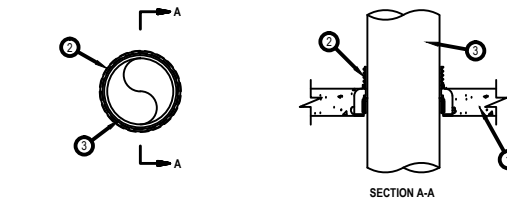


System No. F-A-1016
F Rating — 2 Hr
T Rating — 0 Hr
L Rating At Ambient — 1 CFM/sq ft (See Item 3)
L Rating At 400 F — Less Than 1 CFM/sq ft (See Item 3)
W Rating — Class 1 (See Items 4B and 4B1)



- Floor Assembly — Min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete.
1A. Floor Assembly — (Optional, Not Shown) — The fire rated unprotected concrete and steel floor assembly shall be constructed of the materials and in the manner specified in the individual D900 Series designs in the UL Fire Resistance Directory and as summarized below:
A. Concrete — Min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete.
B. Steel Floor and Form Units* — Composite or non-composite max 3 in. (76 mm) deep galv steel fluted units as specified in the individual Floor-Ceiling Design.
- Firestop Device* — Cast in place firestop device permanently embedded during concrete placement or grouted in concrete floor assembly in accordance with accompanying installation instructions. The devices may extend a max of 2 in. (51 mm) above the top surface of the concrete.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — CP 680N-75/2.5", CP 680N-110/4", CP 680N-160/6", CP 680-75/2.5", CP 680-110/4", CP 680-M 2", CP 680-M 3", CP 680-M 4", CP 680-M 6", CP 680-P 2", CP 680-P 3", CP 680-P 4", CP 680-P 6"
- Through Penetrants — One metallic pipe, conduit or tubing to be installed within the firestop device. Pipe, conduit or tubing to be rigidly supported on both sides of floor assembly. The following types of pipe, conduit or tubing may be used:
A. Steel Pipe — Nom 6 in. (152 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
B. Iron Pipe — Nom 6 in. (152 mm) diam (or smaller) cast or ductile iron pipe.
C. Conduit — Nom 6 in. (152 mm) diam (or smaller) rigid steel conduit.
D. Conduit — Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing.
E. Copper Tubing — Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.
F. Copper Pipe — Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe.
The firestop device and metallic penetrant shall be sized as follows:

Nom Pipe Diam + ++	Firestop Device
1-1/2 to 2-1/2 in. (38 to 64 mm) - Other than copper pipe or tubing	CP680N-75/2.5" or CP682-75/2.5"
1-1/2 to 2 in. (38 to 51 mm) - Other than copper pipe or tubing	CP 680-M 2", CP 680-P 2
2 to 2-1/2 in. (51 to 64 mm) - Copper pipe or tubing	CP680N-75/2.5" or CP682-75/2.5"
2-1/2 to 3 in. (64 to 76 mm)	CP 680-M 3", CP 680-P 3"
4 in. (102 mm)	CP680N-110/4" or CP682-110/4"
6 in. (152 mm)	CP 680-M 4", CP 680-P 4" CP 680N-160/6" CP 680-M 6", CP 680-P 6"

- * When metallic pipes of diameters smaller than those shown above are installed within the device, CP618 Firestop Putty Stick or mineral wool insulation shall be installed within the device.
++ L Rating applies only to CP 680-M and -P devices and only when the nom diam of pipe equals size of device (2 in. diam pipe in 2" device etc.). L Rating does not apply to CP 680N and CP682 devices.
4. Fill, Void or Cavity Material* - Putty (Not Shown) — Min 1 in. (25 mm) thickness of fill material applied within annular flush with top surface of device.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — CP 618 Firestop Putty Stick
4A. Packing Material (Not Shown) — As an alternate to Item 4, min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m³) mineral wool insulation firmly packed to the fullest extent possible within annular flush with top surface of device.
4B. Firestop Device* - Top Seal Plug — (Optional, Not Shown) - Top seal plug for use with CP 680-M 2" and CP 680-P 2" devices and nom pipe, conduit or tubing sizes of 1/2 in. (13 mm) to 2 in. (51 mm) diam. Plug is friction fit into top of firestop device (Item 2) in accordance with the manufacturer's instructions. When top seal plug is used, no putty (Item 4) or packing material (Item 4A) is required. W Rating applies only to nom 1, 1-1/4, 1-1/2 and 2 in. (25, 32, 38 and 51 mm) diam copper pipe/tube in conjunction with 2" CPS Top Seal and CP 680-M 2" or CP 680-P 2" devices.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — CPS Top Seal Plug
4B1. Firestop Device* - Water Barrier Module — (Optional, Not Shown) - Used as an alternate to the top seal plug (Item 4B) and in combination with the CP 680-M and CP 680-P devices to achieve a W Rating. Module is threaded onto top of device. See Table below for sizes of device/module and penetrants covered. When water barrier module is used, a W Rating applies to the water barrier module, device and penetrant sizes specified in Table below. For W Rating with Water Barrier Module, pipe shall be installed from bottom of device.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — Water Barrier Module

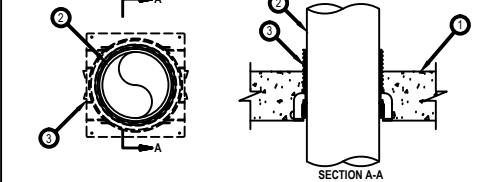
Penetrant Type (See Item 3 above)	Nom Penetrant Diam	Size of Device/Module
A, B, C, D	2"	2"
	2-1/2"	3"
	3"	3"
	4"	4"
	6"	6"
E, F	2"	3"
	3"	3"
	4"	4"
	6"	6"

*Bearing the UL Classification Mark



Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. August 04, 2008

System No. F-A-2012
F Ratings — 1, 2 and 3 Hr (See Item 3)
FT Ratings — 0, 1/4, 3/4 and 2 Hr (See Items 2, 3 and 4)
FTH Ratings — 0 and 3 Hr (See Item 3)
FTH Ratings — 0 and 2 Hr (See Items 2 and 3)
L Rating At Ambient — Less Than 1 CFM/sq ft (See Item 2)
L Rating At 400 F — Less Than 1 CFM/sq ft (See Item 2)



- System tested with a pressure differential of 50 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.
- Floor Assembly — Min 64, 114 or 152 mm (2-1/2, 4-1/2 or 6 in.) thick normal weight concrete (2400 kg/m³ or 150 pcf). See Items 2D and 2E and Table in Item 3.
1A. Floor Assembly — (Optional — Not Shown) — The fire-rated unprotected concrete and steel deck floor assembly shall be constructed of the materials and in the manner specified in the individual D900 Series designs in the UL Fire Resistance Directory and as summarized below:
A. Concrete — Min 64, 114 or 152 mm (2-1/2, 4-1/2 or 6 in.) thick normal weight concrete (2400 kg/m³ or 150 pcf). See Table in Item 3.
B. Steel Floor and Form Units* — Composite or non-composite, max 76 mm (3 in.) deep galv steel fluted units as specified in the individual Floor-Ceiling Design.
D. Acrylonitrile Butadiene Styrene (ABS) Pipe — Nom 102 mm (4 in.) diam (or smaller) Schedule 40 cellular or solid core pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems. Minimum floor thickness is 114 mm (4-1/2 in.) when ABS pipe is used. FT and FTH Ratings are 0 hr for ABS pipe.
E. Fire Retardant Polypropylene (FRPP) Pipe — Nom 156 mm (6 in.) diam (or smaller) Schedule 40 FRPP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems. Minimum floor thickness is 114 mm (4-1/2 in.) when FRPP pipe is used. FT and FTH Ratings are 0 hr for FRPP pipe.
F. Rigid Nonmetallic Conduit* — Nom 102mm (4 in.) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NEC, NFPA No. 70).
G. Polyvinyl Chloride (PVC) Pipe — Nom 152 mm (6 in.) 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.
IPEX INC. — Aquaflex
 - Firestop Device* — Cast in place firestop device permanently embedded during concrete placement or grouted in concrete assembly in accordance with accompanying installation instructions with a max 51 mm (2 in.) projection above the top surface of the concrete.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — CP 680-75/2.5", CP 680-110/4", CP 680-160/6", CP 680-P 2", CP 680-P 3", CP 680-P 4", CP 680-P 6"

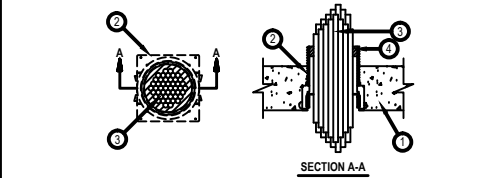
the ratings of the first two inches of the cond. Thickness, mm (in.)	system or type of material	dimension of the system (in.) (Item 2)	size of the device, type and table No. Device	F	FT	FH	FTH	
64 (2-1/2)	51 (2)	All*	CP680-75/2.5"N CP 680-P 2"	2	4	Ma	r	0
64 (2-1/2)	76 (3)	All	CP 680-P 3"	2	0	0	0	0
64 (2-1/2)	102 (4)	All	CP680-110/4"N CP 680-P 4"	2	0	0	0	0
64 (2-1/2)	152 (6)	All	CP680-160/6"N CP 680-P 6"	2	0	0	0	0
114 (4-1/2)	38 (1.5)	All*	CP680 - 75/2.5"N CP 680-P 2"	2	2	0	0	0
114 (4-1/2)	76 (3)	All*	CP680-110/4"N CP 680-P 4"	3	2	3	3	2
114 (4-1/2)	76 (3)	All	CP 680-P 3"	3	0	0	0	0
114 (4-1/2)	102 (4)	All	CP680-160/6"N CP 680-P 6"	1	0	0	0	0
114 (4-1/2)	51 (2)	All*	CP680-75/2.5"N CP 680-P 2"	2	2	0	0	0
114 (4-1/2)	102 (4)	All*	CP680-110/4"N CP 680-P 4"	3	2	3	3	2
114 (4-1/2)	152 (6)	All	CP680-160/6"N CP 680-P 6"	2	0	0	0	0
152 (6)	76 (3)	A, B, C, G	CP 680-P 3"	2	2	2	2	2

