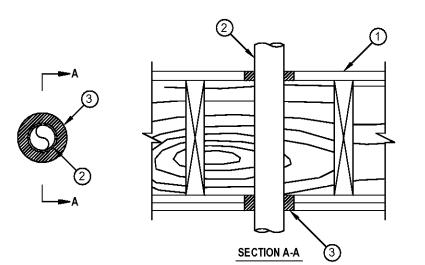


CRABTREE NORTH APTS.
 2251 Charles Drive
 Raleigh, North Carolina
EYC COMPANIES

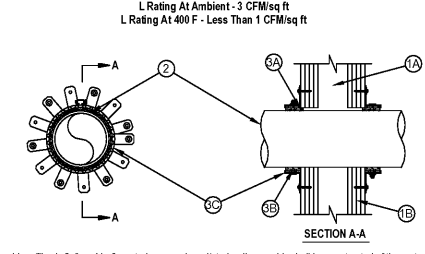
System No. F-C-2160
 F Rating - 1 Hr and 2 Hr
 T Rating - 1 Hr and 2 Hr



1. Floor-Ceiling Assembly - The 1 and 2 hr fire-rated solid or trussed lumber joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory. The general construction features of the floor-ceiling assembly are summarized below.
 A. Flooring System - Lumber or plywood subfloor with finish floor of lumber, plywood or Floor Topping Mixture as specified in the individual Floor-Ceiling Design. Max diam of opening shall be 4 in.
 B. Wood Joists - Nom 10 in. deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or Structural Wood Members with bridging as required and with ends firestopped.
 C. Furring Channels (Not Shown) - Resilient galv steel furring installed perpendicular to wood joists between first and second layers of wallboard (Item 1D). Furring channels spaced max 24 in.
 D. Gypsum Board - Nom 4 1/2 wide by 5/8 in. thick as specified in the individual Floor-Ceiling Design. First layer of wallboard nailed to wood joists. Second layer of wallboard screw fastened to furring channels. Max diam of ceiling opening is 4 in.
 1.1 Chaise Wall - (Optional, Not Shown) - The through penetrants (Item No. 2) may be routed through a fire-rated single, double or staggered wood stud/gypsum wall board chaise wall having a fire rating consistent with that of the floor-ceiling assembly. The chaise wall shall be constructed of the materials and in the manner specified in the individual U300 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
 A. Studs - Nom 2 by 6 in. or double nom 2 by 4 in. lumber studs.
 B. Sill Plate - Nom 2 by 6 in. or parallel nom 2 by 4 in. lumber plates, tightly bolted.
 C. Top Plate - The double top plate shall consist of two nom 2 by 6 in. or two sets of parallel 2 by 4 in. lumber plates, tightly bolted. Max diam of opening is 4 in.
 D. Gypsum Board - Thickness, type, number of layers and fasteners shall be as specified in individual Wall and Partition Design.
 2. Through Penetrants - One nonmetallic pipe or conduit to be installed concentrically or eccentrically within the firestop system. Annular space between pipe or conduit and edge of opening to be min 1/2 in. (point contact) and max 1-1/8 in. Pipe or conduit to be rigidly supported on both sides of floor-ceiling assembly. The following types and sizes of nonmetallic pipes or conduits may be used:
 A. Polyvinyl Chloride (PVC) Pipe - Nom 6 in. (152 mm) diam (or smaller) Schedule 40 solid or cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
 B. Chlorinated Polyvinyl Chloride (CPVC) Pipe - Nom 2 in. diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
 C. Acrylonitrile Butadiene Styrene (ABS) Pipe - Nom 4 in. diam (or smaller) Schedule 40 cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
 3. Fill, Void or Cavity Material - Sealant - Fill material forced into annular space to fill space to max extent possible. Sealant shall be installed flush with both surfaces of floor-ceiling assembly.
 HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. - FS - ONE Sealant.
 *Bearing the UL Classification Mark



System No. W-L-2447
 F Ratings - 1, 2, 3 and 4 Hr (See Item 1)
 T Rating - 1, 2, 3 and 4 Hr (See Item 2)
 L Rating At Ambient - 3 CFM/sq ft
 L Rating At 400 F - Less Than 1 CFM/sq ft



1. Wall Assembly - The 1, 2, 3 or 4 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U100, U400 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
 A. Studs - Wall framing shall consist of min 3-1/2 in. (89 mm) wide steel channel studs spaced max 24 in. (610 mm) OC.
 B. Gypsum Board - Min 1/2 in. (13 mm) thick, 4 ft (1222 mm) wide with square or tapered edges. The gypsum board type, thickness, number of layers, balancer type and sheet orientation shall be as specified in the individual U100, U400 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 7 in. (178 mm). The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.
 2. Through Penetrants - One nonmetallic pipe to be installed concentrically or eccentrically within the firestop system. Annular space between pipe and periphery of opening to be min 0 in. (point contact) and max 1/2 in. (13 mm). Pipe to be rigidly supported on both sides of wall assembly. The following types and sizes of nonmetallic pipes may be used:
 A. Polyvinyl Chloride (PVC) Pipe - Nom 6 in. (152 mm) diam (or smaller) Schedule 40 solid or cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
 B. Chlorinated Polyvinyl Chloride (CPVC) Pipe - Nom 6 in. (152 mm) diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.
 C. Acrylonitrile Butadiene Styrene (ABS) Pipe - Nom 6 in. (152 mm) diam (or smaller) Schedule 40 solid or cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
 The hourly T Rating of the firestop system is 1 hr except that for nom 2 in. (51 mm) diam (or smaller) penetrants, the hourly T Rating is equal to the hourly fire rating of the wall assembly in which it is installed.
 3. Firestop System - The firestop system shall consist of the following:
 A. Fill, Void or Cavity Material - Sealant - Min 1/4 in. (6 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall.
 HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. - FS - ONE Sealant.
 B. Fill Void or Cavity Material - Wrap Strip - Nom 3/16 in. (5 mm) thick by 1-3/4 in. (45 mm) wide intumescent wrap strip continuously wrapped around the pipe. Wrap strip bolted tightly against both surfaces of wall.
 HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. - CP648-E-W/451-3/4

