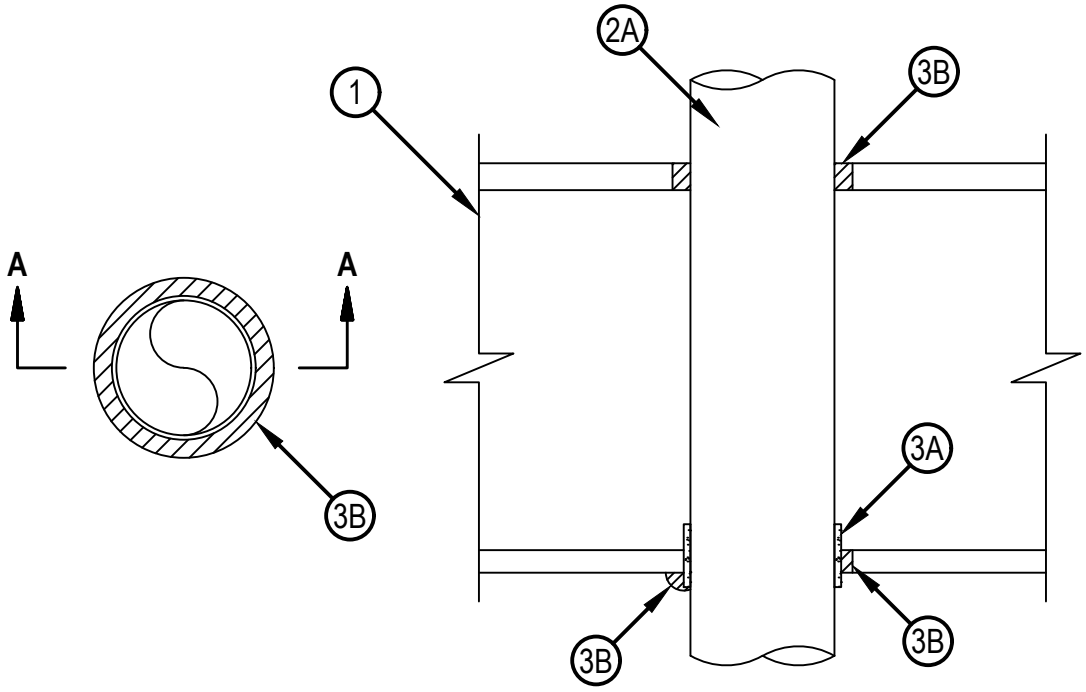
Classified by
Underwriters Laboratories, Inc.
to UL 1479 and CAN/ULC-S115

System No. F-C-2516

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 1 Hr	F Rating — 1 Hr
T Ratings — 1/2 and 1 Hr (See Items 3A and 3A1)	FT Ratings — 1/2 and 1 Hr (See Items 3A and 3A1)
	FH Rating — 1 Hr
	FTH Ratings — 1/2 and 1 Hr (See Items 3A and 3A1)



SECTION A-A

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System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

1. Floor-Ceiling Assembly — The 1 hr fire-rated solid or trussed lumber joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory. The general construction features of the floor-ceiling assembly are summarized below:
   A. Flooring System — Lumber or plywood subfloor with finish floor of lumber, plywood or Floor Topping Mixture* as specified in the individual Floor-Ceiling Design. Max diam of opening shall be 5-1/2 in. (140 mm).
   B. Wood Joists* — Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or Structural Wood Members* with bridging as required and with ends firestopped.
   C. Gypsum Board* — Min 1/2 in. (13 mm) thick as specified in the individual Floor-Ceiling Design. Gypsum board secured to wood joists or furring channels as specified in the individual Floor-Ceiling Design. Max diam of opening shall be 5-1/2 in. (140 mm).

1.1. Chase Wall — (Optional, not shown) The through penetrant may be routed (Item 2) through a fire rated or non-rated single, double or staggered wood stud/gypsum wallboard chase wall constructed to include the following construction details:
   A. Studs — Nom 2 by 6 in. (51 by 152 mm) or double nom 2 by 4 in. (51 by 102 mm) lumber studs.
   B. Sole Plate — Nom 2 by 6 in. (51 by 152 mm) or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max diam of opening is 5-1/2 in. (140 mm).
   C. Top Plate — The double top plate shall consist of two nom 2 by 6 in. (51 by 152 mm) or two sets of parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max diam of opening is 5-1/2 in. (140 mm).
   D. Gypsum Board* — One layer of min 1/2 in. (13 mm) gypsum board.

