Firestop Submittal Package

Opechee Construction Corporation

Project: Courtyard by Marriott
320 Commercial Street
Portland, ME.

Date: February 4, 2014

Submitted by: TRT Electric

This submittal is auto-generated based on user-selected inputs.
Therefore, Hilti makes no representation as to the suitability of these systems for their intended use.

Table Of Contents

CP 643 N

CP 648-E

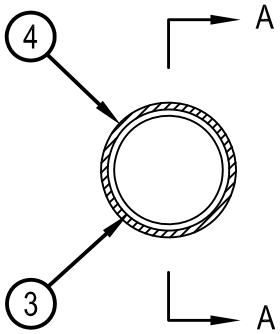
CP 648-S

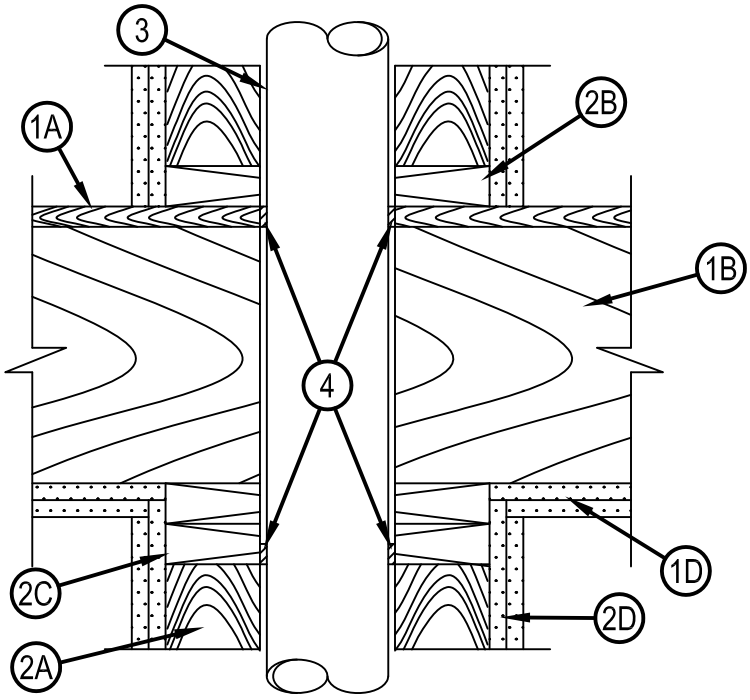
FS-ONE

System No. F-C-1009

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

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 1 and 2 Hr (See Item 1)	F Rating — 1 and 2 Hr (See Item 1)
T Rating — 1/4 Hr	FT Rating — 1/4 Hr
L Rating At Ambient — Less Than 1 CFM/sq ft	FH Rating — 1 and 2 Hr (See Item 1)
L Rating At 400 F — 4 CFM/sq ft	FTH Rating — 1/4 Hr
	L Rating At Ambient — Less Than 1 CFM/sq ft
	L Rating At 400 F — 4 CFM/sq ft





SECTION A-A

1. Floor-Ceiling Assembly — The 1 or 2 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 F Rating of the firestop system is equal to the rating of the floor-ceiling assembly. 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. Diam of opening to be max 1 in. larger than diam of pipe. As an alternate, the opening may be square-cut with a max dimension 1 in. greater than the diam of the pipe.
   B. Wood Joists* — Nom 10 in. 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. Furring Channels — (Not Shown) —(As required) Resilient galvanized steel furring installed in accordance with the manner specified in the individual L500 Series Designs in the Fire Resistance Directory.
   D. Gypsum Board* — Thickness, type, number of layers and fasteners shall be as specified in the individual Floor-Ceiling Design. Diam of opening to be max 1 in. larger than diam of pipe.

System No. F-C-1009

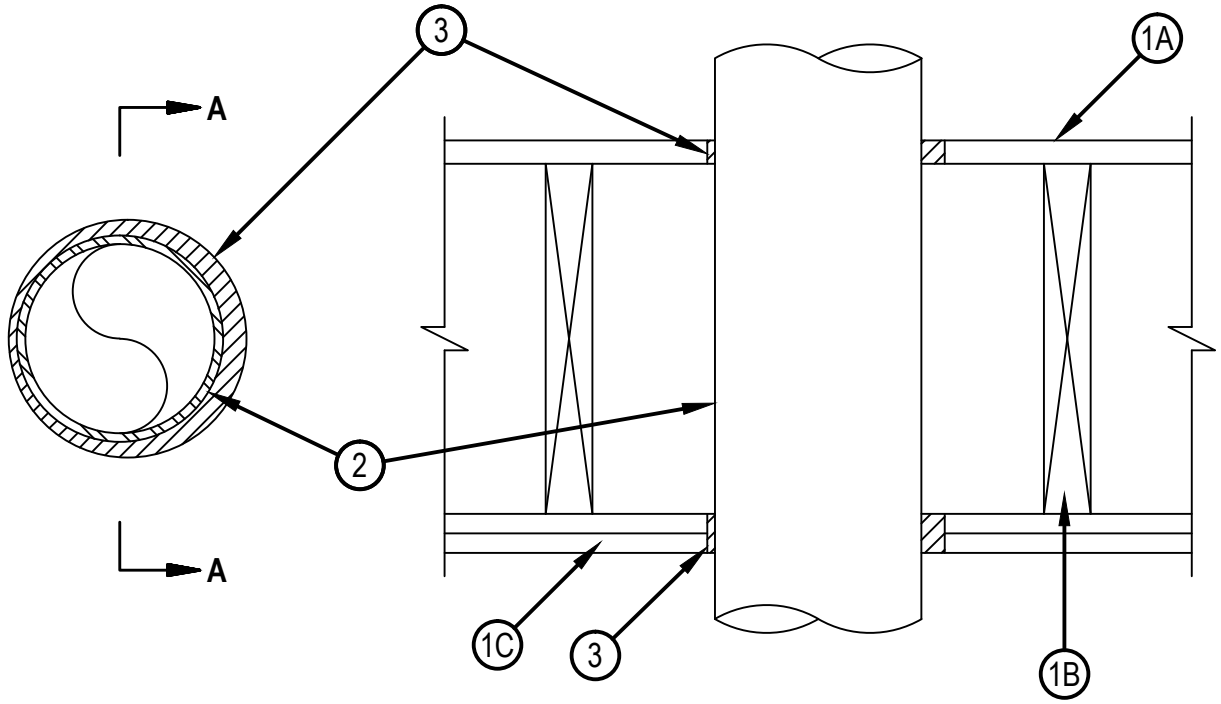
2. Chase Wall — (Optional) - The through penetrant (Item 3) may be routed through a 1 or 2 hr fire-rated single, double or staggered wood stud/gypsum board chase wall having a fire rating consistent with that of the floor-ceiling assembly. Depth of chase wall to be min 1 in. greater than the diameter of the through penetrant. The chase wall shall be constructed of the materials and in the manner specified in the individual U300 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs — Nom 2 by 4 in., 2 by 6 in. or double nom 2 by 4 in. lumber studs. Nom 2 by 4 in. studs are allowed for through-penetrants (Item 3) not exceeding nom 2 in. diam.
   B. Sole Plate — Nom 2 by 4 in., 2 by 6 in. or parallel 2 by 4 in. lumber plates, tightly butted. Diam of opening is to be max 1 in. larger than diam of pipe. As an alternate, the opening may be square-cut with a max dimension 1 in. greater than the diam of the pipe. Plates may be discontinuous over opening, terminating at two opposing edges of opening. Max length of discontinuity to be 1 in. greater than diam of through penetrant.
   C. Top Plate — The double top plate shall consist of two nom 2 by 4 in., 2 by 6 in. or two sets of parallel 2 by 4 in. lumber plates, tightly butted. Diam of opening is to be max 1 in. larger than diam of pipe. As an alternate, the opening may be square-cut with a max dimension 1 in. greater than the diam of the pipe. Plates may be discontinuous over opening, terminating at two opposing edges of opening. Max length of discontinuity to be 1 in. greater than diam of through penetrant.
   D. Steel Plate — When lumber plates are discontinuous, nom 1-1/2 in. wide No. 20 gauge (or heavier) galv steel plates shall be installed to connect each discontinuous lumber plate and to provide a form for the fill material. Steel plates sized to lap 2 in. onto each discontinuous lumber plate and secured to lumber plates with steel screws or nails.
   E. Gypsum Board* — Thickness, type, number of layers and fasteners shall be as specified in individual Wall and Partition Design.
3. Through Penetrants — One metallic pipe, conduit or tubing to be installed within the firestop system. Pipe, conduit or tubing to be rigidly supported on both sides of floor assembly. The annular space within the firestop system shall be min 0 in. (point contact) to max 1 in.. The following types and sizes of metallic pipes or conduits may be used:
   A. Steel Pipe — Nom 4 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. Iron Pipe — Nom 4 in. diam (or smaller) cast or ductile iron pipe.
   C. Conduit — Nom 4 in. diam (or smaller) steel electrical metallic tubing or steel conduit.
   D. Copper Tubing — Nom 4 in. diam (or smaller) Type L (or heavier) copper tubing.
   E. Copper Pipe — Nom 4 in. diam (or smaller) Regular (or heavier) copper pipe.
4. Fill, Void or Cavity Material* — Sealant — Min 3/4 in. thickness of fill material applied within the annulus, flush with the top surface of the floor or the sole plate. Min 5/8 in. thickness of fill material applied within the annulus, flush with bottom surface of ceiling or lower top plate.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP601S, CFS-S SIL GG, CP606 or FS-One Sealant. (Note: L Ratings apply only when FS-ONE Sealant is used.)

*Bearing the UL Classification Mark

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

System No. F-C-1059

F Rating - 1 Hr and 2 Hr
T Rating - 0 Hr and 1/2 Hr



SECTION A-A

1. Floor-Ceiling Assembly — The 1 or 2 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 F Rating of the firestop system is equal to the rating of the floor-ceiling and wall assemblies. 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 7-5/8 in. (194 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* — Thickness, type, number of layers and fasteners shall be as specified in the individual Floor-Ceiling Design. Max diam of opening shall be 7-5/8 in. (194 mm).
   D. Furring Channels — (Not Shown) (As required) Resilient galvanized steel furring installed in accordance with the manner specified in the individual L500 Series Designs in the Fire Resistance Directory.

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

System No. F-C-1059

F Rating - 1 Hr and 2 Hr
T Rating - 0 Hr and 1/2 Hr

1.1 Chase Wall — (Not Shown, Optional)—The through penetrants (Item 2) may be routed through a 1 or 2 hr fire-rated single, double or staggered wood stud/gypsum wallboard chase wall having a fire rating consistent with that of the floor-ceiling assembly. The chase wall shall be constructed of the materials and in the manner specified in the individual U300 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features :

A. Studs — Nom 2 by 8 in. (51 by 203 mm) lumber or double nom 2 by 6 in. (51 by 152 mm) lumber studs.

B. Sole Plate — Nom 2 by 8 in. (51 by 203 mm) lumber or parallel 2 by 6 in. (51 by 152 mm) lumber plates, tightly butted. Max diam of opening shall be 7-5/8 in. (194 mm).

C. Top Plate — The double top plate shall consist of two nom 2 by 8 in. (51 by 203 mm) lumber plates or two sets of nom 2 by 6 in. (51 by 152 mm) lumber plates tightly butted. Max diam of opening is 7-5/8 in. (194 mm).

D. Gypsum Board* — Thickness, type, number or layers and fasteners shall be as specified in individual Wall and Partition Designs.

2. Through Penetrants — One metallic tubing, pipe or conduit to be installed concentrically or eccentrically within the firestop system. Annular space between pipe or conduit and edge of opening to be min 1/4 in. (6 mm) and max 3/4 in. (19 mm). Pipe, tubing or conduit to be rigidly supported on both sides of floor-ceiling assembly. The following types and sizes of metallic pipes, tubing or conduit may be used:

A. Steel Pipe — Nom 6 in. (152 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe.

B. Iron Pipe — Nom 6 in. (152 mm) diam (or smaller) cast or ductile pipe.

C. Conduit — Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing or nom 6 in. diam (or smaller) steel conduit.

D. Steel Flexible Metal Conduit + — Nom 2 in. (51 mm) diam (or smaller) steel flexible metal conduit.

See Flexible Metal Conduit (DXUZ) category in the Electrical Construction Materials Directory for names of manufacturers.

3. Fill, Void or Cavity Material*—Sealant — Min 5/8 in. (16 mm) or 1-1/4 in. (32 mm) thickness of sealant applied within annular space, flush with the bottom surface of gypsum wallboard or lower top plate for 1 and 2 hr floors respectively. Min. 3/4 in. (19 mm) thickness of sealant applied within annular space, flush with top surface of floor or sole plate.

HILTI INC — FS-ONE Sealant

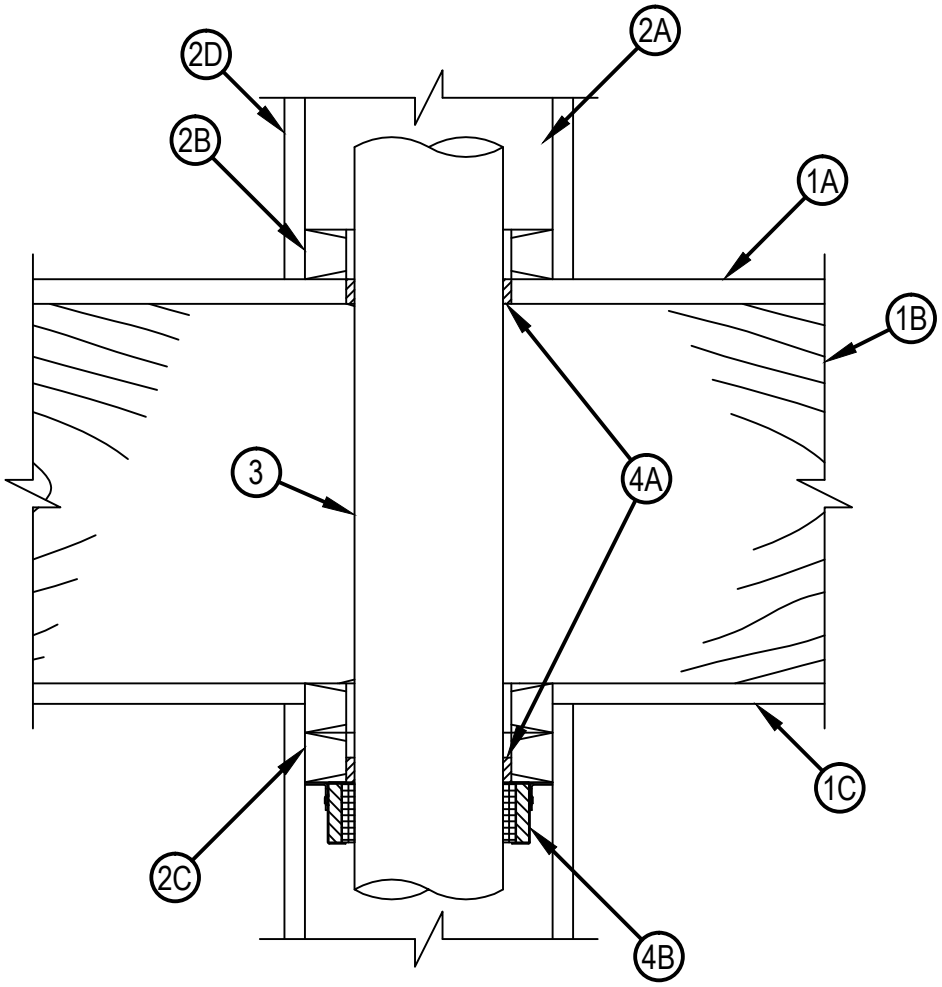
+Bearing the UL Listing Mark.

*Bearing the UL Classification Mark

Classified by
Underwriters Laboratories, Inc.
to UL 1479

System No. F-C-2030

F Ratings — 1 and 2 Hr (See tem 1)
T Ratings — 0, 3/4, 1, 1-1/2 and 2 Hr (See Item 3)



1. Floor-Ceiling Assembly — The 1 or 2 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 F Rating of the firestop system is equal to the rating of the floor-ceiling and wall assemblies. 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. Diam of opening shall be 1 in. (25 mm) larger than the nom diam of through-penetrant (Item 3).
   B. 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 end firestopped.
   C. Gypsum Board* — Thickness, type, number of layers and fasteners shall be as specified in the individual Floor-Ceiling Design. Diam of opening shall be 1 in. (25 mm) larger than the nom diam of through-penetrant (Item 3).
   D. Furring Channels — (Not Shown) (As required) - Resilient galvanized steel furring installed in accordance with the manner specified in the individual L500 Series Designs in the Fire Resistance Directory.

Classified by
Underwriters Laboratories, Inc.
to UL 1479

System No. F-C-2030

F Ratings — 1 and 2 Hr (See tem 1)
T Ratings — 0, 3/4, 1, 1-1/2 and 2 Hr (See Item 3)

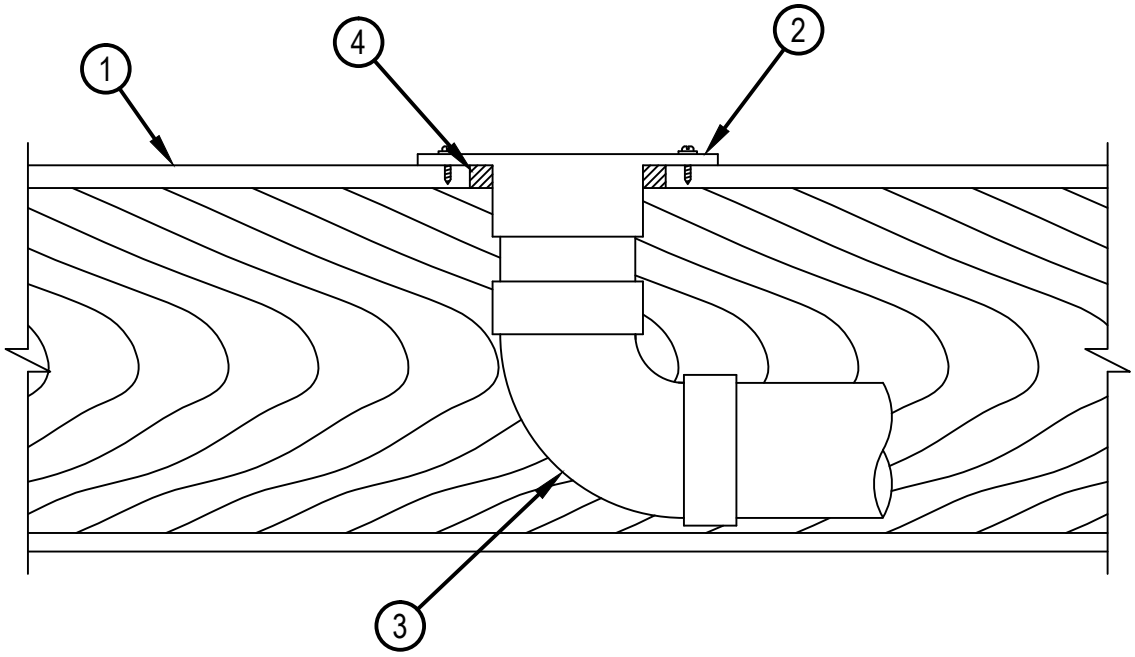
2. Chase Wall — (Optional) - The through penetrant (Item 3) may be routed through a 1 or 2 hr fire-rated single, double or staggered wood stud/gypsum wallboard chase wall having a fire rating consistent with that of the floor-ceiling assembly. The chase wall shall be constructed of the materials and in the manner specified in the individual U300 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   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 larger) or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Diam of opening shall be 1 in. (25 mm) larger than the nom diam of through-penetrant (Item 3).
   C. Top Plate — The double top plate shall consist of two nom 2 by 6 in. (51 by 152 mm) (or larger) or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Diam of opening shall be 1 in. (25 mm) larger than the nom diam of through-penetrant (Item 3).
   D. Gypsum Board* — Thickness, type, number of layers and fasteners shall be as specified in individual Wall and Partition Design.
3. Through-Penetrants — One nom 1-1/2 in. (38 mm), 2 in. (51 mm), 3 in. (76 mm) or 4 in. (102 mm) diam nonmetallic pipe to be installed within the firestop system. Diam of opening through flooring system and through sole and top plates of chase wall to be max 2-1/8 in. (54 mm), 2-5/8 in. (67 mm), 4 in. (102 mm) or 5 in. (127 mm) for nom 1-1/2 in. (38 mm), 2 in. (51 mm), 3 in. (76 mm) or 4 in. (102 mm) diam nonmetallic pipe sizes, respectively. Pipe to be rigidly supported on both sides of the floor-ceiling assembly. The T Rating is dependent on the size of the through-penetrant. For 2 hr rated assemblies, the T Rating is 2 hr for 1-1/2 in. (38 mm) diam (and smaller) pipes and 1-1/2 hr for pipes greater than 1-1/2 in. (38 mm) diam. For 1 hr rated assemblies, the T rating is 1 hr for 1-1/2 in. (38 mm) diam (and smaller) pipes, 3/4 hr for 2 in. (51 mm) diam pipes and 0 hr for pipes greater than 2 in. (51 mm) diam. The following types of nonmetallic pipes may be used:
   A. Polyvinyl Chloride (PVC) Pipe — Schedule 40 solid-core or cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
   B. Chlorinated Polyvinyl Chloride (CPVC) Pipe — SDR17 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   C. Acrylonitrile Butadiene Styrene (ABS) pipe — Schedule 40 solid-core or cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   D. Flame Retardant Polypropylene(FRPP) Pipe — Schedule 40 FRPP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
4. Firestop System — The details of the firestop system shall be as follows:
   A. Fill, Void or Cavity Material* — Sealant — Min 3/4 in. (19 mm) thickness of fill material to be installed within the annular space between the pipe and the flooring (Item 1A) or sole plate. Min 5/8 in. (16 mm) thickness applied within the annular space, flush with the bottom surface of ceiling or lower top plate.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI INC — FS-ONE Sealant
   B. Firestop Device* — Firestop Collar — Firestop collar shall be installed in accordance with the accompanying installation instructions. Collar to be installed and latched around the pipe and secured to underside of ceiling or chase wall top plate (Item 2C) using the anchor hooks provided with the collar. (Minimum 2 anchor hooks for 1-1/2 (38 mm) and 2 in. (51 mm) diam pipes and 3 anchor hooks for 3 in. (76 mm) diam pipes). The anchor hooks are to be secured to the ceiling with min 3/16 in. (5 mm) diam steel toggler bolts or to the chase wall top plate with min No. 12 by min 1 in. (25 mm) long steel wood screws in conjunction with steel washers.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI INC — CP 643 50/1.5"N, CP643 63/2"N, CP 643 90/3"N or CP643 110/4"N Firestop Collar

*Bearing the UL Classification Mark

Classified by
Underwriters Laboratories, Inc.
to UL 1479

System No. F-C-2203

F Rating — 1 Hr
T Rating — 1 Hr



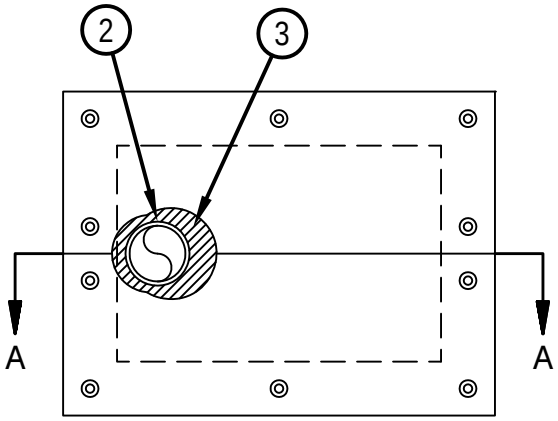
1. Floor-Ceiling Assembly — The 1 hr fire-rated solid or trussed lumber joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory. The general construction features of the floor-ceiling 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 in. (127 mm).
   B. Wood Joist* — 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* — Nom 5/8 in. (16 mm) thick, 4 ft (1.2 m) wide as specified in the individual Floor-Ceiling Design.
2. Closet Flange — Acrylonitrile butadiene styrene (ABS) or polyvinyl chloride (PVC) closet stub sized to accommodate drain pipe. Closet flange installed over drain piping within floor opening with flange secured to plywood floor with steel screws. Diam of circular opening through flooring (Item 1A) to be max 1/2 in. (13 mm) larger than outside diam of closet flange.
3. Drain Piping — Nom 4 in. (102 mm) diam (on smaller) Schedule 40 acrylonitrile butadiene styrene (ABS) or polyvinyl chloride (PVC) drain pipe and 90 degree elbow for use in vented (drain, waste or vent) piping systems. Pipe installed concentrically within firestop system.
4. Fill, Void or Cavity Materials*—Sealant — Min 3/4 in. (19 mm) thickness of fill material applied within the annulus, flush with the bottom surface of floor.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant
5. Water Closet — (Not Shown)—Floor mounted vitreous china water closet.