- *When ABS or FRPP pipe is used, FT and FTH Ratings are 0 hr.
++ L Rating applies only to CP 680-P devices and only when the nom diam of pipe equals size of device (2 in. diam pipe in 2" device etc.). Also applies only to PVC and CPVC pipes. L Rating does not apply when pipe covering and packing material are used.
4. Pipe Covering* — (Optional, Not Shown) - Min 13 mm (1/2 in.) thick hollow cylindrical glass fiber units with an all service jacket installed around 76 mm (3 in.) diam (or smaller) ABS or PVC pipe at the top of the floor and extending min 305 mm (12 in.) above floor surface or device. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. Prior to installation of pipe covering, packing material specified in Item 5 shall be installed as required. When pipe covering is used, FT Rating is 2 Hr.
See Pipe and Equipment Covering Materials (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering 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.
5. Packing Material — (Not Shown) - Required as noted in Item 4 above for 2 Hr FT Rating. When nom pipe size is less than device size (ie, nom 76 mm (3 in.) diam pipe in 102 mm (4 in.) device), min 32 mm (1-1/4 in.) thickness of min 64 kg/m³ (4 pcf) mineral wool batt insulation tightly packed to fill annular space between pipe and device, flush with top of device.
*Bearing the UL Classification Mark
*Bearing the UL Listing Mark



Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. July 20, 2012

System No. F-A-2017
F Rating — 3 Hr
T Ratings — 0, 1/4, 1/2 Hr (See Items 3 and 4)



- Floor Assembly — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete.
1A. Floor Assembly — (Optional - Not Shown) — The fire rated unprotected concrete and steel floor assembly shall be constructed of the materials and in the manner specified in the individual D900 Series designs in the UL Fire Resistance Directory and as summarized below:
A. Concrete — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete.
B. Steel Floor and Form Units* — Composite or non-composite max 3 in. (76 mm) deep galv steel fluted units as specified in the individual Floor-Ceiling Design.
2. Firestop Device* — Cast in place firestop device permanently embedded during concrete placement in accordance with accompanying installation instructions.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — CP 680-75/2.5", CP 680-110/4", CP 680-160/6", CP 680-75/2.5", CP 682-110/4", CP 680-M 2", CP 680-M 3", CP 680-M 4", CP 680-P 2", CP 680-P 3", CP 680-P 4", CP 680-P 6"
- Cables — Cables to be rigidly supported on both sides of the assembly. Any combination of the following types and sizes of copper conductor cables may be used:
A. Max 1/16 750 kcmil (or smaller) copper conductor cable with polyvinyl chloride (PVC) insulation and jacket.
B. Max 7/16 12 AWG with polyvinyl chloride (PVC) insulation and jacket.
C. Max 300 pair No. 24 AWG telephone cable with PVC insulation and jacket.
D. Multiple fiber optical communication cables jacketed with PVC and having a max OD of 1/2 in. (13 mm).
E. Max 3/16 12 AWG with ground with polyvinyl chloride jacketed steel clad Type IIC cable.
The firestop device and max cable bundle diameter shall be sized as follows:

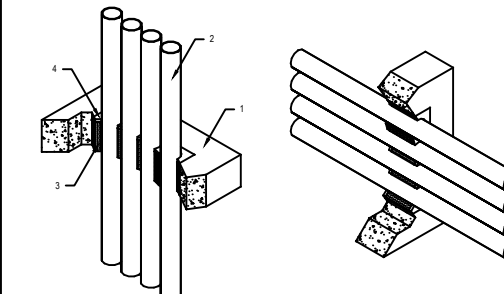
Max Bundle Diameter	Firestop Device	T Rating-Hr
2 in. (51 mm)	CP 680-75/2.5", CP 682-75/2.5" CP 680-M 2", CP 680-P 2"	1/4
3 in. (76 mm)	CP 680-75/2.5", CP 682-75/2.5" CP 680-M 3", CP 680-P 3"	1/2
4-1/2 in. (114 mm)	CP 680-110/4", CP 682-110/4" CP 680-M 4", CP 680-P 4"	1/2
6-1/2 in. (165 mm)	CP 680-160/6" CP 680-P 6"	0

- Fill, Void or Cavity Material* - Putty — Min 1 in. (25 mm) thickness of fill material applied within annular flush with top surface of device. Fill material is optional for 2-1/2 (64 mm) diam (or larger) cable bundle installed in 4 in. device and 2 in. (51 mm) diam (or larger) cable bundle installed in 2 in. or 2.5 in. device. The T Rating for the firestop system is 1/4 hr when fill material or packing material (Item 4 or 4A) is not used.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — CP 618 Firestop Putty Stick
4A. Packing Material (Not Shown) — As an alternate to Item 4, min 2 in. thickness of min 4 pcf (64 kg/m³) mineral wool insulation firmly packed to the fullest extent possible within annular flush with top surface of device.
*Bearing the UL Classification Mark



Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. December 13, 2008

Hilti Corporation
Design Number HUPF 120-05
Through Penetration
FS-ONE MAX Intumescent Firestop Sealant
ASTM E 814 (2011) & UL 1479 (2010)
F Rating: 2 Hours
T Rating: 2 Hours
CANULC S115 (2009) at 2.5Pa
FTH: 2 Hours



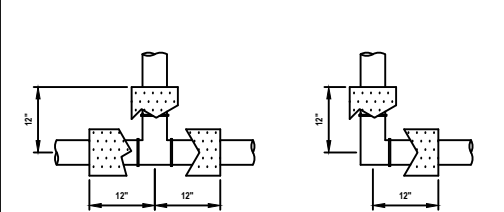
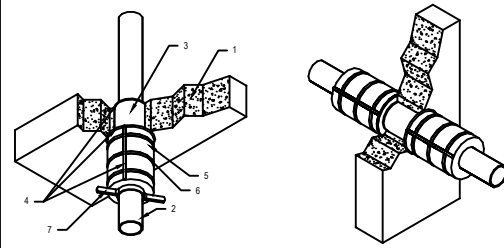
- FLOOR/CEILING OR WALL ASSEMBLY: Use a two-hour fire-rated floor/ceiling or wall assembly consisting of min. 6 in. (152 mm) thick normal weight (100-150 pcf (1600-2400 kg/m³)) reinforced concrete or 6 in. (152 mm) thick hollow or concrete filled Concrete Masonry Units (CMU). Create a through-opening with a max. area of 90 square inches (581 square cm) with a max. dimension of 18 in. (457 mm) or max. diameter of 6 in. (152 mm).
- PENETRATING ITEM: Install one or more 4/0 (platinum conductor) 500 kcmil PVC jacketed metal clad power cables. Install penetrating item centered or offset in the through-opening created in floor/ceiling or wall assembly (Item 1). Offset may be 0 in. (0 mm) to 4 in. (102 mm) between cables and periphery of opening and 1 in. (25 mm) to 1-1/2 in. (38 mm) between cables.
- PACKING MATERIAL: Install min. 4 pcf (64 kg/m³) density mineral wool batt insulation in the annular space, compressed 25% around the penetrating item (Item 2) as follows:
• Floor Ceiling Assembly: Install nominal 5-1/2 in. (140 mm) layer recessed 1/2 in. (13 mm) from the top of the floor/ceiling assembly (Item 1).
• Wall Assembly: Install nominal 5 in. (127 mm) layer recessed 1/2 in. (13 mm) from both surfaces of the wall assembly (Item 1).



Reproduced by HILTI, Inc. Courtesy of Intertek Group December 16, 2014



Hilti Corporation
Design Number HUPF 120-01
Through Penetration
FS-ONE MAX Intumescent Firestop Sealant
ASTM E 814 (2011) & UL 1479 (2010)
F Rating: 2 Hours
T Rating: 2 Hours
H Rating: 2 Hours
CANULC S115 (2011) at 2.5Pa
FTH: 2 Hours



- FLOOR/CEILING OR WALL ASSEMBLY: Use a two-hour fire-rated floor/ceiling assembly or concrete or block wall assembly consisting of min. 7 in. (178 mm) thick normal weight (100-150 pcf (1600-2400 kg/m³)) reinforced concrete or 7-5/8 in. (194 mm) thick Concrete Masonry Units (CMU). Create a round through-opening with diameter of 6 in. (152 mm).
- PENETRATING ITEM: Install one of the following penetrating items:
• Max. 4 in. (102 mm) Cast or Ductile Iron Pipe
• Max. 4 in. (102 mm) Rigid Steel Conduit or EMT
• Maximum 4 in. (102 mm) Schedule 40 (or thicker) Steel Pipe
Install penetrating item point contact or offset max. 1-1/2 in. (38 mm) in the through-opening created in floor/ceiling or wall assembly (Item 1).
- PACKING MATERIAL: Install min. 4 pcf (64 kg/m³) density mineral wool batt insulation in the annular space, compressed 25% around the penetrating item (Item 2) as follows:
• Floor Ceiling Assembly: Install min. 6-3/4 in. (171 mm) layer recessed 1/4 in. (6 mm) from the top of the floor/ceiling assembly (Item 1).
• Wall Assembly: Install min. 6-1/2 in. (165 mm) layer recessed 1/4 in. (6 mm) from both surfaces of the wall assembly (Item 1).
If the floor/ceiling or wall assembly (Item 1) is greater than 7 in. (178 mm), the 12 in. length of insulation (Item 5) may be reduced to the amount the floor/ceiling or wall assembly (Item 1) exceeds 7 in. If the insulation (Item 5) is reduced, the packing material (Item 3) must be increased by the same thickness in the annular space.
- CERTIFIED PRODUCT: Sealant
MODEL: FS-ONE MAX Intumescent Firestop Sealant
Apply nominal 1/4 in. (6 mm) layer of FS-ONE MAX Intumescent Firestop Sealant to fill the 1/4 in. (6 mm) void left after installing the packing material (Item 3). After installing the insulation (Item 5) around the penetrating item (Item 2), apply a nominal 1/4 in. (6 mm) bead of FS-ONE MAX Intumescent Firestop Sealant in the longitudinal seam of the insulation and at the insulation (Item 5) and floor/ceiling or wall assembly (Item 1) interface.
- INSULATION: Install one layer of 12 in. (305 mm) long, 8 pcf (128 kg/m³) density, hollow cylindrical mineral wool pipe insulation around penetrating item (Item 1) installed below the floor/ceiling assembly (Item 1) or on both sides of the wall assembly (Item 1). For penetrating items (Item 2) 2 in. (51 mm) or less in diameter, use min. 1 in. (25 mm) thick insulation. For penetrating items (Item 2) with a diameter greater than 2 in. (51 mm), use min. 2 in. (51 mm) thick insulation. As the thickness of the concrete floor/ceiling assembly or wall assembly (Item 1) increases greater than 7 in. (178 mm), the 12 in. (305 mm) length of insulation may be reduced by the amount that the slab exceeds 7 in. (178 mm).
- STAINLESS STEEL CLAMP: Install 1/2 in. (13 mm) wide stainless steel hose clamps to secure insulation (Item 5) around penetrating item (Item 2). Install hose clamps around insulation spaced 2 in. (51 mm) from the ends of the insulation and max. 8 in. (203 mm) on center (oc) between.
- RISER CLAMP: Install 4 in. (102 mm) galvanized steel riser clamp around penetrating item (Item 2) flush with the end of the insulation (Item 5) (not required on horizontal penetration).
- TEE/BELLOW (Optional): Attach to penetrating item (Item 2) when required. When installing tee or elbow at a distance greater than 12 in. (305 mm) from the floor/ceiling or wall assembly (Item 1), insulation (Item 5) is only required from the floor/ceiling or wall assembly (Item 1) to the Tee or elbow. If the tee or elbow is less than 12 in. (305 mm) from the floor/ceiling or wall assembly (Item 1), insulation (Item 5) must be installed from the floor/ceiling or wall assembly (Item 1) to the tee or elbow and installed min. 12 in. (305 mm) from the junction of the tee or elbow in both directions. Secure insulation (Item 5) around tee/bellow using stainless steel hose clamps (Item 6) spaced max. 8 in. (203 mm) oc.