2. Through Penetrants — One non-metallic pipe or conduit to be installed concentrically or eccentrically within the opening. Annular space within the firestop system is dependent upon the max diam of penetrant and type of firestop wrap strip used as tabulated in Item 3A. Pipe or conduit to be rigidly supported on both sides of floor-ceiling assembly. The following types and sizes of non-metallic pipes or conduit may be used:
   A. Polyvinyl Chloride (PVC) Pipe — Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular core or solid core PVC pipe for use in vented (drain, waste or vent) or closed (process or supply) piping systems.
   B. Chlorinated Polyvinyl (CPVC) Pipe — Nom 4 in. (102 mm) diam (or smaller) SDR13.5 CPVC pipe for use in vented (drain, waste or vent) or closed (process or supply) piping systems.
   C. Rigid Nonmetallic Conduit+ — Nom 4 in. (102 mm) diam (or smaller) PVC conduit installed in accordance with the National Electrical Code (NFPA 70).

3. Firestop System — The firestop system shall consist of the following:
   A. Fill, Void or Cavity Material* - Wrap Strip — One layer of wrap wrapped around pipe with ends tightly butted and held in place with supplied tape. Wrap strip slid into the annular space such that the wrap strip is centered in the gypsum board ceiling, or extending below lower top plate for half of the wrap strip height. The size of wrap strip for a given size penetrant are shown in table below:

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 648S - 1.5"(38 mm) US, CP 648S - 2"(51 mm) US, CP 648S - 3"(76 mm), CP 648S - 4"(102 mm).

Product Designation	Nom Pipe Size, in. (mm)	Max Opening Diam, in. (mm)	Annular Space Min, in. (mm)	Annular Space Max, in. (mm)	Nom Wrap Strip Length, in. (mm)	Nom Wrap Strip Thick, in. (mm)	Nom Wrap Strip Width, in. (mm)
CP648-S-1.5" US	1-1/2 (38)	3 (76)	3/16 (4.8)	5/16 (8)	6.5 (165)	0.18 (4.6)	1 (25)
CP648-S-2" US	2 (51)	3-1/2 (89)	3/16 (4.8)	5/16 (8)	8 (203)	0.18 (4.6)	1 (25)
CP648-S-3" US	3 (76)	4 (102)	3/16 (4.8)	5/16 (8)	11.5 (292)	0.18 (4.6)	1-3/4 (45)
CP648-S-4" US	4 (102)	5-1/2 (140)	3/8 (10)	3/4 (19)	15.1 (384)	0.36 (9)	1-3/4 (45)

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The T Rating is 1/2 Hr for penetrants with a nom diam of 2 in (51 mm) or smaller. The T Rating is 0 Hr for nom 3 in. (76 mm) penetrants. The T Rating is 1 Hr for nom 4 in. (102 mm) penetrants.

A1. Fill, Void or Cavity Material* - Wrap Strip — (As an alternate to the wrap strip in Item 3A) — Layers of intumescent wrap strip are continuously wrapped around the pipe with ends held in place with tape. Wrap strip slid into the annular space such that the wrap strip is centered in the gypsum board ceiling, or extending below lower top plate for half of the wrap strip height. The number of layers of wrap strip for a given size penetrant are shown in table below:

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP648-E W45/1-3/4" Firestop Wrap Strip

Product Designation	Nom Pipe Size, in. (mm)	Max Opening Diam, in. (mm)	Annular Space Min, in. (mm)	Annular Space Max, in. (mm)	Number of Layers	Nom Wrap Strip Width, in. (mm)
CP648-E W45/1-3/4"	1-1/2 (38)	3 (76)	3/16 (4.8)	5/16 (8)	1	1-3/4 (45)
CP648-E W45/1-3/4"	2 (51)	3-1/2 (89)	3/16 (4.8)	5/16 (8)	1	1-3/4 (45)
CP648-E W45/1-3/4"	3 (76)	4 (102)	3/16 (4.8)	5/16 (8)	1	1-3/4 (45)
CP648-E W45/1-3/4"	3 (76)	5 (127)	3/8 (10)	5/8 (16)	2	1-3/4 (45)
CP648-E W45/1-3/4"	4 (102)	6 (152)	3/8 (10)	5/8 (16)	2	1-3/4 (45)

The T Rating is 1/2 Hr when CP648-E is used.

B. Fill, Void or Cavity Material* - Sealant — Min 1/2 in. (13 mm) thickness applied within the anulus, flush with the bottom surface of the ceiling or lower top plate. An additional min 1/2 in. (13 mm) bead applied around periphery of wrap strip, at the wrap strip gypsum board interface or at the underside of the top plate. Min 3/4 in (19 mm) depth applied within the annulus, flush with the top surface of the floor or the top surface of the sole plate.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — 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.