



Classified by
Underwriters Laboratories, Inc.
to CAN/ULC-S115

System No. C-AJ-8014

F Rating — 2 Hr

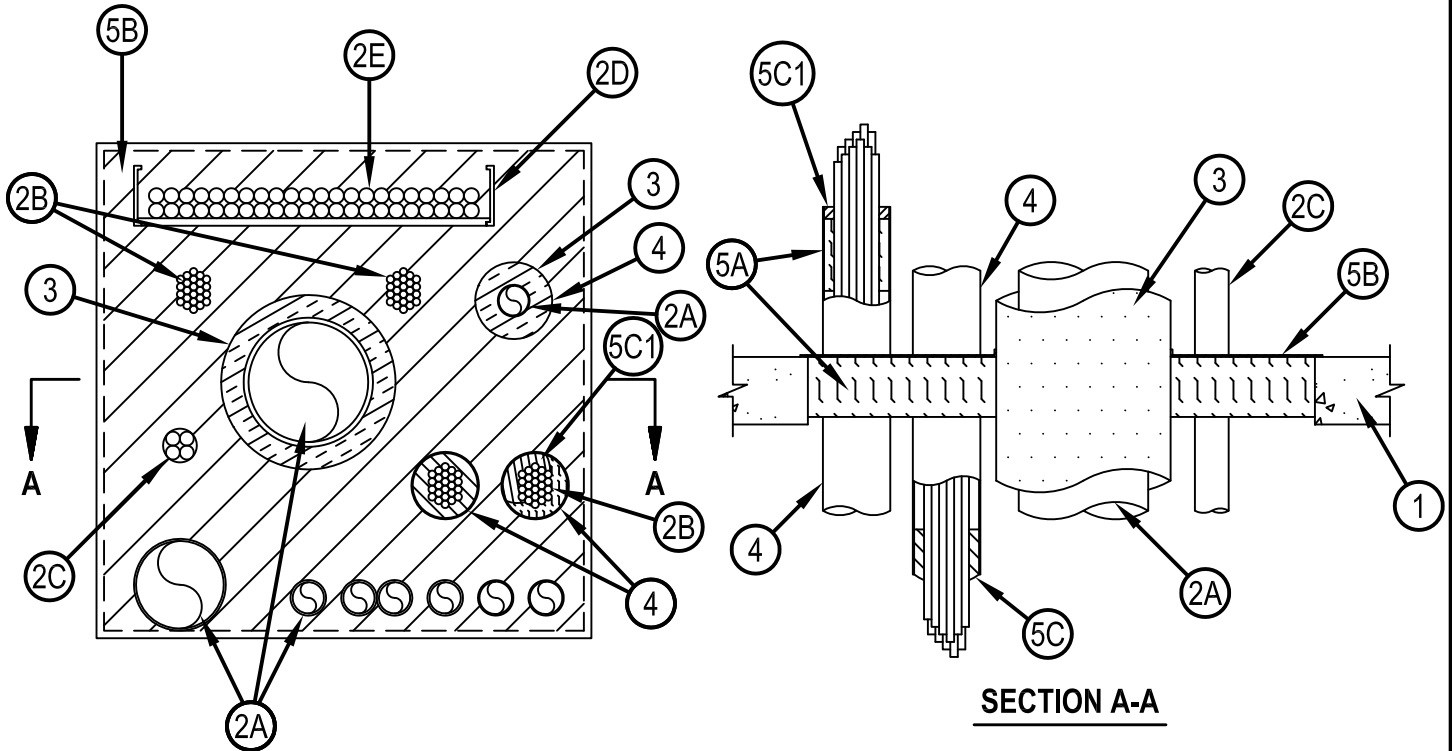
FT Rating — 0, 1/4, 1/2 And 1 Hr (See Items 2, 3 and 4)

FH Rating — 0 Hr

FTH Rating — 0 Hr



CAJ 8014



1. Floor or Wall Assembly — Min 114 mm (4-1/2 in.) thick reinforced lightweight or normal weight (1600-2400 kg/m³ or 100-150 pcf) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Max area of opening is 6606 cm² (1024 in²) with a max dimension of 813 mm (32 in.).

See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. Through-Penetrants — One or more pipes, tubes or cable bundles to be installed within the opening. The total number of through-penetrants is dependent on the size of the opening and types and sizes of the penetrants. Any combination of the penetrants described below may be used provided that the specified annular spaces are maintained. The max annular space in the system shall be 330 mm (13 in.). The minimum annular spaces shall be as specified in individual penetrant descriptions below. Penetrants to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of penetrants may be used.