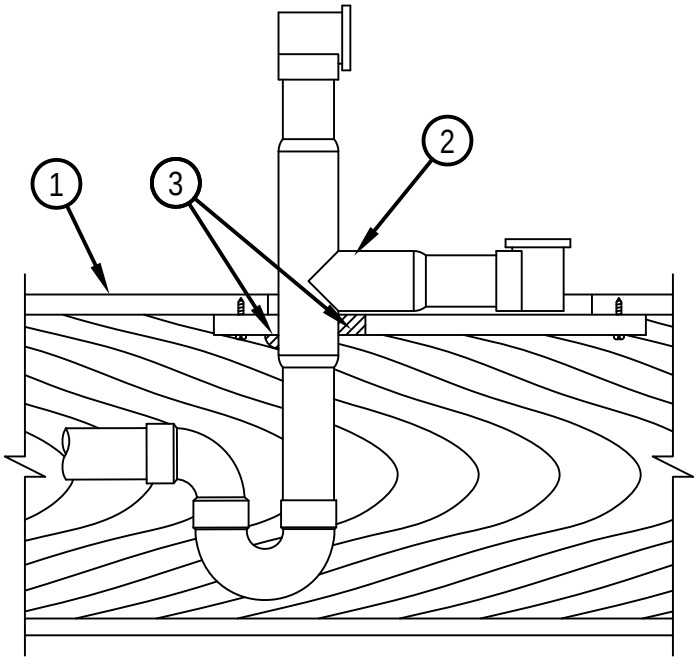
*Bearing the UL Classification Mark

Classified by
Underwriters Laboratories, Inc.
to UL 1479

System No. F-C-2204

F Rating — 1 Hr
T Rating — 1/2 Hr





SECTION A-A

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 theUL 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. Rectangular cutout in flooring to accommodate the bathtub drain piping (Item 2) to be max 8 in. by 12 in. Cutout to be patched on underside of subfloor using one layer of min 3/4 in. thick plywood or min 5/8 in. thick gypsum board (Item 1C) sized to lap min 2 in. beyond each edge of rectangular cutout. Patch split into two pieces at opening and hole-sawed for bathtub drain piping. Diam of opening hole sawed through patch to accommodate drain piping (Item 2) to be 1 in. larger than outside diam of drain piping and positioned such that the annular space between drain piping and periphery of opening is min 0 in. (point contact) to max 1 in. Two pieces positioned around drain piping, with cut edges tightly butted, and screw-attached to underside of subfloor with 1-1/4 in. long steel screws spaced max 6 in. OC.
   B. Wood Joists* — Nom 10 in. 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* — Nom 5/8 in. thick, 4 ft wide as specified in the individual Floor-Ceiling Design.
2. Drain Piping — Nom 1-1/2 in. (or smaller) diam Schedule 40 acrylonitrile butadiene styrene (ABS) or polyvinyl chloride (PVC) pipe and drain fittings cemented together and provided with ABS or PVC bathtub waste/overflow fittings. Annular space shall be min 0 in. (point contact) to max 1 in.
3. Fill Void or Cavity Materials* — Min 5/8 in. depth or fill material applied within the annulus, flush with both surfaces of plywood or gypsum board patch.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant

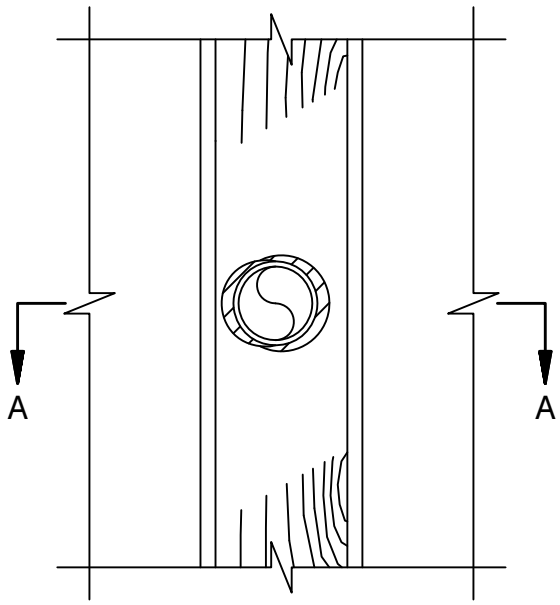
*Bearing the UL Classification Mark

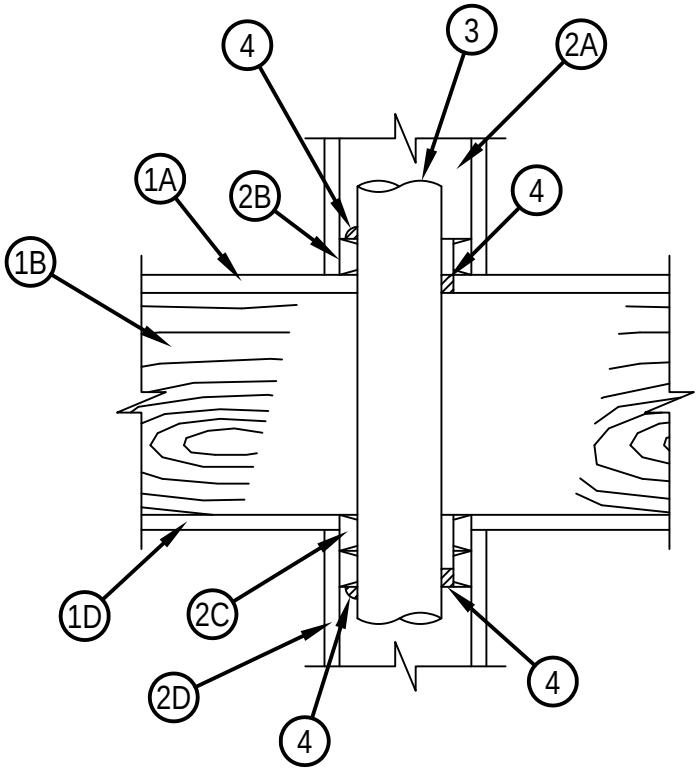
Hilti Firestop Systems

Classified by
Underwriters Laboratories, Inc.
to UL 1479

System No. F-C-2389

F Rating — 1 Hr
T Ratings — 3/4 and 1 Hr (See Item 3)





1. Floor-Ceiling Assembly — The fire-rated solid or trussed lumber joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory. The general construction details 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 floor opening is 4 in. (102 mm).
   B. Wood Joists — Nom 2 by 10 in. (51 by 254 mm) lumber joists spaced 16 in. (406 mm) OC with nom 1 by 3 in. (25 by 76 mm) lumber bridging and with ends firestopped. As an alternate to lumber 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 with ends firestopped.
   C. Furring Channels — (Not shown) — Resilient galv steel furring installed perpendicular to wood joists (Item 1B) between wallboard (Item 1D) and wood joists as required in the individual Floor-Ceiling Design.
   D. Gypsum Board* — Nom 4 ft (122 cm) wide by 5/8 in. (16 mm) thick as specified in the individual Floor-Ceiling Design.

Classified by
Underwriters Laboratories, Inc.
to UL 1479

System No. F-C-2389

F Rating — 1 Hr
T Ratings — 3/4 and 1 Hr (See Item 3)

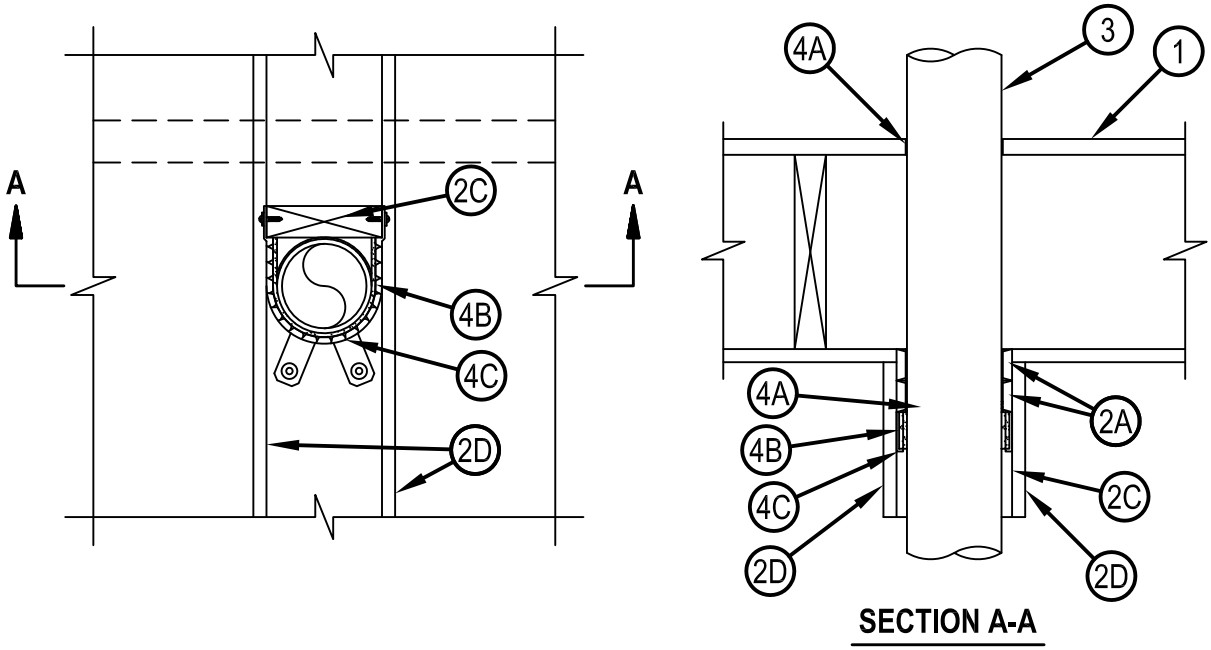
2. Chase Wall — The through penetrant (Item No. 3) shall be routed through a single, double or staggered wood studs/gypsum board chase wall and shall include the following construction features:
   A. Studs — Nom 2 by 4 in. (51 by 102 mm) or nom 2 by 6 in. (51 by 152 mm) lumber studs.
   B. Sole Plate — Nom 2 by 4 in. (51 by 102 mm) or 2 by 6 in. (51 by 152 mm) lumber plates. Max diam of opening is 4 in. (102 mm) when nom 3 in. (76 mm) diam penetrants are used. Max diam of opening is 3 in. (76 mm) when nom 2 in. (51 mm) or smaller diam penetrants are used.
   C. Top Plate — The double top plate shall consist of two nom 2 by 4 in. (51 by 102 mm) or 2 by 6 in. (51 by 152 mm) lumber plates. Max diam of opening is 4 in. (102 mm) when nom 3 in. (76 mm) diam penetrants are used. Max diam of opening is 3 in. (76 mm) when nom 2 in. diam penetrants are used.
   C. Gypsum Board — Min 1/2 in. (13 mm) rated or non-rated gypsum board.
   E. Steel Straps — (Not shown) — Steel straps to be used when top and sole plates are discontinuous and shall meet the structural requirements of the wall. Min 1-1/2 in. (38 mm) wide by 20 gauge (or heavier) galvanized steel straps used to bridge opening on both sides of wall at sole plate when sole plate is discontinuous at opening in plywood floor. Steel straps to be cut to overlap a min of 2 in. (51 mm) onto sole plate on each side of opening and secured to sole plate with a min of two nails or screws on each side of opening on both sides of wall. Min 3 in. (76 mm) wide by 20 gauge (or heavier) galvanized steel straps used to bridge opening on both sides of wall at double top plate when top plate is discontinuous at opening. Steel straps to be cut to overlap a min of 2 in. (51 mm) onto top plate on each side of opening and secured to top plates with a min of two nails or screws on each side of opening on both sides of wall.
3. Through Penetrants — One nonmetallic pipe to be installed either eccentrically or concentrically within the firestop system. The annular space between the through penetrant and the periphery of the opening shall be a min 0 in. (point contact) to a max of 5/8 in.(16 mm) Pipe to be rigidly supported on both sides of the floor-ceiling assembly. The following types and sizes of nonmetallic pipes may be used.
   A. Polyvinyl Chloride (PVC) Pipe — Nom 3 in. (76 mm) diam (or smaller) Schedule 40 solid or cellular core PVC for use in closed (process or supply) or vented (drain, waste or vent) piping systems. When PVC pipe is used the T rating is ¾ hour.
   B. Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 3 in. (76 mm) diam (or smaller) SDR13.5 CPVC for use in closed (process or supply) piping systems. When CPVC pipe is used the T rating is ¾ hour.
   C. Acrylonitrile Butadiene Styrene (ABS) Pipe — Nom 3 in. (76 mm) diam (or smaller) Schedule 40 solid-core or cellular-core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system. When ABS pipe is used the T rating is 1 hour.
   D. Electrical Nonmetallic Tubing (ENT+) — Nom 2 in. (51 mm) diam (or smaller) corrugated-wall electrical nonmetallic tubing (ENT) constructed of polyvinyl chloride (PVC) and installed in accordance with the National Electrical Code (NFPA No. 70). When ENT is used the T rating is 1 hour.
   See Electrical Nonmetallic Tubing (FKHU) category in the Electrical Construction Materials Directory for names of manufacturers.
4. Fill, Void or Cavity Material* - Sealant — Min 3/4 in. (19 mm) thickness of fill material applied within the annulus, flush with top surface of floor or sole plate. Min 3/4 in. (19 mm) thickness of fill material applied within the annulus, flush with bottom surface of lower top plate. At point contact location, a min 1/2 in. (13 mm) diam bead of fill material shall be applied at bottom surface of lower top plate. In addition, at top of floor, a min 1/2 in. (13 mm) diam bead of fill material shall be applied at the point contact location at top of sole plate or subfloor.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant

*Bearing the UL Classification Mark

Classified by
Underwriters Laboratories, Inc.
to UL 1479

System No. F-C-2401

F Rating - 1 Hr
T Rating - 1 Hr



SECTION A-A

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 details 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. Diam of floor opening shall be 1/8 in. (3.2 mm) larger than the outside diam of the through-penetrant (Item 3).
   B. Wood Joists — Nom 2 by 10 in. (51 by 254 mm) lumber joists spaced 16 in. (406 mm) OC with nom 1 by 3 in. (25 by 76 mm) lumber bridging and with ends firestopped. As an alternate to lumber 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 with ends firestopped.
   C. Furring Channels — (Not shown) — Resilient galv steel furring installed perpendicular to wood joists (Item 1B) between wallboard (Item 1D) and wood joists as required in the individual Floor-Ceiling Design.
   D. Gypsum Board* — Nom 4 ft (1.2 m) wide by 5/8 in. (16 mm) thick as specified in the individual Floor-Ceiling Design.

Classified by
Underwriters Laboratories, Inc.
to UL 1479

System No. F-C-2401

F Rating - 1 Hr
T Rating - 1 Hr

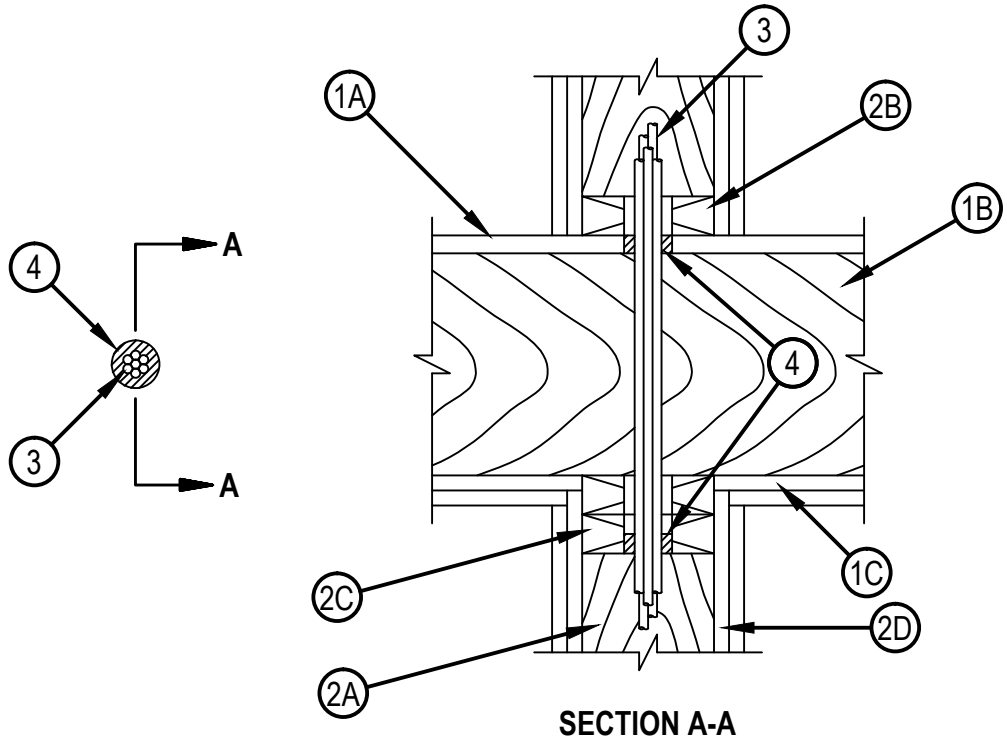
2. Chase Wall — The through penetrant (Item No. 3) shall be routed through a wood stud/gypsum board chase wall and shall include the following construction features:
   A. Studs — Nom 2 by 6 in. (51 by 152 mm) lumber studs.
   B. Sole Plate — Nom 2 by 6 in. (51 by 152 mm) lumber plates. Diam of opening shall be 1/8 in. (3.2 mm) larger than the outside diam of the through-penetrant.
   C. Top Plate — The double top plate shall consist of two nom 2 by 6 in. (51 by 152 mm) lumber plates. Diam of opening shall be 1/8 in. (3.2 mm) larger than the outside diam of the through-penetrant.
   D. Gypsum Board — Min 5/8 in. (16 mm) thick rated or nonrated gypsum board.
3. Through Penetrant — One nonmetallic pipe to be centered within the opening. The annular space between the through penetrant and the periphery of the opening shall be 1/16 in. (1.6 mm). Pipe to be min 1/16 in. (1.6 mm) from chase wall stud. Pipe to be rigidly supported on both sides of the floor-ceiling assembly. The following types and sizes of nonmetallic pipes may be used.
   A. Polyvinyl Chloride (PVC) Pipe — Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular core PVC for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
4. Firestop System — The firestop system shall consist of the following:
   A. Fill, Void or Cavity Material* - Sealant — Min 1/2 in. (13 mm) crown of fill material applied over the annulus, flush with top surface of floor or sole plate. Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with bottom surface of lower top plate.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI INC — FS-ONE Sealant
   B. Fill, Void or Cavity Material* - Wrap Strip — Nom 3/16 in. (4.8 mm) thick by 1-3/4 in. (44 mm) wide intumescent wrap strip. Min two layers of wrap strip wrapped around pipe in a U-Shaped manner with the ends tightly butted against the chase wall stud. Wrap strip butted tightly against lower surface of top plates.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI INC — CP648-E W45/1-3/4" Wrap Strip
   C. Steel Collar — Collar fabricated from coils of precut min 0.017 in. (0.43 mm) thick (No. 28 MSG) galv steel available from the sealant manufacturer. Collar shall be nom 1-3/4 in. (44 mm) deep with 1 in. (25 mm) wide by 2 in. (51 mm) long anchors tabs on 2 in. (51 mm) centers for securement to floor/ceiling assembly. The opposite side incorporates retainer tabs, 1/2 in. (13 mm) wide by 3/16 in. (4.8 mm) long, pre-bent toward the pipe surface. Collar shall be tightly wrapped over the wrap strip, overlapping min. 1 in. (25 mm) onto chase wall stud at both ends. A min two anchor tabs of collar to be secured to top plate opposite the stud with min 1/4 in. (6 mm) diam by 1-1/2 in. (38 mm) long steel wood screws in conjunction with min 3/4 in. (19 mm) diam steel washers. Both ends of collar to be secured to the stud with min 1/4 in. (6 mm) diam by 1-1/2 in. (38 mm) long steel wood screws in conjunction with min 3/4 in. (19 mm) diam steel washers.

*Bearing the UL Classification Mark

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

System No. F-C-3012

F Ratings — 1 and 2 Hr (See Item 1)
T Ratings — 0, 1 and 1-3/4 Hr (See Item 3)



SECTION A-A

1. Floor-Ceiling Assembly — The 1 or 2 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 for 1 or 2 hr assembly is 2-1/2 in. (64 mm) or 2 in. (51 mm), respectively.
   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. Furring Channels — (Not Shown) — (As required) - Resilient galvanized steel furring installed in accordance with the manner specified in the individual L500 Series Designs in the Fire Resistance Directory.
   D. Gypsum Board* — Thickness, type, number of layers and fasteners shall be as specified in the individual Floor-Ceiling Design. Max diam of opening for 1 or 2 hr assembly is 2-1/2 in. (64 mm) or 2 in. (51 mm), respectively.

   The F Rating of the firestop system is equal to the rating of the floor-ceiling assembly.
2. Chase Wall — (Optional) - The through penetrant (Item 3) shall be routed through a fire-rated single, double or staggered wood stud/gypsum wallboard chase wall having a fire rating consistent with that of the floor-ceiling assembly. The chase wall shall be constructed of the materials and in the manner specified in the individual U300 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   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 for 1 or 2 hr rated assembly is 2-1/2 in. (64 mm) or 2 in. (51 mm), respectively.
   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 for 1 or 2 hr rated assembly is 2-1/2 in. (64 mm) or 2 in. (51 mm), respectively.
   D. Gypsum Board* — Thickness, type, number of layers and fasteners shall be as specified in individual Wall and Partition Design.

