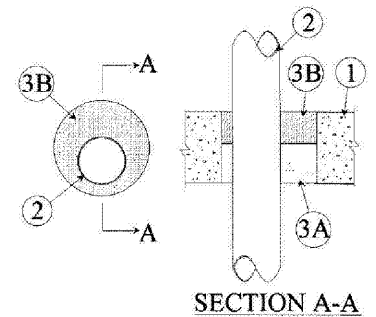


Order Plans

THESE DETAILS ARE SCHEMATIC IN NATURE AND ARE INTENDED TO CONVEY CLEARANCE CHARACTERISTICS AND MOUNTING HEIGHTS TO COMPLY WITH 2010 ADA STANDARDS.

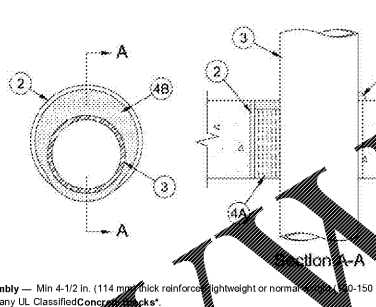
Through-penetration Firestop Systems
 System No. C-AJ-2141
 April 20, 2012
 F Rating — 3 Hr
 T Rating — 2 Hr
 L Rating At Ambient — Less Than 1 CFM/Sq Ft
 L Rating At 400 F — 4 CFM/Sq Ft



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. Wall may also be constructed of any UL Classified Concrete Blocks*. Max diam of opening is 6 in. (152 mm).
 See Concrete Blocks* (CAZT) category in the Fire Resistance Directory for names of manufacturers.
 2. **Through Penetrants** — One nonmetallic pipe or conduit to be installed either concentrically or eccentrically within the firestop system. The annular space between the pipe or conduit and the periphery of the opening shall be min 1/2 in. (13 mm) to max 2 in. (51 mm). The pipe or conduit to be rigidly supported on both sides of floor or wall. The following types and sizes of pipes or conduits may be used:
 A. **Polyvinyl Chloride (PVC) Pipe** — Nom 3 in. (76 mm) diam (or smaller) Schedule 40 PVC pipe for use in closed (process or supply) piping systems.
 B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe** — Nom 3 in. (76 mm) diam (or smaller) SDR 17 CPVC pipe for use in closed (process or supply) piping systems.
 3. **Firestop System** — The firestop system shall consist of the following:
 A. **Forming Material*** — Min 2-1/2 in. (64 mm) thickness of forming material foamed into opening as a permanent form. Forming material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of fill material.
 HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CR12 or CF-AS C-IP Foam Sealant
 B. **Fill, Void or Cavity Material*** — Sealant — Min 2 in. (51 mm) thickness of fill material applied with annulus flush with top surface of floor or within both surfaces of wall.
 HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant
 *Bearing the UL Classification Mark

1 UL DETAIL: C-AJ-2141
 LS1.2 NOT TO SCALE

Through-penetration Firestop Systems
 System No. C-AJ-1609
 July 09, 2010
 F Rating — 2 Hr
 T Rating — 0 Hr
 L Rating At Ambient — Less Than 1 CFM/Sq Ft
 L Rating At 400 F — 4 CFM/Sq Ft

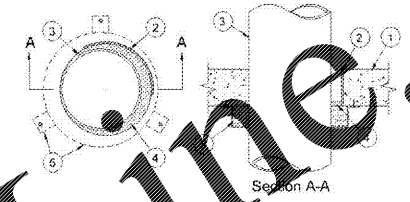


1. **Floor or Wall Assembly** — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*.
 See Concrete Blocks* (CAZT) category in the Fire Resistance Directory for names of manufacturers.
 2. **Nonmetallic Sleeve** — Nom 4 in. (102 mm) diam (or smaller) Schedule 40 polyvinyl chloride (PVC) pipe cast or grouted into floor or wall assembly, flush with floor or wall surface.
 3. **Through Penetrants** — One nonmetallic pipe or tube to be installed either concentrically or eccentrically within the firestop system. Pipes or tube to be rigidly supported on both sides of floor or wall assembly. The annular space between the pipe or tube and the periphery of the opening shall be min 0 in. (point contact) to max 2-7/8 in. (73 mm). The following types and sizes of pipes or conduits 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) steel electrical metallic tubing or steel conduit.
 D. **Copper Tubing** — Nom 3 in. (76 mm) diam (or smaller) Type L (or heavier) copper tubing.
 E. **Other Pipe** — Nom 3 in. (76 mm) diam (or smaller) Regular (or heavier) copper pipe.
 4. **Firestop System** — The firestop system shall consist of the following:
 A. **Forming Material*** — Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m³) mineral wool batt insulation firmly packed into sleeved opening as a permanent form. Forming material to be recessed from top end of sleeve for floors or from both ends of sleeve for walls as required to accommodate the required thickness of fill material.
 B. **Fill, Void or Cavity Material*** — Sealant — Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with the top end of sleeve for floors or with both ends of the sleeve for walls. Min 1/2 in. (13 mm) thick bead of sealant to be installed around pipe at interface with sleeve at point contact installations.
 HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP806 Sealant, FS-ONE Sealant.
 *Bearing the UL Classification Mark