Reproduced by HILTI, Inc. Courtesy of Intertek Group December 16, 2014



Notes:

- Refer to section 15084 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.
- Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:
* Minimum and maximum annular space
* Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.
- If alternate details matching the field conditions are not available, manufacturer's engineering judgment drawings are acceptable. Drawings shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
- References:
* 2013 Fire Resistance Directory - Volume III or UL Products
Certified for Canada (cUL) Directory
* All governing local, provincial or national building codes
* www.UL.com/database
* www.Intertek.com
5. Firestop System installations must meet requirements of tested assemblies that provide the required assembly rating CANULC-S115.
6. All rated assemblies shall be prominently labeled with the following information:
* ATTENTION: Fire Rated Assembly
* ULC, cUL or Intertek #
* Product(s) used
* Hourly Rating (Assembly Rating)
* Installation Date

<Notes to designer (delete this note after reading and replace with title block information)>

- Any modification to these details could result in an application/system not meeting the UL/CUL Classification or the intended temperature or fire ratings.
- Details shown are up to date as of February 2015.
- For additional information on the details, refer to the most current "Underwriter's Laboratories of Canada Fire Resistance Directory Volume III" or "Underwriter's Laboratories Products Certified for Canada (cUL) Directory."

JOB NUMBER:

DRAWN:

CHECKED:

ISSUE DATE:

REVISIONS:

TYPICAL
FIRESTOP
DETAILS

SHEET NAME:

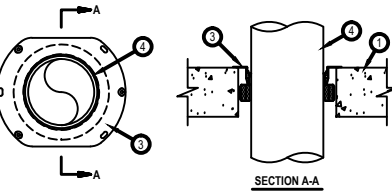
SHEET NUMBER:

M.1.4



System No. F-A-2214

F Ratings — 2 and 3 Hr (See Items 1 and 1A)
FT Ratings — 0, 1/4 and 1/2 Hr (See Items 2, 2A and 4)
FH Ratings — 2 and 3 Hr (See Items 1 and 1A)
FTH Ratings — 0, 1/4 and 1/2 Hr (See Items 2, 2A and 4)
L Rating At Ambient — Less Than 1 CFM/sq ft (See Item 3A)
L Rating At 400 F — 1 CFM/sq ft (See Item 3A)
W Rating — Class I



System tested with a pressure differential of 50 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

1. Floor Assembly — Min 2-1/2 in. (64 mm) to max 8 in. (203 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete. When concrete thickness is min 4-1/2 in. (114 mm), F and FH Rating is 3 hr.

1A. Floor Assembly — (Optional, Not Shown) — The fire rated concrete and steel deck floor assembly shall be constructed of the materials and in the manner specified in the individual D700, D800 or D900 Series designs in the UL Fire Resistance Directory and as summarized below:

A. Concrete — Min 2-1/2 in. (64 mm) to max 8 in. (203 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete, as measured over crest of fluted steel deck. When concrete topping thickness is min 4-1/2 in. (114 mm), F and FH Rating is 3 hr.
B. Steel Floor and Form Units* — Composite or non-composite max 3 in. (76 mm) deep galv steel fluted units as specified in the individual Floor-Ceiling Design.

2. Metallic Sleeve — (Optional, Not Shown) — Nom 4, 5 or 6 in. (102, 127 or 152 mm) diam Schedule 10 (or heavier) steel sleeve cast or grouted into floor assembly, flush with floor surfaces. When metallic sleeve is used, FT and FTH Rating is 0 Hr.

2A. Sheet Metal Sleeve — (Optional, Not Shown) — Nom 4, 5, 6 or 9 in. (102, 127, 152 or 229 mm) diam, min 26 ga galv steel provided with a 26 ga galv steel square flange spot welded to the sleeve at approx mid-height, or flush with bottom of sleeve in floors, and sized to be a min of 2 in. (51 mm) larger than the sleeve diam. The sleeve is to be cast in place and may extend a max of 4 in. (102 mm) below the bottom of the deck and flush with the top surface of the concrete floor. When sheet metal sleeve is used, FT and FTH Rating is 0 Hr.

3. Firestop Device* — Drop-in firestop device installed in core-drilled or sleeved opening in concrete floor assembly in accordance with accompanying installation instructions. The firestop device flange should be secured to the top surface of the floor with three 1/4 in. (6 mm) diam by min 1-1/4 in. (32 mm) long steel expansion bolts or screw anchors (installed in a triangular fashion through holes provided). As alternates to the anchors specified above, Hilti 1/4 in. (6 mm) diam by 1-1/4 in. (32 mm) long KWIK-CON II+ concrete screw anchor, Hilti 1/4 in. (6 mm) diam by 1-3/4 in. (45 mm) long KWIK-BOLT 3 steel expansion anchor or Hilti 1/4 in. (6 mm) by 3/4 in. (19 mm) long Metal HIT Anchor may be used. In addition, for nom 2 in. (51 mm), 3 in. and 4 in. (102 mm) firestop devices, four 11/16 in. (18 mm) long Hilti X-GH P18 MX steel fasteners may be installed through the steel flange, two on each side. The firestop devices shall be installed as detailed in the following table:

Core Hole or Sleeve Diam, In. (mm)	Firestop Device	Nom Diam of Through Penetrant, In. (mm)
4 (102)	CFS-DID 2"MD	2 (51) or smaller+
5 (102)	CFS-DID 3"MD	3 (76)
6 (152)	CFS-DID 4"MD	4 (102)
9 (229)	CFS-DID 6"MD	6 (152)

+ For pipe smaller than nom 2 in. (51 mm) diam, Adapter and Top Seal Plug is required to be used.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — CFS-DID 2"MD, CFS-DID 3"MD, CFS-DID 4"MD, CFS-DID 6"MD

3A. Firestop Device* - Water Barrier Module — (Optional, Not Shown) - Used in combination with the CFS-DID device and supplied by device manufacturer. Module is threaded onto top of device.

W Rating and L Rating apply only when water barrier module is used.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — Water Barrier Module

4. Through Penetrant — One nonmetallic pipe to be installed within the firestop device. Pipe to be rigidly supported on both sides of floor assembly. The following types of pipe may be used:

- Polyvinyl Chloride (PVC) Pipe — Nom 6 in. (152 mm) 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.
- Acrylonitrile Butadiene Styrene (ABS) Pipe — Nom 6 in. (152 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.
- 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) or vented (drain, waste or vent) piping system.
- Flame Retardant Polypropylene (FRPP) Pipe — Nom 6 in. (152 mm) diam (or smaller) Schedule 40 (or heavier) FRPP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 4 in. (102 mm) diam (or smaller) SDR 11 CPVC for use in closed (process or supply) piping systems.

IPEX INC. — Aquaflex

FT and FTH Rating is 1/4 hr when Pipe D is used.

*Bearing the UL Classification Mark



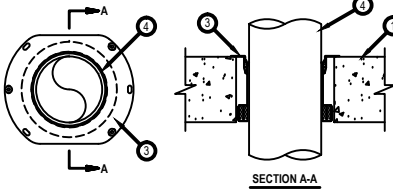
Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. May 18, 2011



System No. F-B-2049

F Rating — 3 Hr
FT Ratings — 0 and 1/2 Hr (See Items 2, 2A and 4)
FH Rating — 3 Hr
FTH Ratings — 0 and 1/2 Hr (See Items 2, 2A and 4)
L Rating At Ambient — Less Than 1 CFM/sq ft (See Item 3A)
L Rating At 400 F — 1 CFM/sq ft (See Item 3A)
W Rating — Class I (See Item 3A)



System tested with a pressure differential of 50 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

1. Floor Assembly — Min 6 in. (152 mm) to max 12 in. (305 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete.
1A. Floor Assembly — (Optional, Not Shown) — The fire rated concrete and steel deck floor assembly shall be constructed of the materials and in the manner specified in the individual D700, D800 or D900 Series designs in the UL Fire Resistance Directory and as summarized below:

A. Concrete — Min 6 in. (152 mm) to max 12 in. (305 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete, as measured over crest of fluted steel deck.

B. Steel Floor and Form Units* — Composite or non-composite max 3 in. (76 mm) deep galv steel fluted units as specified in the individual Floor-Ceiling Design.

2. Metallic Sleeve — (Optional, Not Shown) — Nom 4, 5 or 6 in. (102, 127 or 152 mm) diam Schedule 10 (or heavier) steel sleeve cast or grouted into floor assembly, flush with floor surfaces. When metallic sleeve is used, FT and FTH Rating is 0 Hr.

2A. Sheet Metal Sleeve — (Optional, Not Shown) — Nom 4, 5, 6 or 9 in. (102, 127, 152 or 229 mm) diam, min 26 ga galv steel provided with a 26 ga galv steel square flange spot welded to the sleeve at approx mid-height, or flush with bottom of sleeve in floors, and sized to be a min of 2 in. (51 mm) larger than the sleeve diam. The sleeve is to be cast in place and may extend a max of 4 in. (102 mm) below the bottom of the deck and flush with the top surface of the concrete floor. When sheet metal sleeve is used, FT and FTH Rating is 0 Hr.