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

System No. F-C-3012

F Ratings — 1 and 2 Hr (See Item 1)
T Ratings — 0, 1 and 1-3/4 Hr (See Item 3)

3. Cables — In 1 hr fire-rated assemblies, aggregate cross-sectional area of cables in opening to be max 45 percent of the cross-sectional area of the opening (max 2 in. (51 mm) diam bundle). Cables to be rigidly supported on both sides of floor assembly. Any combination of the following types and sizes of copper conductors may be used:
   A. RG 59 coaxial cable with single copper conductor, cellular polyethylene cellular foam insulation and polyvinyl chloride (PVC) jacket.
   B. Max 8/C No. 22 AWG telephone cable with polyvinyl chloride (PVC) jacketing.
   C. Max 2/C No. 12 AWG cable with polyvinyl chloride (PVC) insulation and jacketing.
   D. Max 3/C with ground No. 2/0 AWG aluminum or copper Type SER cable with polyvinyl chloride (PVC) insulation.
   E. Max 3/C with ground No. 2/0 AWG Type NM cable with polyvinyl chloride (PVC) insulation.
   F. Max 3/C No. 12 AWG MC (BX) cable with polyvinyl chloride (PVC) insulation.
   G. Max 1 in. diam metal clad TEK cable with PVC jacket.
   H. Max 4/C with ground No. 300 kcmil (or smaller) aluminum SER cable with PVC insulation and jacket.
   I. Through Penetrating Product* - Any cables, Metal-Clad Cable+ or Armored Cable+ currently Classified under the Through Penetrating Products category.

   See Through Penetrating Product (XHLY) category in the Fire Resistance Directory for names of manufacturers.

   The T Rating is 1 and 1-3/4 hr for 1 and 2 hr rated assemblies, respectively, for cables 3A through 3G. The T Rating is 0 hr for cables 3H and 3I.
4. Fill, Void or Cavity Material* — Sealant — Min 3/4 in. (19 mm) thickness of fill material applied within the annulus, flush with top surface of floor or sole plate. Min 5/8 in. (16 mm) thickness of fill material also applied within the annulus, flush with bottom surface of ceiling or lower top plate.

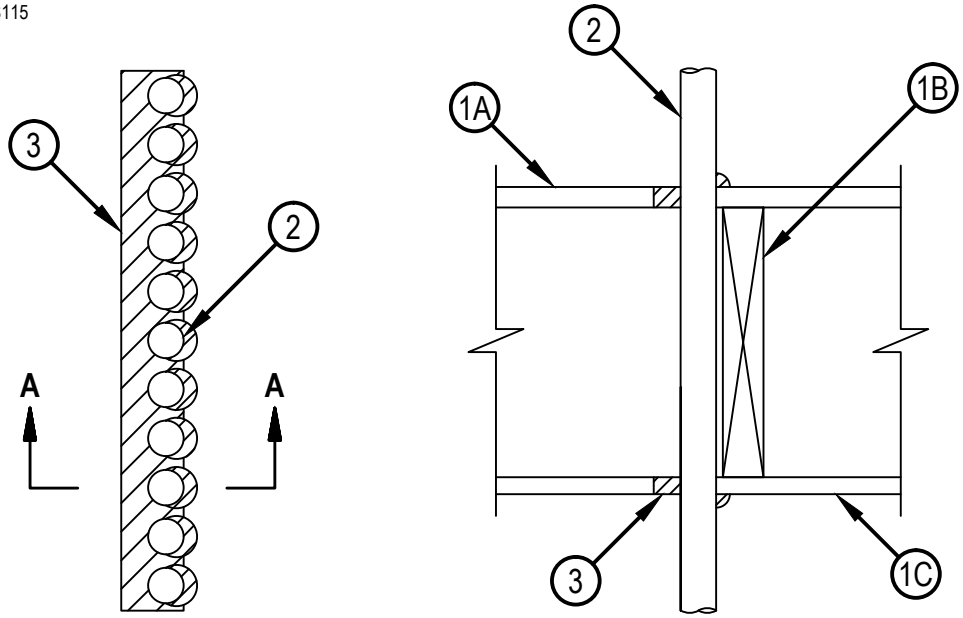
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS611A Sealant or FS-One Sealant

*Bearing the UL Classification Mark

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

System No. F-C-3094

F Rating - 1 Hr
T Rating - 1 Hr



SECTION A-A

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, as 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 area of floor opening is 40 in2 (258 cm2) with max dimension of 20 in. (508 mm).
B. Joists — Nom 10 in. (254 mm) deep (or deeper) lumber and steel joist, trusses or Structural Wood Members* with bridging as required and with ends firestopped.
C. Gypsum Board* — Nom 4 ft (122 cm) wide by 5/8 in. (16 mm) thick. Gypsum board direct-attached to joists or screw-attached to furring channels as specified in the individual Floor-Ceiling Design. Max area of opening in ceiling is 40 in2 (258 cm2) with max dimension of 20 in. (508 mm).

2. Cables — One or more cables to be installed either concentrically or eccentricity within the firestop system. The annular space between each cable and the periphery of the opening shall be 0 in. (point contact) to max 1 in. (25 mm). The annular space between individual cables shall be min 1/4 in. (6 mm) to max 1/2 in. (13 mm). Cables to be rigidly supported on both sides of floor-ceiling assembly. The following types and sizes of cables may be used:

A. Max 3/C (with ground) No. 2/0 AWG aluminum conductor service entrance cable with PVC insulation and jacket materials.

3. Fill, Void or Cavity Material* — Sealant — Min 3/4 in.(19 mm) thickness of fill material applied within the annulus, flush with top surface of floor. At the bottom of assembly, a min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with the surface of the ceiling. Additional fill material to be installed such that a min 1/2 in. (13 mm) diam bead is applied at the cable/floor and cable/ceiling interface at all point contact locations.

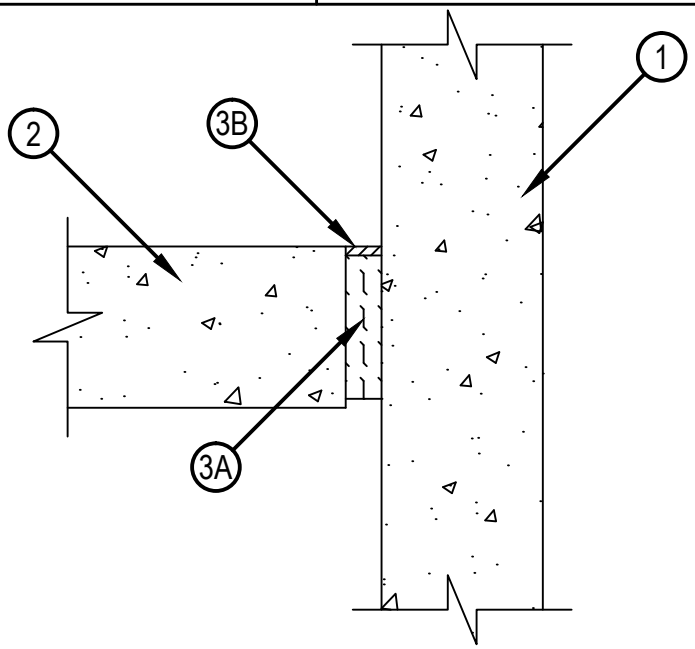
HILTI CONSTRUCTION CHEMICALS, DIV OF
HILTI INC — FS-ONE Sealant

*Bearing the UL Classification Mark

Classified by
Underwriters Laboratories, Inc.
to UL 2079 and CAN/ULC-S115

System No. FW-D-0067

ANSI/UL2079	CAN/ULC S115
Assembly Rating — 2 Hr	F Rating — 2 Hr
Nominal Joint Width - 1 In.	FT Rating — 2 Hr
Class II and III Movement Capabilities — 25% Compression or Extension	FH Rating — 2 Hr
L Rating at Ambient — Less than 1 CFM/Lin. Ft.	FTH Rating — 2 Hr
L Rating at 400° F — Less than 1 CFM/Lin. Ft.	Nominal Joint Width - 1 In.
	Class II and III Movement Capabilities — 25% Compression or Extension
	L Rating at Ambient — Less than 1 CFM/Lin. Ft.
	L Rating at 400° F — Less than 1 CFM/Lin. Ft.



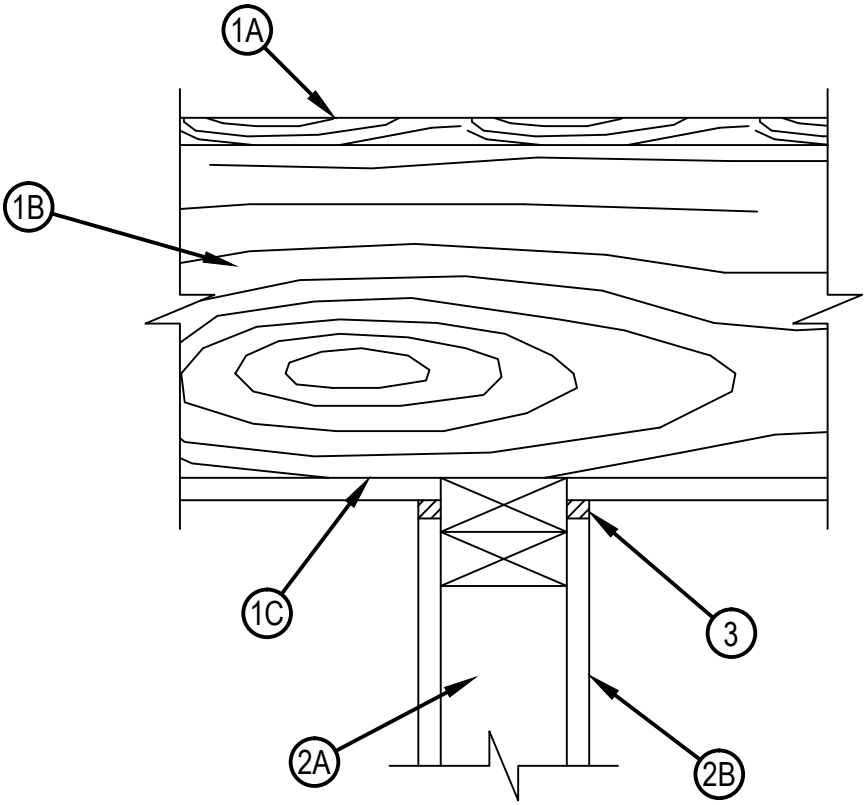
1. Wall Assembly — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf 1600-2400 kg/cu meter) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*.
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Floor Assembly — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf 1600-2400 kg/cu meter) concrete.
3. Joint System — Max width of joint (at time of installation of joint system) is 1 in. (25 mm). The joint system is designed to accommodate a max 25 percent compression or extension from its installed width. The joint system shall consist of the following:
   A. Forming Material* — Min 4.0 pcf (64 kg/cu meter) mineral wool insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4 in. (102 mm) and installed edge-first into the joint opening, paralleled with the joint directions, such that batt sections are compressed min 50 percent in thickness and that the compressed batt sections are recessed from top surface of floor as required to accommodate the required thickness of fill material.
   ROCK WOOL MANUFACTURING CO — Delta Board
   IIG MINWOOL L L C — MinWool-1200 Safing
   THERMAFIBER INC — SAF Mineral Wool
   B. Fill, Void or Cavity Mateiral* (Caulk) — Min 1/4 in. (6 mm) thickness of fill material applied within the joint, flush with top surface of floor.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CFS-S SIL GG or CFS-S SIL SL

*Bearing the UL Classification Mark

Classified by
Underwriters Laboratories, Inc.
to UL 2079 and CAN/ULC-S115

System No. HW-S-0090

Assembly Rating — 1 Hr
Joint Width — 1/2 In. Max



1. Floor Assembly — The 1 hr fire-rated wood joist, wood truss or combination wood and steel truss Floor-Ceiling assembly shall be constructed of the materials and in the manner described in the individual L500 Series Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:
   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.
   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* — Nom 4 ft. (122 cm) wide by 5/8 in. (16 mm) thick as specified in the individual Floor-Ceiling Design.
2. Wall Assembly — The 1 hr fire rated gypsum board/lumber stud wall assembly shall be constructed of the materials and in the manner described in the individual U300 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs — Wall framing to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Top plate installed parallel or perpendicular to direction of wood joists and secured to bottom of joists with steel fasteners spaced max 24 in. (610 mm) OC.
   B. Gypsum Board* — Gypsum board sheets installed to a min total thickness of 5/8 in. (16 mm) on each side of wall. Wall to be constructed as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory, except that a max 1/2 in. (13 mm) gap shall be maintained between the top of the gypsum board and the ceiling of the floor-ceiling assembly.
3. Joint System — Fill, Void or Cavity Material* — Sealant — Max separation between the bottom of the ceiling and the top of the wall is 1/2 in. (13 mm). Min 5/8 in. (16 mm) thickness of fill material installed to fill the joint, flush with each surface of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI INC — FS-ONE or CP606 Sealant

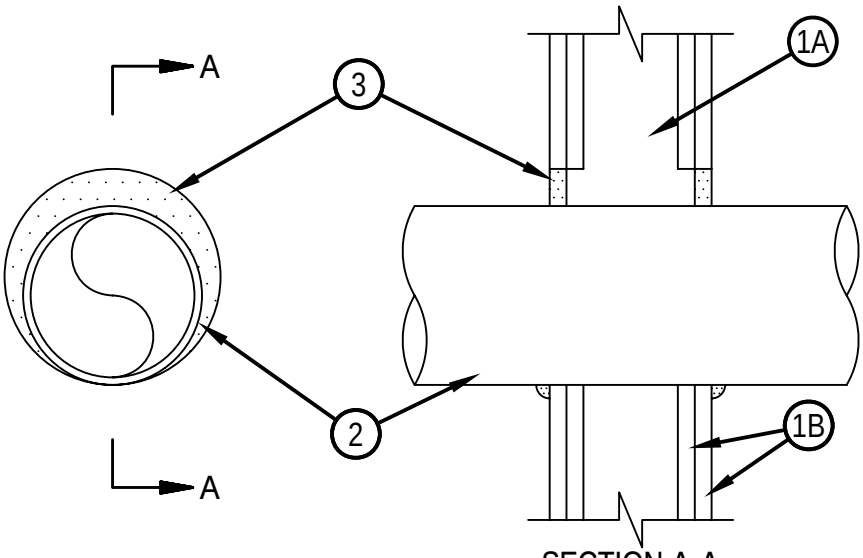
*Bearing the UL Classification Mark

Hilti Firestop Systems

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

System No. W-L-1054

F Ratings — 1 and 2 Hr (See Items 1 and 3)
T Rating — 0 Hr
L Rating At Ambient — Less Than 1 CFM/Sq Ft
L Rating At 400 F — 4 CFM/Sq Ft



SECTION A-A

1. Wall Assembly — The 1 or 2 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. OC. Steel studs to be min 2-1/2 in. wide and spaced max 24 in. OC. When steel studs are used and the diam of opening exceeds the width of stud cavity, the opening shall be framed on all sides using lengths of steel stud installed between the vertical studs and screw-attached to the steel studs at each end. The framed opening in the wall shall be 4 to 6 in. wider and 4 to 6 in. higher than the diam of the penetrating item such that, when the penetrating item is installed in the opening, a 2 to 3 in. clearance is present between the penetrating item and the framing on all four sides.
   B. Gypsum Board* — 5/8 in. thick, 4 ft wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 32-1/4 in. for steel stud walls. Max diam of opening is 14-1/2 in. for wood stud walls.

   The F Rating of the firestop system is equal to the fire rating of the wall assembly.
2. Through-Penetrants — One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. The annular space shall be min 0 in. to max 2-1/4 in. Pipe may be installed with continuous point contact. Pipe, conduit or tubing may be installed at an angle not greater than 45 degrees from perpendicular. Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
   A. Steel Pipe — Nom 30 in diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. Iron Pipe — Nom 30 in. diam (or smaller) cast or ductile iron pipe.
   C. Conduit — Nom 4 in diam (or smaller) steel electrical metallic tubing or 6 in. diam steel conduit.
   D. Copper Tubing — Nom 6 in. diam (or smaller) Type L (or heavier) copper tubing.
   E. Copper Pipe — Nom 6 in. diam (or smaller) regular (or heavier) copper pipe.
3. Fill, Void or Cavity Material* — Sealant — Min 5/8 in. thickness of fill material applied within the annulus, flush with both surfaces of wall. At the point or continuous contact locations between pipe and wall, a min 1/2 in. diam bead of fill material shall be applied at the pipe wall interface on both surfaces of wall .

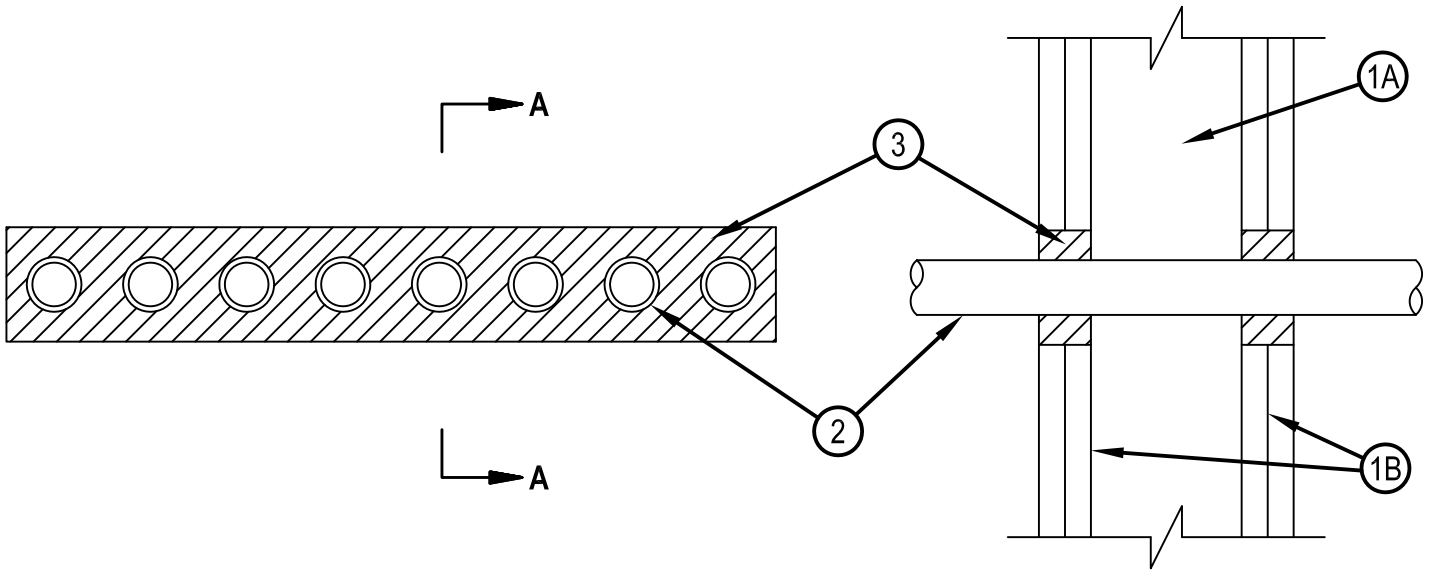
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-One Sealant

*Bearing the UL Classification Mark

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

System No. W-L-1095

F Ratings — 1 & 2 Hr (See Item 1)
T Ratings — 1 & 2 Hr (See Item 3)
L Rating At Ambient — Less Than 1 CFM/Sq Ft
L Rating At 400 F — 4 CFM/Sq ft



SECTION A-A

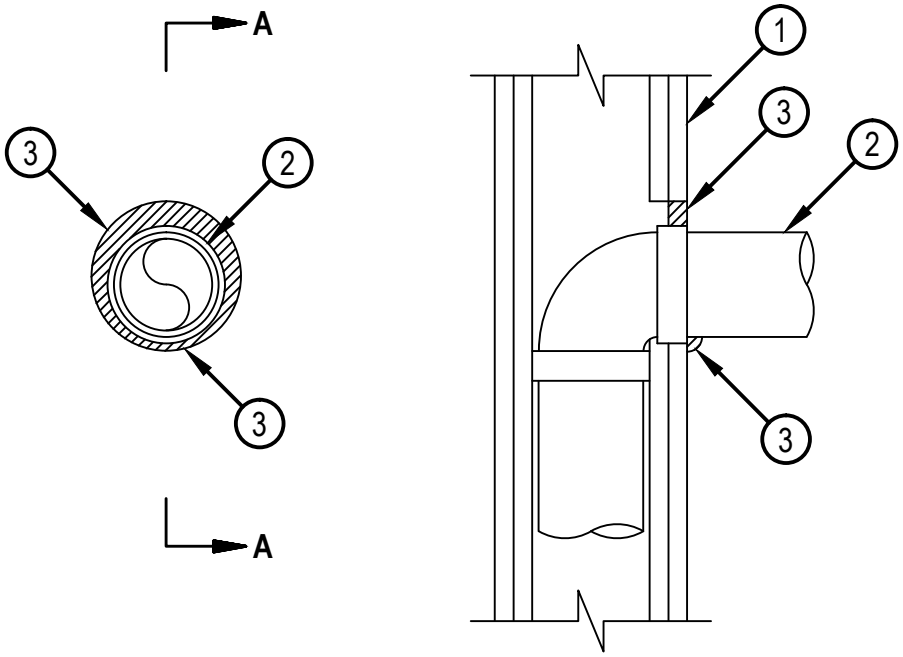
1. Wall Assembly — The 1 or 2 h fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner described in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. OC. Steel studs to be min 2-1/2 in. wide and spaced max 24 in. OC.
   B. Gypsum Board* — 5/8 in. thick, 4 ft wide with square or tapered edges. The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max size of opening 2-5/8 in. by 18 in. The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.
2. Electric Metallic Tubing (EMT) — One or more nom 1 in. diam steel electric tubing. The annular space shall be min 1/2 in. to a max 1 in. Conduit to be rigidly supported on both sides of wall assembly.
3. Fill, Void or Cavity Material* — Sealant — For 2 h F Rating, min 1-1/4 in. thickness of fill material applied within the annulus, flush with both surfaces of wall. For 1 h F Rating, min 5/8 in. thickness of fill material applied within the annulus, flush with both surfaces of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI INC — FS-One Sealant

*Bearing the UL Classification Mark

System No. W-L-1410

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

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings — 1 and 2 Hr (See Item 1)	F Ratings — 1 and 2 Hr (See Item 1)
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Ratings — 1 and 2 Hr (See Item 1)
	FTH Rating — 0 Hr



SECTION A-A

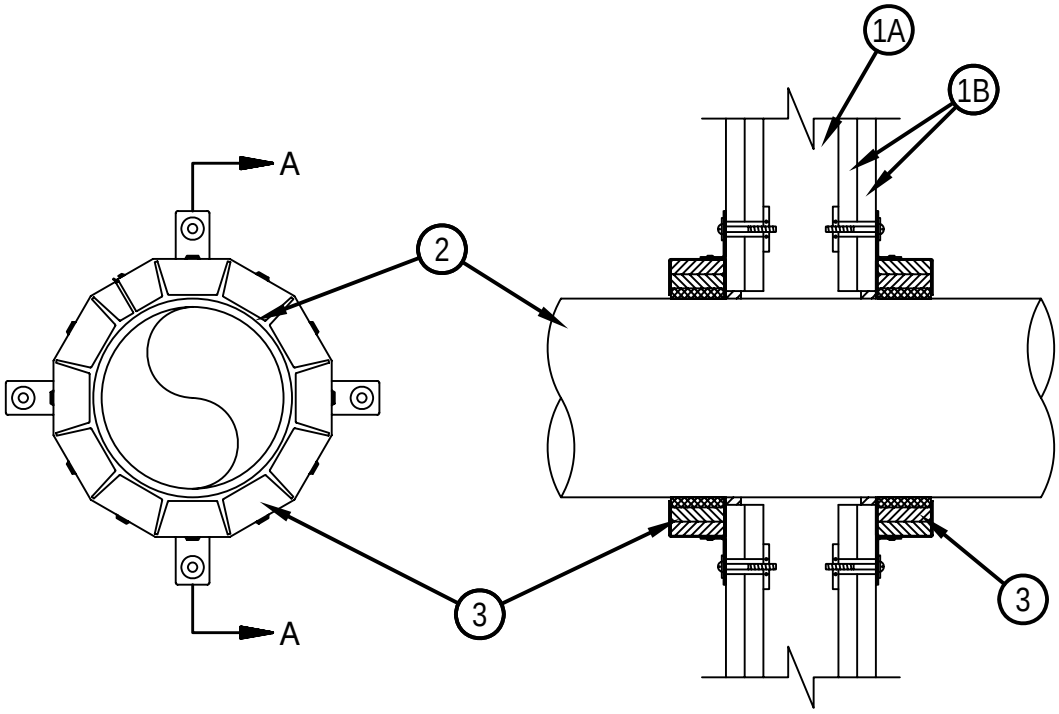
1. Wall Assembly — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.
   B. Gypsum Board* — One or two layers of nom 5/8 in. (16 mm) thick gypsum board as specified in the individual Wall and Partition Design. Max diam of opening is 5 in. (127 mm).
   The hourly F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall assembly.
2. Through penetrants — One metallic pipe or conduit to be installed either concentrically or eccentrically within the firestop system. The annular space shall be 0 in. (point contact) to 1 in. (25 mm). Pipe or conduit to be rigidly supported on the penetrated side of the wall assembly. The following types and sizes of metallic pipes or conduits may be used:
   A. Steel pipe — Nom 3 in. (76 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. Conduit — Nom 3 in. (76 mm) diam (or smaller) steel electrical metallic tubing (EMT), nom 3 in. (76 mm) diam steel conduit or nom 1 in. (25 mm) diam (or smaller) flexible steel conduit.
   C. Copper Tubing — Nom 1 in. (25 mm) diam (or smaller) Type L (or heavier) copper tubing.
   D. Copper Pipe — Nom 1 in. (25 mm) diam (or smaller) Regular (or heavier) copper pipe.
3. Fill, Void or Cavity Material++— Sealant — Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with surface of wall. Min 1/2 in. (13 mm) diam bead of sealant applied at point contact location.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant, CFS-S-SIL GG Sealant, CP601S Elastomeric Sealant, CP 606 Sealant, CP618 Putty.