2 UL DETAIL: C-AJ-1609
 LS1.2 NOT TO SCALE

System No. C-AJ-2109
 July 21, 2018

F Rating — 2 and 3 Hr (See Item 3)
 T Rating — 0, 2 and 3 Hr (See Items 2 and 3)
 W Rating — Class 1 (See Items 2, 3 and 4)
 L Rating at Ambient — Less Than 1 CFM/Sq Ft (See Item 4)
 L Rating at 400 F — Less Than 1 CFM/Sq Ft (See Item 4)



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. Wall may also be constructed of any UL Classified Concrete Blocks*. Max diam of opening is 12 in. (305 mm).
 See Concrete Blocks* (CAZT) category in the Fire Resistance Directory for names of manufacturers.
 2. **Nonmetallic Sleeve** — (Not Shown) — Nom 12 in. (305 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe cast or grouted into floor or wall assembly, flush with floor or wall surface a max of 3 in. (76 mm) above the floor. If the steel sleeve extends above the floor, the T Rating of the firestop system is 0 Hr and a max 1/2 in. (13 mm) annular space is required between the sleeve and the periphery of the opening. The W Rating does not apply within the sleeve.
 3. **Through Penetrants** — One nonmetallic pipe to be installed either concentrically or eccentrically within the firestop system. For max 6 in. (152 mm) diam pipes, the annular space between the pipe and the periphery of opening shall be min 0 in. (point contact) to max 1-3/4 in. (44 mm). If the steel sleeve extends above the floor (Item 2), a min 1/2 in. (13 mm) annular space is required between the through-penetrant (Item 3) and the periphery of the opening. Pipe to be rigidly supported on both sides of floor or wall assembly. For systems with a W Rating, the max annular space is 1/2 in. (13 mm). The T Rating depends on the size and/or type of pipe as shown in the table below. The following types and sizes of nonmetallic pipes may be used:
 A. **Polyvinyl Chloride (PVC) Pipe** — Nom 16 in. (406 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 systems. For systems with a W Rating, the max diam of pipe shall not exceed 8 in. (203 mm).
 B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe** — Nom 10 in. (254 mm) diam (or smaller) SDR17.5 CPVC pipe for use in closed (process or supply) piping systems. For systems with a W Rating, the max diam of pipe shall not exceed 8 in. (203 mm).
 C. **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 systems.
 D. **Flame Retardant Polypropylene (FRPP) Pipe** — Nom 6 in. (152 mm) diam (or smaller) Schedule 40 FRPP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

Pipe Type	Non Pipe Diam, In. (mm)	F Rating Hr
PVC, CPVC	Greater than 6 (152)	2
PVC, CPVC, ABS, FRPP	6 (152) or smaller	3

Pipe Type	Non Pipe Diam, In. (mm)	T Rating Hr
PVC, CPVC, ABS, FRPP	1-1/2, 2, 2-1/2, 3, 3-1/2, 4, 5, 6	0
PVC, CPVC, ABS, FRPP	4 (102)	3
PVC, CPVC, ABS, FRPP	6 (152)	3
PVC, CPVC	Greater than 6 (152)	0
ABS +	6 (152)	0

4. **Fill, Void or Cavity Material*** — Sealant — Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top or bottom surface of floor or both surfaces of wall. Sealant is optional for pipes having a max diam of 6 in. (152 mm) in unsleeved openings. For systems with W Rating and/or L Rating, min 1/2 in. (13 mm) thickness of CP 801S, CF-9 SIL GG, CF-9 SIL SL (Floors only) Sealant shall be applied within the annulus, flush with top or bottom surface of floor.
 HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE MAX Intumescent Sealant, CP 801S Sealant, CF-9 SIL GG, CF-9 SIL SL (Floors only) Sealant.
 5. **Firestop Device*** — **Firestop Collar** — Firestop collar shall be detailed in accordance with the accompanying installation instructions. Collar to be installed over the pipe and secured to underside of floor or both sides of wall using the anchor hooks provided with the collar. Minimum two anchor hooks for min 1-1/2 and 2 in. (38 and 51 mm) diam pipes. Minimum three anchor hooks required for min 2 and 4 in. (51 and 102 mm) diam pipes. Minimum four anchor hooks required for min 6 in. (152 mm) diam pipes. Minimum two anchor hooks required for min 8 in. (203 mm) diam pipes. Minimum two anchor hooks required for min 10 in. (254 mm) diam pipes. The anchor hooks are to be secured with min 1/4 in. (6 mm) diam by min 1-1/4 in. (32 mm) long steel expansion bolts or min 6-14S in. (13.7 mm) diam by 1-1/4 in. (32 mm) long powder actuated fasteners (cutting 1/4 in. (6 mm) diam by 1/2 in. (13 mm) thick steel washer. As alternative to the anchors specified above, HR9 1/4 in. (6 mm) diam by 1-1/4 in. (32 mm) long WYK-COM 1-1/4

3 UL DETAIL: C-AJ-2109
 LS1.2 NOT TO SCALE

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