plug. The appropriate sheathing is then assembled to form the metal closure and cable rack support. The method of removing the concrete plug is shown in Fig. 5.

Sheathings

1.06 Each cable hole requires sheathing to close the opening. In floors, the sheathing is sealed to the floor surface by a flexible gasket forming material . extends about 4 inches above the floor line to protect the cables and equipment below from possible damage by water. Sheathing of this kind consists of channels which form a framework around the hole. A steel sheet cover, 0.125 inch thick and cut to fit the cable runs, is bolted to the top of the channels by flat head screws. An adjustable steel cover is bolted to the ceiling frame and fastened to cover the opening at the ceiling below and thereafter accessed only from the floor above. The adjustable ceiling plate is shown in Fig. 6. The sheathing also provides a way to fasten cable racks. The closure packing is obtained by a complete and tight filling of the opening with overlapping layers of KS-5048 bags (Issue 4) under a pressure of 50 pounds per square foot (this pressure can be obtained from the full thrust of an employee's hands and upper torso). Tight banding of cables with nylon strap R-4659 at the levels of the ceiling and floor cover plates, and a high temperature caulking compound (AT-8832, R-4661) applied in a continuous bead between the top cover and cable perimeter completes the procedure. This packing impedes the passage of heat, smoke or flames through the opening. The fire-stopping arrangement is illustrated in Fig. 7 for openings of 2 feet by 1 foot and 2 feet by 2 feet. -5048 bags must also be inserted between the first row of cables and the adjoining concrete surface.

1.07 In many older buildings continuous 12 inch wide slots may be provided between columns, the slots being covered by steel plates at the ceiling and floor elevations. When a cable hole is required, a portion of the steel plates is removed and the sheath- is placed over the opening. The cable hole should then be physically isolated from the unused portion of the slot by a thin steel partition between the ceiling plate and the lower flange of the channel framework. The cable hole is then fire-stopped using the procedures given in 1.06. In addition, all portions of the slot not being used should be fire-stopped to an equivalent fire resistance as the cable closure itself. Two methods can be used to achieve this objective. The first method consists of tightly packing the entire space with overlapping layers of KS-5048 bags under a pressure of 50 pounds per square foot which can be achieved by the full thrust of an employee's hands and upper torso. The second method, illustrated in Fig. 8, uses 2 overlapping layers of 3-inch thick mineral wool batting cut in widths 2 inches larger than the slot dimension. These batts are inserted into the slot space either from above or below to provide fire-stopping.

1.08 For small rectangular holes (2-inch by 6-inch or 4-inch by 6-inch openings) spaced regularly beneath protector frames or distributing frames, a suitable means of closing them is required to impede the passage of heat, fire, and smoke. To obtain an optimum fire stop, the fire-resistant packing material should be stuffed to a depth of at least 12 inches in the space between the cable and the hole. The thickness of the concrete slab beneath protector frames and distributing frames is typically less than 12 inches and therefore, to obtain the necessary 12-inch packing depth a rectangular thin-walled split steel sleeve of appropriate height, width, and length is placed over each 2- by 6-inch or 4- by 6-inch opening. To facilitate packing the hole, this extension sleeve should not be placed until after the caulking compound (AT-8832, R-4661) is packed around the individual cables. The space between cables is reduced by using nylon strap R-4659, and then the space between the cable bundle and the hole is tightly packed using a high temperature ceramic fiber and a fire retardant caulking compound (AT-8832, R-4661). The residual volume within the extension is then packed with ceramic fiber and capped with a final top layer of 2 inches of fire retardant caulking compound (AT-8832, R-4661). To provide room for packing, a 1/4 inch minimum space should be left between the cable bundle and the sides of the opening. The ceramic fiber to be used is an alumina-silica fire clay having a melting temperature in excess of 3000°F. This product comes in a variety of shapes and forms, but the ***bulk*** form of this material is the only one to be used. It has a "cotton-ball" consistency, making it easy to tightly pack between the cable bundle and the walls of the opening. Ceramic fiber is available from ***Babcock and Wilcox*** as "Kaowool Ceramic Fiber-Bulk," from ***Carborundum Co.*** as ***"Fiberflax Bulk Fiber."*** or from ***Johns-Manville*** as ***"Cerafiber Bulk 111"***. To avoid possible skin irritation, gloves should be worn when this material is handled. Fig. 9 illustrates the final packing configuration.

1.09 In older buildings there may be a continuous cable slot in the floor between the cable entrance vault and the double-sided protector frame or the main distributing frame (MDF). A suitable means of closing these slots to impede the passage of heat, fire, and smoke is required. This closing is accomplished by fastening sheet steel sections, cut to fit the rise cables, to the floor angles of the frames. At the MDF, an additional angle, parallel with the floor angle and on the opposite side of the slot, is required for closing and for support of the cover. An angle is also furnished for closing each end of the slot both at the protector and main frames. All voids between the individual rise cables should be closed using caulking compound AT-8832 at the point where they pass through the steel cover plate. The caulking compound should extend a minimum of two inches below the cover plate. The cable should then be tied in a tight bundle reducing the void space. The caulking compound, AT-8832, should also be applied to close the void space between the steel cover plate and the outer perimeter of the cable bundle as specified in Section 800-614-153 and 636-210-205. The slot volume is packed to a total depth of 12 inches using 3- or 4-inch mineral wool batts of U.S. Gypsum Thermafiber Curtain Wall insulation with an aluminum foil facing on one surface and having a density of 4 pounds per cubic foot. The aluminum foil facing serves to reduce the quantity of loose particles that are generated when handling and inserting the batts into the slot. The mineral wool batts are cut to a dimension 2 inches longer than the distance between verticals, and 2 inches wider than the width of the cable slot. With the top cover in place the batts are inserted from below in the space between the rise cables. This fire stopping configuration is illustrated in Figure 10.

1.10 Where a continuous slot has been partially worked with cable, the empty space should be filled with concrete to a depth of 8 inches and provision made for the rectangular holes described in 1.08 or a series of circular holes, formed by using the removable core method described in Section 760-330-151.

Wall Openings

1.11 For wall openings, sheathing is used to form a framework around the hole, metal plates .125 inches thick are cut to fit the cable runs on both faces of the wall, and the plates are fastened to the sheathing. Cable runs should be tied by nylon strap R-4659 at each plate position, the cable hole packed full and tight with KS-5048 bags, and the AT-8832 caulking compound applied between the cabling perimeter at both metal plate interfaces, see Fig. 7.

Cable Sleeves

1.12 For accommodating one or more switchboard, outside plant or power cables, sleeves should be used. For outside plant cables these sleeves are positioned along an outer wall. The sleeves consist of lengths of standard thin-walled steel pipe having a maximum inside diameter of 4 inches. The sleeve should have a minimum length of 12 inches, extending as required above the floor to permit an adequate depth of insulating material between the sleeve and cable. Since fire, smoke and heat protection is required before the sleeves are used for cabling, the opening is closed off with a concrete plug of 4 inch minimum thickness (Fig. 1). With cable in place, the sleeve should be tightly packed with ceramic fiber and fire retardant caulking compound (AT-8832, R-4661). In addition, for concrete slabs less than 8 inches thick, the emergent end of the steel sleeve is covered with a one inch minimum thickness of fire resistant pipe insulation. The ceramic fiber to be used is that of 1.08; the fire-resistant pipe insulation with a 0.016-inch aluminum liner is available from ***Johns-Manville*** as "J-M Flame-Safe ML." This fire-stopping configuration is shown in Fig. 11. Where polyethylene outer jacketed outside plant cables are run in the sleeves, between floors, the cables should be placed in individual floor-to-ceiling metal conduits or enclosed in at least a 1-hour Fire-Resistive Constructed floor-to-ceiling wall chase or shaft cabinet, with doors, to gain access to fire-stop sleeves or holes at each floor. The access door should be C-labelled.