++ Bearing the UL Classification Mark

Classified by
Underwriters Laboratories, Inc.
to UL 1479

System No. W-L-2078

F Ratings — 1 and 2 Hr (See Item 1)
T Ratings — 0, 1 and 2 Hr (See Items 2 and 3)
L Rating At Ambient — 3 CFM/sq ft
L Rating At 400 F — Less Than 1 CFM/sq ft



SECTION A-A

1. Wall Assembly — The fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or V400 Series Wall and Partition Designs in the UL fire Resistance Directory and shall include the construction features noted below:
   A. Studs — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced max 16 in. OC. Steel studs to be min 2-1/2 in. wide and spaced max 24 in. OC.
   B. Gypsum Board* — Nom 5/8 in. thick gypsum board, as specified in the individual Wall and Partition Design. Max diam of opening is 11-1/2 in. The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.
2. Through-Penetrants — One nonmetallic pipe, conduit or tubing to be installed within the firestop system. The annular space between pipe and periphery of opening shall be min 0 in. (point contact) to max 1/2 in. Pipe or conduit to be rigidly supported on both sides of the wall assembly. The following types and sizes of nonmetallic pipes may be used:
   A. Polyvinyl Chloride (PVC) Pipe — Nom 10 in. diam (or smaller) Schedule 40 solid-core or cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
   B. Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 10 in. diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.
   C. Acrylonitrile Butadiene Styrene (ABS) Pipe — Nom 6 in. diam (or smaller) Schedule 40 solid-core or cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems
   D. Flame Retardant Polypropylene (FRPP) Pipe — Nom 6 in. diam (or smaller) Schedule 40 FRPP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
   E. Polyvinylidene Fluoride (PVDF) Pipe — Nom 4 in. diam (or smaller) PVDF pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.

   When max 6 in. diam pipe is used, T Rating is equal to the hourly fire rating of the wall. When nom 8 in. or 10 in. diam pipe is used, T Rating is 0 hr.

Classified by
Underwriters Laboratories, Inc.
to UL 1479

System No. W-L-2078

F Ratings — 1 and 2 Hr (See Item 1)
T Ratings — 0, 1 and 2 Hr (See Items 2 and 3)
L Rating At Ambient — 3 CFM/sq ft
L Rating At 400 F — Less Than 1 CFM/sq ft

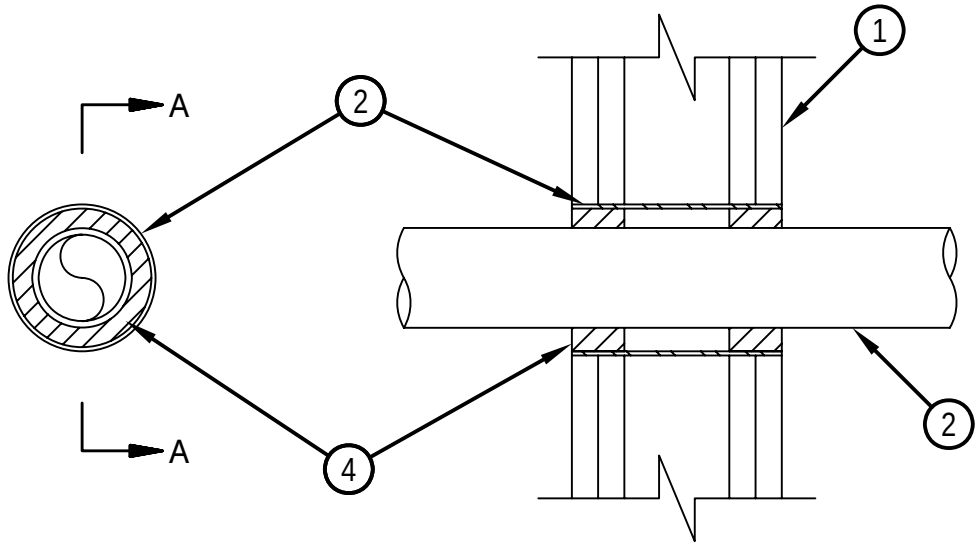
3. Firestop Device* — Firestop Collar — Firestop collar shall be installed in accordance with the accompanying installation instructions. Collar to be installed and latched around the pipe and secured to both sides of the wall using the anchor hooks provided with the collar. (Minimum two anchor hooks for 1-1/2 and 2 in. diam pipes, three anchor hooks for 3 and 4 in. diam pipes, four anchor hooks for 6 in. diam pipes, ten anchor hooks for 8 in. diam pipes and twelve anchor hooks for 10 in. diam pipes). The anchor hooks are to be secured to the surface of wall with 3/16 in. diam by 2-1/2 in. long steel toggle bolts along with washers. As an alternate for pipe sizes of nom 4 in. diam or less, min No. 10 by 1-1/2 in. long drywall or laminate screws with min 3/4 in. steel washers may be used. When the drywall or laminate screw is used, T Rating shall not exceed 1 hr.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 643 50/1.5"N, CP 643 63/2"N, CP 643 90/3"N, CP 643 110/4"N, CP 643 160/6"N, CP 644 200/8" andCP 644 250/10" Firestop Collars
4. Fill, Void or Cavity Material* — Sealant - (Not Shown) — Min 1/2 in. thickness of sealant applied within the annular space for nom 8 in. and 10 in. diam pipes, flush with each side of wall. Sealant in annular space is optional for max 6 in. diam pipes. A min 1/4 in. thickness of sealant is required within the annular space, flush with each side of wall, to attain the L Ratings for max 6 in. diam pipes.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-One Sealant

*Bearing the UL Classification Mark

Classified by
Underwriters Laboratories, Inc.
to UL 1479

System No. W-L-2128

F Rating — 1 and 2 Hr (See Item 1)
T Rating — 0 Hr



SECTION A-A

1. Wall Assembly — The 1 or 2 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. Studs — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. OC. Steel studs to be min 2-1/2 in. wide and spaced max 24 in. OC.
B. Gypsum Board* — 5/8 in. thick, 4 ft wide with square or tapered edges. The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max diam of opening is 3-1/2 in.

2. Metallic Sleeve Optional — Nom 3-1/2 in. (or smaller) cylindrical sleeve fabricated from min 0.016 in. thick (28 gauge) galv sheet steel and having a min 1-1/4 in. lap salong longitudinal seam. Length of sleeve to be installed flush with wall surfaces.

3. Through Penetrants — One nonmetallic pipe installed within the firestop system.. Pipe may be installed at an angle not greater than 45 degrees from perpendicular. Pipe to be rigidly supported on both sides of wall assembly. The space between pipe and periphery of opening shall be min 1/4 in. to max 11/16 in. The following types and sizes of nonmetallic pipes may be used:

A. Polyvinyl Chloride (PVC) Pipe — Nom 2 in. diam (or smaller) Schedule 40 PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
B. Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 2 in. diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.

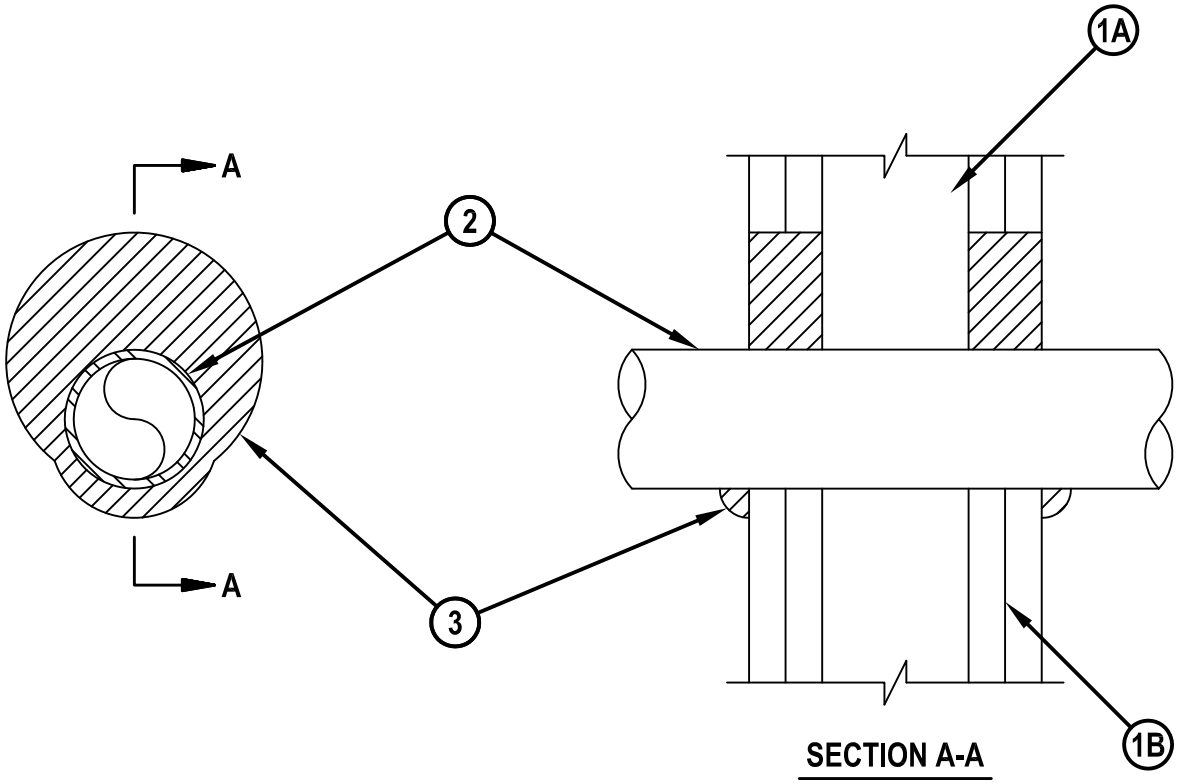
4. Fill, Void or Cavity Materials* — Sealant — For 1 hr F Rating, min 5/8 in. thickness of fill material applied within the annulus, flush with both surfaces of wall. For 2 hr F Rating, min 1-1/4 in. thickness of fill material applied within annulus, flush with both surfaces of wall.
HILTI CONSTRUCTION CHEMICALS, DIV OF
HILTI INC — FS-ONE Sealant

*Bearing the UL Classification Mark

Underwriters Laboratories, Inc.
to UL 1479

System No. W-L-2377

F Ratings - 1 and 2 Hr (See Items 1 and 3)
T Ratings - 1 and 2 Hr (See Items 1 and 3)
L - Rating at Ambient - Less that 1 CFM/Sq Ft
L - Rating at 400°F - 4 CFM/Sq Ft



SECTION A-A

1. Wall Assembly - The 1 and 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U300 or U400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

   A. Studs - Wall framing shall consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. OC. Steel studs to be min 2-1/2 in. wide by 1-3/8 in. deep channels spaced max 24 in. OC.

   B. Gypsum Board* - The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 3 in.

The hourly F and T Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.

Underwriters Laboratories, Inc.
to UL 1479

System No. W-L-2377

F Ratings - 1 and 2 Hr (See Items 1 and 3)
T Ratings - 1 and 2 Hr (See Items 1 and 3)
L - Rating at Ambient - Less that 1 CFM/Sq Ft
L - Rating at 400°F - 4 CFM/Sq Ft

2. Through Penetrant - One nonmetallic pipe, conduit or tubing installed either concentrically or eccentrically within the firestop system. The annular space between pipe and periphery of opening shall be min of 0 in. (point contact) to a max 1-1/4 in. Pipe to be rigidly supported on both sides of wall assembly. The following types and sizes of nonmetallic pipes may be used:

   A. Chlorinated Polyvinyl Chloride (CPVC) Pipe - Nom 2 in. diam (or smaller) FLOWGUARD GOLD® SDR11 CPVC pipe for use in closed (process or supply) piping systems.

   B. Chlorinated Polyvinyl Chloride (CPVC) Pipe - Nom 2 in. diam (or smaller) BLAZEMASTER® SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.

3. Fill, Void or Cavity Material* - Sealant - Min 5/8 in. and 1-1/4 in. thickness of fill material applied within annulus, flush with both surfaces of wall for 1 and 2 hr rated assemblies, respectively. At point contact location, a min 1/2 in. diam bead of fill material shall be applied to the wall/penetrant interface on both surfaces of the wall.

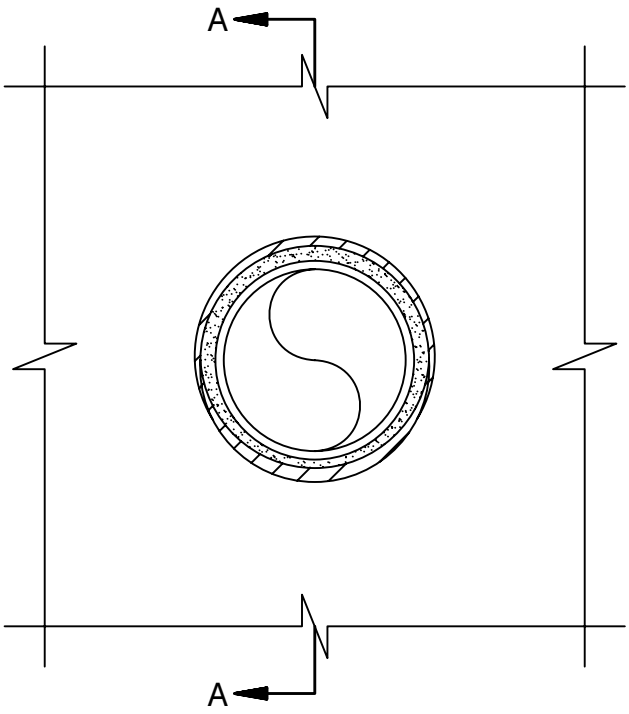
HILTI CONSTRUCTION CHEMICALS, DIV OF
HILTI INC - FS-ONE Sealant

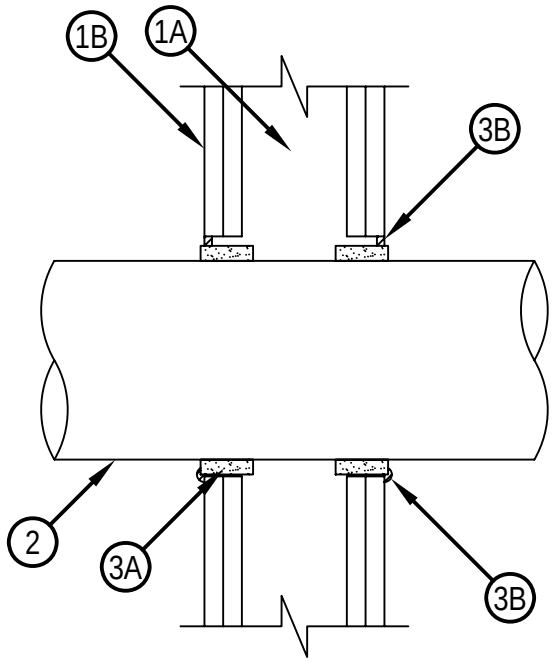
*Bearing the UL Classification Mark

Classified by
Underwriters Laboratories, Inc.
to UL 1479

System No. W-L-2406

F Ratings — 1 and 2 Hr (See Item 1)
T Ratings — 0, 1/2 and 3/4 Hr (See Item 2)
L Rating At Ambient - 1.2 CFM/sq ft (See Item 3B)
L Rating At 400 F - Less Than 1 CFM/sq ft (See Item 3B)





SECTION A-A

1. Wall Assembly — The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or V400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.
   B. Gypsum Board* — One or two layers of nom 5/8 in. (16 mm) thick gypsum board, as specified in the individual Wall and Partition Design. See Table under Item 3B for max diam of opening.
2. Through-Penetrants — One nonmetallic pipe installed within the firestop system. See Table under Item 3B for annular space required in the firestop system. Pipe to be rigidly supported on both sides of wall assembly. The following types and sizes of nonmetallic pipes may be used:
   A. Polyvinyl Chloride (PVC) Pipe — Nom 6 in. (152 mm) diam (or smaller) Schedule 40 cellular or solid core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
   B. Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 6 in. (152 mm) diam (or smaller) SDR 13.5 CPVC pipe for use in closed (process or supply) piping system.
   C. Acrylonitrile Butadiene Styrene (ABS) Pipe — Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular or solid core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.

   The T Rating for 2 hr fire-rated walls is 0 hr. The T Rating for 1 hr fire-rated walls is 3/4 hr for nom 1-1/2, 2 and 3 in. (38, 51 and 76 mm) diam through penetrants. The T Rating for 1 hr fire-rated walls is 1/2 hr for nom 4 and 6 in. (102 and 152 mm) diam through penetrants.

Classified by
Underwriters Laboratories, Inc.
to UL 1479

System No. W-L-2406

F Ratings — 1 and 2 Hr (See Item 1)
T Ratings — 0, 1/2 and 3/4 Hr (See Item 2)
L Rating At Ambient - 1.2 CFM/sq ft (See Item 3B)
L Rating At 400 F - Less Than 1 CFM/sq ft (See Item 3B)

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

A. Fill, Void or Cavity Material* — Wrap Strip — See Table under Item 3B for min size of intumescent wrap strip. The wrap strip is continuously wrapped around the outer circumference of the pipe once and slid into the annular space such that approx 1/8 in. (3 mm) of the wrap strip protrudes from the wall surface. Wrap strip is held in place with integral fastening tape. Wrap strip installed on each surface of wall.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 648S - 1.5" US, CP 648S - 2" US, CP 648S - 3" US, CP 648S - 4" US and CP 648S - 6" US

B. Fill, Void or Cavity Material* — Caulk — Min 1/4 in. (6 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. For 2 hr fire-rated walls, 1/4 in. (6 mm) bead fill material also applied at wrap strip/gypsum wall interface. In 1 hr fire-rated walls, fill material is optional for nom 1-1/2, 2, 3 and 4 in. (38, 51, 76 and 102 mm) diam penetrants. In 2 hr fire-rated walls, fill material is optional for nom 1-1/2, 2 and 3 in. (38, 51 and 76 mm) diam penetrants. Fill material is required to be used to attain L Ratings.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-One Sealant

Nom Pipe Diam, in. (mm)	Wrap Strip	Wrap Strip Size, thick. X width, in. (mm)	Max Diam of Opening, in. (mm)	Annular Space, in. (mm)	
				Min	Max
1-1/2 (38)	CP 648S - 1.5" US	3/16 x 1 (5 x 25)	2-3/8 (60)	3/16 (5)	5/16 (8)
2 (51)	CP 648S - 2" US	3/16 x 1 (5 x 25)	3 (76)	3/16 (5)	5/16 (8)
3 (76)	CP 648S - 3" US	3/16 x 1-3/4 (5 x 44)	4 (102)	3/16 (5)	5/16 (8)
4 (102)	CP 648S - 4" US	3/8 x 1-3/4 (10 x 44)	5-3/8 (137)	3/8 (10)	1/2 (13)
6 (152)	CP 648S - 6" US	1/2 x 1-3/4 (13 x 44)	8 (203)	9/16 (14)	13/16 (21)

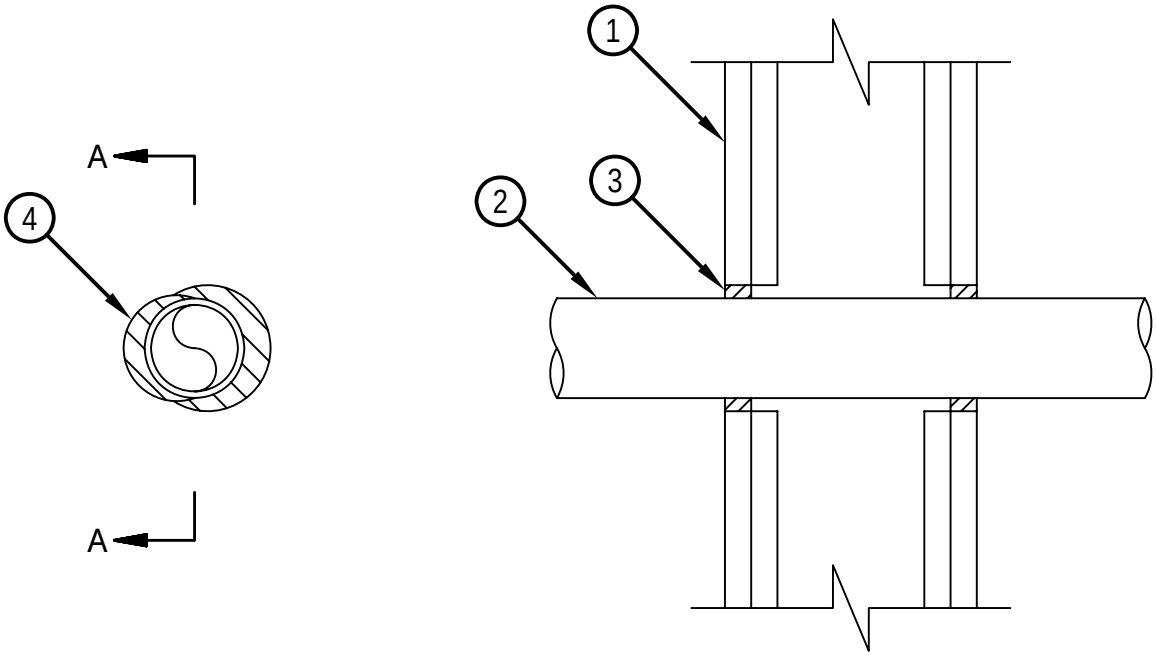
*Bearing the UL Classification Mark

Classified by
Underwriters Laboratories, Inc.
to UL 1479

System No. W-L-2474

F Ratings - 1 and 2 Hr (See Item 1)
T Rating - 0 Hr
L Rating At Ambient - Less Than 1 CFM/Sq Ft
L Rating at 400 F - 4 CFM/Sq Ft

SECTION A-A



Classified by
Underwriters Laboratories, Inc.
to UL 1479

System No. W-L-2474

F Ratings - 1 and 2 Hr (See Item 1)
T Rating - 0 Hr
L Rating At Ambient - Less Than 1 CFM/Sq Ft
L Rating at 400 F - 4 CFM/Sq Ft

1. Wall Assembly — The fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or V400 Series Wall and Partition Designs in the UL fire Resistance Directory and shall include the construction features noted below:

A. Studs — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced max 16 in. (406 mm) OC. Steel studs to be min 2-1/2 in. (64 mm) wide and spaced max 24 in. (610 mm) OC.
B. Gypsum Board* — Nom 5/8 in. (16 mm) thick gypsum board, as specified in the individual Wall and Partition Design. Max diam of opening is 3 in. (76 mm).

