

System No. C-AJ-8099

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Ratings — 0 and 3/4 Hr (See Item 2)	FT Ratings — 0 and 3/4 Hr (See Item 2)
	FH Rating — 2 Hr
	FTH Ratings — 0 and 3/4 Hr (See Item 2)

1. Floor or Wall Assembly — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete floor or min 5 in. (127 mm) reinforced lightweight or normal weight concrete wall. Wall may also be constructed of any UL Classified Concrete Blocks*. Floor may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow core Precast Concrete Units*. Max area of square, rectangular or circular opening is 192 sq in. (1239 cm²) with max dimension of 24 in. (61 cm). When Precast Concrete Unit floors are used, max area of square, rectangular or circular opening is 49 sq in. (316 cm²) with max dimension of 7 in. (17.8 cm).

2. Through-Penetrant — One or more pipes or tubes to be installed within the opening. The total number of through-penetrants is dependent on the size of the opening and types and sizes of the penetrants. Any combination of the penetrants described below may be used provided that the following parameters relative to the annular spaces and the spacings between the pipes are maintained. The separation between cable bundle, tubes and insulated tubes shall be a min 1/2 in. (13 mm) to max 3-1/8 in. (79 mm). The annular space between penetrants and the periphery of opening shall be a min 1/2 in. (13 mm) to max 5 in. (127 mm). Pipes or tubes to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes or tubes may be used:

A. Copper Tubing — Nom 3 in. (76 mm) diam (or smaller) Type L (or heavier) copper tube.
 B. Copper Pipe — Nom 3 in. (76 mm) diam (or smaller) Regular (or heavier) copper pipe.
 C. Steel Pipe — Nom 3 in. (76 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
 D. Iron Pipe — Nom 3 in. (76 mm) diam (or smaller) cast or ductile iron pipe.
 E. Conduit — Nom 3 in. (76 mm) diam (or smaller) electric metallic tubing (EMT) or steel conduit.
 F. Flexible Steel Conduit — Nom 1 in. (25 mm) diameter (or smaller) flexible steel conduit.
 G. Through Penetrating Product* — Flexible Metal Piping — The following types of steel flexible metal gas piping may be used:

1.) Nom 2 in. (51 mm) diam (or smaller) steel flexible metal gas piping. Plastic covering on piping may or may not be removed on both sides of floor or wall assembly.
 OMEGA FLEX INC.
 2.) Nom 1 in. (25 mm) diam (or smaller) steel flexible metal gas piping. Plastic covering on piping may or may not be removed on both sides of floor or wall assembly.
 GASTITE, DIV OF TITEFLEX
 3.) Nom 2 in. (51 mm) diam (or smaller) steel flexible metal gas piping. Plastic covering on piping may or may not be removed on both sides of floor or wall assembly.
 WARD MFG L L C

The hourly T Rating is 3/4 hr when a pipe or tube with fiber-glass insulation is used, or 0 hr when a pipe or tube, a pipe or tube with AB/PVC insulation or a cable bundle is used. The T Rating is 0 hr when metallic penetrants without pipe insulation are used.

3. Pipe Insulation — (Optional)—The following types of pipe insulation may be used with metallic penetrants (Items 2A, 2B, 2C, 2D and 2F):
 A. Pipe Covering — Nom 1 in. (25 mm) thick (or thinner) hollow cylindrical heavy density (min 3.5 pcf or 56 kg/m³) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with built tape supplied with the product.
 See Pipe and Equipment Covering - Materials (BRCU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
 B. Tube Insulation-Plastics+++ — Nom 3/4 in. (19 mm) thick (or thinner) acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing.
 See Plastics+++ category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL 94 Flammability Classification of 94-5(A) may be used.

4. Cables — Max 2 in. (51 mm) diam light bundle of cables installed within the opening and rigidly supported on both sides of floor or wall assembly. The space between the cables and periphery of the opening shall range from min 2 in. (51 mm) to max 4 in. (102 mm). Any combination of the following types and sizes of metallic conductor of fiber optic cable may be used:
 A. Max 500 kcmil single copper conductor power cable with thermoplastic insulation and polyvinyl chloride (PVC) jacket.
 B. Max 300 pair No. 24 AWG copper conductor telecommunication cables with PVC insulation and jacket material.
 C. Max 7/8 copper conductor No. 12 AWG multiconductor power and control cables with PVC or cross-linked polyethylene (XLPE) insulation and PVC jacket.
 D. Multiple fiber optical communication cables jacketed with PVC and having a max outside diam of 1/2 in.
 E. Max 3/8 copper conductor No. 12 AWG with bare aluminum ground, PVC insulated steel Metal-Clad cable.

5. Firestop System — The firestop system shall consist of the following:
 A. Packing Material — Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m³) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or both surfaces of wall to accommodate the required thickness of fill material. When Precast Concrete Unit floors are used, packing material shall be installed at a thickness equal to the thickness of the floor minus 1/2 in. (13 mm), flush with bottom surface of floor.
 B. Fill Void or Cavity Material* — Sealant — Min 1/2 in. (51 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall.
 HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant or FS-ONE MAX Intumescent Sealant.