Closing Shafts Around Power Cable Runs

1.13 Where it is more desirable to carry the cable to the various floors through a shaft, a method for supporting the cable run at each floor and for closing the shaft around the cable run is required. Individual shaft openings should be limited to 2 feet square. Sheathing as described under 1.06 should be used, and the entire run enclosed in a wall of Fire-Resistive Construction with at least a 1-hour rating. An entrance door or removable panel should be provided to permit the running of cables and the subsequent closing of every opening between floors to impede the passage of heat, smoke, and fire. This access door should be C-labelled.

Closing Cable Openings Provided for Future Use

1.14 The closing of cable holes and sleeves provided for future use will be arranged for by the operating telephone company. In general such a cable hole or sleeve will be closed by a 4 inch deep (minimum) precast concrete plug placed in the opening to seal it until such time as the sleeve is installed. See Fig. 1.

1.15 Where plugs have not been provided, cable holes should be closed with a steel plate at the under side, and at the top by a steel cover set flush with the floor. The space between the plates should be tightly and completely packed with KS-5048 bags of mineral wool. When a concrete plug has not been provided for a cable sleeve, the sleeve should be tightly packed over its entire length with ceramic fiber (1.08) followed by a 2 inch top layer of caulking compound, AT-8832.

Types of Floor Construction

1.16 Cable hole sheathing are available for use with fire-resistive construction, the particular type being indicated in the title of the drawing. See Part 3. DRAWINGS.

2. SUPPLEMENTARY INFORMATION

801-000-000—Checking List, Common Eqpt Reqt
802-000-000—Numerical Index-Power Systems
800-020-001—Cross Reference List—J, NJ, IS, and X Specifications to BSP Numbers
800-020-020—Cross-Reference List—AA Series to Nine-Digit BSP Numbers
800-610-164—New Equipment Building System (NEBS) General Equipment Requirements
800-614-152—Switchboard, Power and Local Cables, Installation
800-614-153—Sheathing for Cable Openings, Installation
636-210-205—Cable Termination, Installation of Open Cable Forms
628-220-204—Sealing Ducts, Caulking Materials
760-330-150—Cable Openings
760-330-151—Core Method of Forming Main Frame Cable Holes
760-330-152—Cable Vaults
X-74300—NEBS Building Engineering Standards

3. DRAWINGS

3.01 The following drawings cover the requirements for the design of cable holes and sleeves of sheathing for cable holes and shafts, of sleeves in floors, and of closing arrangements at floors in shafts around power and outside plant cable runs. These drawings also cover the closing arrangements the telephone company furnishes for cable openings provided for future use.

Cable Hole Sheathing

ED-90005-31—Cable Hole Sheathing—Angle Type for Cable in Mill-Type and Wood Joist Floors
ED-90006-30—Cable Hole Sheathing for Fire-Resistive and Combustible Walls and Partitions and for Floor Openings in Cable Ducts
ED-92116-71—Cable Hole Sheathing Channel-Type Construction Cable Slots or Series of Cable Holes Between Columns and Miscellaneous Cable Holes in Fire-Resistive Type Floors
ED-92116-72—Cable Hole Sheathing Channel-Type Construction and Adjustable Ceiling Cover Louver-Type for Cable Holes in Fire-Resistant-Type Floors
ED-92117-70—Cable Hole Sheathing for 8-1/2 Inch Holes Switchboard Used on Existing Cable Holes Made for Toll Switchboard 3C or on Original-Type Cable Hole Made for Switchboard 3CL

Cable Slot Sheathing

ED-90007-32—Cable Slot Sheathing for Cable Slot Beneath IDF in Noncombustible-Type Floor-Angle Type
ED-90274-71—Protector Frame Double-Sided
ED-90627-31—MDF, CDF, or Protector Frames-Closing Framework and Cover for Slot Under Frame for Outside Cables
ED-90979-30—Cable Slot Sheathing for Cable Slot Beneath IDF in Fire-Resistive Type Floors-Channel Type
ED-90979-31—Cable Slot Sheathing for Cable Slot Beneath IDF in Fire-Resistive Type Floors-Channel Type

Cable Sleeve

ED-90591-70—Cable Sleeve in Floors

Closing of Cable Shafts

ED-90578-01—Closing Arrangements and Supporting of Cable Runs in Power Cable Shafts
ED-90878-01—Sheathing for Cable Slot Between Columns or Series of Cable Holes Between Columns
ED-90679-31—Details of Supporting Units at Floors for Power Cable Runs
ED-New xxx—Closing Arrangements of Outside Plant Cable in Holes Beneath Protector Frames and Distributing Frames

Guard Rails

ED-91177-( )—General Railings for Cable Holes

4. EQUIPMENT

ED-90005-31—A&M Only—Cable Hole Sheathing—Angle Type for Cable Holes in Mill-Type and Wood Joist Floors

ED-90006-30—AT&TCo Std—Cable Hole Sheathing for Fire Resistive and Combustible Walls and Partitians and for Floor Openings in Cable Ducts

ED-90007-32—A&M Only—Cable Slot Sheathing for Cable Slot Beneath IDF in Noncombustible—Type Floors—Angle Type

ED-90274-71—A&M Only—Protector Frame Double-Sided

ED-90627-31—A&M Only—MDF, CDF, or Protector Frames—Closing Framework and Cover for Slot Under Frame for Outside Cables

ED-90679-31—AT&TCo Std—Power Cable Shafts—Closing Arrangements and Cable Run Supporting Details

ED-90878-01—A&M Only—Sheathing for Cable Slot Between Columns or Series of Cable Holes Between Columns

ED-90979-30—A&M Only—Cable Slot Sheathing for Cable Slot Beneath IDF in Fire-Resistive Type Floors—Channel Type

ED-90979-31—A&M Only—Cable Slot Sheathing for Cable Slot Beneath IDF in Fire-Resistive Type Floors—Channel Type

ED-92116-71—AT&TCo Std—Cable Hole Sheathing Channel—Type Construction Cable Slots or Series of Cable Holes Between Columns and Miscellaneous Cable Holes in Fire-Resistive Type Floors

ED-92116-72—AT&TCo Std—Cable Hole Sheathing Channel—Type Construction and Adjustable Ceiling Cover Louver-Type for Cable Holes in Fire-Resistant-Type Floors

ED-92117-70—A&M Only—Cable Hole Sheathing for 8-1/2 Inch Panel Switchboard Used on Existing Cable Holes Made for Toll Switchboard 3C or on Original-Type Cable Hole Made for Switchboard 3CL.

5. GENERAL NOTES AND INDEXES

5.01 To prevent drafts and to furnish satisfactory fire protection, fire resistant canvas bags containing mineral wool, per specification KS-5048, shall be packed in cable holes at the end of each day's working tour and at the time of closing.