The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.

2. Through Penetrants — One nonmetallic pipe to be installed either concentrically or eccentrically within the firestop system. The annular space between pipe and the periphery of the opening shall be min 0 in. (point contact) to a max 1/2 in. (13 mm). The following types and sizes of nonmetallic pipes may be used:

A. Polyvinyl Chloride (PVC) Pipe — Nom 2 in. (51 mm) diam (or smaller) cellular or solid core Schedule 40 (or heavier) pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
B. Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 2 in. (51 mm) diam (or smaller) SDR 13.5 CPVC pipe for use in closed (process or supply) piping systems.
C. Crosslinked Polyethylene (PEX) Tubing — Nom 2 in. (51 mm) diam (or smaller) SDR 9 PEX tubing for use in closed (process or supply) piping systems.
D. Rigid Nonmetallic Conduit (RNC)+ — Nom 2 in. diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA No. 70).

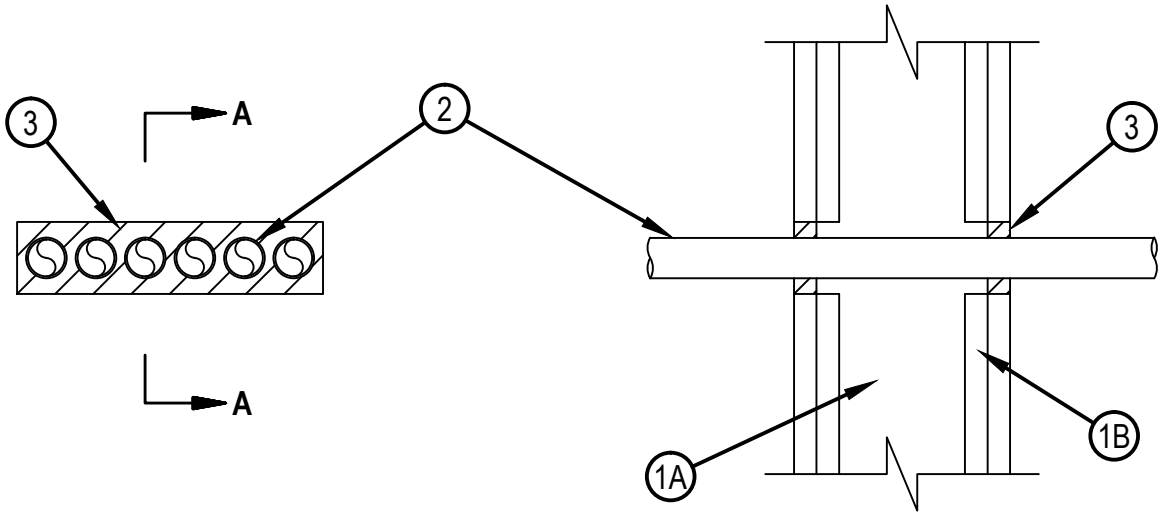
3. . Fill, Void or Cavity Material* - Sealant — Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall. At point contact location, a min 1/2 in. (13 mm) diam bead of fill material shall be applied to the wall/penetrant interface on both surfaces of the wall.
HILTI CONSTRUCTION CHEMICALS, DIV OF
HILTI INC — FS-ONE Sealant

*Bearing the UL Classification Mark
+ Bearing the UL Listing Mark

Classified by
Underwriters Laboratories, Inc.
to UL 1479

System No. W-L-2480

F Ratings — 1 and 2 Hr (See Item 1)
T Rating — 0 Hr



SECTION A-A

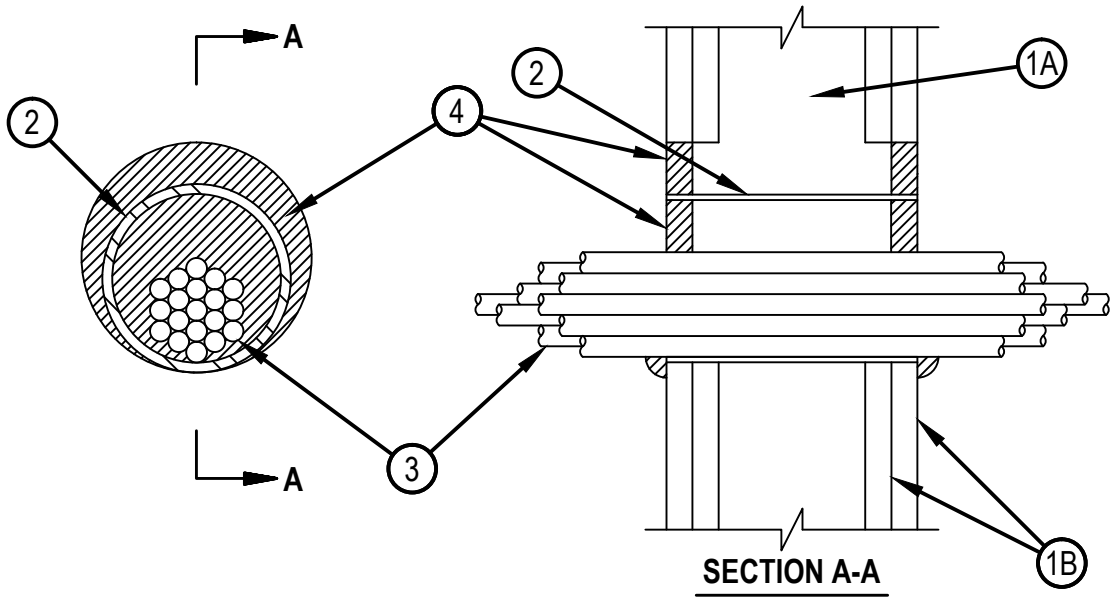
1. Wall Assembly — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or V400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced max 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.
   B. Gypsum Board* — One or two layers of gypsum board, as specified in the individual Wall and Partition Design. Max area of opening 17 in. (110 cm2) with a max dimension of 8-1/2 in. (102 mm).
   The hourly F Rating of the firestop system is equal to the hourly rating of the wall assembly in which it is installed.
2. Crosslinked Polyethylene (PEX) Tubing — Max six nom 1 in. (25 mm) diam (or smaller) SDR 9 PEX tubing for use in closed (process or supply) piping systems, installed either concentrically or eccentrically within the firestop system. The annular space between the tubing and the edge of the opening shall be min 1/4 in. (6 mm) to max 1 in. (25 mm). Separation between tubes shall be min 1/4 in. (6 mm). Tubing to be rigidly supported on both sides of wall assembly.
3. Fill, Void or Cavity Materials* — Sealant — Min 5/8 in. (16 mm) thickness of thickness of sealant applied within annular space, flush with both surfaces of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI INC — FS-ONE Sealant

*Bearing the UL Classification Mark

System No. W-L-3065

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

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings — 1 and 2 Hr (See Item 1)	F Ratings — 1 and 2 Hr (See Item 1)
T Rating — 0 and 3/4 Hr (See item 3)	FT Rating — 0 and 3/4 Hr (See item 3)
L Rating At Ambient — 15 CFM/sq ft	FH Ratings — 1 and 2 Hr (See Item 1)
L Rating At 400 F — 8 CFM/sq ft	FTH Rating — 0 and 3/4 Hr (See item 3)
	L Rating At Ambient — 15 CFM/sq ft
	L Rating At 400 F — 8 CFM/sq ft



SECTION A-A

1. Wall Assembly — The 1 or 2 fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or V400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 2-1/2 in. (64 mm) wide and spaced max 24 in. (610 mm) OC.
   B. Gypsum Board* — Nom 5/8 in. (16 mm) thick gypsum board, with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300, U400 or V400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 5-1/2 in. (138 mm) when sleeve (Item 2) is employed. Max diam of opening is 4 in. (102 mm) when sleeve (Item 2) is not employed.
   The F Rating of the firestop system is equal to the fire rating of the wall assembly.
2. Metallic Sleeve — (Optional) - Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing (EMT) or Schedule 5 (or heavier) steel pipe or min 0.016 in. thick (0.41 mm, No. 28 ga) galv steel sleeve installed flush with wall surfaces. The annular space between steel sleeve and periphery of opening shall be min 0 in. (0 mm, point contact) to max 1 in. (25mm). When Schedule 5 steel pipe or EMT is used, sleeve may extend up to 18 in. (457 mm) beyond the wall surfaces. As an option when Schedule 5 steel pipe or EMT is used, sleeve may extend continuously beyond one wall surface. When cable bundle penetrates wall assembly at an angle of 45 degrees, no metallic sleeve is used.

System No. W-L-3065

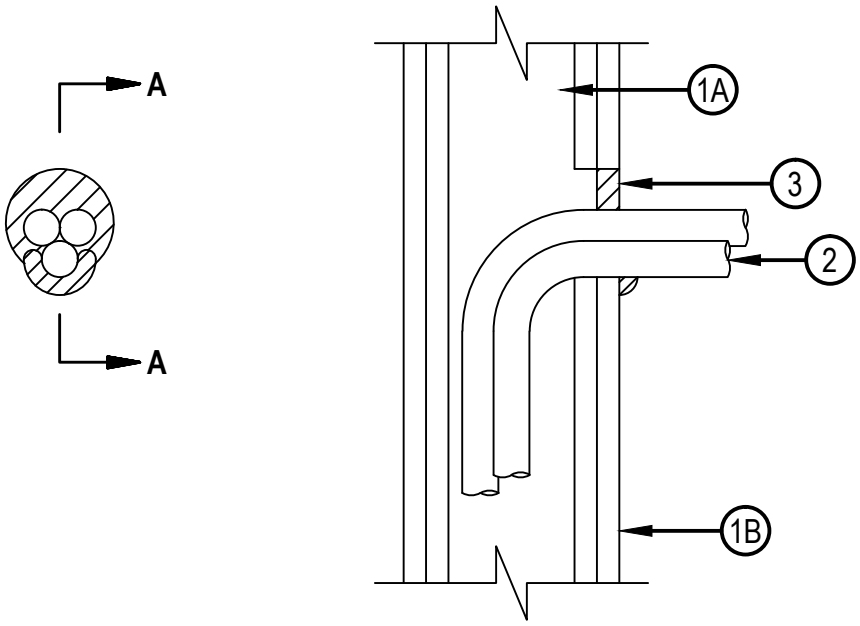
3. Cables — Aggregate cross-sectional area of cable in opening to be max 45 percent of the cross-sectional area of the opening. The annular space between the cable bundle and the periphery of the opening to be min 0 in. (point contact) to max 1 in. (25 mm). When sleeve is continuous on one side of wall (see Item 2), the cable fill may be 0 to 45% and the max annular space is not limited. Cables to be rigidly supported on both sides of the wall assembly. Cable bundle, using cables described below, may penetrate the wall at an angle not greater than 45 degrees. Any combination of the following types and sizes of copper conductor cables may be used:
   A. Max 7/C No. 12 AWG with polyvinyl chloride (PVC) insulation and jacket.
   B. Max 25 pair No. 24 AWG telephone cable with PVC insulation and jacket.
   B1. Max 4 pr No. 22 AWG Cat 5 or Cat 6 computer cables.
   C. Type RG/U coaxial cable with polyethylene (PE) insulation and PVC jacket having a max outside diameter of ½ in. (13 mm).
   C1. Max RG 6/U coaxial cable with fluorinated ethylene insulation and jacketing.
   D. Multiple fiber optical communication cable jacketed with PVC and having a max OD of 5/8 in. (16 mm).
   E. Through Penetrating Products*— Max three copper conductor No. 8 AWG .Metal-Clad Cable+.
   AFC CABLE SYSTEMS INC
   F. Max 3/C (with ground)(or smaller) No. 8 AWG copper conductor cable with PVC insulation and jacketing.
   G. Max 3/4 in. (19 mm) diam copper ground cable with or without a PVC jacket.
   H. Fire Resistive Cables* - Max 1-1/4 in. (32 mm) diam single conductor or multi conductor Type MI cable. A min 1/8 in. (3 mm) separation shall be maintained between MI cables and any other types of cable.
   I. Max 4/C with ground 300 kcmil (or smaller) aluminum SER cable with PVC insulation and jacket.
   J. Through Penetrating Product* - Any cables, Metal-Clad Cable+ or Armored Cable+ currently Classified under the Through Penetrating Products category.
   K. Maximum 3/C No. 8 AWG metal-clad cable.
   L. Maximum 5/8 diam fiber-optic cable with PVC jacket.
   For cable bundle penetrating the wall assembly at an angle of 45 degrees, the T rating is ¾ hr for a 2 hr wall assembly.
   See Through Penetrating Product (XHLY) category in the Fire Resistance Directory for names of manufacturers.
4. Fill, Void or Cavity Material*— Sealant or Putty — Fill material applied within the annulus, flush with each end of the steel sleeve or wall surface. Fill material installed symmetrically on both sides of the wall. A min 5/8 in. (16 mm) thickness of sealant is required for the 1 or 2 hr F Rating . An additional 1/2 in. (13 mm) diam bead of fill material shall be applied at the interface of sleeve with gypsum board.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP601S, CP606, FS-One Sealants or CP618 Putty
5. Packing Material — (Optional, Not Shown) — Mineral wool forming material may be used as a backer for the fill material (Item 4). When used, it shall be firmly packed into annular space within the sleeve as a permanent form and recessed from end of sleeve to accommodate the required thickness of fill material.

*Bearing the UL Classification Mark
+Bearing the UL Listing Mark

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

System No. W-L-3310

F Rating - 1 and 2 Hr (See Item 1)
T Rating - 0 Hr



SECTION A-A

1. Wall Assembly — The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or V400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. Studs — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.
B. Gypsum Board* — One or two layers of nom 5/8 in. (16 mm) thick gypsum board as specified in the individual Wall and Partition Design. Max diam of opening is 3 in. (76 mm).
The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly.

2. Cables — Max of three tightly bundled 3/C (with ground) No. 8 AWG bare copper ground metal clad cables with a PVC jacket. Annular space between cable bundle and periphery of opening shall be a min 0 in. (point contact) to a max 1 in. (25 mm). When FS-One sealant is used, max annular space is 1-1/2 in. (38 mm). Cables to be rigidly supported within 24 in. (610 mm) of wall assembly.

3. Fill, Void or Cavity Material*— Sealant — Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with surface of wall. Min 1/2 in. (13 mm) diam bead of sealant applied at point contact location.
HILTI CONSTRUCTION CHEMICALS, DIV OF
HILTI INC — FS-ONE Sealant or CP 606 Sealant

*Bearing the UL Classification Mark

Hilti Firestop Systems

Firestop Self Leveling Silicone Sealant CFS-S SIL SL

Product description

- Self-leveling, single-component, silicone-based firestop sealant for use with through-penetrations as well as construction joints in floors.

Product features

- Self-leveling–requires no tooling
- Excellent elongation/compression properties
- Meets 500 cycle requirements (ASTM E 1966 and UL 2079)
- Smoke, fume, water and UV resistant
- Meets Class I W-rating requirements
- Meets LEED™ requirements for indoor environmental quality credit 4.1 Low Emitting Materials, Sealants and Adhesives and 4.2 Paints and Coatings

Areas of application

- Sealing construction/expansion joints
- Metal pipes
- Cable bundles
- Sealing multiple penetrations in small or large openings

For use with

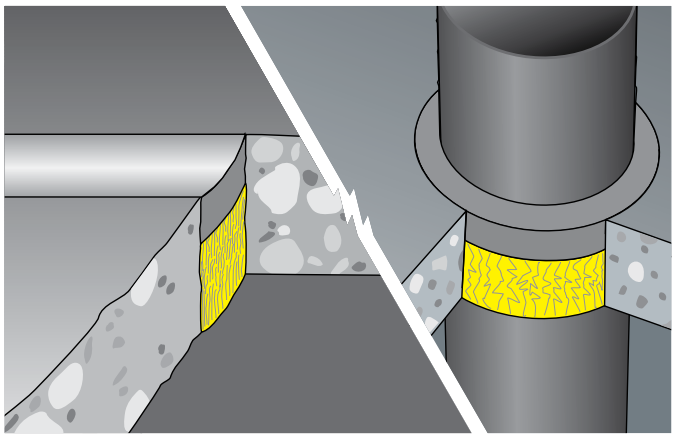
- Concrete floors rated up to 4 hours

Examples

- Penetrations for metal pipes between floor levels
- Construction joints and expansion joints in floors

Installation instructions

- Refer to what is included in the package, the MSDS, and the applicable listing.



Technical Data*	CFS-S SIL SL
Chemical basis	Neutral elastic silicone
Density	Approx. 1.4 g/cm³
Color	Gray
Application temperature	40°F to 104°F (5°C to 40°C)
Skin forming time	Approx. 15 min
Curing time	Approx. 2 mm/3 days
Volume shrinkage	Approx. 0 – 5%
Joint movement capability (UL 2079)	Approx. 33%
Temperature resistance	–40°F to 300°F (–40°C to 149°C)
Surface burning characteristics (ASTM E 84-12)	Flame Spread: 0 Smoke Development: 50
Sound transmission classification (ASTM E 90-09)	53 (Relates to specific construction)
Tested in accordance with	UL 1479 ASTM E 1966 UL 2079 ASTM E 814 ASTM E 2307 ASTM E 84 ASTM G21

*At 73°F (23°C) and 50% relative humidity

CLASSIFIED C UL US
FILL, VOID OR CAVITY MATERIAL FOR USE IN THROUGH-PENETRATION FIRESTOP SYSTEMS, JOINT SYSTEMS AND PERIMETER FIRE CONTAINMENT SYSTEMS
SEE UL FIRE RESISTANCE DIRECTORY 5BP5

FM APPROVED

W rated SYSTEMS AVAILABLE

FBC SYSTEM COMPATIBLE
Visit fbcsystemcompatible.com. FBC™ is a trademark of the Lubrizol Corporation.

Hilti Firestop
Saving lives through innovation and education

Hilti. Outperform. Outlast.

MATERIAL SAFETY DATA SHEET

Product name:	**CFS-S SIL SL Firestop Silicone Sealant**
Description:	Self-leveling, flexible silicone sealant for firestopping through penetrations and construction joints where movement is expected.
Supplier:	Hilti, Inc. P.O. Box 21148, Tulsa, OK 74121
Emergency # (Chem-Trec.):	1 800 424 9300 (USA, PR, Virgin Islands, Canada); 703 527 3887 (Other countries)

INGREDIENTS AND EXPOSURE LIMITS

Ingredients:	CAS Number:	TLV:	PEL:	STEL:
Amorphous silica	7631-86-9	3 mg/m^3(R)	NE	NE
Calcium carbonate	000471-34-1	NE	5mg/m^3(R)	NE
Quartz silica	14808-60-7	0.025mg/m^3(R)	10 mg/ m^3(R) / % SiO_2 + 2	
Titanium dioxide	13463-67-7	10 mg/m^3	3 mg/m^3	NE

Abbreviations: **PEL** = OSHA Permissible Exposure Limit. **TLV** = ACGIH Threshold Limit Value. **STEL** = Short Term Exposure Limit. **NE** = None Established. **NA** = Not Applicable. **R** = Respirable Particle

PHYSICAL DATA

Appearance:	Red or white paste.	**Odor:**	Negligible.
Vapor Density: (air = 1)	Not applicable.	**Vapor Pressure @ 68° F:**	Not determined
Boiling Point:	Not applicable.	**VOC Content:**	50 g/l
Evaporation Rate:	Not applicable.	**Solubility in Water:**	Insoluable
Specific Gravity:	1.38	**pH:**	Not determined.

FIRE AND EXPLOSION HAZARD DATA

Flash Point:	412° F	**Flammable Limits:**	Not applicable.
Extinguishing Media:	Water, CO_2, Dry Chemical, Foam.		
Special Fire Fighting Procedures:	A NIOSH-approved self-contained breathing apparatus (SCBA) should be worn when fighting fires involving chemicals.		
Unusual Fire and Explosion Hazards:	None known. Product serves as a fire stopping material.		

REACTIVITY DATA

Stability:	Stable.	**Hazardous Polymerization:**	Will not occur.
Incompatibility:	Strong oxidizing agents, acids, alkaline hydroxides, and water.		
Decomposition Products:	Thermal decomposition can yield CO and CO_2.		
Conditions to Avoid:	None known.		

HEALTH HAZARD DATA

Known Hazards:	**Acute**: Irritation is possible. **Chronic:** None known or anticipated.
Signs and Symptoms of Exposure:	**Eyes –** Strong irritant with danger of eye injury. **Skin –** No irritant effects. **Inhalation** - No effects expected. **Ingestion** - Not a likely route of exposure.
Routes of Exposure:	Dermal, eyes..
Carcinogenicity:	Product contains quartz silica which is classified as a carcinogen by IARC, NTP, and OSHA. However, since the product is a wet paste, exposure is unlikely.
Medical Conditions Aggravated by Exposure:	Eye, skin, and respiratory conditions.

EMERGENCY AND FIRST AID PROCEDURES	
Eyes:	Immediately flush with plenty of water. Contact a physician.
Skin:	Wash with soap and water. Contact a physician if symptoms occur.
Inhalation:	If ill effects occur, move victim to fresh air. Contact a physician.
Ingestion:	Do not induce vomiting. If conscious, give plenty of water to drink. Contact a physician immediately.
Other:	Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure.

CONTROL MEASURES AND PERSONAL PROTECTIVE EQUIPMENT	
Ventilation:	General (natural or mechanically induced fresh air movements).
Eye Protection:	Safety glasses with side shields.
Skin Protection:	Nitrile gloves are recommended.
Respiratory Protection:	None required under normal conditions of use.

PRECAUTIONS FOR SAFE HANDLING AND USE	
Handling and Storing Precautions:	Store in a cool dry area away from direct sunlight. Avoid temperature extremes; recommended storage temperature is between 40° and 77° F. For industrial use only. Keep out of reach of children. Use with adequate ventilation. Practice good hygiene; i.e. wash after using and before eating or smoking.
Spill Procedures:	Allow to cure and place in a container for proper disposal in accordance with all applicable local, state, or federal requirements. Not regulated as a hazardous waste according to federal EPA definitions.

REGULATORY INFORMATION	
Hazard Communication:	This MSDS has been prepared in accordance with the federal OSHA Hazard Communication Standard 29 CFR 1910.1200.
HMIS Codes:	Health 2, Flammability 1, Reactivity 0, PPE B
DOT Shipping Name:	Not regulated
IATA / ICAO Shipping Name:	Not regulated
TSCA Inventory Status:	Chemical components listed on TSCA inventory.
SARA Title III, Section 313:	This product does not contain any ingredients which are subject to reporting under Section 313 of SARA Title III (40 CFR Part 372).
EPA Waste Code(s):	Not regulated by EPA as a hazardous waste
Waste Disposal Methods:	Consult with regulatory agencies or your corporate personnel for disposal methods that comply with local, state, and federal safety, health and environmental regulations.