A. Metallic Penetrants — The annular space between metallic penetrants and any other type of penetrant shall be a min 127 mm (5 in.). The annular space between nom 51 mm (2 in.) diam (and smaller) metallic penetrants shall be a min 0 mm (point contact). For metallic penetrants with nom diam exceeding 51 mm (2 in.), the minimum annular space between metallic penetrants shall be 76 mm (3 in.). The annular space between metallic penetrants and periphery of opening shall be min 0 mm (point contact). The following types of metallic pipes, tubes or conduits may be used.

1. Copper Tubing — Nom 152 mm (6 in.) diam (or smaller) Type L (or heavier) copper tube.
2. Copper Pipe — Nom 152 mm (6 in.) diam (or smaller) Regular (or heavier) copper pipe.
3. Steel Pipe — Nom 610 mm (24 in.) diam (or smaller) Schedule 40 (or heavier) steel pipe.
4. Iron Pipe — Nom 610 mm (24 in.) diam (or smaller) cast or ductile iron pipe.
5. Conduit — Nom 102 mm (4 in.) diam (or smaller) steel electric metallic tubing (EMT) or nom 152 mm (6 in.) diam (or smaller) rigid steel conduit or nom 51 mm (2 in.) diam (or smaller) flexible steel conduit.

The FT Rating for the firestop system is 0 hr when metallic penetrants are used.



Hilti Firestop Systems

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- B. Cables Bundles — Max 76 mm (3 in.) diam tightly bundled cables. The annular space between cable bundles and between cable bundles and other penetrants (all except Item 2A) shall be a min 76 mm (3 in.). The annular space between cable bundles and the periphery of opening shall be min 25 mm (1 in.). Any combination of the following types and sizes of cables may be used.
1. Max 500 kcmil single copper or aluminum conductor power cable with thermoplastic insulation and polyvinyl chloride (PVC) jacket. The FT Rating for the firestop system shall not exceed 1/2 hr when this penetrant is used.
 2. Max 300 pair No. 24 AWG copper conductor telecommunication cables with PVC insulation and jacket material. The FT Rating for the firestop system shall not exceed ½ hr when this penetrant is used.
 3. Max 7/C copper conductor No. 12 AWG multi-conductor power and control cables with PVC or cross-linked polyethylene (XLPE) insulation and PVC jacket. The FT Rating for the firestop system shall not exceed ½ hr when this penetrant is used.
 4. Multiple fiber optical communication cables jacketed with PVC and having a max outside diam of 13 mm (1/2 in.). The FT Rating for the firestop system shall not exceed 1 hr when this penetrant is used.
 5. Max 3/C No. 12 AWG steel clad cable with copper conductors and PVC insulation material. The FT Rating for the firestop system shall not exceed ¼ hr when this penetrant is used.
- C. Individual Cables — Any of the following types and sizes of individual (non-bundled) cables may be used. The annular space between cables and between cables and other penetrants (all except Item 2A) shall be a min 76 mm (3 in.). The annular space between individual cables and the periphery of opening shall be min 25 mm (1 in.).
1. Max 4C / 500 kcmil (or smaller) aluminum conductor metal clad cable with aluminum or steel armor, with or without PVC jacket. The FT Rating for the firestop system shall not exceed 1/2 hr when this penetrant is used.
- D. Cable Tray* — Max of one max 610 mm (24 in) wide by 102 mm (4 in.) deep open-ladder cable tray with channel-shaped side rails formed of 2.54 mm (0.10 in.) thick aluminum or 1.5 mm (0.060 in.) thick steel and with 25 mm (1 in.) wide by 25 mm (1 in.) deep tubular channel-shaped rungs spaced 229 mm (9 in.) OC. The annular space between cable tray and cable bundles shall be a min 76 mm (3 in.). The annular space between cable tray and sleeved insulated penetrants shall be min 25 mm (1 in.). The annular space between cable tray and insulated penetrants shall be min 127 mm (5 in.). The annular space between cable tray and periphery of opening shall be min 38 mm (1-1/2 in.). Cable tray to be rigidly supported on both sides of floor or wall assembly. The FT Rating for the firestop system shall not exceed 1/4 hr when this penetrant is used.
- E. Cables for Cable Tray — Aggregate cross-sectional area of cables in cable tray to be max 45 percent of the cross-sectional area of the cable tray based on a max loading depth of 76 mm (3 in.) within the cable tray. Any combination of the following types and sizes of copper conductor cables may be used:
1. Max 3/C-No. 12 AWG metal clad cable with copper conductors and PVC insulation material.
 2. Max 300 pair No. 24 AWG telephone cable with PVC insulation and jacket.
 3. Through Penetrating Product* — Max three copper conductors with ground No. 2 AWG (or smaller) Metal-Clad Cable+ with aluminum armor and with or without PVC or PE jacket.
- NEXANS CANADA INC
3. Pipe Insulation — (Optional) - Metallic pipes and tubes of the sizes noted below may be provided with the following type of pipe insulation:
- A. Pipe Covering* — Nom 38 mm (1-1/2 in.) thick (or thinner) hollow cylindrical heavy density glass fiber units jacketed on the outside with an all service jacket for steel or iron pipes with a nom diam of 203 mm (8 in.) (or smaller) or copper pipes or tubes with a nom diam of 51 mm (2 in.) (or smaller). Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. The annular space between insulated penetrants shall be min 76 mm (3 in.). The annular space between insulated penetrants and periphery of opening shall be min 102 mm (4 in.).
- See Pipe and Equipment Covering - Materials (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
- The FT Rating for the firestop system shall not exceed 1 hr when this insulated penetrant is used.