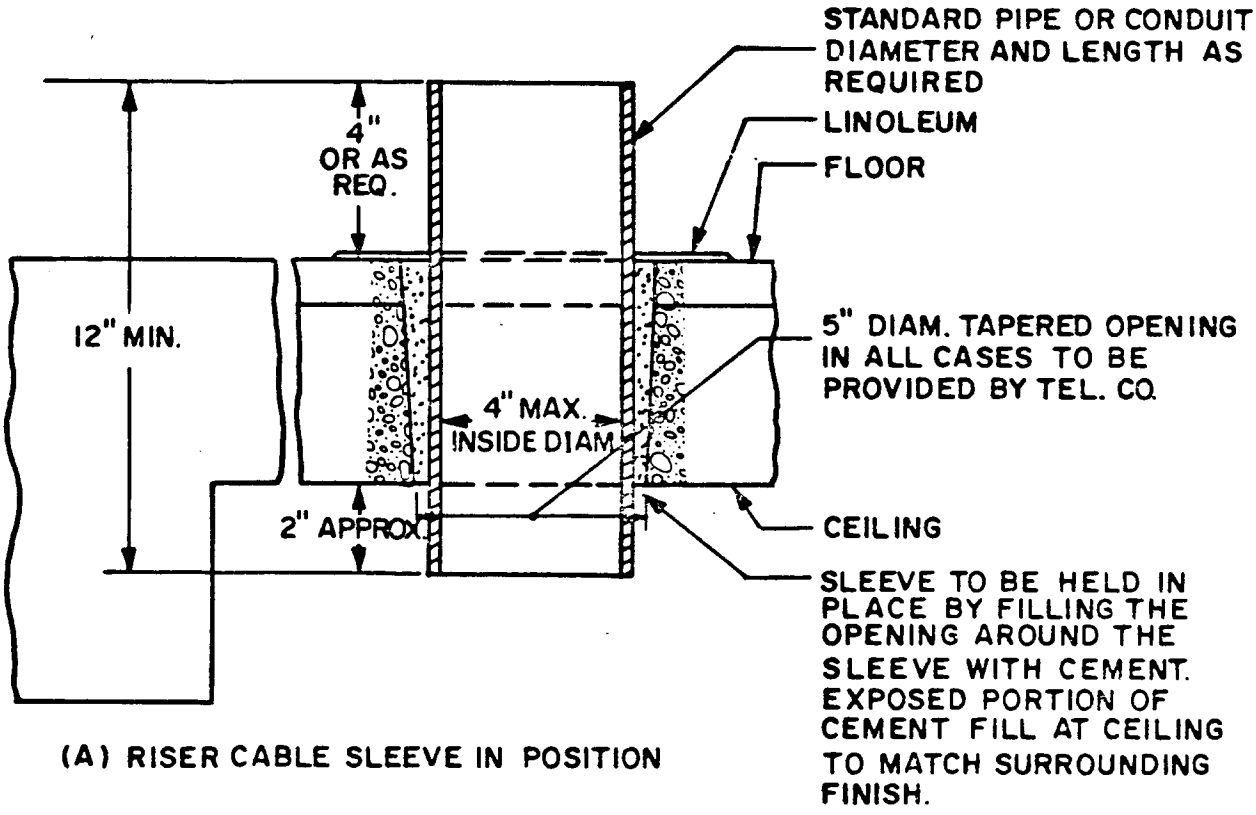
5.02 In the case of cable holes in fire-resistive and mill-type floors, the canvas bags shall be packed tightly to fill the space not occupied by cable runs between the bottom closing plate and cover plate. To provide adequate space for packing, a 3-inch minimum space should be left between the cable bundle and the face of the cable hole.

5.03 On installing the bags of mineral wool, the bags shall be placed to lap joints between bags in each layer and packed in place with a pressure of 50 pounds per square foot, which can be obtained from the full thrust of person's hands and upper torso. All spaces between the sides of the hole and cable, rack, hardware must be carefully stuffed with bags. The cable hole shall be overfilled by one layer of bags and the top cover plate forced down and fastened to complete the closure.

To provide adequate space for fire stopping cable sleeves and the small rectangular openings under protector and distributing frames, a 1/4-inch minimum space should be left between the cable bundle and the sides of the opening.

List of A&M Only and Mfr Disc. Equipment

EQUIPMENT	RATING	DETAILS LAST SHOWN IN ISSUE	REPLACING EQUIPMENT
ED-90004-31	Mfr Disc.	5	—
ED-90005-31	A&M Only	5	—
ED-90007-32	A&M Only	4	ED-90979-30
ED-90274-71	A&M Only	5	—
ED-90627-31	A&M Only	5	—
ED-90878-01	A&M Only	5	—
ED-90878-30	Mfr Disc.	4	ED-92116-71, -72
ED-90979-30	A&M Only	4	—
ED-90979-31	A&M Only	5	—
ED-90980-30	Mfr Disc.	5	ED-92116-71
ED-92117-70	A&M Only	4	ED-92116-71, -72