CONTACTS			
Customer Service:	1 800 879 8000	**Technical Service:**	1 800 879 8000
Health / Safety:	1 800 879 6000 Jerry Metcalf (x1003704)		
Emergency # (Chem-Trec):	1 800 424 9300 (USA, PR, Virgin Islands, Canada); 001 703 527 3887 (other countries)		

The information and recommendations contained herein are based upon data believed to be correct; however, no guarantee or warranty of any kind expressed or implied is made with respect to the information provided.

Underwriters Laboratories Inc.®

Northbrook Division
333 Pfingsten Road
Northbrook, IL 60062-2096 USA
www.ul.com
tel: 1 847 272 8800

CERTIFICATE OF COMPLIANCE

CERTIFICATE NUMBER: 20040809-R10905

ISSUE DATE: August 9, 2004 **Page 1 of 1**

Issued to: Thermafiber Inc.
3711 W Mill St Ext
Wabash, IN 46992

Report Reference: **R10905**

This is to Certify that representative samples of: Forming Material, designated as Type SAF mineral wool batts.

Have been investigated by Underwriters Laboratories Inc.® in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: ANSI/UL 1479, Fire Tests of Through-Penetration Firestops. ANSI/UL 2079, Test for Fires Resistance of Building Joint Systems. ASTM E2307-04, Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediae-Scale, Multi-story Test Apparatus

Additional Information: Type SAF mineral wool batts for use as a forming material for use in various Through-Penetration FireStop Systems, Joint Systems and Perimeter Fire Barrier Systems as Specified in UL's Fire Resistance Directory Volume 2.

Only those products bearing the UL Classification Marking should be considered as being covered by UL's Classification and Follow-Up Service.

The UL Classification Marking includes: UL in a circle symbol: with the word "CLASSIFIED" (as shown); a control number (may be alphanumeric) assigned by UL; a statement to indicate the extent of UL's evaluation of the product; and, the product category name (product identity) as indicated in the appropriate UL Directory.

LOOK FOR THE UL CLASSIFICATION MARKING ON THE PRODUCT

Engineer:
Mona Couloute
Underwriters Laboratories Inc.

Review Engineer:
Chris Johnson
Underwriters Laboratories Inc.

MATERIAL SAFETY DATA SHEET

Product name:	**Mineral wool**
Description:	Synthetic vitreous fiber
Supplier:	Hilti, Inc. P.O. Box 21148, Tulsa, OK 74121
Emergency # (Chem-Trec.):	1 800 424 9300 (USA, PR, Virgin Islands, Canada); 001 703 527 3887 (other countries)

INGREDIENTS AND EXPOSURE LIMITS

Ingredients:	CAS Number:	PEL:	TLV:	STEL:
Slag wool fiber	65997-17-3	NE	1 fiber / cc	NE
Phenolic resin	09003-35-4	NE	NE	NE
Polyvinyl alcohol	09002-89-5	NE	NE	NE

Abbreviations: **PEL** = OSHA Permissible Exposure Limit. **TLV** = ACGIH Threshold Limit Value. **STEL** = Short Term Exposure Limit. **NE** = None Established. **NA** = Not Applicable.

PHYSICAL DATA

Appearance:	2' x 4' x 4" sheets.	**Odor:**	Negligible.
Boiling Point:	Not applicable.	**Vapor Pressure:**	Not applicable.
Melting Point:	Approx. 2400° F	**VOC Content:**	< 1% w/w
Evaporation Rate:	Not applicable.	**Solubility in Water:**	Insoluble.
pH:	Not applicable.	**Specific Gravity:**	Not determined.

FIRE AND EXPLOSION HAZARD DATA

Flash Point:	Not applicable.	**Flammable Limits:**	Not applicable.
Extinguishing Media:	As appropriate for surrounding fire; material does not burn.		
Special Fire Fighting Procedures:	Soak cartons to help prevent the spread of fire. Use a self-contained breathing apparatus when fighting fires involving chemicals.		
Unusual Fire and Explosion Hazards:	None known.		

REACTIVITY DATA

Stability:	Stable.	**Hazardous Polymerization:**	Will not occur.
Incompatibility:	Strong acids.		
Hazardous Decomposition Products:	Thermal decomposition products can be formed at temperatures exceeding 2000° F. Thermal decomposition can yield CO and CO_2.		
Conditions to Avoid:	None known.		

HEALTH HAZARD DATA

Known Hazards:	**Acute:** Eye, skin and respiratory irritation. **Chronic:** Respiratory impairment.
Routes of Exposure:	Inhalation, Dermal.
Signs and Symptoms of Exposure:	**Eyes:** Mechanical irritation. **Skin:** Itching, irritation. **Inhalation:** Nose, throat and upper respiratory tract irritation.
Carcinogenicity:	Slag wool has been classified by the IARC as Group 3 – Unclassifiable as to Carcinogenicity in Humans.
Medical Conditions Aggravated by Exposure:	Eye, skin, and respiratory conditions.

EMERGENCY AND FIRST AID PROCEDURES

Eyes:	Flush with plenty of water while holding eyelids apart. Avoid rubbing the eyes as mechanical abrasions can occur. Call a physician if symptoms persist.
Skin:	Wash with soap and water. Launder clothing before reuse.
Inhalation:	Move to fresh air.
Ingestion:	No ill effects expected.
Other:	Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure.

CONTROL MEASURES AND PERSONAL PROTECTIVE EQUIPMENT

Ventilation:	General (natural or mechanically induced fresh air movements).
Eye Protection:	Safety goggles recommended to prevent particulates from irritating the eyes.
Skin Protection:	Cloth gloves and long sleeves to protect skin from irritating fibers.
Respiratory Protection:	Use local exhaust and/or a NIOSH-approved dust respirator when air movement is inadequate to control dusts / fibers below recommended exposure levels.

PRECAUTIONS FOR SAFE HANDLING AND USE

Handling and Storing Precautions:	Avoid generating dusts. Local exhaust may be required to control dusts if power tools are used for cutting / trimming. Wear appropriate personal protective equipment. Store away from moisture; keep dry.
Spill Procedures:	Not applicable.

REGULATORY INFORMATION

Hazard Communication:	This MSDS has been prepared in accordance with the federal OSHA Hazard Communication Standard 29 CFR 1910.1200.
HMIS Codes:	Health 1, Flammability 0, Reactivity 0, PPE B (Gloves, Goggles)
DOT Shipping Name:	Not regulated.
IATA / ICAO Shipping Name:	Not regulated.
TSCA Inventory Status:	Chemical components listed on TSCA inventory.
SARA Title III, Section 313:	This product does not contain any toxic chemicals which are subject to reporting under Section 313 of SARA Title III (40 CFR Part 372).
EPA Waste Code(s):	Not regulated by EPA as a hazardous waste.
Waste Disposal Methods:	Consult with regulatory agencies or your corporate personnel for disposal methods that comply with local, state, and federal safety, health and environmental regulations.

CONTACTS

Customer Service:	1 800 879 8000	**Technical Service:**	1 800 879 8000
Health / Safety:	1 800 879 6000 Jerry Metcalf (x1003704)		
Emergency # (Chem-Trec):	1 800 424 9300 (USA, PR, Virgin Islands, Canada); 001 703 527 3887 (other countries)		

The information and recommendations contained herein are based upon data believed to be correct; however, no guarantee or warranty of any kind expressed or implied is made with respect to the information provided.

August 13, 2010

To Whom It May Concern:

Re: Hilti Mineral Wool-LEED Info.

The Hilti Mineral Wool is manufactured in Waubash Indiana.

The post-consumer recycled content in the Hilti Mineral Wool is 0%. The pre-consumer recycled content in the Hilti Mineral Wool is 90%. There is no detectable VOC content in this product.

Hilti Mineral Wool is not regulated as a hazardous waste by the Federal EPA Standards. The regulations for the disposal of non-regulated industrial waste can vary from state to state and even city to city. For this reason, you should consult your local and state regulatory agencies for direction on disposal.

Please feel free to contact me at (918) 872-3704 if you have questions.

Sincerely,

Jerry Metcalf MPH, CHMM
Safety/Environmental Manager
Hilti Inc.
918 872 3704
jerry.metcalf@hilti.com

Rev. Date: 8/13/10

Hilti, Inc.
5400 South 122nd East Avenue
Tulsa, OK 74146

1-800-879-8000
www.hilti.com

Flexible Firestop Sealant (CP 606)

Product description

- An acrylic based firestop sealant that provides movement capability in fire rated joints and seals through-penetrations applications

Product features

- Silicone free
- Halogen, asbestos and solvent free
- Paintable
- Tested up to 33% movement with 500 cycles in accordance to UL 2079 and ASTM 1966
- Smoke and fume resistant
- Easy clean up with water
- Single component systems available
- Meets LEED™ requirements for indoor environmental quality credit 4.1 Low Emitting Materials, Sealants and Adhesives and 4.2 Paints and Coatings

Areas of application

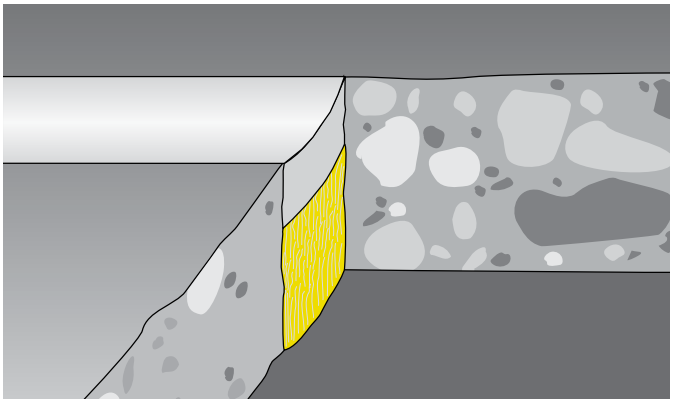
- Sealing construction/expansion joints
- Top-of-wall joints
- Metal pipes
- Cable bundles
- HVAC penetrations

For use with

- Various base materials such as masonry, concrete, gypsum, etc.
- Wall and floor assemblies rated up to 3 hours

Examples

- Where a gypsum wall assembly meets the underside of a metal or concrete deck
- Sealing expansion joints to impede the passage of fire, smoke and toxic fumes
- Sealing around HVAC penetrations through fire-rated assemblies



Technical Data*	CP 606
Chemical basis	Acrylic based firestop sealant
Color	Available in red, white and gray
Application temperature	40°F to 104°F (5°C to 40°C)
Skin-forming time	Approx. 15 min
Curing time	Approx. 3 mm / 3 days
Average volume shrinkage (ASTM C1241)	22.2%
Movement capability	Approx. 10%
Temperature resistance	–22°F to 176°F (–30°C to 80°C)
Surface burning characteristics (ASTM E 84-96)	Flame Spread: 10 Smoke Development: 0
Sound transmission classification (ASTM E 90-99)	56 (Relates to specific construction)
Tested in accordance with	• UL 2079 • ASTM E 814 • ASTM E 1966 • ASTM E 84 • UL 1479 • ASTM G21

*At 73°F (23°C) and 50% relative humidity

CLASSIFIED C UL US
FILL, VOID OR CAVITY MATERIAL
FOR USE IN THROUGH-PENETRATION
FIRESTOP SYSTEMS AND
JOINT SYSTEMS
SEE UL FIRE RESISTANCE DIRECTORY
66Y7

FM APPROVED

Installation instructions for CP 606

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information
- The use of backing material is recommended to control the sealant depth and help ensure assembly seal is complete

Opening

1. Clean the opening. Surfaces to which CP 606 will be applied should be cleaned of loose debris, dirt, oil, wax and grease. The surface should be moisture and frost free.

Application of firestop

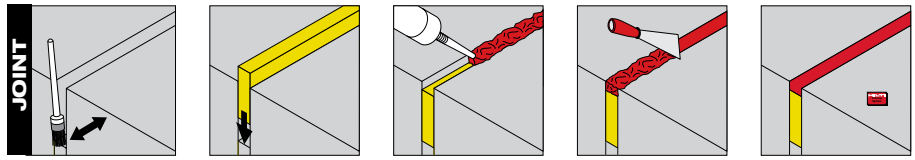
2. Insert fill of mineral wool or backer (as required).
3. Apply firestop over backer.
4. Smooth firestop sealant with a trowel before the skin forms. Once cured, CP 606 can only be removed mechanically.
5. For maintenance reasons, a penetration seal can be permanently marked with an identification plate and fastened in a visible position next to the seal.

Not for use

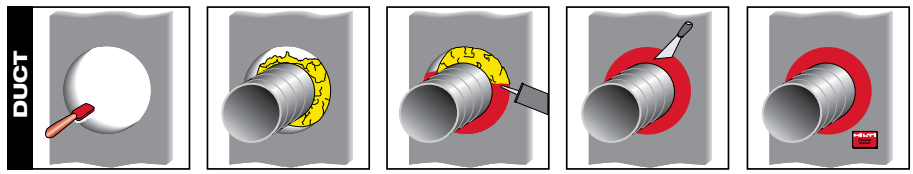
- On areas immersed in water

Storage

- Store only in the original packaging in a location protected from moisture at a temperature of 40°F to 77°F (5°C to 25°C)
- Observe expiration date on package



1. Clean opening | 2. Insert backing material compressed per UL System | 3. Apply CP 606 | 4. Smooth CP 606 | 5. Fasten identification plate (if required)



1. Clean opening | 2. Insert backing material | 3. Apply CP 606 | 4. Smooth CP 606 | 5. Fasten identification plate (if required)

Certificate of Compliance

Certificate Number **20060214-R13240B**
Report Reference **2006 February 14**
Issue Date **2006 February 14**

Underwriters Laboratories Inc.®

Issued to: **Hilti, Inc.**
5400 S 122ND East Ave
Tulsa, OK 74146 USA

This is to certify that representative samples of **Fill, Void or Cavity Materials**
CP606

Have been investigated by Underwriters Laboratories Inc.® in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: ANSI/UL 1479, ANSI/UL 2079, CAN/ULC-S115-05

Additional Information: CP606 Sealant for use in Joint Systems and CP606 Sealant for use in Through-Penetration Firestop Systems as currently described in the UL Fire Resistance Directory.

Only those products bearing the UL Classification Mark should be considered as being covered by UL's Classification and Follow-Up Service.

The UL Classification Mark includes: UL in a circle symbol: with the word "CLASSIFIED" (as shown); a control number (may be alphanumeric) assigned by UL; a statement to indicate the extent of UL's evaluation of the product; and, the product category name (product identity) as indicated in the appropriate UL Directory.

Look for the UL Classification Mark on the product

Issued by:
Mona Couloute
Underwriters Laboratories Inc.

Reviewed by:
Christopher Johnson
Underwriters Laboratories Inc.

MATERIAL SAFETY DATA SHEET

Product name: **CP 606 Flexible Firestop Sealant**

Description: Fire resistant sealant

Supplier: Hilti, Inc. P.O. Box 21148, Tulsa, OK 74121

Emergency # (Chem-Trec.): 1 800 424 9300 (USA, PR, Virgin Islands, Canada); 001 703 527 3887 (other countries)

INGREDIENTS AND EXPOSURE LIMITS

Ingredients:	CAS Number:	TLV:	PEL:	STEL:
Calcium carbonate	01317-65-3	NE	5 (R) mg/m^3	NE
Ethylene glycol	00107-21-1	C: 100 mg/m^3 (A)	NE	NA
Pigments:		NE	NE	NE
• Titanium dioxide	13463-67-7 [1]	10 mg/m^3	15 (T) mg/m^3	NE
• Red iron oxide	1309-37-1 [2]	5 (R) mg/m^3	10 (fume) mg/m^3	NE
• Black Iron oxide	1317-61-9 [3]	NE	NE	NE

[1] CP 606 white; [2] CP 606 red, [1,3] CP 606 grey

Abbreviations: **PEL** = OSHA Permissible Exposure Limit. **TLV** = ACGIH Threshold Limit Value. **STEL** = Short Term Exposure Limit. **NE** = None Established. (R) = Respirable dust (T) = Total dust (A) = Aerosol

PHYSICAL DATA

Appearance:	White, red, or grey paste.	**Odor:**	Negligible.
Boiling Point:	Not applicable.	**Vapor Pressure:**	Not applicable.
Melting Point:	Not determined.	**VOC Content:**	71.0 g/L
Evaporation Rate:	Not applicable.	**Solubility in Water:**	Miscible.
pH:	Not determined.	**Specific Gravity:**	1.55

FIRE AND EXPLOSION HAZARD DATA

Flash Point:	Not applicable.	**Flammable Limits:**	Not applicable.
Fire / Explosion Hazards:	None known.		
Extinguishing Media:	As appropriate for surrounding fire; material itself does not burn.		
Special Fire Fighting Procedures:	As appropriate for surrounding fire.		

REACTIVITY DATA

Stability:	Stable.	**Hazardous Polymerization:**	Will not occur.
Incompatibility:	Strong oxidizing agents.		
Hazardous Decomposition Products:	Not applicable.		
Conditions to Avoid:	Avoid temperature extremes that could shorten the shelf life of this product. See handling and storage requirements.		

HEALTH HAZARD DATA

Known Hazards:	**Acute**: Product is slightly alkaline; minor irritation is possible. **Chronic**: None known.
Signs and Symptoms of Exposure:	**Eyes -** Can cause slight irritation but injury is unlikely. **Skin -** Can cause irritation with some individuals. **Inhalation** - No effects expected. **Ingestion** - Not considered to be a route of exposure. Effects of ingestion have not been determined.
Routes of Exposure:	Inhalation, Dermal.
Medical Conditions Aggravated by Exposure:	Eye, skin, and respiratory conditions.
Carcinogenicity:	No ingredients are classified as a carcinogen by IARC, NTP or OSHA.

EMERGENCY AND FIRST AID PROCEDURES

Eyes:	Flush with plenty of water. Contact a Physician if symptoms occur.
Skin:	Wash with soap and water.
Inhalation:	Move victim to fresh air. Call a Physician if symptoms occur.
Ingestion:	Seek medical attention. Do not induce vomiting unless directed by a Physician.
Other:	Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure.

CONTROL MEASURES AND PERSONAL PROTECTIVE EQUIPMENT

Ventilation:	General (natural or mechanically induced fresh air movements).
Eye Protection:	Safety glasses with side shields.
Skin Protection:	Impermeable gloves are recommended.
Respiratory Protection:	Not normally required. Where ventilation is inadequate to control vapors, use a NIOSH-approved respirator with organic vapor cartridges. Never enter a confined space without an appropriate air supplied respirator.

PRECAUTIONS FOR SAFE HANDLING AND USE

Handling and Storing Precautions:	Store in a cool dry area. Keep from freezing. Shelf life is one year from date of manufacture if stored between 40° and 77° F (5 - 25° C). For industrial use only. Keep out of reach of children. Keep container sealed when not in use to prevent curing of the product. Avoid contact with the eyes and skin. Practice good hygiene; i.e. wash after using and before eating or smoking.
Spill Procedures:	Allow to cure and place in a container for proper disposal in accordance with all applicable local, state, or federal requirements. Not regulated as a hazardous waste according to federal EPA definitions.

REGULATORY INFORMATION

Hazard Communication:	This MSDS has been prepared in accordance with the federal OSHA Hazard Communication Standard 29 CFR 1910.1200.
HMIS Codes:	Health 1, Flammability 0, Reactivity 0, PPE B (Gloves, Glasses)
DOT Shipping Name:	Not regulated.
IATA / ICAO Shipping Name:	Not regulated.
TSCA Inventory Status:	Chemical components listed on TSCA inventory.
SARA Title III, Section 313:	This product contains approximately 3% ethylene glycol which is subject to reporting under Section 313 of SARA Title III (40 CFR Part 372).
EPA Waste Code(s):	Not regulated by EPA as a hazardous waste.
Waste Disposal Methods:	Consult with regulatory agencies or your corporate personnel for disposal methods that comply with local, state, and federal safety, health and environmental regulations.

CONTACTS

Customer Service:	1 800 879 8000	**Technical Service:**	1 800 879 8000
Health / Safety:	1 800 879 6000 Jerry Metcalf (x1003704)		
Emergency # (Chem-Trec):	1 800 424 9300 (USA, PR, Virgin Islands, Canada); 001 703 527 3887 (other countries)		

The information and recommendations contained herein are based upon data believed to be correct; however, no guarantee or warranty of any kind expressed or implied is made with respect to the information provided.

February 26, 2010

To Whom It May Concern:

Re: Hilti CP 606 Flexible Firestop – LEEDs Info.

The Hilti CP 606 Flexible Firestop Sealant is manufactured in Germany.

The CP 606 pail is made of polyethylene and can be completely recycled. There is no post-consumer or post-industrial content in CP 606 and it cannot be recycled. The CP 606 does not contain any Rapidly Renewable Materials. The VOC content for CP 606 is 71.0 grams/liter.

CP 606 is not regulated as a hazardous waste by the Federal EPA Standards. The regulations for the disposal of non-regulated industrial waste can vary from state to state and even city to city. For this reason, you should consult your local and state regulatory agencies for direction on disposal.

Please feel free to contact me at (918) 872-3704 if you have questions.

Sincerely,

Jerry Metcalf MPH, CHMM
Safety/Environmental Manager
Hilti Inc.
918 872 3704
jerry.metcalf@hilti.com

Rev. Date: 2/26/10

Hilti, Inc.
5400 South 122nd East Avenue
Tulsa, OK 74146

1-800-879-8000
www.hilti.com

Firestop Collar (CP 643N)

Product description

- A ready-to-use firestop collar, made of a galvanized steel housing and intumescent inserts for firestopping combustible pipes

Product features

- Ready-to-use collar
- No construction required
- Fast installation time
- Adjustable mounting tabs
- Low profile for tight installations

Areas of application

- Firestopping combustible pipes up to 6" diameter in penetrations through fire walls and floors
- Suitable for the following pipe materials:
- PVC, CPVC, ABS, PVDF, PP and FRPP

For use with

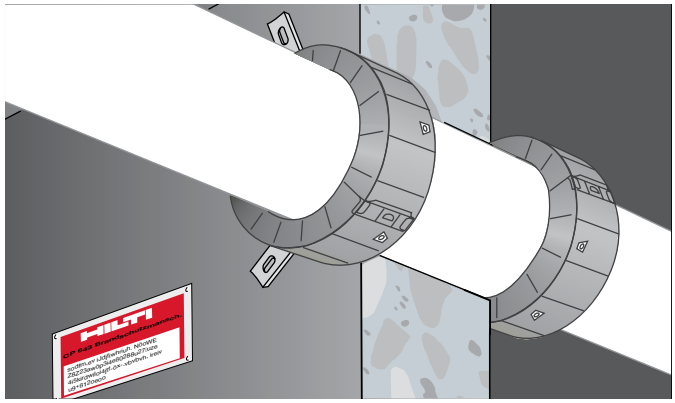
- Concrete, masonry, wood floor and gypsum wall assemblies
- Wall and floor assemblies rated up to 4 hours

Types of installation

- Wall: two collars, one on each side
- Floor: one collar on underside (bottom)

Example

- Waste water pipes
- Fresh water pipes



Technical Data	CP 643N		
Description	Pipe outside dia (in.)	Collar outside dia. (in.)	Collar Height (in.)	No. of hooks and fasteners
CP 643-50/1.5"N	1.4–2.0	2.8	0.9	2
CP 643-63/2"N	2.0–2.5	3.4	1.3	2
CP 643-90/3"N	2.6–3.6	4.9	1.7	3
CP 643-110/4"N	3.6–4.5	6.0	1.9	3
CP 643-160/6"N	6.6	9.8	1.9	4
Temperature resistance		-40°F to 140°F (–40°C to 60°C)		
Intumescent activation		Approx. 392°F (200°C)		
Expansion ratio (unrestricted)		Up to 1:10		

Tested in accordance with
• UL 1479 • ASTM E 814 • ASTM G21

CLASSIFIED c UL us
FIRESTOP DEVICE
FOR USE IN THROUGH-PENETRATION FIRESTOP SYSTEMS
SEE UL FIRE RESISTANCE DIRECTORY 5N76

FM APPROVED

FBC SYSTEM COMPATIBLE
Visit fbcsystemcompatible.com.
FBC™ is a trademark of the Lubrizol Corporation.