+++Bearing the UL Recognized Component Marking

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

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. January 15, 2015

Hilti Firestop Systems

Page: 1 of 2

System No. C-AJ-8099

1.) Nom 2 in. (51 mm) diam (or smaller) steel flexible metal gas piping. Plastic covering on piping may or may not be removed on both sides of floor or wall assembly.
 OMEGA FLEX INC.
 2.) Nom 1 in. (25 mm) diam (or smaller) steel flexible metal gas piping. Plastic covering on piping may or may not be removed on both sides of floor or wall assembly.
 GASTITE, DIV OF TITEFLEX
 3.) Nom 2 in. (51 mm) diam (or smaller) steel flexible metal gas piping. Plastic covering on piping may or may not be removed on both sides of floor or wall assembly.
 WARD MFG L L C

The hourly T Rating is 3/4 hr when a pipe or tube with fiber-glass insulation is used, or 0 hr when a pipe or tube, a pipe or tube with AB/PVC insulation or a cable bundle is used. The T Rating is 0 hr when metallic penetrants without pipe insulation are used.

3. Pipe Insulation — (Optional)—The following types of pipe insulation may be used with metallic penetrants (Items 2A, 2B, 2C, 2D and 2F):
 A. Pipe Covering — Nom 1 in. (25 mm) thick (or thinner) hollow cylindrical heavy density (min 3.5 pcf or 56 kg/m³) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with built tape supplied with the product.
 See Pipe and Equipment Covering - Materials (BRCU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
 B. Tube Insulation-Plastics+++ — Nom 3/4 in. (19 mm) thick (or thinner) acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing.
 See Plastics+++ category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL 94 Flammability Classification of 94-5(A) may be used.

4. Cables — Max 2 in. (51 mm) diam light bundle of cables installed within the opening and rigidly supported on both sides of floor or wall assembly. The space between the cables and periphery of the opening shall range from min 2 in. (51 mm) to max 4 in. (102 mm). Any combination of the following types and sizes of metallic conductor of fiber optic cable may be used:
 A. Max 500 kcmil single copper conductor power cable with thermoplastic insulation and polyvinyl chloride (PVC) jacket.
 B. Max 300 pair No. 24 AWG copper conductor telecommunication cables with PVC insulation and jacket material.
 C. Max 7/8 copper conductor No. 12 AWG multiconductor power and control cables with PVC or cross-linked polyethylene (XLPE) insulation and PVC jacket.
 D. Multiple fiber optical communication cables jacketed with PVC and having a max outside diam of 1/2 in.
 E. Max 3/8 copper conductor No. 12 AWG with bare aluminum ground, PVC insulated steel Metal-Clad cable.

5. Firestop System — The firestop system shall consist of the following:
 A. Packing Material — Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m³) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or both surfaces of wall to accommodate the required thickness of fill material. When Precast Concrete Unit floors are used, packing material shall be installed at a thickness equal to the thickness of the floor minus 1/2 in. (13 mm), flush with bottom surface of floor.
 B. Fill Void or Cavity Material* — Sealant — Min 1/2 in. (51 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall.
 HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant or FS-ONE MAX Intumescent Sealant.

+++Bearing the UL Recognized Component Marking

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

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. January 15, 2015

Hilti Firestop Systems

Page: 2 of 2

System No. W-J-3215

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Ratings — 1/2 and 2 Hr (See Item 2)	FT Ratings — 1/2 and 2 Hr (See Item 2)
L Rating at Ambient — Less than 1 CFM/Opening	FH Rating — 2 Hr
L Rating at 400 F — Less than 1 CFM/Opening	FTH Ratings — 1/2 and 2 Hr (See Item 2)
	L Rating at Ambient — Less than 1 CFM/Opening
	L Rating at 400 F — Less than 1 CFM/Opening

1. Wall Assembly — Min 6 in. (152 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Opening may be round, rectangular or irregular with a max diam or dimension of 1 in. (25 mm). See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. Cables — Single or tight bundle of cables to be installed within the opening. Aggregate cross-sectional area of cables in opening shall have a visual fill of min 0% to max 100%. The annular space between the cable bundle and the periphery of the opening to be min 0% (no contact). Cables to be rigidly supported on both sides of the wall assembly. Any combination of the following types and sizes of cables may be used:
 A. Max 3/8 No. 8 AWG NM copper conductor cable (Romex) with PVC insulation and jacket.
 B. Max 7/8 No. 12 AWG copper conductor control cable with PVC or XLPE insulation and jacket.
 C. Max 100 pair No. 24 AWG (or smaller) copper conductor telecommunication cable with PVC or plenum rated insulation and jacketing.
 D. Max 4 pr No. 22 AWG (or smaller) Cat 5 or Cat 6 computer cables with PVC or plenum rated insulation and jacketing.
 E. Type RGU coaxial cable with fluorinated ethylene or PVC insulation and jacketing having a max outside diameter of 1/2 in. (13 mm).
 F. Max 24 fiber optic cable with polyvinyl chloride (PVC) or polyethylene (PE) jacket and insulation.
 G. Through Penetrating Product* — Max two copper conductor No. 18 AWG (or smaller) Power or Non-Power Limited Fire Alarm Cable with or without a jacket under a metal armor.
 AFC CABLE SYSTEMS INC

H. Maximum 3/8 No. 10 AWG metal-clad cable.

The hourly T, FT and FTH Ratings of the firestop system are 2 hr except that for cable type 2B and 2C, the ratings are 1/2 hr. For blank openings with no penetrant, the F, FT, FH and FTH Ratings are 2 hr.