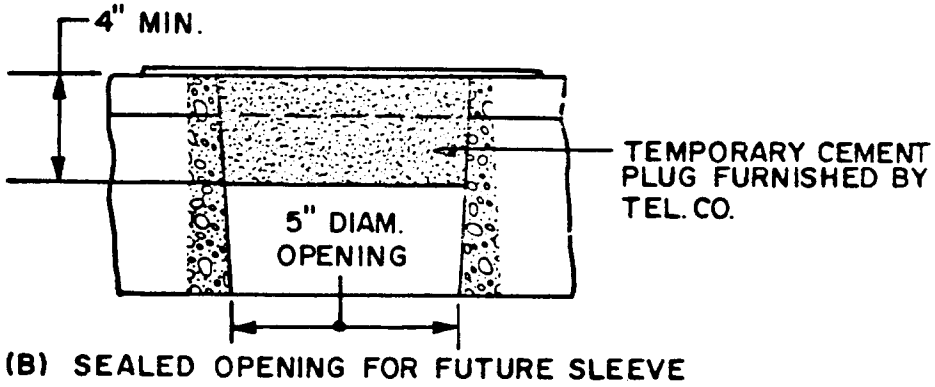


Fig. 1—Cable Sleeves

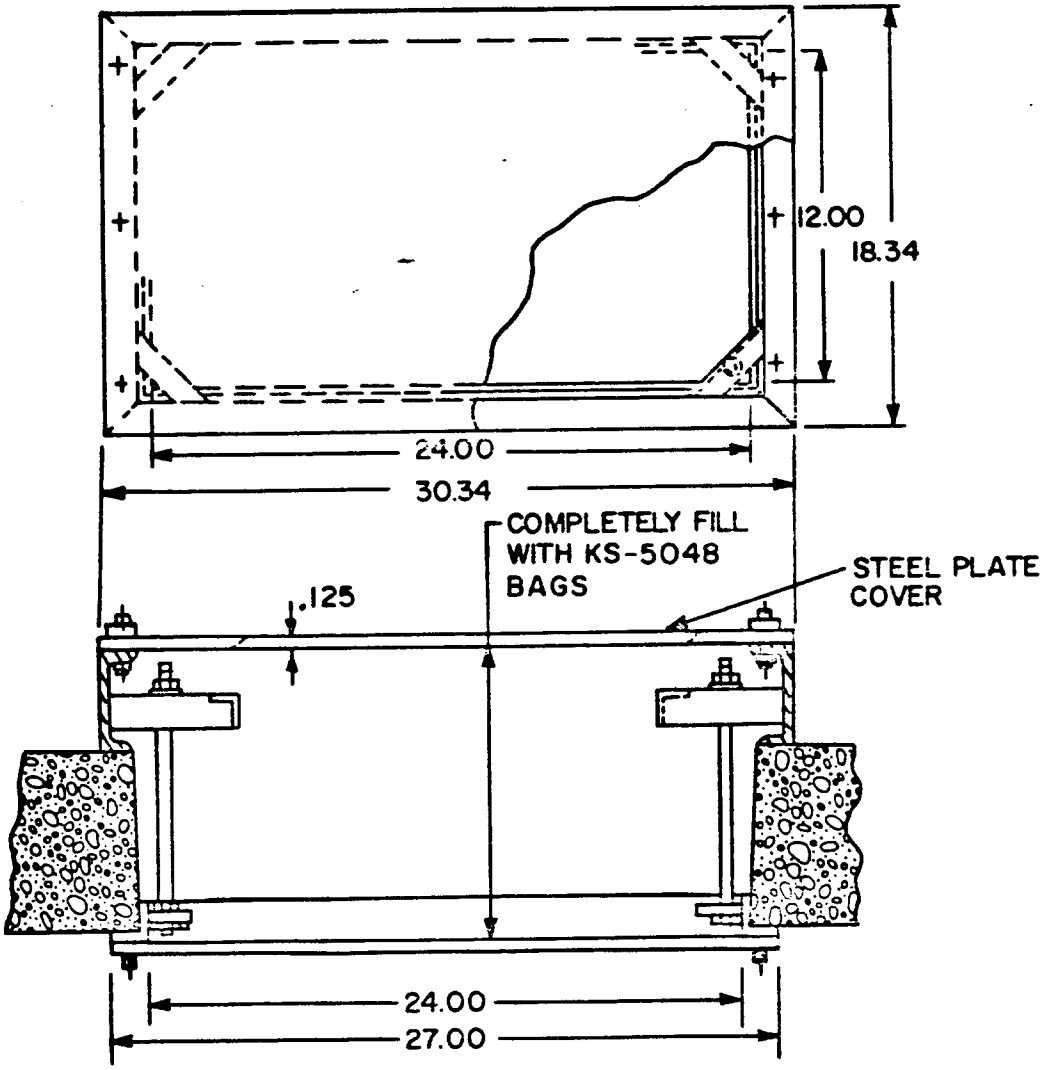
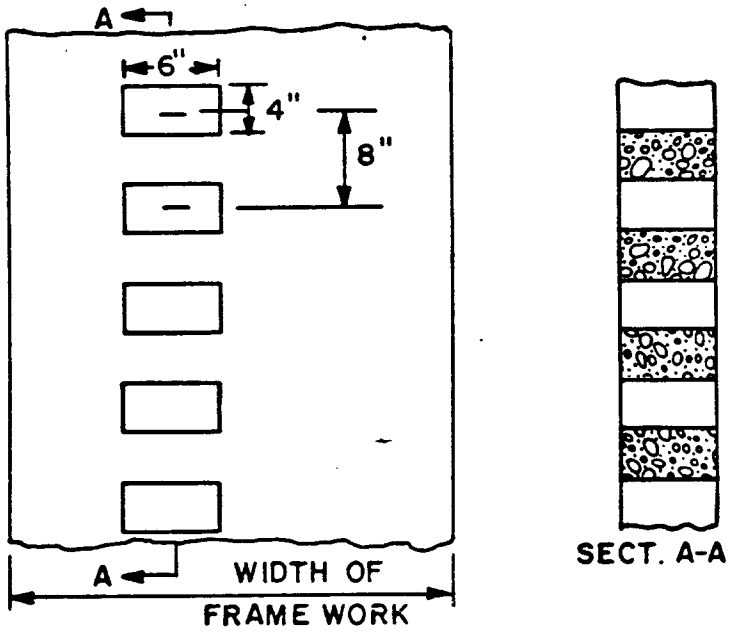
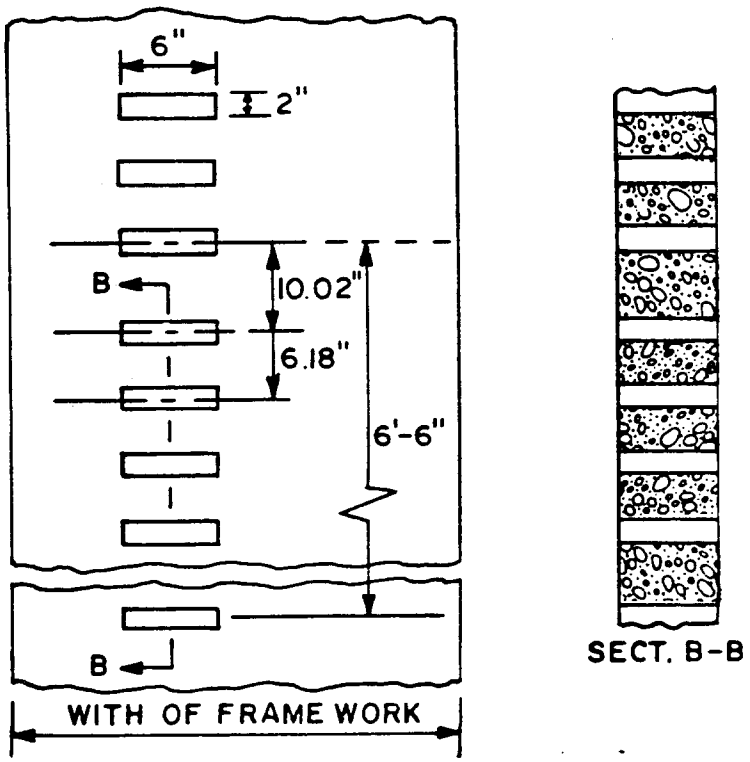


FIG. 2 TYPICAL RECTANGULAR 12"x 24"
CABLE HOLE BETWEEN COLUMNS

Fig. 2—Typical Rectangular 12-Inch by 24-Inch Cable Hole Between Columns



(A) 4" X 6" CABLE HOLES FOR DOUBLE-SIDED PROTECTOR FRAME AND LOW PROFILE CONVENTIONAL DISTRIBUTING FRAME



(B) TYPICAL ARRANGEMENT OF 2" X 6" CABLE HOLES FOR MODULAR ESS PROTECTOR FRAME

Fig. 3—Typical Arrangements of Cable Holes Under Distributing and Protector Frames