Installation instructions for CP 643N

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information

Opening

1. Clean the plastic pipes. Expansion of the intumescent material during a fire acts to close the plastic pipe. Very dirty pipes (ie: with remains of mortar) may lead to a delay in this closing action. Soiled plastic pipes should, therefore, be cleaned in the area where the CP 643N Firestop Collar is to be installed.

Application of firestop system

2. Seal the opening if required. Gaps may be closed with FS-ONE. The approved methods vary and are given in the specific UL system.
3. Close the CP 643N Firestop Collar. Place the CP 643N Firestop Collar around the plastic pipe and lock the closure by applying firm pressure until it latches.
4. Attach fastening hooks. The fastening hooks can be attached to various points on the metal housing. This allows the fastening points to be made to suit the space available in each case. The hooks must be positioned as symmetrically as possible. The required number of fastening hooks is indicated on the packaging.
5. Fastening the CP 643N Firestop Collar. Only when fastened properly can CP 643N offer protection against fire.

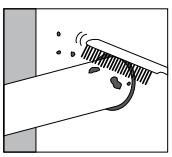
a. Mark the fastening points.
b. Drill holes with a Hilti rotary hammer drill (i.e. TE 4-A18) or, depending on base material, fasten using Hilti powder-actuated tool.
c. To secure the CP 643N Firestop Collar, use Hilti anchors/fasteners.
d. For maintenance reasons, a penetration can be permanently marked with an identification plate and fastened in a visible position next to the seal.

Not for use

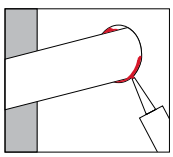
- With metal pipes
- In highly corrosive surroundings
- With unapproved anchors/fasteners

Storage

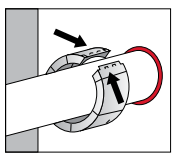
- Store only in the original packaging in a location protected from moisture



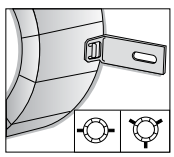
1. Clean plastic pipe.



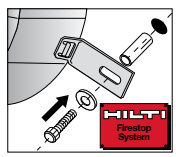
2. Close remaining gap to provide smoke and gas resistant seal.



3. Close collar.



4. Attach fastening hooks.



5. Fasten collar and identification plate (if required).

Hilti Firestop
Saving lives through innovation and education

Hilti. Outperform. Outlast.

Certificate of Compliance

Certificate Number **20069214-R15431**
Report Reference **2006 February 14**
Issue Date **2006 February 14**

Underwriters Laboratories Inc.®

Issued to: **Hilti, Inc.**
5400 S 122ND East Ave
Tulsa, OK 74146 USA

This is to certify that representative samples of **Firestop Devices**
CP643N 50/1.5 in., CP643N 63/2 in., CP643N 90/3 in. and CP643N 110/4 in., CP643N 160/6 in., CP644 200/8 in. and CP644 250/10 in.

Have been investigated by Underwriters Laboratories Inc.® in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: ANSI/UL 1479, CAN/ULC-S115-05

Additional Information: CP 643N and CP 644 Firestop Collar for use in Through-Penetration Firestop Systems as currently described in the UL Fire Resistance Directory.

Only those products bearing the UL Classification Mark should be considered as being covered by UL's Classification and Follow-Up Service.

The UL Classification Mark includes: UL in a circle symbol: with the word "CLASSIFIED" (as shown); a control number (may be alphanumeric) assigned by UL; a statement to indicate the extent of UL's evaluation of the product; and, the product category name (product identity) as indicated in the appropriate UL Directory.

Look for the UL Classification Mark on the product

Issued by:
Mona Couloute
Mona Couloute
Underwriters Laboratories Inc.

Reviewed by:
Christopher Johnson
Underwriters Laboratories Inc.

MATERIAL SAFETY DATA SHEET

Product name:	**CP 643N Firestop Collar/ CP 644 Firestop Collar**
Description:	Galvanized metal housing containing black polymer-bonded intumescent firestop material
Supplier:	Hilti, Inc. P.O. Box 21148, Tulsa, OK 74121
Emergency # (Chem-Trec.):	1 800 424 9300 (USA, PR, Virgin Islands, Canada); 001 703 527 3887 (other countries)

INGREDIENTS AND EXPOSURE LIMITS

Not applicable. This product is considered to be an "article" as defined in the federal OSHA Hazard Communication Standard 29 CFR 1910.1200 / 1926.59.

PHYSICAL DATA

Appearance:	Metal collar/ black firestop material	**Odor:**	None
Vapor Density: (air = 1)	Not applicable	**Vapor Pressure:**	Not applicable
Boiling Point:	Not applicable	**VOC Content:**	7.6 g/l
Evaporation Rate:	Not applicable	**Solubility in Water:**	Not determined
Specific Gravity:	Not determined	**pH:**	Not applicable

FIRE AND EXPLOSION HAZARD DATA

Flash Point:	Not applicable	**Flammable Limits:**	Not applicable
Extinguishing Media:	Use extinguishing media appropriate for surrounding fire.		
Special Fire Fighting Procedures:	None known.		
Unusual Fire and Explosion Hazards:	None known. Product serves as a Firestop; intumescent material inside the collar expands when exposed to temperatures > 160° C / 320° F.		

REACTIVITY DATA

Stability:	Stable.	**Hazardous Polymerization:**	Will not occur.
Incompatibility:	None known	**Decomposition Products:**	None known
Conditions to Avoid:	None known		

HEALTH HAZARD DATA

Known Hazards:	None known	**Routes of Exposure:**	None known
Signs and Symptoms of Exposure:	None expected from routine use/installation according to manufacturer's specifications and technical guides.		
Carcinogenicity:	No ingredients are classified as a carcinogen by IARC, NTP or OSHA.		
Medical Conditions Aggravated by Exposure:	None known		

EMERGENCY AND FIRST AID PROCEDURES

Eyes:	Immediately flush with plenty of water. Call a physician if symptoms occur.
Skin:	Not applicable. Practice good hygiene; i.e. wash hands during breaks, before eating or smoking, and after work.
Inhalation:	Not applicable.
Ingestion:	Not a potential route of exposure
Other:	Referral to a physician is recommended if there is any question about the seriousness of any injury/exposure.

CONTROL MEASURES AND PERSONAL PROTECTIVE EQUIPMENT	
Ventilation:	General (natural or mechanically induced fresh air movements).
Eye Protection:	Not required, however, safety glasses should be worn in most industrial settings.
Skin Protection:	None required; however, (cotton) gloves recommended.
Respiratory Protection:	No respiratory protection is needed for normal application of this product.

PRECAUTIONS FOR SAFE HANDLING AND USE	
Handling and Storing Precautions:	Store in a cool dry area. Follow installation instructions.
Spill Procedures:	No special requirements.

REGULATORY INFORMATION	
Hazard Communication:	This product is considered to be an “article” as defined in the federal OSHA Hazard Communication Standard.
DOT Shipping Name:	Not regulated.
IATA / ICAO Shipping Name:	Not regulated.
TSCA Inventory Status:	Chemical components listed on TSCA inventory.
SARA Title III, Section 313:	This product is classified as an "article" and is not subject to reporting under Section 313 of SARA Title III (40 CFR Part 372).
EPA Waste Code(s):	Not regulated by EPA as a hazardous waste
Waste Disposal Methods:	Consult with regulatory agencies or your corporate personnel for disposal methods that comply with local, state, and federal safety, health and environmental regulations.

CONTACTS			
Customer Service:	1 800 879 8000	**Technical Service:**	1 800 879 8000
Health / Safety:	1 800 879 6000 Jerry Metcalf (x6704)		
Emergency # (Chem-Trec):	1 800 424 9300 (USA, PR, Virgin Islands, Canada); 001 703 527 3887 (other countries)		

The information and recommendations contained herein are based upon data believed to be correct; however, no guarantee or warranty of any kind expressed or implied is made with respect to the information provided.

August 5, 2009

To Whom It May Concern:

Re: The CP 643N/644 Firestop Collars – LEEDs Info.

The Hilti CP 643N/644 Firestop Collars are manufacturered in Italy.

The Hilti CP 643N/644 Firestop Collars have a VOC content of 7.6 grams/liter.

The amount of post-consumer or post-industrial content in CP 643N/644 Firestop Collars is not known. The metal portions of the collars are recyclable. The CP 643N/644 Firestop Collars do not contain any Rapidly Renewable Materials.

The CP 643N/644 Firestop Collars are not regulated as a hazardous waste by the Federal EPA Standards. The regulations for the disposal of non-regulated industrial waste can vary from state to state and even city to city. For this reason, you should consult your local and state regulatory agencies for direction on disposal.

Please feel free to contact me at (918) 872-3704 if you have questions.

Sincerely,

Jerry Metcalf MPH, CHMM
Safety/Environmental Manager
Hilti Inc.
(918) 872 3704
jerry.metcalf@hilti.com

Rev. Date: 8/5/09

Hilti, Inc.
5400 South 122nd East Avenue
Tulsa, OK 74146

1-800-879-8000
www.hilti.com

Firestop Wrap Strip (CP 648-E)

Product description

- An intumescent, flexible firestop wrap strip for plastic and insulated pipe penetrations

Product features

- Highly Intumescent
- Long length avoids waste
- Can be continuously wrapped
- Cost effective
- Quick and easy closure without tools
- Ideal for very tight installations

Areas of application

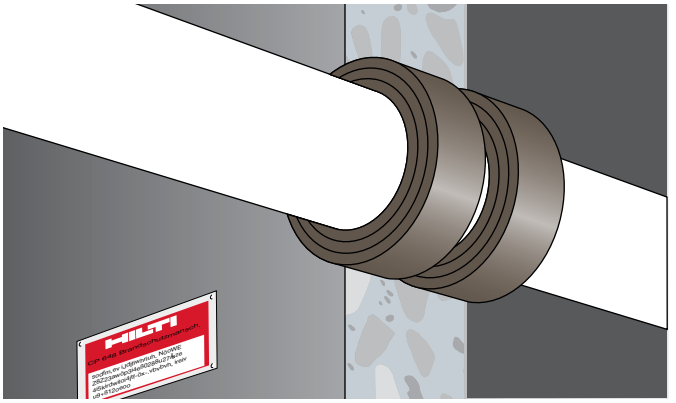
- Firestopping combustible pipe penetrations
- Difficult applications where space is limited
- Penetrations through concrete over metal deck
- Plastic and insulated penetrations using PVC, CPVC, ABS, FRPP and PEX

For use with

- Concrete, masonry, wood floor and gypsum wall assemblies
- Wall and floor assemblies rated up to 4 hours

Examples

- Waste water pipes
- Fresh water pipes
- Decking penetrations



Technical Data*	CP 648-E
Density	Approx. 1.35 g/cm³
Dimensions (approximate)	3/16" x 1" x 33 ft or 3/16" x 1-3/4" x 33 ft
Color	Black with foil backing
Temperature resistance	–40°F to 212°F (–40°C to 100°C)
Intumescent activation	Approx. 320°F (160°C)
Expansion ratio (unrestricted)	1:40

Tested in accordance with
• UL 1479 • ASTM E 814 • ASTM G21

*At 73°F (23°C) and 50% relative humidity

CLASSIFIED C UL US
FILL, VOID OR CAVITY MATERIAL
FOR USE IN THROUGH-PENETRATION
FIRESTOP SYSTEMS
SEE UL FIRE RESISTANCE DIRECTORY
66Y7

FM APPROVED

FBC SYSTEM COMPATIBLE
Visit fbcsystemcompatible.com.
FBC™ is a trademark of
the Lubrizol Corporation.

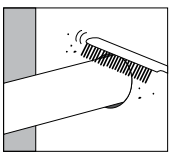
Installation instructions for CP 648-E

Notice

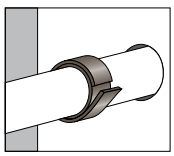
- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information

Opening

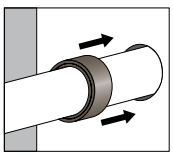
1. Clean the plastic or insulated pipe penetration. Expansion of the intumescent material during a fire closes the plastic or insulated pipe penetration. Very dirty pipes (ie: with remains of mortar) may lead to a delay in this closing action. Soiled plastic pipes or insulated pipe penetrations should, therefore, be cleaned in the area where the CP 648-E Firestop Wrap Strip is to be installed.



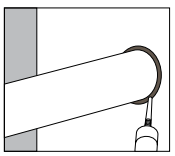
1. Clean penetration



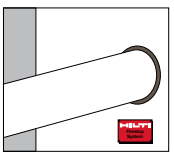
2. Wrap strips around pipe the specified number of times



3. Push Wrap Strips into hole



4. Seal penetration against smoke with FS-ONE



5. Fasten installation plate (If required)

Application of firestop system

2. Tightly wrap the required number of strips continuously around the penetrant, and hold in place with tape.
3. Push the Hilti Wrap Strip into the opening until it is flush with the substrate surface unless otherwise required by the UL system. It may be required by the UL system to clamp, wire or use a Hilti Retaining Collar to secure the wrap strip in place for some applications.
4. If the UL system requires a cold smoke seal, then apply the proper amount of Hilti FS-ONE sealant in the opening over the wrap strip.
5. For maintenance reasons, a penetration seal can be permanently marked with an identification plate and fastened in a visible position next to the seal.

Not for use

- In highly corrosive surroundings
- With unapproved retaining collars, anchors/fasteners
- Outdoors

Storage

- Store only in the original packaging in a location protected from moisture at temperatures between 23°F and 86°F (–5°C and 30°C).

Hilti Firestop
Saving lives
through innovation
and education

Hilti. Outperform. Outlast.

Certificate of Compliance

Certificate Number **20060214-R13240L**
Report Reference **2006 February 14**
Issue Date **2006 February 14**

Underwriters Laboratories Inc.®

Issued to: **Hilti, Inc.**
5400 S 122ND East Ave
Tulsa, OK 74146 USA

This is to certify that representative samples of **Fill, Void or Cavity Materials**
CP 648E, CP 648S

Have been investigated by Underwriters Laboratories Inc.® in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: ANSI/UL 1479, CAN/ULC-S115-05

Additional Information: CP 648E and CP648S (Product number may be suffixed to denote size) Wrap Strip for use in Through-Penetration Firestop Systems as currently described in the UL Fire Resistance Directory.

Only those products bearing the UL Classification Mark should be considered as being covered by UL's Classification and Follow-Up Service.

The UL Classification Mark includes: UL in a circle symbol: with the word "CLASSIFIED" (as shown); a control number (may be alphanumeric) assigned by UL; a statement to indicate the extent of UL's evaluation of the product; and, the product category name (product identity) as indicated in the appropriate UL Directory.

Look for the UL Classification Mark on the product

Issued by:
Mona Couloute
Mona Couloute
Underwriters Laboratories Inc.

Reviewed by:
Christopher Johnson
Underwriters Laboratories Inc.

MATERIAL SAFETY DATA SHEET

Product name:	**CP 648-S & CP 648-E Firestop Wrap Strip**
Description:	1" or 1 3/4" wide - intumescent wrap for plastic or insulated pipe
Supplier:	Hilti, Inc. P.O. Box 21148, Tulsa, OK 74121
Emergency # (Chem-Trec.):	1 800 424 9300 (USA, PR, Virgin Islands, Canada); 703 527 3887 (Other countries)

INGREDIENTS AND EXPOSURE LIMITS

Not a hazardous chemical as defined by the OSHA Hazard Communication Standard 29 CFR 1910.1200

PHYSICAL DATA

Appearance:	Dark gray colored putty strips.	**Odor:**	Mild odor.
Vapor Density: (air = 1)	Not applicable.	**Vapor Pressure:**	Not applicable.
Boiling Point:	Not applicable.	**VOC Content:**	7.6 g/l.
Evaporation Rate:	Not applicable.	**Solubility in Water:**	Not determined.
Density:	1.3-1.4 g/cm^3	**pH:**	Not determined.

FIRE AND EXPLOSION HAZARD DATA

Flash Point:	Not applicable.	**Flammable Limits:**	Not applicable.
Extinguishing Media:	Use extinguishing media appropriate for the surrounding fire.		
Special Fire Fighting Procedures:	None known.		
Unusual Fire and Explosion Hazards:	None known. Product serves as a firestop; intumescent material begins to expand when exposed to temperatures > 160º C (320º F)		

REACTIVITY DATA

Stability:	Stable.	**Hazardous Polymerization:**	Will not occur.
Incompatibility:	None known.	**Conditions to Avoid:**	None known.
Decomposition Products:	None known.		

HEALTH HAZARD DATA

Known Hazards:	Irritation of the eyes and skin is possible with some individuals.
Signs and Symptoms of Exposure:	**Eyes:** Can cause irritation and watering but injury is unlikely. **Skin:** Irritation. is possible with some individuals. **Inhalation:** No effects expected. **Ingestion:** Not a likely route of exposure. Can cause irritation. Considered to have a low acute oral toxicity.
Routes of Exposure:	Contact.
Carcinogenicity:	No ingredients are classified as a carcinogen by IARC, NTP or OSHA.
Medical Conditions Aggravated by Exposure:	None known.

EMERGENCY AND FIRST AID PROCEDURES

Eyes:	Immediately flush with plenty of water. Call a physician if symptoms occur.
Skin:	Wash with soap and water. Seek medical attention if any effects persist.
Inhalation:	Not applicable
Ingestion:	Only induce vomiting if directed by a physician. Contact a physician immediately.
Other:	Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure.

CONTROL MEASURES AND PERSONAL PROTECTIVE EQUIPMENT

Ventilation:	General (natural or mechanically induced fresh air movements).
Eye Protection:	Not required, however, safety glasses should be worn in most industrial settings.
Skin Protection:	Cloth gloves are suitable; impermeable (neoprene or rubber) gloves recommended.
Respiratory Protection:	Not required.

PRECAUTIONS FOR SAFE HANDLING AND USE

Handling and Storing Precautions:	Avoid prolonged or repeated contact with the skin. Do not rub the eyes after contact with the hands. Practice good hygiene; i.e. wash after using and before eating or smoking. Store above 32º F and below 140º F (0 - 60º C). For industrial use only. Keep out of reach of children.
Spill Procedures:	No special requirements.

REGULATORY INFORMATION

Hazard Communication:	Not a hazardous chemical as defined by the federal OSHA Hazard Communication Standard 29 CFR 1910.1200.
HMIS Codes:	Health 1, Flammability 0, Reactivity 0, PPE B
DOT Shipping Name:	Not regulated.
IATA / ICAO Shipping Name:	Not regulated.
TSCA Inventory Status:	Chemical components listed on TSCA inventory.
SARA Title III, Section 313:	This product does not contain any ingredients which are subject to reporting under Section 313 of SARA Title III (40 CFR Part 372).
EPA Waste Code(s):	Not regulated by EPA as a hazardous waste
Waste Disposal Methods:	Consult with regulatory agencies or your corporate personnel for disposal methods that comply with local, state, and federal safety, health and environmental regulations.

CONTACTS

Customer Service:	1 800 879 8000	**Technical Service:**	1 800 879 8000
Health / Safety:	1 800 879 6000 Jerry Metcalf (x6704)		
Emergency # (Chem-Trec):	1 800 424 9300 (USA, PR, Virgin Islands, Canada); 703 527 3887 (Other countries)		

The information and recommendations contained herein are based upon data believed to be correct; however, no guarantee or warranty of any kind expressed or implied is made with respect to the information provided.

May 12, 2011

To Whom It May Concern:

Re: The CP 648 E & S Firestop Wrap Strips – LEEDs Info.

The Hilti CP 648 E & S Firestop Wrap Strips are manufactured in Germany.

The Hilti CP 648 E & S Firestop Wrap Strips have a VOC content of 3.1 grams/liter.

The amount of post-consumer or post-industrial content in CP 648 E & S Firestop Wrap Strips is not known. The packaging is recyclable. The CP 648 E & S Firestop Wrap Strips do not contain any Rapidly Renewable Materials.

The CP 648 E & S Firestop Wrap Strips are not regulated as a hazardous waste by the Federal EPA Standards. The regulations for the disposal of non-regulated industrial waste can vary from state to state and even city to city. For this reason, you should consult your local and state regulatory agencies for direction on disposal.

Please feel free to contact me at (918) 872-3704 if you have questions.

Sincerely,

Jerry Metcalf MPH, CHMM
Sr. Manager Safety, Environmental, & Facilities
Hilti Inc.
(918) 872 3704
jerry.metcalf@hilti.com

Rev. Date: 5/12/11

Hilti, Inc.
5400 South 122nd East Avenue
Tulsa, OK 74146

1-800-879-8000
www.hilti.com

Firestop Wrap Strip (CP 648-S)

Product description

- A single wrap strip of intumescent, flexible firestop for use with plastic and insulated pipe penetrations

Product features

- Highly intumescent
- Pre-measured — no cutting required
- Integrated fastening tape
- Cost effective
- Quick and easy closure without tools
- Ideal for very tight installations

Areas of application

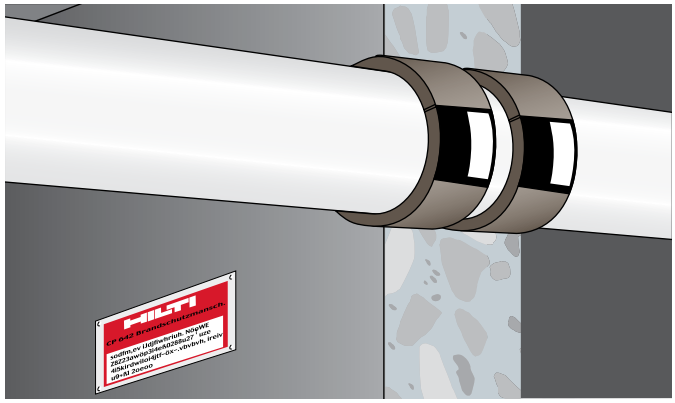
- Firestopping combustible pipe penetrations
- Difficult applications where space is limited
- Penetrations through concrete over metal deck
- Suitable for the following plastic pipe materials: PVC, CPVC, ABS, FRPP

For use with

- Concrete, masonry, wood floor and gypsum wall assemblies
- Wall and floor assemblies rated up to 3 hours

Examples

- Waste water pipes
- Fresh water pipes
- Decking penetrations



Technical Data*	CP 648-S
Density	Approx. 1.35 g/cm³
Dimension (approximate) (thkns" x width" x length")	**1.5":** 3/16" x 1" x 6-3/4" **2":** 3/16" x 1" x 8-1/4" **3":** 3/16" x 1-3/4" x 11-1/2" **4":** 3/8" x 1-3/4" x 15" **6":** 1/2" x 1-3/4" x 22-1/4"
Color	Black with foil backing
Temperature resistance	–40°F to 212°F (–40°C to 100°C)
Intumescent activation	Approx. 320°F (160°C)
Expansion ratio (unrestricted)	1:40
Tested in accordance with • UL 1479 • ASTM E 814 • ASTM G21	

*At 73°F (23°C) and 50% relative humidity

CLASSIFIED C UL US
FILL, VOID OR CAVITY MATERIAL
FOR USE IN THROUGH-PENETRATION
FIRESTOP SYSTEMS
SEE UL FIRE RESISTANCE DIRECTORY
66Y7

FM APPROVED

FBC SYSTEM COMPATIBLE
Visit fbcsystemcompatible.com.
FBC™ is a trademark of
the Lubrizol Corporation.