3. Fill, Void or Cavity Material* — Nom 60 mm diam by 3 mm thick poly disc with one seam at center. Paper-backer of disc to be removed and disc firmly pressed around the cable/cable bundle lapping nom 5 mm onto cables to completely cover and be firmly pressed to lap into the wall around periphery of opening. Disc seam to be pressed into wall. Disc to be installed at both surfaces of wall.
 HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-D 1" Firestop Cable Disc

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

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. October 14, 2015

Hilti Firestop Systems

Page: 1 of 2

System No. W-J-3215

1. Wall Assembly — Min 6 in. (152 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Opening may be round, rectangular or irregular with a max diam or dimension of 1 in. (25 mm). See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. Cables — Single or tight bundle of cables to be installed within the opening. Aggregate cross-sectional area of cables in opening shall have a visual fill of min 0% to max 100%. The annular space between the cable bundle and the periphery of the opening to be min 0% (no contact). Cables to be rigidly supported on both sides of the wall assembly. Any combination of the following types and sizes of cables may be used:
 A. Max 3/8 No. 8 AWG NM copper conductor cable (Romex) with PVC insulation and jacket.
 B. Max 7/8 No. 12 AWG copper conductor control cable with PVC or XLPE insulation and jacket.
 C. Max 100 pair No. 24 AWG (or smaller) copper conductor telecommunication cable with PVC or plenum rated insulation and jacketing.
 D. Max 4 pr No. 22 AWG (or smaller) Cat 5 or Cat 6 computer cables with PVC or plenum rated insulation and jacketing.
 E. Type RGU coaxial cable with fluorinated ethylene or PVC insulation and jacketing having a max outside diameter of 1/2 in. (13 mm).
 F. Max 24 fiber optic cable with polyvinyl chloride (PVC) or polyethylene (PE) jacket and insulation.
 G. Through Penetrating Product* — Max two copper conductor No. 18 AWG (or smaller) Power or Non-Power Limited Fire Alarm Cable with or without a jacket under a metal armor.
 AFC CABLE SYSTEMS INC

H. Maximum 3/8 No. 10 AWG metal-clad cable.

The hourly T, FT and FTH Ratings of the firestop system are 2 hr except that for cable type 2B and 2C, the ratings are 1/2 hr. For blank openings with no penetrant, the F, FT, FH and FTH Ratings are 2 hr.

3. Fill, Void or Cavity Material* — Nom 60 mm diam by 3 mm thick poly disc with one seam at center. Paper-backer of disc to be removed and disc firmly pressed around the cable/cable bundle lapping nom 5 mm onto cables to completely cover and be firmly pressed to lap into the wall around periphery of opening. Disc seam to be pressed into wall. Disc to be installed at both surfaces of wall.
 HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-D 1" Firestop Cable Disc

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

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. October 14, 2015

Hilti Firestop Systems

Page: 2 of 2

System No. HW-S-0090

ANSI/UL2079	CAN/ULC S115
Assembly Rating — 1 Hr	F Rating — 1 Hr
Joint Width - 1/2 In Max.	FT Rating — 1 Hr
	FH Rating — 1 Hr
	FTH Ratings — 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 Sealant, CP606 Sealant or FS-ONE MAX Intumescent Sealant.

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

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. January 28, 2015

Hilti Firestop Systems

No.	Description	Date

DISCLAIMER: PC is provided, by agreement with certain parties, materials stored electronically. The parties recognize that data, plans, specifications, reports, drawings, and other documents may be subject to unauthorized alteration, copying, transmission, conversion, media degradation, software error or human alteration. Accordingly, all such documents are deemed to be the original documents for purposes only and not as an end product or as a record. Any reliance thereon is deemed to be the user's responsibility. HILTI and the HILTI logo are trademarks of Hilti AG. Service are the only true documents of record.

MEISTER-COX ARCHITECTS

INFO@MEISTER-COX.COM
 PHONE: 610-375-1331 FAX: 610-375-4655
 1622 PENN AVENUE WYOMISSING, PA 19380
 WWW.MEISTER-COX.COM

HILTI FIRESTOP DETAILS

HOLIDAY INN EXPRESS & SUITES

INTERSECTION OF HAYNES PLACE & LAMM RD.
 WILSON, NC 27783

STATUS: BIDDING

PROJ. DATE: 06-07-19

PROJ. NO: 18-176

PRINTED: 6/7/2019 7:12:38 PM

DRAWN BY: RFF

CHECKED BY: TGC

SHEET NO. **A911**

SCALE: 1/2" = 1'-0"