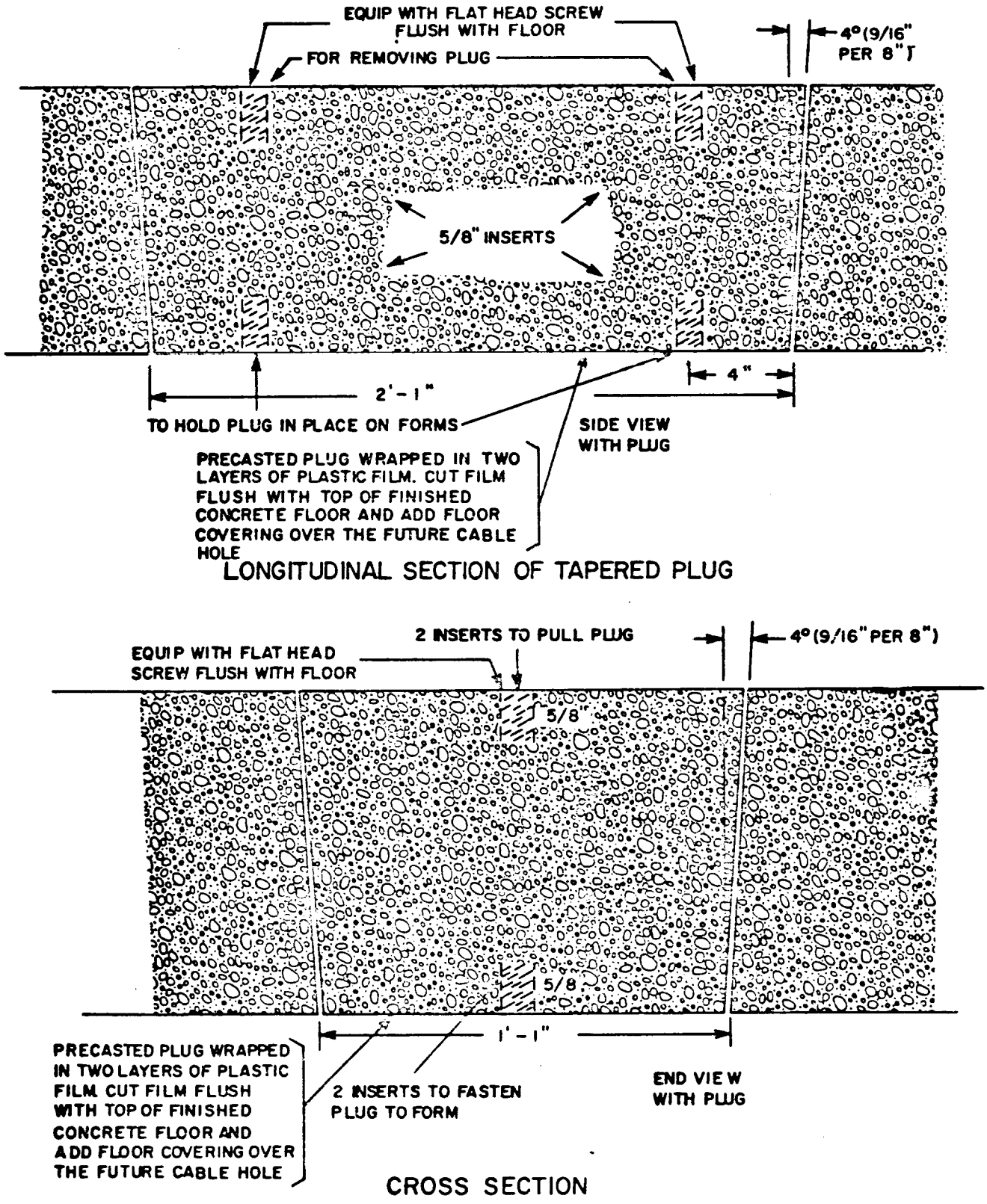


Fig. 4—Precast Concrete Plug for Cable Holes Between Columns

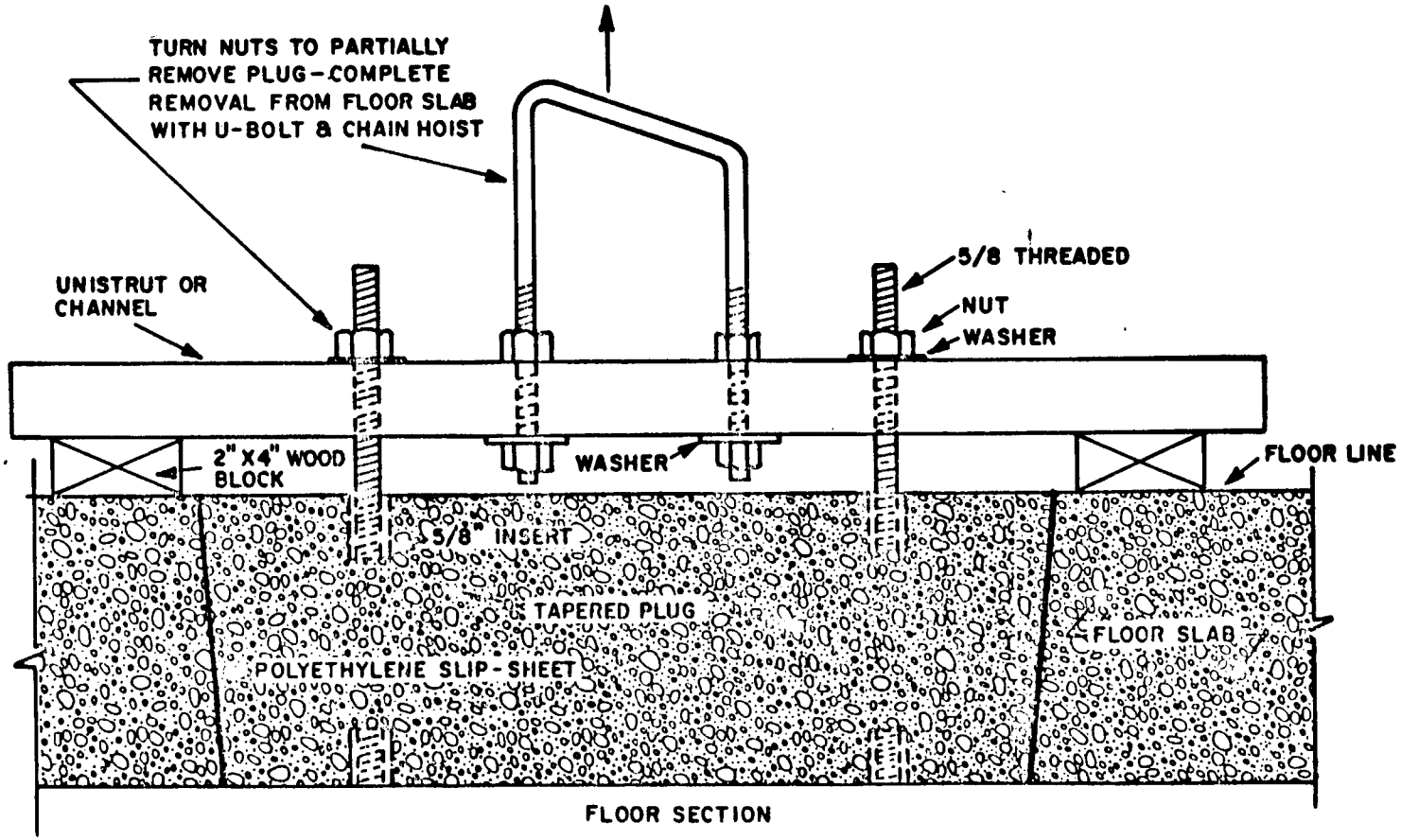


Fig. 5—Method of Removing The Precast Concrete Plug for Cable Holes Between Columns