Installation instructions for CP 648-S

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information

Installation

1. Clean the plastic or insulated pipe penetration. Expansion of the intumescent material during a fire closes the plastic pipe. Very dirty pipes (ie: with remains of mortar) may lead to a delay in the closing action. Soiled plastic or insulated pipes should, therefore, be cleaned in the area where the CP 648-S Firestop Wrap Strip is to be installed.
2. Install Wrap Strip. First check the annular space to ensure compatibility with the appropriate UL System. Use the CP 648-S Firestop Wrap Strip corresponding to the diameter of the pipe to be installed. Wrap the CP 648-S strip around the pipe and fasten it tightly using the integrated adhesive strip.

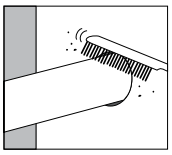
   Push the CP 648-S Firestop Wrap Strip into the annular space in accordance with the UL listing.
3. Seal against smoke and gas. Seal the remaining gap with Hilti FS-ONE sealant.
4. For maintenance reasons, a penetration seal can be permanently marked with an identification plate and fastened in a visible position next to the seal.

Not for use

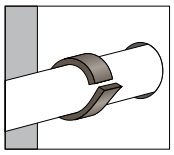
- In highly corrosive surroundings
- Outdoors

Storage

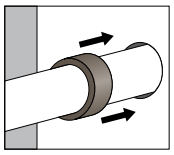
- Store only in the original packaging in a location protected from moisture at temperatures between 23°F and 86°F (–5°C and 30°C).



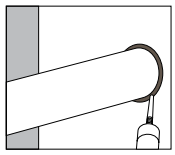
1. Clean penetration



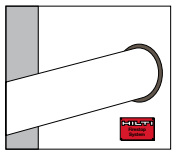
2A. Wrap the CP 648-S Wrap Strip around the pipe and fasten it tightly with the adhesive strip.



2B. Push the CP 648-S Wrap Strip along the pipe and into the annular space as indicated above.



3. Seal penetration against smoke with FS-ONE sealant.



4. Fasten installation plate (If required)

Hilti Firestop
Saving lives through innovation and education

Hilti. Outperform. Outlast.

Certificate of Compliance

Certificate Number **20060214-R13240L**
Report Reference **2006 February 14**
Issue Date **2006 February 14**

Underwriters Laboratories Inc.®

Issued to: **Hilti, Inc.**
5400 S 122ND East Ave
Tulsa, OK 74146 USA

This is to certify that representative samples of **Fill, Void or Cavity Materials**
CP 648E, CP 648S

Have been investigated by Underwriters Laboratories Inc.® in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: ANSI/UL 1479, CAN/ULC-S115-05

Additional Information: CP 648E and CP648S (Product number may be suffixed to denote size) Wrap Strip for use in Through-Penetration Firestop Systems as currently described in the UL Fire Resistance Directory.

Only those products bearing the UL Classification Mark should be considered as being covered by UL's Classification and Follow-Up Service.

The UL Classification Mark includes: UL in a circle symbol: with the word "CLASSIFIED" (as shown); a control number (may be alphanumeric) assigned by UL; a statement to indicate the extent of UL's evaluation of the product; and, the product category name (product identity) as indicated in the appropriate UL Directory.

Look for the UL Classification Mark on the product

Issued by:
Mona Couloute
Mona Couloute
Underwriters Laboratories Inc.

Reviewed by:
Christopher Johnson
Underwriters Laboratories Inc.

MATERIAL SAFETY DATA SHEET

Product name:	**CP 648-S & CP 648-E Firestop Wrap Strip**
Description:	1" or 1 3/4" wide - intumescent wrap for plastic or insulated pipe
Supplier:	Hilti, Inc. P.O. Box 21148, Tulsa, OK 74121
Emergency # (Chem-Trec.):	1 800 424 9300 (USA, PR, Virgin Islands, Canada); 703 527 3887 (Other countries)

INGREDIENTS AND EXPOSURE LIMITS

Not a hazardous chemical as defined by the OSHA Hazard Communication Standard 29 CFR 1910.1200

PHYSICAL DATA

Appearance:	Dark gray colored putty strips.	**Odor:**	Mild odor.
Vapor Density: (air = 1)	Not applicable.	**Vapor Pressure:**	Not applicable.
Boiling Point:	Not applicable.	**VOC Content:**	7.6 g/l.
Evaporation Rate:	Not applicable.	**Solubility in Water:**	Not determined.
Density:	1.3-1.4 g/cm^3	**pH:**	Not determined.

FIRE AND EXPLOSION HAZARD DATA

Flash Point:	Not applicable.	**Flammable Limits:**	Not applicable.
Extinguishing Media:	Use extinguishing media appropriate for the surrounding fire.		
Special Fire Fighting Procedures:	None known.		
Unusual Fire and Explosion Hazards:	None known. Product serves as a firestop; intumescent material begins to expand when exposed to temperatures > 160º C (320º F)		

REACTIVITY DATA

Stability:	Stable.	**Hazardous Polymerization:**	Will not occur.
Incompatibility:	None known.	**Conditions to Avoid:**	None known.
Decomposition Products:	None known.		

HEALTH HAZARD DATA

Known Hazards:	Irritation of the eyes and skin is possible with some individuals.
Signs and Symptoms of Exposure:	**Eyes:** Can cause irritation and watering but injury is unlikely. **Skin:** Irritation. is possible with some individuals. **Inhalation:** No effects expected. **Ingestion:** Not a likely route of exposure. Can cause irritation. Considered to have a low acute oral toxicity.
Routes of Exposure:	Contact.
Carcinogenicity:	No ingredients are classified as a carcinogen by IARC, NTP or OSHA.
Medical Conditions Aggravated by Exposure:	None known.

EMERGENCY AND FIRST AID PROCEDURES

Eyes:	Immediately flush with plenty of water. Call a physician if symptoms occur.
Skin:	Wash with soap and water. Seek medical attention if any effects persist.
Inhalation:	Not applicable
Ingestion:	Only induce vomiting if directed by a physician. Contact a physician immediately.
Other:	Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure.

CONTROL MEASURES AND PERSONAL PROTECTIVE EQUIPMENT

Ventilation:	General (natural or mechanically induced fresh air movements).
Eye Protection:	Not required, however, safety glasses should be worn in most industrial settings.
Skin Protection:	Cloth gloves are suitable; impermeable (neoprene or rubber) gloves recommended.
Respiratory Protection:	Not required.

PRECAUTIONS FOR SAFE HANDLING AND USE

Handling and Storing Precautions:	Avoid prolonged or repeated contact with the skin. Do not rub the eyes after contact with the hands. Practice good hygiene; i.e. wash after using and before eating or smoking. Store above 32º F and below 140º F (0 - 60º C). For industrial use only. Keep out of reach of children.
Spill Procedures:	No special requirements.

REGULATORY INFORMATION

Hazard Communication:	Not a hazardous chemical as defined by the federal OSHA Hazard Communication Standard 29 CFR 1910.1200.
HMIS Codes:	Health 1, Flammability 0, Reactivity 0, PPE B
DOT Shipping Name:	Not regulated.
IATA / ICAO Shipping Name:	Not regulated.
TSCA Inventory Status:	Chemical components listed on TSCA inventory.
SARA Title III, Section 313:	This product does not contain any ingredients which are subject to reporting under Section 313 of SARA Title III (40 CFR Part 372).
EPA Waste Code(s):	Not regulated by EPA as a hazardous waste
Waste Disposal Methods:	Consult with regulatory agencies or your corporate personnel for disposal methods that comply with local, state, and federal safety, health and environmental regulations.

CONTACTS

Customer Service:	1 800 879 8000	**Technical Service:**	1 800 879 8000
Health / Safety:	1 800 879 6000 Jerry Metcalf (x6704)		
Emergency # (Chem-Trec):	1 800 424 9300 (USA, PR, Virgin Islands, Canada); 703 527 3887 (Other countries)		

The information and recommendations contained herein are based upon data believed to be correct; however, no guarantee or warranty of any kind expressed or implied is made with respect to the information provided.

May 12, 2011

To Whom It May Concern:

Re: The CP 648 E & S Firestop Wrap Strips – LEEDs Info.

The Hilti CP 648 E & S Firestop Wrap Strips are manufactured in Germany.

The Hilti CP 648 E & S Firestop Wrap Strips have a VOC content of 3.1 grams/liter.

The amount of post-consumer or post-industrial content in CP 648 E & S Firestop Wrap Strips is not known. The packaging is recyclable. The CP 648 E & S Firestop Wrap Strips do not contain any Rapidly Renewable Materials.

The CP 648 E & S Firestop Wrap Strips are not regulated as a hazardous waste by the Federal EPA Standards. The regulations for the disposal of non-regulated industrial waste can vary from state to state and even city to city. For this reason, you should consult your local and state regulatory agencies for direction on disposal.

Please feel free to contact me at (918) 872-3704 if you have questions.

Sincerely,

Jerry Metcalf MPH, CHMM
Sr. Manager Safety, Environmental, & Facilities
Hilti Inc.
(918) 872 3704
jerry.metcalf@hilti.com

Rev. Date: 5/12/11

Hilti, Inc.
5400 South 122nd East Avenue
Tulsa, OK 74146

1-800-879-8000
www.hilti.com

FS-ONE
High Performance Intumescent Firestop Sealant

Product description

- Intumescent (expands when exposed to fire) firestop sealant that helps protect combustible and non-combustible penetrations for up to 4 hours fire rating

Product features

- Smoke, gas and water resistant after material has cured
- Contains no halogen, solvents or asbestos
- High fire rating properties
- Water based, easy to clean
- Protects most typical firestop penetration applications
- Paintable
- Single component systems available
- Meets LEED™ requirements for indoor environmental quality credit 4.1 Low Emitting Materials, Sealants and Adhesives and 4.2 Paints and Coatings

Areas of application

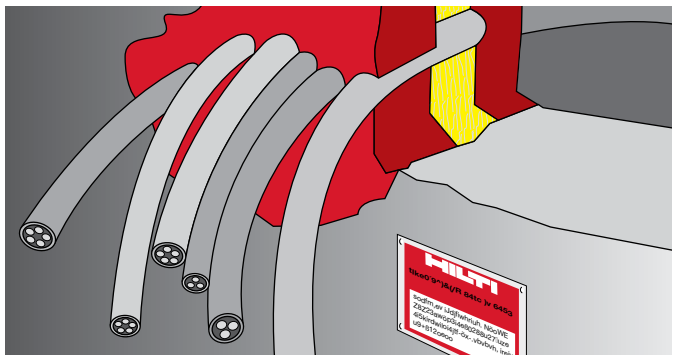
- Steel, copper and EMT pipes
- Insulated steel and copper pipes
- Cable bundles
- Closed or vented plastic pipes
- HVAC penetrations

For use with

- Concrete, masonry, drywall and wood floor assemblies
- Wall and floor assemblies rated up to 4 hours

Examples

- Sealing around combustible pipe penetrations in fire rated construction
- Sealing around non-combustible penetrations in fire rated construction



Technical Data*	FS-ONE
Chemical basis	Water-based intumescent acrylic dispersion
Color	Red
Application temperature	40°F to 104°F (5°C to 40°C)
Skin forming time	Approx. 20-30 min.
Curing time	Approx. 2 mm / 3 days
Average volume shrinkage (ASTM C1241)	24.1%
Movement capability	Approx. 5%
Expansion rate (unrestricted)	Up to 3-5 times original volume
Temperature resistance (cured)	–40°F to 212°F (–40°C to 100°C)
Surface burning characteristics (ASTM E 84-96)	Flame Spread: 0 Smoke Development: 5
Sound transmission classification (ASTM E 90-99)	56 (Relates to specific construction)
Tested in accordance with • UL 1479 • ASTM E 814 • ASTM E 84 • ASTM G21	

*At 73°F (23°C) and 50% relative humidity

CLASSIFIED C UL US
FILL, VOID OR CAVITY MATERIAL
FOR USE IN THROUGH-PENETRATION
FIRESTOP SYSTEMS
SEE UL FIRE RESISTANCE DIRECTORY
66Y7

FM APPROVED

FBC SYSTEM COMPATIBLE
Visit fbcsystemcompatible.com.
FBC™ is a trademark of the Lubrizol Corporation.

Installation instructions for FS-ONE

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information

Opening

1. Clean the opening. Surfaces to which FS-ONE will be applied should be cleaned of loose debris, dirt, oil, moisture, frost and wax. Structures supporting penetrating items must be installed in compliance with local building and electrical standards.

Application of firestop sealant

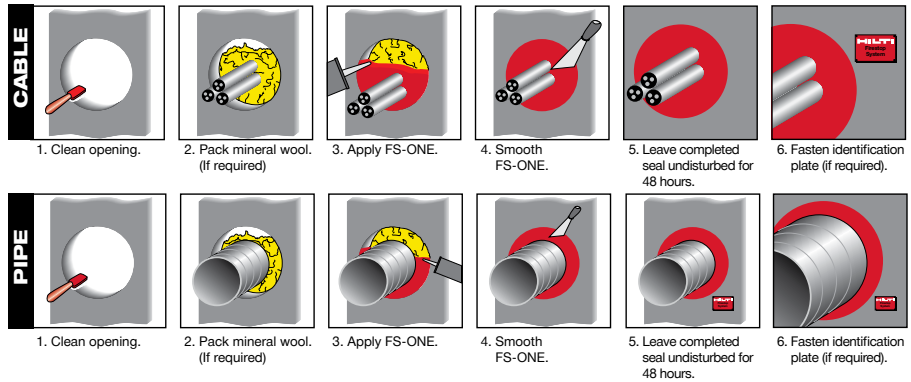
2. Install the prescribed backfilling material type and depth to obtain the desired rating (if required). Leave sufficient depth for applying FS-ONE.
3. Application of firestop sealant: Apply FS-ONE to the required depth in order to obtain the desired fire rating. Make sure FS-ONE contacts all surfaces to provide maximum adhesion. For application of FS-ONE use a standard caulking gun, foil pack gun, bulk loader and bulk gun. With FS-ONE buckets, Graco type sealant pumps may be used. (Contact pump manufacturer for proper selection).
4. Smoothing of firestop sealant: To complete the seal, tool immediately to give a smooth appearance. Excess sealant, prior to curing, can be cleaned away from adjacent surfaces and tools with water.
5. Leave completed seal undisturbed for 48 hours.
6. For maintenance reasons, a penetration seal could be permanently marked with an identification plate. In such a case, mark the identification plate and fasten it in a visible position next to the seal.

Not for use

- High movement expansion joints
- Underwater
- On materials where oil, plasticizers or solvents may bleed i.e. impregnated wood, oil based seals, green or partially vulcanized rubber
- In any penetration other than those specifically described in this manual or the test reports

Storage

- Store only in the original packaging in a location protected from moisture at temperatures between 40°F (5°C) and 86°F (30°C)
- Observe expiration date on the packag



Hilti. Outperform. Outlast.

Certificate of Compliance

Certificate Number **20100512-R13240**
Report Reference **2010 May 12**
Issue Date **2010 May 12**

Underwriters Laboratories Inc.®

Issued to: Hilti, Inc.

54 S 122ND East AVe
Tulsa, OK 74146 USA

This is to certify that representative samples of Fill, Void or Cavity Materials
FS-ONE

Have been investigated by Underwriters Laboratories Inc.® (UL) or any authorized licensee of UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: ANSI/UL 1479, ANSI/UL 2079, CAN/ULC-S115-05
Third Edition, revised March 1, 2010

Additional Information: FS-ONE Sealant for use in Joint Systems and FS-ONE for use in Through-Penetration Firestop Systems as currently described in the UL Fire Resistance Directory.

Only those products bearing the UL Classification Mark should be considered as being covered by UL's Classification and Follow-Up Service.

The UL Classification Mark includes: UL in a circle symbol: with the word "CLASSIFIED" (as shown); a control number (may be alphanumeric) assigned by UL; a statement to indicate the extent of UL's evaluation of the product; and, the product category name (product identity) as indicated in the appropriate UL Directory.

Look for the UL Classification Mark on the product

Issued by:
Mona Couloute
Mona Couloute
Underwriters Laboratories Inc.

Reviewed by:
Chris J. Johnson
Underwriters Laboratories Inc.

MATERIAL SAFETY DATA SHEET

Product name: **FS-ONE High Performance Intumescent Firestop Sealant**

Description: One-part acrylic-based sealant

Supplier: Hilti, Inc. P.O. Box 21148, Tulsa, OK 74121

Emergency # (Chem-Trec.): 1 800 424 9300 (USA, PR, Virgin Islands, Canada); 001 703 527 3887 (other countries)

INGREDIENTS AND EXPOSURE LIMITS

Ingredients:	CAS Number:	PEL:	TLV:	STEL:
Polyacrylate dispersion	Mixture	NE	NE	NE
Calcium carbonate	001317-65-3	5 mg/m^3 (R)	NE	NE
Zinc borate	138265-88-0	NE	NE	NE
Talc	014807-96-6	20 mppcf	2 mg/m^3(R)	NE
Ethylene glycol	000107-21-1	NE	NE	C:100 mg/m^3 (A)
Iron oxide	001309-37-1	10 mg/m^3 (F)	5 mg/m^3(R)	NE

Abbreviations: **PEL** = OSHA Permissible Exposure Limit. **TLV** = ACGIH Threshold Limit Value. **C** = Ceiling. **STEL** = Short Term Exposure Limit. **NE** = None Established. **NA** = Not Applicable. **(T)** indicates "as total dust". **(R)** indicates "as respirable fraction". **(A)** indicates "as an aerosol". **mppcf** = million particles per cubic foot. **F** = Fume

PHYSICAL DATA

Appearance:	Red paste.	**Odor:**	Odorless.
Vapor Density: (air = 1)	Not determined.	**Vapor Pressure:**	23mbar @ 20C / 68F
Boiling Point:	Not applicable.	**VOC Content:**	75.0 g/L.
Evaporation Rate:	Not applicable.	**Solubility in Water:**	Soluble.
Specific Gravity:	1.5	**pH:**	Not determined.

FIRE AND EXPLOSION HAZARD DATA

Flash Point:	Non-flammable.	**Flammable Limits:**	Not applicable.
Extinguishing Media:	Not applicable. Use extinguishing media as appropriate for surrounding fire.		
Special Fire Fighting Procedures:	None known. Use a self-contained breathing apparatus when fighting fires involving chemicals.		
Unusual Fire and Explosion Hazards:	None known. Thermal decomposition products can be formed such as oxides of carbon, sulfur and phosphorous.		

REACTIVITY DATA

Stability:	Stable.	**Hazardous Polymerization:**	Will not occur.
Incompatibility:	Strong acids, peroxides, and oxidizing agents.		
Decomposition Products:	Thermal decomposition can yield CO and CO_2.		
Conditions to Avoid:	None known.		

HEALTH HAZARD DATA

Known Hazards:	None known.
Signs and Symptoms of Exposure:	Possibly irritating upon contact with the eyes or upon repeated contact with the skin.
Medical Conditions Aggravated by Exposure:	Eye and skin conditions.
Routes of Exposure:	Dermal.
Carcinogenicity:	No ingredients are classified as carcinogens.

EMERGENCY AND FIRST AID PROCEDURES

Eyes:	Immediately flush with plenty of water. Contact a physician if symptoms occur.
Skin:	Immediately wipe off material and wash with soap and water. Contact a physician if symptoms occur.
Inhalation:	Move victim to fresh air if discomfort develops. Contact a physician if symptoms occur. persist.
Ingestion:	Seek medical attention. Do not induce vomiting unless directed by a physician.
Other:	Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure.

CONTROL MEASURES AND PERSONAL PROTECTIVE EQUIPMENT

Ventilation:	General (natural or mechanically induced fresh air movements).
Eye Protection:	Safety glasses with side shields.
Skin Protection:	Impermeable gloves. Other protective clothing as required to prevent skin contact.
Respiratory Protection:	None normally required. Where ventilation is inadequate to control vapors, use a NIOSH-approved respirator with organic vapor cartridges. Never enter a confined space without an appropriate air-supplied respirator.

PRECAUTIONS FOR SAFE HANDLING AND USE

Handling and Storing Precautions:	Store in a cool, dry area preferably between 40º and 77º F. Keep from freezing. Do not store in direct sunlight. Avoid contact with the eyes or skin. Practice good hygiene; i.e. always wash thoroughly after handling and before eating or smoking. For industrial use only. Keep out of reach of children. Follow label/use instructions.
Spill Procedures:	Immediately wipe away spilled material before it hardens. Place in a container for proper disposal in accordance with all applicable local, state, or federal requirements.

REGULATORY INFORMATION

Hazard Communication:	This MSDS has been prepared in accordance with the federal OSHA Hazard Communication Standard 29 CFR 1910.1200.
HMIS Codes:	Health 1, Flammability 0, Reactivity 0, PPE B
DOT Shipping Name:	Not regulated.
IATA / ICAO Shipping Name:	Not regulated.
TSCA Inventory Status:	Chemical components listed on TSCA inventory.
SARA Title III, Section 313:	This product contains < 3% ethylene glycol (CAS 107-21-1) and < 15% zinc borate (re: zinc compounds) which are subject to reporting under Section 313 of SARA Title III (40 CFR Part 372).
EPA Waste Code(s):	Not regulated by EPA as a hazardous waste.
Waste Disposal Methods:	Consult with regulatory agencies or your corporate personnel for disposal methods that comply with local, state, and federal safety, health and environmental regulations.

CONTACTS

Customer Service:	1 800 879 8000	**Technical Service:**	1 800 879 8000
Health / Safety:	1 800 879 6000 Jerry Metcalf (x71003704)		
Emergency # (Chem-Trec):	1 800 424 9300 (USA, PR, Virgin Islands, Canada); 001 703 527 3887 (other countries)		

The information and recommendations contained herein are based upon data believed to be correct; however, no guarantee or warranty of any kind expressed or implied is made with respect to the information provided.

February 26, 2010

To Whom It May Concern:

Re: Hilti FS-ONE Intumescent Firestop – LEED Info.

The Hilti FS-ONE Intumescent Firestop is manufactured in Germany.

The FS-ONE pail is made of polyethylene and can be completely recycled. There is no post-consumer or post-industrial content in FS-ONE and it cannot be recycled. The VOC content for FS-ONE is 75 grams/liter.

FS-ONE is not regulated as a hazardous waste by the Federal EPA Standards. The regulations for the disposal of non-regulated industrial waste can vary from state to state and even city to city. For this reason, you should consult your local and state regulatory agencies for direction on disposal.

Please feel free to contact me at (918) 872-3704 if you have questions.

Sincerely,

Jerry Metcalf MPH, CHMM
Safety/Environmental Manager
Hilti Inc
(918) 872 3704
jerry.metcalf@hilti.com

Rev. Date: 2/26/10

Hilti, Inc.
5400 South 122nd East Avenue
Tulsa, OK 74146

1-800-879-8000
www.hilti.com