3. Firestop Device* — Drop-in firestop device installed in core-drilled or sleeved opening in concrete floor assembly in accordance with accompanying installation instructions. The firestop device flange should be secured to the top surface of the floor with three 1/4 in. (6 mm) diam by min 1-1/4 in. (32 mm) long steel expansion bolts or screw anchors (installed in a triangular fashion through holes provided). As alternates to the anchors specified above, Hilti 1/4 in. (6 mm) diam by 1-1/4 in. (32 mm) long KWIK-CON II+ concrete screw anchor, Hilti 1/4 in. (6 mm) diam by 1-3/4 in. (45 mm) long KWIK-BOLT 3 steel expansion anchor or Hilti 1/4 in. (6 mm) by 3/4 in. (19 mm) long Metal HIT Anchor may be used. In addition, for nom 2 in. (51 mm), 3 in. and 4 in. (102 mm) firestop devices, four 11/16 in. (18 mm) long Hilti X-GH P18 MX steel fasteners may be installed through the steel flange, two on each side. The firestop devices shall be installed as detailed in the following table:

Core Hole or Sleeve Diam, In. (mm)	Firestop Device	Nom Diam of Through Penetrant, In. (mm)
4 (102)	CFS-DID 2" C	2 (51) or smaller+
5 (102)	CFS-DID 3" C	3 (76)
6 (152)	CFS-DID 4" C	4 (102)
9 (229)	CFS-DID 6" C	6 (152)

+ For pipe smaller than nom 2 in. (51 mm) diam, Adapter and Top Seal Plug is required to be used.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — CFS-DID 2" C, CFS-DID 3" C, CFS-DID 4" C, CFS-DID 6" C

3A. Firestop Device* - Water Barrier Module — (Optional, Not Shown) - Used in combination with the CFS-DID device and supplied by device manufacturer. Module is threaded onto top of device.

W Rating and L Ratings apply only when water barrier module is used.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — Water Barrier Module

4. Through Penetrant — One nonmetallic pipe to be installed within the firestop device. Pipe to be rigidly supported on both sides of floor assembly. The following types of pipe may be used:

- Polyvinyl Chloride (PVC) Pipe — Nom 6 in. (152 mm) 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.
- Acrylonitrile Butadiene Styrene (ABS) Pipe — Nom 6 in. (152 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.
- 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) or vented (drain, waste or vent) piping system.
- Flame Retardant Polypropylene (FRPP) Pipe — Nom 4 in. (102 mm) diam (or smaller) Schedule 40 (or heavier) FRPP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 4 in. (102 mm) diam (or smaller) SDR 11 CPVC for use in closed (process or supply) piping systems.

IPEX INC. — Aquaflex

FT and FTH Rating is 1/4 hr when Pipe D is used.

*Bearing the UL Classification Mark



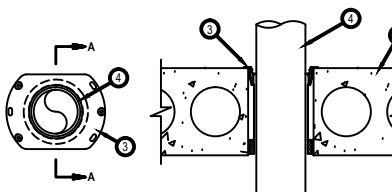
Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. May 18, 2011



System No. F-B-2051

F Rating — 3 Hr
FT Ratings — 0 and 1/2 Hr (See Items 2 and 4)
FH Rating — 3 Hr
FTH Ratings — 0 and 1/2 Hr (See Items 2 and 4)
L Rating At Ambient — Less Than 1 CFM/sq ft (See Item 3A)
L Rating At 400 F — 1 CFM/sq ft (See Item 3A)
W Rating — Class I (See Item 3A)



System tested with a pressure differential of 50 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

1. Floor Assembly — Min 6 in. (152 mm) to max 12-1/2 in. (318 mm) thick UL Classified hollow core Precast Concrete Units*. Max diam of opening is 6 in. (152 mm).

2. Sheet Metal Sleeve — (Optional, Not Shown) — Nom 4, 5 or 6 in. (102, 127 or 152 mm) diam, min 26 ga galv steel and having a min 2 in. (51 mm) lap along the longitudinal seam, and may extend a max of 4 in. (102 mm) below the bottom of the deck and flush with the top surface of the concrete floor. Sleeve installed by coiling the sheet steel to a diam smaller than the through opening, inserting the coil through the openings and releasing the coil to let it uncoil against the opening.

When sheet metal sleeve is used, FT and FTH Rating is 0 Hr.

3. Firestop Device* — Drop-in firestop device installed in core-drilled or sleeved opening in concrete floor assembly in accordance with accompanying installation instructions. The firestop device shall extend a max 1/2 in. (13 mm) below the bottom surface of the floor or may be recessed a max of 1/2 in. from the bottom surface of the floor. The firestop device flange should be secured to the top surface of the floor with three 1/4 in. (6 mm) diam by min 1-1/4 in. (32 mm) long steel expansion bolts or screw anchors (installed in a triangular fashion through holes provided). As alternates to the anchors specified above, Hilti 1/4 in. (6 mm) diam by 1-1/4 in. (32 mm) long KWIK-CON II+ concrete screw anchor, Hilti 1/4 in. (6 mm) by 1-3/4 in. (45 mm) long KWIK-BOLT 3 steel expansion anchor or Hilti 1/4 in. (6 mm) by 3/4 in. (19 mm) long Metal HIT Anchor may be used. In addition, for nom 2 in. (51 mm), 3 in. and 4 in. (102 mm) firestop devices, four 11/16 in. (18 mm) long Hilti X-GH P18 MX steel fasteners may be installed through the steel flange, two on each side. The firestop devices shall be installed as detailed in the following table:

Core Hole or Sleeve Diam, In. (mm)	Firestop Device	Nom Diam of Through Penetrant, In. (mm)	Min-Max Floor Thickness, In. (mm)
4 (102)	CFS-DID 2" C	2 (51) or smaller+	6 - 6-1/2 (152 - 165)
5 (102)	CFS-DID 3" C	3 (76)	6 - 6-1/2 (152 - 165)
6 (152)	CFS-DID 4" C	4 (102)	6 - 6-1/2 (152 - 165)
4 (102)	CFS-DID 2" HC8	2 (51) or smaller+	7-1/2 - 8-1/2 (191 - 216)
5 (102)	CFS-DID 3" HC8	3 (76)	7-1/2 - 8-1/2 (191 - 216)
6 (152)	CFS-DID 4" HC8	4 (102)	7-1/2 - 8-1/2 (191 - 216)
4 (102)	CFS-DID 2" HC10	2 (51) or smaller+	9-1/2 - 10-1/2 (241 - 267)
5 (102)	CFS-DID 3" HC10	3 (76)	9-1/2 - 10-1/2 (241 - 267)
6 (152)	CFS-DID 4" HC10	4 (102)	9-1/2 - 10-1/2 (241 - 267)
4 (102)	CFS-DID 2" HC12	2 (51) or smaller+	11-1/2 - 12-1/2 (292 - 318)
5 (102)	CFS-DID 3" HC12	3 (76)	11-1/2 - 12-1/2 (292 - 318)
6 (152)	CFS-DID 4" HC12	4 (102)	11-1/2 - 12-1/2 (292 - 318)

+ For pipe smaller than nom 2 in. (51 mm) diam, Adapter and Top Seal Plug is required to be used.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — CFS-DID 2" C, CFS-DID 3" C, CFS-DID 4" C, CFS-DID 2" HC10, CFS-DID 3" HC10, CFS-DID 4" HC10, CFS-DID 2" HC12, CFS-DID 3" HC12, CFS-DID 4" HC12

3A. Firestop Device* - Water Barrier Module — (Optional, Not Shown) - Used in combination with the CFS-DID device and supplied by device manufacturer. Module is threaded onto top of device.

W Rating and L Rating apply only when water barrier module is used.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — Water Barrier Module

4. Through Penetrant — One nonmetallic pipe to be installed within the firestop device. Pipe to be rigidly supported on both sides of floor assembly. The following types of pipe may be used:

- Polyvinyl Chloride (PVC) Pipe — Nom 4 in. (102 mm) 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.
- Acrylonitrile Butadiene Styrene (ABS) Pipe — Nom 4 in. (102 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.
- Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 4 in. (102 mm) diam (or smaller) SDR 13.5 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
- Flame Retardant Polypropylene (FRPP) Pipe — Nom 4 in. (102 mm) diam (or smaller) Schedule 40 (or heavier) FRPP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 4 in. (102 mm) diam (or smaller) SDR 11 CPVC for use in closed (process or supply) piping systems.

IPEX INC. — Aquaflex

FT and FTH Rating is 1/4 hr when Pipe D is used.

*Bearing the UL Classification Mark



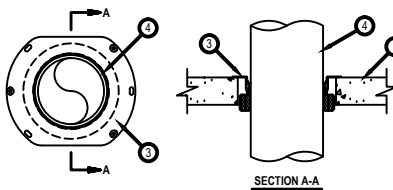
Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. May 18, 2011



System No. F-A-1128

ANSI/UL1479 (ASTM E814)	CANULC S115
F Ratings — 2 and 3 Hr (See Items 1 and 1A)	F Ratings — 2 and 3 Hr (See Items 1 and 1A)
FT Ratings — 0 and 1/4 Hr (See Item 2)	FT Ratings — 0 and 1/4 Hr (See Item 2)
L Rating At Ambient — Less Than 1 CFM/sq ft (See Item 3A)	FH Ratings — 2 and 3 Hr (See Items 1 and 1A)
L Rating At 400 F — Less Than 1 CFM/sq ft (See Item 3A)	FTH Ratings — 0 and 1/4 Hr (See Item 2)
W Rating — Class I (See Item 3A)	L Rating At Ambient — Less Than 1 CFM/sq ft (See Item 3A)
	L Rating At 400 F — Less Than 1 CFM/sq ft (See Item 3A)



1. Floor Assembly — Min 2-1/2 in. (64 mm) to max 8 in. (203 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete. When concrete thickness is min 4-1/2 in. (114 mm), the F and FH Ratings are 3 hr.

1A. Floor Assembly — (Optional, Not Shown) — The fire rated concrete and steel deck floor assembly shall be constructed of the materials and in the manner specified in the individual D700, D800 or D900 Series designs in the UL Fire Resistance Directory and as summarized below:

A. Concrete — Min 2-1/2 in. (64 mm) to max 8 in. (203 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete, as measured over crest of fluted steel deck. When concrete topping thickness is min 4-1/2 in. (114 mm), F and FH Ratings are 3 hr.

B. Steel Floor and Form Units* — Composite or non-composite max 3 in. (76 mm) deep galv steel fluted units as specified in the individual Floor-Ceiling Design.

2. Metallic Sleeve — (Optional, Not Shown) — Nom 4, 5 or 6 in. (102, 127 or 152 mm) diam Schedule 10 (or heavier) steel sleeve cast or grouted into floor assembly, flush with floor surfaces. When metallic sleeve is used, the FT and FTH Ratings are 0 Hr.