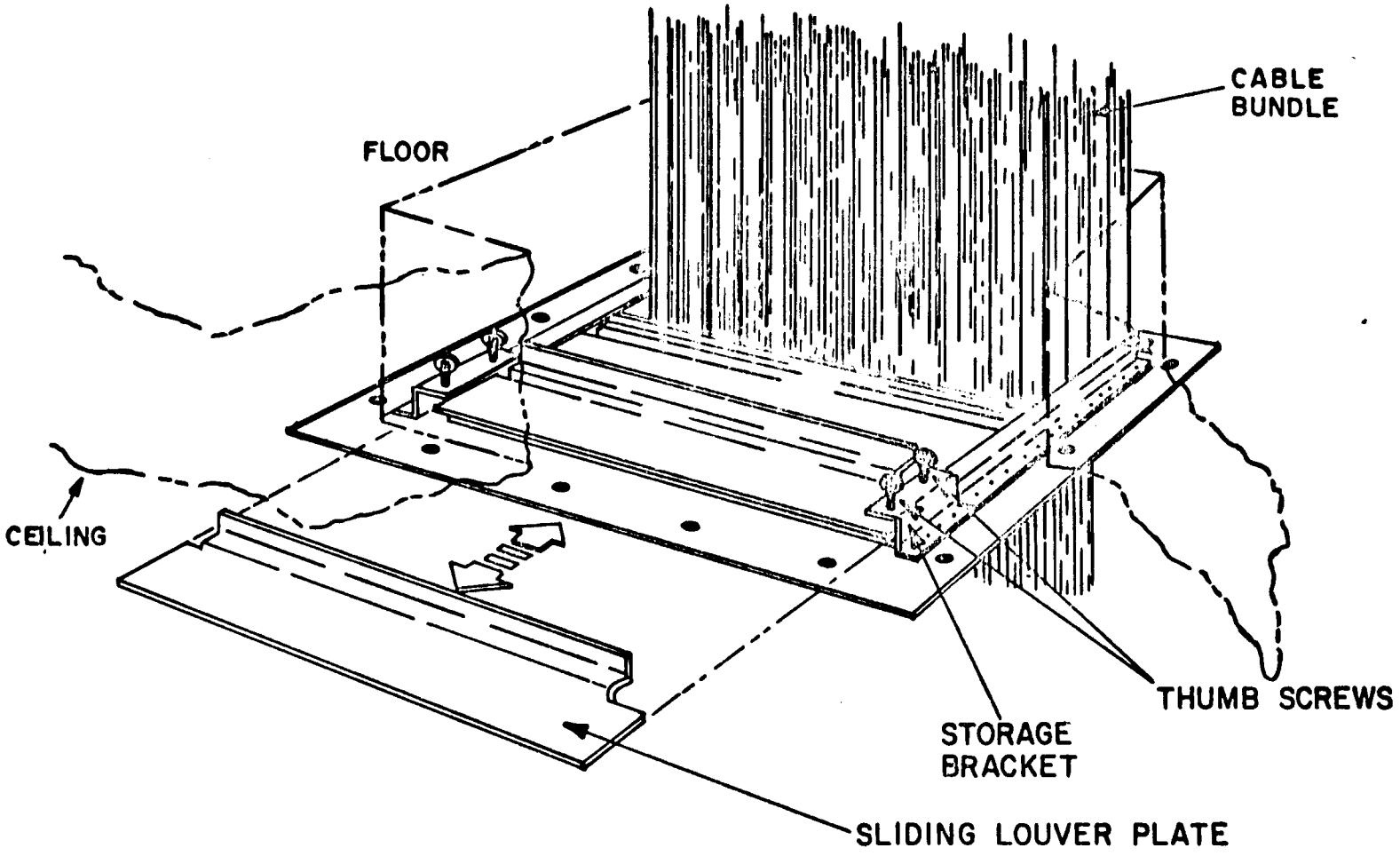


Fig. 6—Adjustable Cable Hole Ceiling Plate (See ED-92116-72)

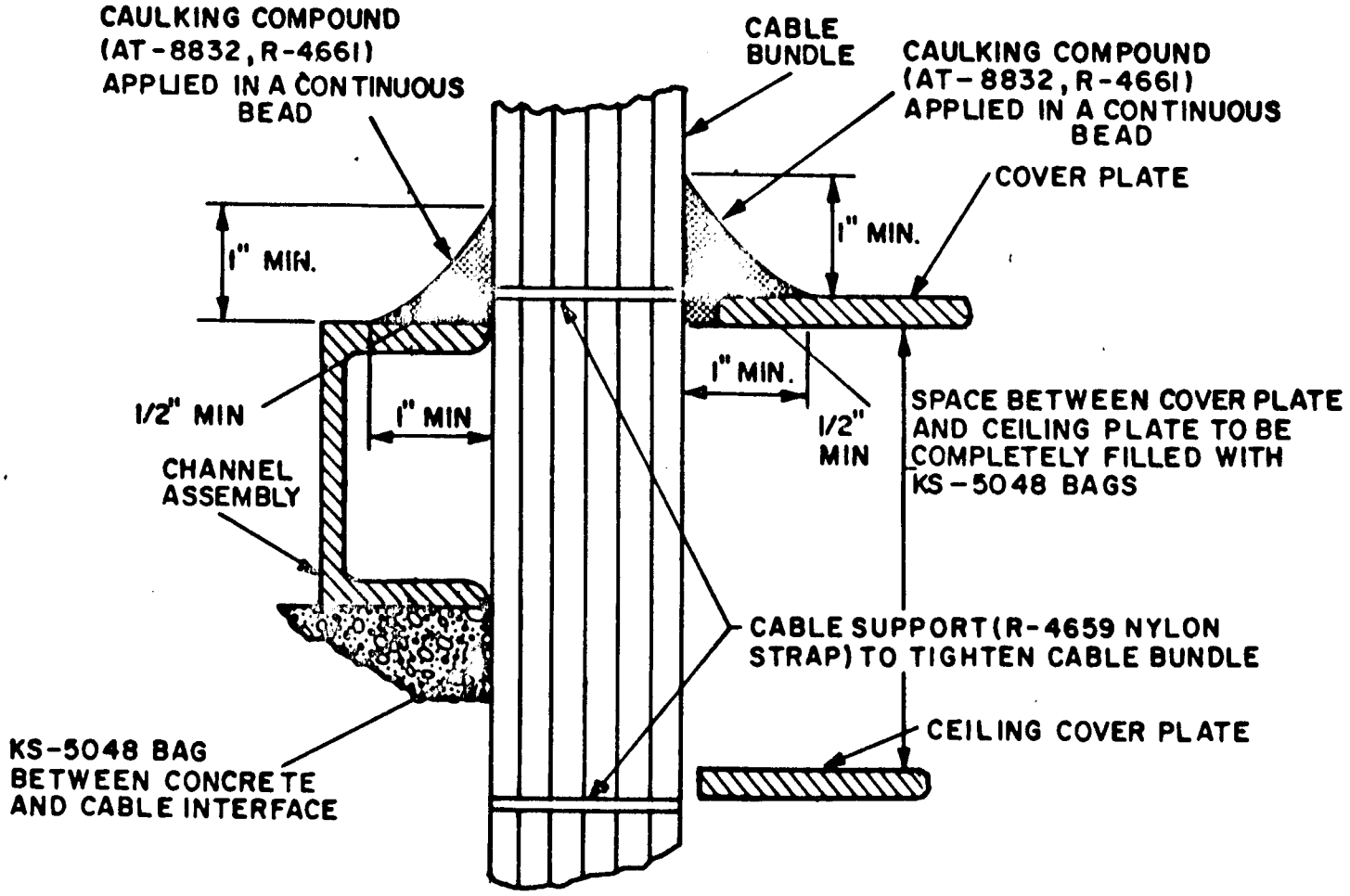


Fig. 7—Fire Stopping Arrangement of Caulking Compound (AT-8832) Between Cable Bundle and Cable Hole Closure Assembly