4. Metallic Jacket/Sleeves — Metallic jackets / sleeves of the types described below shall be provided as noted.

A. Metal Jacket — (Not Shown.) - Required on all insulated copper pipes and tubes. Min 152 mm (6 in.) long jacket of min 0.33 mm (0.013 in.) thick steel sheet cut to wrap tightly around the pipe insulation with a min 51 mm (2 in.) lap and secured using one min 13 mm (1/2 in.) stainless steel hose clamp at approx center of jacket. The bottom edge of jacket shall be recessed 25 mm (1 in.) into opening from top surface of floor and extend upward min 127 mm (5 in.) above opening. The annular space between penetrants with jackets shall be min 76 mm (3 in.). The annular space between penetrants with jackets and the periphery of opening shall be a min 13 mm (1/2 in.).

The FT Rating for the firestop system shall not exceed 1 hr when this jacketed / insulated penetrant is used.

B. Metallic Sleeve — (Optional) - Max 76 mm (3 in.) diam cable bundle (Item 2B) may be routed concentrically through max 102 mm (4 in.) diam electrical metallic tubing (EMT) sleeve. The sleeve is to extend through the floor or wall opening and be rigidly supported at top of floor or both sides of wall. Sleeve to extend a nom 254 to 305 mm (10 to 12 in.) beyond both surfaces of floor or wall (see Item 5C). Annular space between cable bundle and sleeve shall be min 13 mm (1/2 in.) to max 19 mm (3/4 in.). When multiple EMT sleeved penetrants are used, the annular space between EMT sleeved penetrant shall be min 19 mm (3/4 in.). The annular space between EMT sleeved penetrant and all other penetrants (except Item 2A) shall be min 51 mm (2 in.). The annular space between EMT sleeved penetrant and the periphery of opening shall be a min 13 mm (1/2 in.).

The FT Rating for the firestop system shall not exceed 1/4 hr when this sleeved / cable bundle penetrant is used.

5. Firestop System — The firestop system shall consist of the following:

A. Packing Material — Min 102 mm (4 in.) thickness of 64 kg/m³ (4 pcf) mineral wool batt insulation tightly packed into the opening between and around penetrants and within the voids in cable tray as a permanent form. Packing material to be installed flush with top surface of floor or both sides of wall. In addition, when Item 5C1 is used, min 51 mm (2 in.) thickness of packing material to be tightly packed into annular space at top end of EMT sleeve (Item 4B) in floors, or both ends of EMT sleeve in walls, as a permanent form and recessed 13 mm (1/2 in.) from top end of sleeve in floors, or both ends of sleeve in walls, to accommodate required thickness of fill material.

B. Fill, Void, or Cavity Material* — Spray — Min 1.6 mm (1/16 in.) dry thickness (1/8 in. or 3.2 mm wet thickness) of fill material sprayed or troweled to completely cover mineral wool batt packing material on top surface of floor or both sides of wall. Spray material to overlap min 13 mm (1/2 in.) onto top surface of floor or both sides of wall and onto all through-penetrants, pipe insulation and metallic jackets/sleeves, as applicable, on top surface of floor or both sides of wall.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP672 Firestop Spray or CFS-SP WB Firestop Joint Spray

C. Fill, Void or Cavity Materials* - Plug — Required when Item 4B is used. Plug sized for the EMT sleeve (Item 4B) friction-fitted within the sleeve such that the outer circumference of the dome-shaped plug is flush with end of sleeve. Plug cut to fit around the cable bundle and installed tightly within the sleeve. In floors, plug is required at bottom end of sleeve only. In walls, plug required at both ends of sleeve.

When plug is used, the projection of EMT sleeve below bottom surface of floor or both sides of wall shall be nom 254 mm (10 in.).

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 658T Firestop Plug or CFS-PL Firestop Plug

C1. Fill, Void or Cavity Material* — Sealant — May be used in place of firestop plug (Item 5C). Min 13 mm (1/2 in.) thickness of fill material applied over the packing material (Item 5A) within annulus between cable bundle and EMT sleeve, flush with top end of EMT sleeve in floors, or both ends of EMT sleeve in walls.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant or FS-ONE MAX Intumescent Sealant.

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