2A. Sheet Metal Sleeve — (Optional, Not Shown) — Nom 4, 5, 6 or 9 in. (102, 127, 152 or 229 mm) diam, min 26 ga galv steel provided with a 26 ga galv steel square flange spot welded to the sleeve at approx mid-height, or flush with bottom of sleeve in floors, and sized to be a min of 2 in. (51 mm) larger than the sleeve diam. The sleeve is to be cast in place and may extend a max of 4 in. (102 mm) below the bottom of the deck and flush with the top surface of the concrete floor. When sheet metal sleeve is used, the FT and FTH Ratings are 0 Hr.

3. Firestop Device* — Drop-in firestop device installed in core-drilled or sleeved opening in concrete floor assembly in accordance with accompanying installation instructions. The firestop device flange should be secured to the top surface of the floor with three 1/4 in. (6 mm) diam by min 1-1/4 in. (32 mm) long steel expansion bolts or screw anchors (installed in a triangular fashion through holes provided). As alternates to the anchors specified above, Hilti 1/4 in. (6 mm) diam by 1-1/4 in. (32 mm) long KWIK-CON II+ concrete screw anchor, Hilti 1/4 in. (6 mm) diam by 1-3/4 in. (45 mm) long KWIK-BOLT 3 steel expansion anchor or Hilti 1/4 in. (6 mm) by 3/4 in. (19 mm) long Metal HIT Anchor may be used. In addition, for nom 2 in. (51 mm), 3 in. (76 mm) and 4 in. (102 mm) firestop devices, four 11/16 in. (18 mm) long Hilti X-GH P18 MX steel fasteners may be installed through the steel flange, two on each side. The firestop devices shall be installed as detailed in the following table:

Core Hole or Sleeve Diam, In. (mm)	Firestop Device	Nom Diam of Through Penetrant, In. (mm)
4 (102)	CFS-DID 2"MD	2 (51) or smaller+
5 (102)	CFS-DID 3"MD	3 (76)
6 (152)	CFS-DID 4"MD	4 (102)
9 (229)	CFS-DID 6"MD	6 (152)

+ For pipe smaller than nom 2 in. (51 mm) diam, Adapter and Top Seal Plug is required to be used.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — CFS-DID 2"MD, CFS-DID 3"MD, CFS-DID 4"MD, CFS-DID 6"MD

3A. Firestop Device* - Water Barrier Module — (Optional, Not Shown) - Used in combination with the CFS-DID device and supplied by device manufacturer. Module is threaded onto top of device.

W Rating and L Rating apply only when water barrier module is used.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — Water Barrier Module

4. Through Penetrant — One metallic pipe, conduit or tubing to be installed within the firestop device. Pipe, conduit or tubing to be rigidly supported on both sides of floor assembly. The following types of pipe, conduit or tubing may be used:

- Steel Pipe — Nom 6 in. (152 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
- Iron Pipe — Nom 6 in. (152 mm) diam (or smaller) cast or ductile iron pipe.
- Conduit — Nom 6 in. (152 mm) diam (or smaller) rigid steel conduit.
- Conduit — Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing.
- Copper Tubing — Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.
- Copper Pipe — Nom 6 in. (152 mm) diam (or smaller) Regular or heavier copper pipe.

*Bearing the UL Classification Mark



Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. December 21, 2011

Notes:

- Refer to section 15084 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.
- Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:

- Minimum and maximum annular space
- Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.

- If alternate details matching the field conditions are not available, manufacturer's engineering judgment drawings are acceptable. Drawings shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering

- References:
 - 2013 Fire Resistance Directory - Volume III or UL Products Certified for Canada (cUL) Directory
 - All governing local, provincial or national building codes
 - www.UL.com/database
 - www.Intertek.com

- Firestop System installations must meet requirements of tested assemblies that provide the required assembly rating CAN/ULC-S115.

- All rated assemblies shall be prominently labeled with the following information:
 - ATTENTION: Fire Rated Assembly
 - ULC, cUL or Intertek #
 - Product(s) used
 - Hourly Rating (Assembly Rating)
 - Installation Date

<Notes to designer (delete this note after reading and replace with title block information)>

- Any modification to these details could result in an application/system not meeting the UL/cUL Classification or the intended temperature or fire ratings.
- Details shown are up to date as of February 2015.
- For additional information on the details, refer to the most current "Underwriter's Laboratories of Canada Fire Resistance Directory Volume III" or "Underwriter's Laboratories Products Certified for Canada (cUL) Directory."

JOB NUMBER:

DRAWN:

CHECKED:

ISSUE DATE:

REVISIONS:

TYPICAL

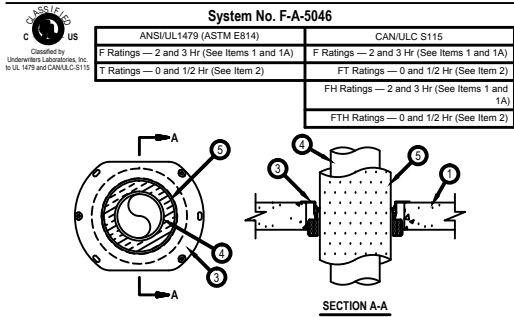
FIRESTOP

DETAILS

SHEET NAME:

SHEET NUMBER:

M.2.4



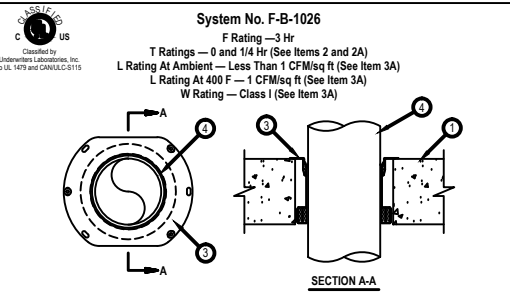
- Floor Assembly — Min 2-1/2 in. (64 mm) to max 8 in. (203 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete. When concrete thickness is min 4-1/2 in. (114 mm), F Rating is 3 hr.
1A. Floor Assembly — (Optional, Not Shown) — The fire rated concrete and steel deck floor assembly shall be constructed of the materials and in the manner specified in the individual D700, D800 or D900 Series designs in the UL Fire Resistance Directory and as summarized below:
A. Concrete — Min 2-1/2 in. (64 mm) to max 8 in. (203 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete, as measured over crest of fluted steel deck. When concrete topping thickness is min 4-1/2 in. (114 mm), the F and FH Ratings are 3 hr.
B. Steel Floor and Form Units* — Composite or non-composite max 3 in. (76 mm) deep galv steel fluted units as specified in the individual Floor-Ceiling Design.
- Metallic Sleeve — (Optional, Not Shown) — Nom 4, 5, 6 or 6 in. (102, 127 or 152 mm) diam Schedule 10 (or heavier) steel sleeve cast or grouted into floor assembly, flush with floor surfaces. When metallic sleeve is used, the T, FT and FH Ratings are 0 Hr.
- Sheet Metal Sleeve — (Optional, Not Shown) — Nom 4, 5, 6 or 9 in. (102, 127, 152 or 229 mm) diam, min 26 ga galv steel provided with a 26 ga galv steel square flange spot welded to the sleeve at approx mid-height, or flush with bottom of sleeve in floors, and sized to be a min of 2 in. (51 mm) larger than the sleeve diam. The sleeve is to be cast in place and may extend a max of 4 in. (102 mm) below the bottom of the deck and flush with the top surface of the concrete floor. When sheet metal sleeve is used, the T, FT and FTH Ratings are 0 Hr.
- Firestop Device* — Drop-in firestop device installed in core-drilled or sleeved opening in concrete floor assembly in accordance with accompanying installation instructions. The firestop device flange should be secured to the top surface of the floor with three 1/4 in. (6 mm) diam by min 1-1/4 in. (32 mm) long steel expansion bolts or screw anchors (installed in a triangular fashion through holes provided). As alternates to the anchors specified above, Hilti 1/4 in. (6 mm) diam by 1-1/4 in. (32 mm) long KWIK-CON II+ concrete screw anchor, Hilti 1/4 in. (6 mm) diam by 1-3/4 in. (45 mm) long KWIK-BOLT 3 steel expansion anchor or Hilti 1/4 in. (6 mm) by 3/4 in. (19 mm) long Metal HIT Anchor may be used. In addition, for nom 2 in. (51 mm), 3 in. (76 mm) and 4 in. (102 mm) firestop devices, four 11/16 in. (18 mm) long Hilti X-GH P18 MX steel fasteners may be installed through the steel flange, two on each side. The firestop devices shall be installed as detailed in the following table:

Nom Pipe or Tube (Item 4) Diam, in. (mm)	Insulation Type (Item 5 or 5A) and Thickness, in. (mm)	Firestop Device	Core Hole or Sleeve Diam, in. (mm)
1/2 (13)	3/4 or 1 (19 or 25) AB/PVC	CFS-DID 2"MD	4 (102)
1 (25)	3/4 or 1 (19 or 25) AB/PVC	CFS-DID 3"MD	5 (127)
2 (51)	3/4 or 1 (19 or 25) AB/PVC	CFS-DID 4"MD	6 (152)
4 (102)	3/4 or 1 (19 or 25) AB/PVC	CFS-DID 6"MD	9 (229)
1/2 (13)	1 (25) Glass Fiber	CFS-DID 2"MD	4 (102)
1 (25)	1 (25) Glass Fiber	CFS-DID 3"MD	5 (127)
1 (25)	1-1/2 (38) Glass Fiber	CFS-DID 4"MD	6 (152)
2 (51)	1 (25) Glass Fiber	CFS-DID 4"MD	6 (152)
2 (51)	2 (51) Glass Fiber	CFS-DID 6"MD	9 (229)
4 (102)	1 (25) Glass Fiber	CFS-DID 6"MD	9 (229)

- HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CFS-DID 2"MD, CFS-DID 3"MD, CFS-DID 4"MD, CFS-DID 6"MD
- Through Penetrant — One metallic pipe or tubing to be installed within the firestop device. Pipe or tubing to be rigidly supported on both sides of floor assembly. The following types of pipe or tubing may be used:
A. Steel Pipe — Nom 4 in. (102 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
B. Iron Pipe — Nom 4 in. (102 mm) diam (or smaller) cast or ductile pipe.
C. Copper Tubing — Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tubing.
D. Copper Pipe — Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
 - Tube Insulation - Plastics+ — Nom 3/4 or 1 in. (19 or 25 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing.
See Plastics+ (CMFZ2) Category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL94 Flammability Classification of 94-5VA may be used.
 - Pipe Covering* — Nom 1, 1-1/2 or 2 in. (25, 38 or 51 mm) thick 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 SSL tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product.
See Pipe and Equipment Covering-Materials (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
*Bearing the UL Classification Mark



Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc.
December 21, 2011



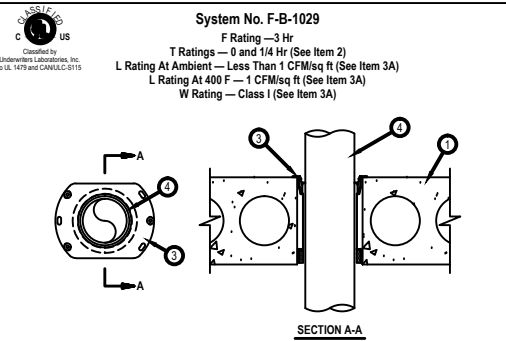
- Floor Assembly — Min 6 in. (152 mm) to max 12 in. (305 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete.
1A. Floor Assembly — (Optional, Not Shown) — The fire rated concrete and steel deck floor assembly shall be constructed of the materials and in the manner specified in the individual D700, D800 or D900 Series designs in the UL Fire Resistance Directory and as summarized below:
A. Concrete — Min 6 in. (152 mm) to max 12 in. (305 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete, as measured over crest of fluted steel deck.
B. Steel Floor and Form Units* — Composite or non-composite max 3 in. (76 mm) deep galv steel fluted units as specified in the individual Floor-Ceiling Design.
- Metallic Sleeve — (Optional, Not Shown) — Nom 4, 5, 6 or 6 in. (102, 127 or 152 mm) diam Schedule 10 (or heavier) steel sleeve cast or grouted into floor assembly, flush with floor surfaces. When metallic sleeve is used, T Rating is 0 Hr.
- Sheet Metal Sleeve — (Optional, Not Shown) — Nom 4, 5, 6 or 9 in. (102, 127, 152 or 229 mm) diam, min 26 ga galv steel provided with a 26 ga galv steel square flange spot welded to the sleeve at approx mid-height, or flush with bottom of sleeve in floors, and sized to be a min of 2 in. (51 mm) larger than the sleeve diam. The sleeve is to be cast in place and may extend a max of 4 in. (102 mm) below the bottom of the deck and flush with the top surface of the concrete floor. When sheet metal sleeve is used, T Rating is 0 Hr.
- Firestop Device* — Drop-in firestop device installed in core-drilled or sleeved opening in concrete floor assembly in accordance with accompanying installation instructions. The firestop device flange should be secured to the top surface of the floor with three 1/4 in. (6 mm) diam by min 1-1/4 in. (32 mm) long steel expansion bolts or screw anchors (installed in a triangular fashion through holes provided). As alternates to the anchors specified above, Hilti 1/4 in. (6 mm) diam by 1-1/4 in. (32 mm) long KWIK-CON II+ concrete screw anchor, Hilti 1/4 in. (6 mm) diam by 1-3/4 in. (45 mm) long KWIK-BOLT 3 steel expansion anchor or Hilti 1/4 in. (6 mm) by 3/4 in. (19 mm) long Metal HIT Anchor may be used. In addition, for nom 2 in. (51 mm), 3 in. (76 mm) and 4 in. (102 mm) firestop devices, four 11/16 in. (18 mm) long Hilti X-GH P18 MX steel fasteners may be installed through the steel flange, two on each side. The firestop devices shall be installed as detailed in the following table:

Core Hole or Sleeve Diam, in. (mm)	Firestop Device	Nom Diam of Through Penetrant, in. (mm)
4 (102)	CFS-DID 2" C	2 (51) or smaller**
5 (102)	CFS-DID 3" C	3 (76)
6 (152)	CFS-DID 4" C	4 (102)
9 (229)	CFS-DID 6" C	6 (152)

- + For pipe smaller than nom 2 in. (51 mm) diam, Adapter and Top Seal Plug is required to be used.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CFS-DID 2" C, CFS-DID 3" C, CFS-DID 4" C, CFS-DID 6" C
- Firestop Device* - Water Barrier Module — (Optional, Not Shown) - Used in combination with the CFS-DID device and supplied by device manufacturer. Module is threaded onto top of device.
W Rating and L Rating apply only when water barrier module is used.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — Water Barrier Module
 - Through Penetrant — One metallic pipe, conduit or tubing to be installed within the firestop device. Pipe, conduit or tubing to be rigidly supported on both sides of floor assembly. The following types of pipe, conduit or tubing may be used:
A. Steel Pipe — Nom 6 in. (152 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
B. Iron Pipe — Nom 6 in. (152 mm) diam (or smaller) cast or ductile iron pipe.
C. Conduit — Nom 6 in. (152 mm) diam (or smaller) rigid steel conduit.
D. Conduit — Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing.
E. Copper Tubing — Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.
F. Copper Pipe — Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe.
*Bearing the UL Classification Mark



Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc.
May 18, 2011



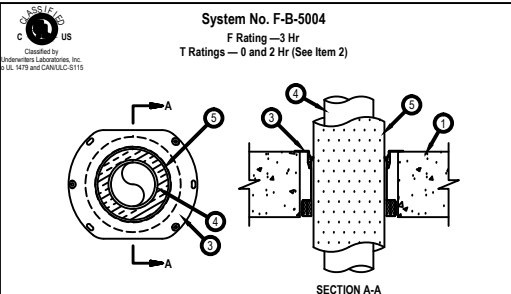
- Floor Assembly — Min 6 in. (152 mm) to max 12-1/2 in. (318 mm) thick UL Classified hollow core Precast Concrete Units*. Max diam of opening is 6 in. (152 mm).
See Precast Concrete Units (CFTV) categories in the Fire Resistance Directory for names of manufacturers.
- Sheet Metal Sleeve — (Optional, Not Shown) — Nom 4, 5 or 6 in. (102, 127 or 152 mm) diam, min 26 ga galv steel and having a min 2 in. (51 mm) lap along the longitudinal seam, and may extend a max of 4 in. (102 mm) below the bottom of the deck and flush with the top surface of the concrete floor. Sleeve installed by rolling the sheet steel to a diam smaller than the through opening, inserting the coil through the openings and releasing the coil to let it uncoil against the opening.
When sheet metal sleeve is used, T Rating is 0 Hr.
- Firestop Device* — Drop-in firestop device installed in core-drilled or sleeved opening in concrete floor assembly in accordance with accompanying installation instructions. The firestop device shall extend a max 1/2 in. (13 mm) below the bottom surface of the floor or may be recessed a max of 1/2 in. from the bottom surface of the floor. The firestop device flange should be secured to the top surface of the floor with three 1/4 in. (6 mm) diam by min 1-1/4 in. (32 mm) long steel expansion bolts or screw anchors (installed in a triangular fashion through holes provided). As alternates to the anchors specified above, Hilti 1/4 in. (6 mm) diam by 1-1/4 in. (32 mm) long KWIK-CON II+ concrete screw anchor, Hilti 1/4 in. (6 mm) diam by 1-3/4 in. (45 mm) long KWIK-BOLT 3 steel expansion anchor or Hilti 1/4 in. (6 mm) by 3/4 in. (19 mm) long Metal HIT Anchor may be used. In addition, for nom 2 in. (51 mm), 3 in. (76 mm) and 4 in. (102 mm) firestop devices, four 11/16 in. (18 mm) long Hilti X-GH P18 MX steel fasteners may be installed through the steel flange, two on each side. The firestop devices shall be installed as detailed in the following table:

Core Hole or Sleeve Diam, in. (mm)	Firestop Device	Nom Diam of Through Penetrant, in. (mm)	Min-Max Floor Thickness, in. (mm)
4 (102)	CFS-DID 2" C	2 (51) or smaller**	6 - 6-1/2 (152 - 165)
5 (102)	CFS-DID 3" C	3 (76)	6 - 6-1/2 (152 - 165)
6 (152)	CFS-DID 4" C	4 (102)	6 - 6-1/2 (152 - 165)
4 (102)	CFS-DID 2" HC8	2 (51) or smaller**	7-1/2 - 8-1/2 (191 - 216)
5 (102)	CFS-DID 3" HC8	3 (76)	7-1/2 - 8-1/2 (191 - 216)
6 (152)	CFS-DID 4" HC8	4 (102)	7-1/2 - 8-1/2 (191 - 216)
4 (102)	CFS-DID 2" HC10	2 (51) or smaller**	9-1/2 - 10-1/2 (241 - 267)
5 (102)	CFS-DID 3" HC10	3 (76)	9-1/2 - 10-1/2 (241 - 267)
6 (152)	CFS-DID 4" HC10	4 (102)	9-1/2 - 10-1/2 (241 - 267)
4 (102)	CFS-DID 2" HC12	2 (51) or smaller**	11-1/2 - 12-1/2 (292 - 318)
5 (102)	CFS-DID 3" HC12	3 (76)	11-1/2 - 12-1/2 (292 - 318)
6 (152)	CFS-DID 4" HC12	4 (102)	11-1/2 - 12-1/2 (292 - 318)

- + For pipe smaller than nom 2 in. (51 mm) diam, Adapter and Top Seal Plug is required to be used.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CFS-DID 2" C, CFS-DID 3" C, CFS-DID 4" C, CFS-DID 2" HC8, CFS-DID 3" HC8, CFS-DID 4" HC8, CFS-DID 2" HC10, CFS-DID 3" HC10, CFS-DID 4" HC10, CFS-DID 2" HC12, CFS-DID 3" HC12, CFS-DID 4" HC12
- Firestop Device* - Water Barrier Module — (Optional, Not Shown) - Used in combination with the CFS-DID device and supplied by device manufacturer. Module is threaded onto top of device.
W Rating and L Rating apply only when water barrier module is used.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — Water Barrier Module
 - Through Penetrant — One metallic pipe, conduit or tubing to be installed within the firestop device. Pipe, conduit or tubing to be rigidly supported on both sides of floor assembly. The following types of pipe, conduit or tubing may be used:
A. Steel Pipe — Nom 4 in. (102 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
B. Iron Pipe — Nom 4 in. (102 mm) diam (or smaller) cast or ductile iron pipe.
C. Conduit — Nom 4 in. (102 mm) diam (or smaller) rigid steel conduit.
D. Conduit — Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing.
E. Copper Tubing — Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tubing.
F. Copper Pipe — Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
*Bearing the UL Classification Mark



Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc.
May 18, 2011



- Floor Assembly — Min 6 in. (152 mm) to max 12 in. (305 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete.
1A. Floor Assembly — (Optional, Not Shown) — The fire rated concrete and steel deck floor assembly shall be constructed of the materials and in the manner specified in the individual D700, D800 or D900 Series designs in the UL Fire Resistance Directory and as summarized below:
A. Concrete — Min 6 in. (152 mm) to max 12 in. (305 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete, as measured over crest of fluted steel deck.
B. Steel Floor and Form Units* — Composite or non-composite max 3 in. (76 mm) deep galv steel fluted units as specified in the individual Floor-Ceiling Design.
- Metallic Sleeve — (Optional, Not Shown) — Nom 4, 5 or 6 in. (102, 127 or 152 mm) diam Schedule 10 (or heavier) steel sleeve cast or grouted into floor assembly, flush with floor surfaces. When metallic sleeve is used, T Rating is 0 Hr.
- Sheet Metal Sleeve — (Optional, Not Shown) — Nom 4, 5, 6 or 9 in. (102, 127, 152 or 229 mm) diam, min 26 ga galv steel provided with a 26 ga galv steel square flange spot welded to the sleeve at approx mid-height, or flush with bottom of sleeve in floors, and sized to be a min of 2 in. (51 mm) larger than the sleeve diam. The sleeve is to be cast in place and may extend a max of 4 in. (102 mm) below the bottom of the deck and flush with the top surface of the concrete floor. When sheet metal sleeve is used, T Rating is 0 Hr.
- Firestop Device* — Drop-in firestop device installed in core-drilled or sleeved opening in concrete floor assembly in accordance with accompanying installation instructions. The firestop device flange should be secured to the top surface of the floor with three 1/4 in. (6 mm) diam by min 1-1/4 in. (32 mm) long steel expansion bolts or screw anchors (installed in a triangular fashion through holes provided). As alternates to the anchors specified above, Hilti 1/4 in. (6 mm) diam by 1-1/4 in. (32 mm) long KWIK-CON II+ concrete screw anchor, Hilti 1/4 in. (6 mm) diam by 1-3/4 in. (45 mm) long KWIK-BOLT 3 steel expansion anchor or Hilti 1/4 in. (6 mm) by 3/4 in. (19 mm) long Metal HIT Anchor may be used. In addition, for nom 2 in. (51 mm), 3 in. (76 mm) and 4 in. (102 mm) firestop devices, four 11/16 in. (18 mm) long Hilti X-GH P18 MX steel fasteners may be installed through the steel flange, two on each side. The firestop devices shall be installed as detailed in the following table:

Nom Pipe or Tube (Item 4) Diam, in. (mm)	Insulation Type (Item 5 or 5A) and Thickness, in. (mm)	Firestop Device	Core Hole or Sleeve Diam, in. (mm)
1/2 (13)	3/4 or 1 (19 or 25) AB/PVC	CFS-DID 2" C	4 (102)
1 (25)	3/4 or 1 (19 or 25) AB/PVC	CFS-DID 3" C	5 (127)
2 (51)	3/4 or 1 (19 or 25) AB/PVC	CFS-DID 4" C	6 (152)
4 (102)	3/4 or 1 (19 or 25) AB/PVC	CFS-DID 6" C	9 (229)
1/2 (13)	1 (25) Glass Fiber	CFS-DID 2" C	4 (102)
1 (25)	1 (25) Glass Fiber	CFS-DID 3" C	5 (127)
1 (25)	1-1/2 (38) Glass Fiber	CFS-DID 4" C	6 (152)
2 (51)	1 (25) Glass Fiber	CFS-DID 4" C	6 (152)
2 (51)	2 (51) Glass Fiber	CFS-DID 6" C	9 (229)
4 (102)	1 (25) Glass Fiber	CFS-DID 6" C	9 (229)

- HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CFS-DID 2" C, CFS-DID 3" C, CFS-DID 4" C, CFS-DID 6" C
- Through Penetrant — One metallic pipe or tubing to be installed within the firestop device. Pipe or tubing to be rigidly supported on both sides of floor assembly. The following types of pipe or tubing may be used:
A. Steel Pipe — Nom 4 in. (102 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
B. Iron Pipe — Nom 4 in. (102 mm) diam (or smaller) cast or ductile pipe.
C. Copper Tubing — Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tubing.
D. Copper Pipe — Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
 - Tube Insulation - Plastics+ — Nom 3/4 or 1 in. (19 or 25 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing.
See Plastics+ (CMFZ2) Category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL94 Flammability Classification of 94-5VA may be used.
 - Pipe Covering* — Nom 1, 1-1/2 or 2 in. (25, 38 or 51 mm) thick 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 SSL tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product.
See Pipe and Equipment Covering-Materials (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.



Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc.
May 18, 2011

Notes:

- Refer to section 15084 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.
- Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:
* Minimum and maximum annular space
* Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.
- If alternate details matching the field conditions are not available, manufacturer's engineering judgment drawings are acceptable. Drawings shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
- References:
* 2013 Fire Resistance Directory - Volume III or UL Products Certified for Canada (cUL) Directory
* All governing local, provincial or national building codes
* www.UL.com/database
* www.Intertek.com
- Firestop System installations must meet requirements of tested assemblies that provide the required assembly rating CAN/ULC-S115.
- All rated assemblies shall be prominently labeled with the following information:
* ATTENTION: Fire Rated Assembly
* ULC, cUL or Intertek #
* Product(s) used
* Hourly Rating (Assembly Rating)
* Installation Date

<Notes to designer (delete this note after reading and replace with title block information)>

- Any modification to these details could result in an application/system not meeting the UL/CUL Classification or the intended temperature or fire ratings.
- Details shown are up to date as of February 2015.
- For additional information on the details, refer to the most current "Underwriter's Laboratories of Canada Fire Resistance Directory Volume III" or "Underwriter's Laboratories Products Certified for Canada (cUL) Directory.

JOB NUMBER:

DRAWN:

CHECKED:

ISSUE DATE:

REVISIONS:

TYPICAL
FIRESSTOP
DETAILS

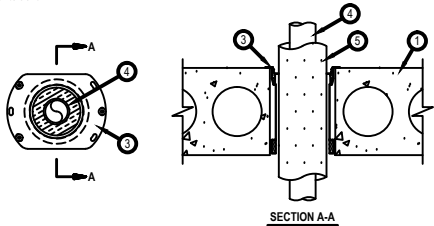
SHEET NAME:

SHEET NUMBER:

M.3.4



System No. F-B-5005
F Rating —3 Hr
T Ratings — 0 and 2 Hr (See Item 2)



1. Floor Assembly — Min 6 in. (152 mm) to max 12-1/2 in. (318 mm) thick UL Classified hollow core Precast Concrete Units*. Max diam of opening is 6 in. (152 mm).
* See Precast Concrete Units (CPTV) categories in the Fire Resistance Directory for names of manufacturers.
2. Sheet Metal Sleeve — (Optional, Not Shown) - Nom 4, 5 or 6 in. (102, 127 or 152 mm) diam, min 26 ga galv steel and having a min 2 in. (51 mm) lap along the longitudinal seam, and may extend a max of 4 in. (102 mm) below the bottom of the deck and flush with the top surface of the concrete floor. Sleeve installed by coiling the sheet steel to a diam smaller than the through opening, inserting the coil through the openings and releasing the coil to let it uncoil against the opening.
When sheet metal sleeve is used, T Rating is 0 Hr.
3. Firestop Device* — Drop-in firestop device installed in core-drilled or sleeved opening in concrete floor assembly in accordance with accompanying installation instructions. The firestop device shall exceed a max 1/2 in. (13 mm) below the bottom surface of the floor or may be recessed a max of 1/2 in. from the bottom surface of the floor. The firestop device flange should be secured to the top surface of the floor with three 1/4 in. (6 mm) diam by min 1-1/4 in. (32 mm) long steel expansion bolts or screw anchors (installed in a triangular fashion through holes provided). As alternates to the anchors specified above, Hilti 1/4 in. (6 mm) diam by 1-1/4 in. (32 mm) long KWIK-CON II+ concrete screw anchor, Hilti 1/4 in. (6 mm) diam by 1-3/4 in. (45 mm) long KWIK-BOLT 3 steel expansion anchor or Hilti 1/4 in. (6 mm) by 3/4 in. (19 mm) long Metal HT Anchor may be used. In addition, for nom 2 in. (51 mm), 3 in. (76 mm) and 4 in. (102 mm) firestop devices, four 11/16 in. (18 mm) long Hilti X-GH P18 MX steel fasteners may be installed through the steel flange, two on each side. The firestop devices shall be installed as detailed in the following table:

Nom Pipe or Tube (Item 4) Diam, In. (mm)	Insulation Type (Item 5 or 5A) and Thickness, In. (mm)	Firestop Device	Core Hole or Sleeve Diam, In. (mm)	Min-Max Floor Thickness In. (mm)
1/2 (13)	3/4 or 1 (19 or 25) AB/PVC	CFS-DID 2"C	4 (102)	6 - 6-1/2 (152 - 185)
1 (25)	3/4 or 1 (19 or 25) AB/PVC	CFS-DID 3"C	5 (127)	6 - 6-1/2 (152 - 185)
2 (51)	3/4 or 1 (19 or 25) AB/PVC	CFS-DID 4"C	6 (152)	6 - 6-1/2 (152 - 185)
1/2 (13)	1 (25) Glass Fiber	CFS-DID 2"C	4 (102)	6 - 6-1/2 (152 - 185)
1 (25)	1 (25) Glass Fiber	CFS-DID 3"C	5 (127)	6 - 6-1/2 (152 - 185)
1 (25)	1-1/2 (38) Glass Fiber	CFS-DID 4"C	6 (152)	6 - 6-1/2 (152 - 185)
2 (51)	1 (25) Glass Fiber	CFS-DID 4"C	6 (152)	6 - 6-1/2 (152 - 185)
1/2 (13)	3/4 or 1 (19 or 25) AB/PVC	CFS-DID 2" HC8	4 (102)	7-1/2 - 8-1/2 (191 - 216)
1 (25)	3/4 or 1 (19 or 25) AB/PVC	CFS-DID 3" HC8	5 (127)	7-1/2 - 8-1/2 (191 - 216)
2 (51)	3/4 or 1 (19 or 25) AB/PVC	CFS-DID 4" HC8	6 (152)	7-1/2 - 8-1/2 (191 - 216)
1/2 (13)	1 (25) Glass Fiber	CFS-DID 2" HC8	4 (102)	7-1/2 - 8-1/2 (191 - 216)
1 (25)	1 (25) Glass Fiber	CFS-DID 3" HC8	5 (127)	7-1/2 - 8-1/2 (191 - 216)
1 (25)	1-1/2 (38) Glass Fiber	CFS-DID 4"HC8	6 (152)	7-1/2 - 8-1/2 (191 - 216)
2 (51)	1 (25) Glass Fiber	CFS-DID 4"HC8	6 (152)	7-1/2 - 8-1/2 (191 - 216)
1/2 (13)	3/4 or 1 (19 or 25) AB/PVC	CFS-DID 2" HC10	4 (102)	9-1/2 - 10-1/2 (241 - 267)
1 (25)	3/4 or 1 (19 or 25) AB/PVC	CFS-DID 3" HC10	5 (127)	9-1/2 - 10-1/2 (241 - 267)
2 (51)	3/4 or 1 (19 or 25) AB/PVC	CFS-DID 4" HC10	6 (152)	9-1/2 - 10-1/2 (241 - 267)
1/2 (13)	1 (25) Glass Fiber	CFS-DID 2" HC10	4 (102)	9-1/2 - 10-1/2 (241 - 267)
1 (25)	1 (25) Glass Fiber	CFS-DID 3" HC10	5 (127)	9-1/2 - 10-1/2 (241 - 267)
1 (25)	1-1/2 (38) Glass Fiber	CFS-DID 4"HC10	6 (152)	9-1/2 - 10-1/2 (241 - 267)
2 (51)	1 (25) Glass Fiber	CFS-DID 4"HC10	6 (152)	9-1/2 - 10-1/2 (241 - 267)
1/2 (13)	3/4 or 1 (19 or 25) AB/PVC	CFS-DID 2" HC12	4 (102)	11-1/2 - 12-1/2 (292 - 318)
1 (25)	3/4 or 1 (19 or 25) AB/PVC	CFS-DID 3" HC12	5 (127)	11-1/2 - 12-1/2 (292 - 318)
2 (51)	3/4 or 1 (19 or 25) AB/PVC	CFS-DID 4" HC12	6 (152)	11-1/2 - 12-1/2 (292 - 318)
1/2 (13)	1 (25) Glass Fiber	CFS-DID 2" HC12	4 (102)	11-1/2 - 12-1/2 (292 - 318)
1 (25)	1 (25) Glass Fiber	CFS-DID 3" HC12	5 (127)	11-1/2 - 12-1/2 (292 - 318)
1 (25)	1-1/2 (38) Glass Fiber	CFS-DID 4"HC12	6 (152)	11-1/2 - 12-1/2 (292 - 318)
2 (51)	1 (25) Glass Fiber	CFS-DID 4"HC12	6 (152)	11-1/2 - 12-1/2 (292 - 318)

+ For pipe smaller than nom 2 in. (51 mm) diam, Adapter and Top Seal Plug is required to be used.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CFS-DID 2"C, CFS-DID 3"C, CFS-DID 4"C, CFS-DID 2"HC8, CFS-DID 3"HC8, CFS-DID 4"HC8, CFS-DID 2"HC10, CFS-DID 3"HC10, CFS-DID 4"HC10, CFS-DID 2"HC12, CFS-DID 3"HC12, CFS-DID 4"HC12

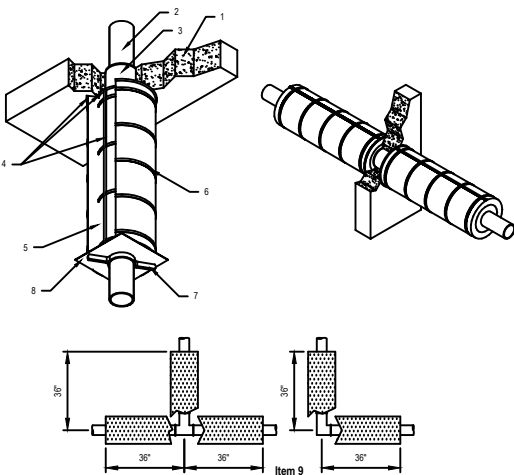
4. Through Penetrant — One metallic pipe or tubing to be installed within the firestop device. Pipe or tubing to be rigidly supported on both sides of floor assembly. The following types of pipe or tubing may be used:
A. Steel Pipe — Nom 2 in. (51 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
B. Iron Pipe — Nom 2 in. (51 mm) diam (or smaller) cast or ductile pipe.
C. Copper Tubing — Nom 2 in. (51 mm) diam (or smaller) Type L (or heavier) copper tubing.
D. Copper Pipe — Nom 2 in. (51 mm) diam (or smaller) Regular (or heavier) copper pipe.
5. Tube Insulation - Plastics+ — Nom 3/4 or 1 in. (19 or 25 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing.
* See Plastics (QMF22) Category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL94 Flammability Classification of 94-5VA may be used.
- 5A. Pipe Covering* — Nom 1 or 1-1/2 in. (25 or 38 mm) thick 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 SSL tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. See Pipe and Equipment Covering Materials (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.



Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. May 18, 2011

Hilti Corporation
Design Number HUPF 120-03
Through Penetration
FS-ONE MAX Intumescent Firestop Sealant
ASTM E 814 (2011) & UL 1479 (2010)
F Rating: 2 Hours
T Rating: 2 Hours
1 Rating: 2 Hours
CANULC S115 (2005) at 2.5 Pa
FTH: 2 Hours



1. FLOOR/CEILING OR WALL ASSEMBLY: Use a two-hour fire-rated floor/ceiling assembly or concrete or block wall assembly consisting of min. 6 in. (180 mm) thick normal weight (100-150 pcf (1600-2400 kg/m³)) reinforced concrete or 6 in. (152 mm) thick hollow or concrete filled Concrete Masonry Units (CMU). Create a round through-opening with max. diameter of 6 in. (152 mm).
2. PENETRATING ITEM: Install max. 4 in. (102 mm) diameter copper tubing centered or offset max. 1-7/8 in. (48 mm) in the through opening created in the floor/ceiling or wall assembly (Item 1).
3. PACKING MATERIAL: Install min. 4 pcf (64 kg/m³) density mineral wool batt insulation in the annular space, compressed min. 25% around the penetrating item (Item 2) as follows:
• Floor Ceiling Assembly: Install nominal 5-3/4 in. (146 mm) layer recessed 1/4 in. (6 mm) from the top of the floor/ceiling assembly (Item 1)
• Wall Assembly: Install nominal 5-1/2 in. (140 mm) layer recessed 1/4 in. (6 mm) from both surfaces of the wall assembly (Item 1). If the floor/ceiling or wall assembly (Item 1) is greater than 6 in., the 36 in. length of insulation (Item 5) may be reduced the amount the floor/ceiling or wall assembly (Item 1) exceeds 6 in. If the insulation (Item 5) is reduced, the packing material (Item 3) must be increased by the same thickness in the annular space.
4. CERTIFIED COMPANY: Hilti Corporation
CERTIFIED PRODUCT: Sealant
MODEL: FS-ONE MAX Intumescent Firestop Sealant
Apply nominal 1/4 in. (6 mm) layer of FS-ONE MAX Intumescent Firestop Sealant to fill the 1/4 in. (6 mm) void left after installing the packing material (Item 3). After installing the insulation (Item 5) around the penetrating item (Item 2), apply a nominal 1/4 in. (6 mm) bead of FS-ONE MAX Intumescent Firestop Sealant in the longitudinal seam of the insulation and at the insulation (Item 5) and floor/ceiling or wall assembly (Item 1) interface.
5. INSULATION: Install two layers of 2 in. thick, 36 in. (914 mm) long, 8 pcf (128 kg/m³) density hollow cylindrical mineral wool pipe insulation around penetrating item (Item 1) installed below the floor/ceiling assembly (Item 1) or on both sides of the wall assembly (Item 1).
6. STAINLESS STEEL CLAMP: Install 12 in. (31 mm) wide stainless steel hose clamps to secure insulation (Item 5) around penetrating item (Item 2). Install hose clamps around the inner layer of insulation spaced 2 in. (51 mm) from the ends of the insulation and 12 in. (305 mm) on center (oc) between. Install hose clamps around the outer layer of insulation spaced 2 in. (51 mm) from the ends of the insulation and 8 in. (203 mm) oc between.
7. RISER CLAMP: When Tees or elbows (Item 9) are not used, install 4 in. (102 mm) galvanized steel riser clamp around penetrating item (Item 2) flush with the end of the insulation (Item 5) (not required on horizontal penetration).
8. STEEL PLATE: When Tees or elbows (Item 9) are not used, install 12 in. X 12 in. steel plate between insulation (Item 5) and the riser clamp (Item 7) to prevent the insulation (Item 5) from sagging (not required on a horizontal penetration).
9. TEELBOW (Optional): Attach to penetrating item (Item 2) when required. When installing tee or elbow at a distance greater than 36 in. (914 mm) from the floor/ceiling or wall assembly (Item 1), insulation (Item 5) is only required from the floor/ceiling or wall assembly (Item 1) to the Tee or elbow. If the tee or elbow is less than 36 in. (914 mm) from the floor/ceiling or wall assembly (Item 1), insulation (Item 5) must be installed from the floor/ceiling or wall assembly (Item 1) to the tee or elbow and installed min. 36 in. (914 mm) from the junction of the tee or elbow in both directions. Secure insulation (Item 5) around teelbow using stainless steel hose clamps (Item 6) spaced 12 in. oc on the inner layer and 8 in. (203 mm) oc on the outer layer.



Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Intertek Group December 16, 2014



Notes:

1. Refer to section 15084 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.
2. Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:
* Minimum and maximum annular space
* Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.
3. If alternate details matching the field conditions are not available, manufacturer's engineering judgment drawings are acceptable. Drawings shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
* 2013 Fire Resistance Directory - Volume III or UL Products
Certified for Canada (cUL) Directory
* All governing local, provincial or national building codes
* www.UL.com/database
* www.Intertek.com
5. Firestop System installations must meet requirements of tested assemblies that provide the required assembly rating CAN/ULC-S115.
6. All rated assemblies shall be prominently labeled with the following information:
* ATTENTION: Fire Rated Assembly
* ULC, cUL or Intertek #
* Product(s) used
* Hourly Rating (Assembly Rating)
* Installation Date

<Notes to designer (delete this note after reading and replace with title block information)>

1. Any modification to these details could result in an application/system not meeting the UL/CUL Classification or the intended temperature or fire ratings.
2. Details shown are up to date as of February 2015.
3. For additional information on the details, refer to the most current "Underwriter's Laboratories of Canada Fire Resistance Directory Volume III" or "Underwriter's Laboratories Products Certified for Canada (cUL) Directory."

JOB NUMBER:

DRAWN:

CHECKED:

ISSUE DATE:

REVISIONS:

TYPICAL
FIRESTOP
DETAILS

SHEET NAME:

SHEET NUMBER:

M.4.4