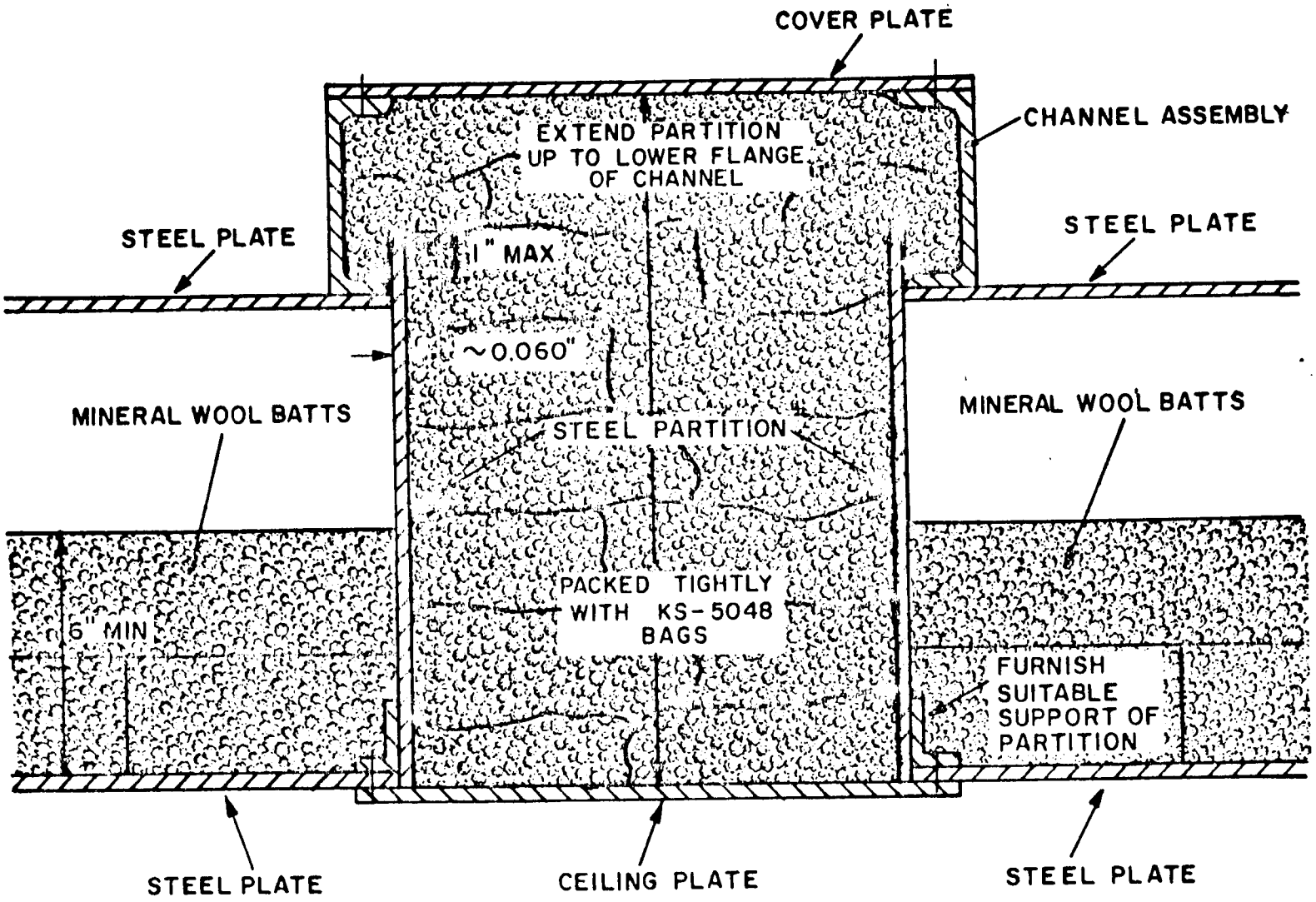


Fig. 8—Fire Stopping Configuration for Continuous Slot Between Columns

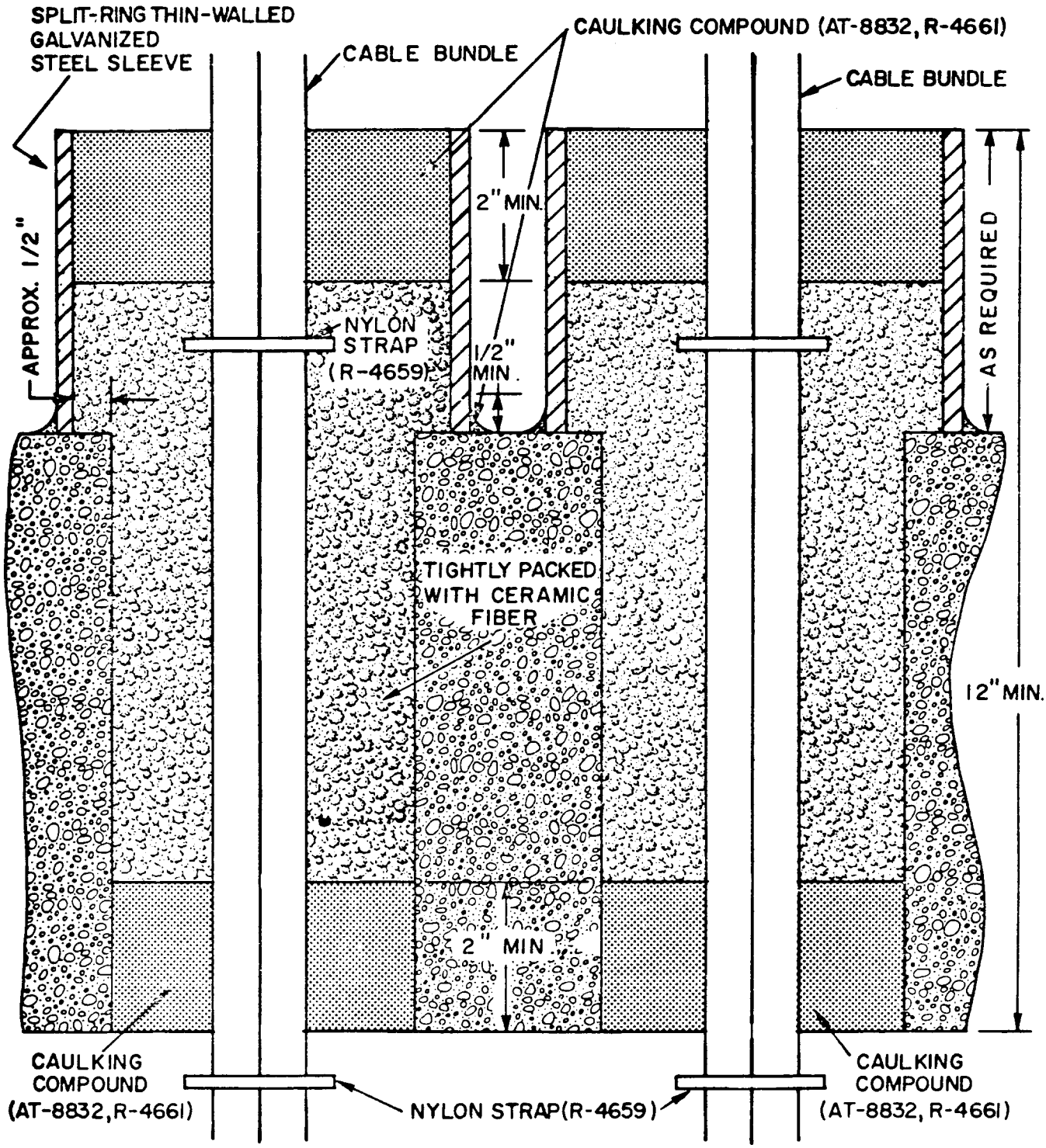
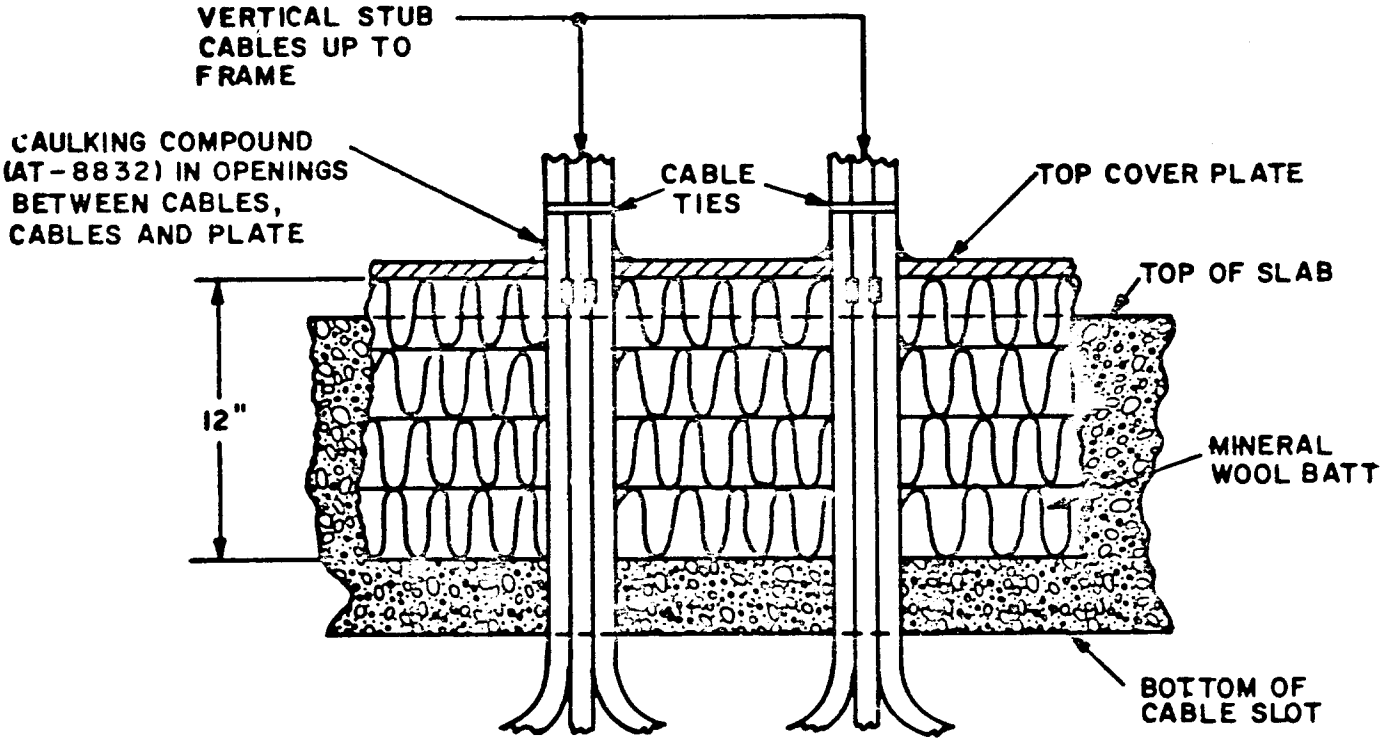
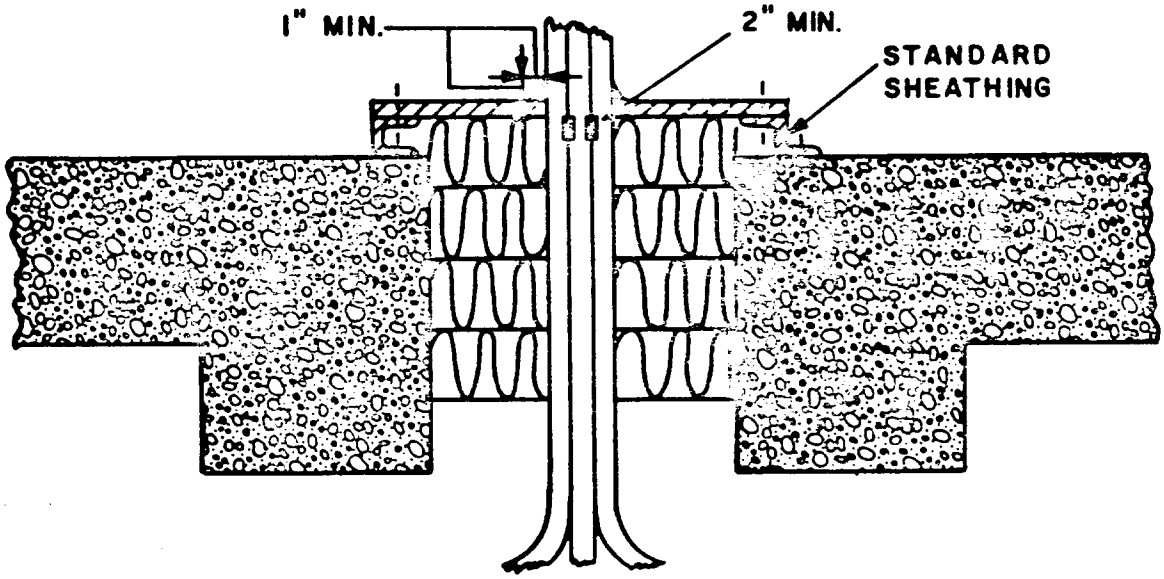


Fig. 9—Fire Stopped 2-Inch by 6-Inch and 4-Inch by 6-Inch Cable Hole Configuration



(A) LONGITUDINAL SLOT SECTION



(B) CROSS SECTION OF SLOT

Fig. 10—Fire Stopping Configuration for Protector Frame and Main Distribution Frame Cable Slots

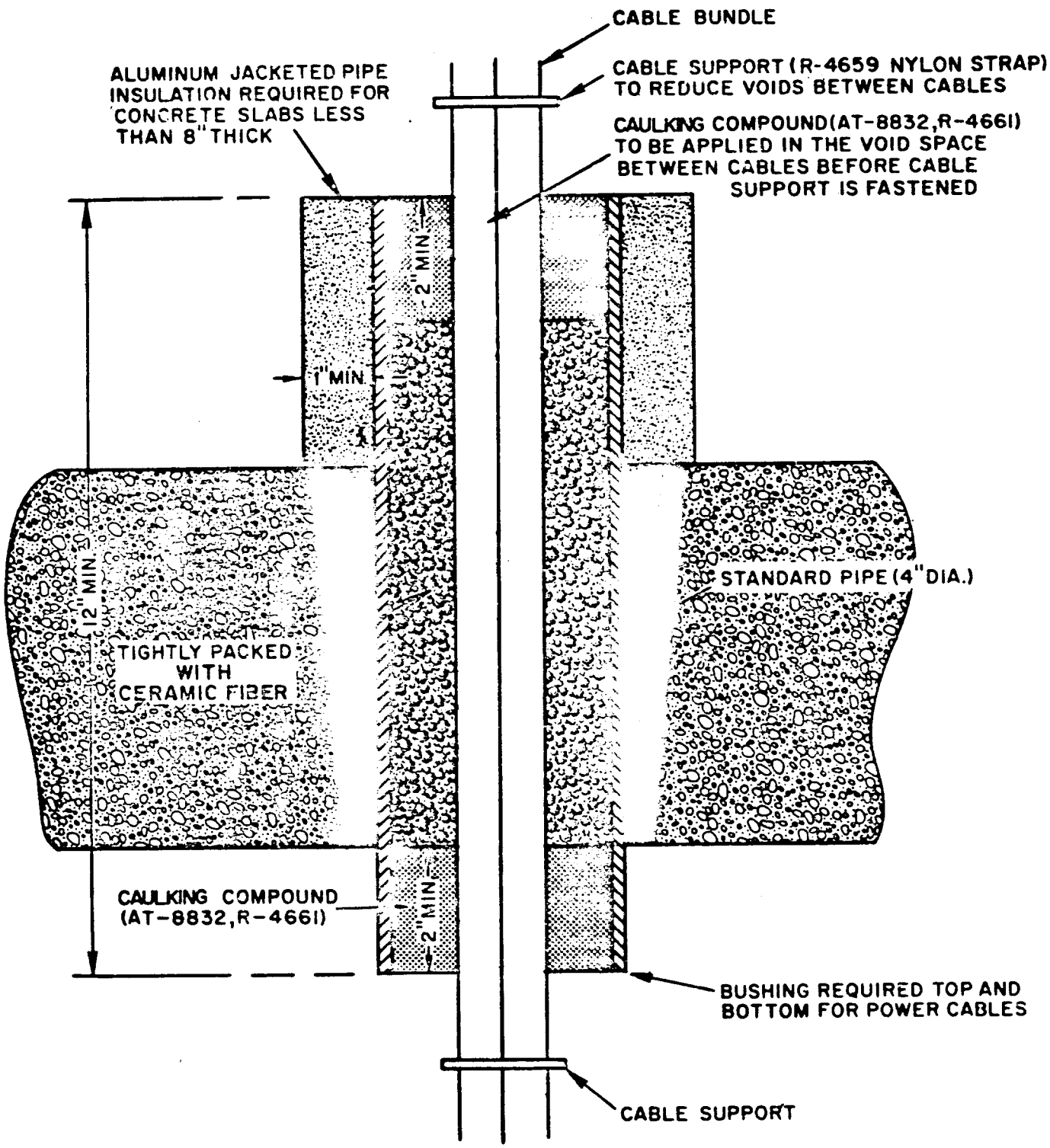


Fig. 11—Fire Stopping Configuration for Cable Sleeves