Nom Pipe Diam, in. (or smaller)	No. of Layers of Wallboard	Hourly Rating
6 (or smaller)	3	3
4 (or smaller)	2	2
2 (or smaller)	1	1

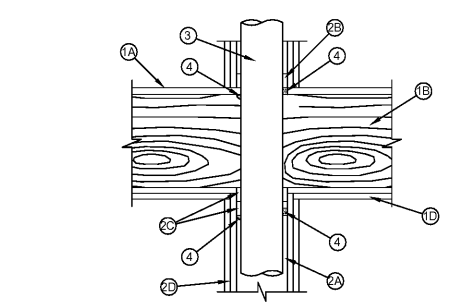
C. Steel Collar - Collar fabricated from coils of precast min 0.017 in. (0.43 mm) thick (No. 28 MSG) galv steel available from the sealant manufacturer. Collar shall be nom 1 1/2 in. (38 mm) diam and 1 1/2 in. (38 mm) wide by 2 in. (51 mm) long anchor tabs on 2 in. (51 mm) centers for use in closed (process or supply) or vented (drain, waste or vent) piping systems. The collar shall be bent 90 degree outward for securement to the wall assembly. The collar shall incorporate retainer tabs, 1/2 in. (13 mm) wide by 3/16 in. (5 mm) long, prebent toward the pipe and the collar shall be tightly wrapped over the wrap strip, overlapping min 1 in. (25 mm) at seams. A nom 1/2 in. (13 mm) wide stainless steel hand clamp shall be secured to the collar at its mid height. Anchor tabs of collar secured to surface of wall by means of nom 3/16 in. diam by 2-1/2 in. long steel toggle bolts in conjunction with 1-1/4 in. (32 mm) diam steel fender washers at every other anchor tab. As an alternate, in 1 and 2 hr rated walls, every anchor tab of collar may be secured to surface of wall by means of nom 1-1/4 in. (32 mm) long steel laminating drywall screws in conjunction with 1-1/4 in. (32 mm) diam steel fender washers. A collar is used on both sides of wall.
 *Bearing the UL Classification Mark



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System No. F-C-217
 F Rating - 1 and 2 Hr (See Item 1)
 T Rating - 3/4 and 1-3/4 Hr



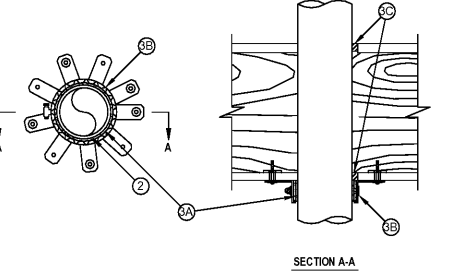
1. Floor-Ceiling Assembly - The 1 or 2 hr fire-rated solid or trussed lumber joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory. The F Rating of the firestop system is equal to the rating of the floor-ceiling and wall assemblies. The general construction features of the floor-ceiling assembly are summarized below.
 A. Flooring System - Lumber or plywood subfloor with finish floor of lumber, plywood or Floor Topping Mixture as specified in the individual Floor-Ceiling Design. Max diam of floor opening is 5-1/2 in.
 B. Wood Joists - Nom 10 in. deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or Structural Wood Members with bridging as required and with ends firestopped.
 C. Furring Channels (Not Shown) - Resilient galv steel furring installed perpendicular to wood joists between wallboard and wood joists as required in the individual Floor-Ceiling Design. Furring channels spaced max 24 in. OC.
 D. Gypsum Board - Nom 4 1/2 wide by 5/8 in. thick as specified in the individual Floor-Ceiling Design. Wallboard secured to wood joists or furring channels as specified in the individual Floor-Ceiling Design.
 2. Chaise Wall - The through penetrant (Item 3) shall be rated through a 1 or 2 hr fire-rated single, double or staggered wood stud/gypsum wallboard chaise wall constructed of the materials and in the manner specified in the individual U300 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
 A. Studs - Nom 2 by 6 in. lumber studs.
 B. Sill Plate - Nom 2 by 6 in. lumber plates.
 C. Top Plate - The double top plate shall consist of two nom 2 by 6 in. lumber plates. Max diam of opening is 1-1/2 in.
 D. Gypsum Board - Thickness, type, number of layers and fasteners shall be as specified in individual Wall and Partition Design.
 3. Nonmetallic Penetrants - One nonmetallic pipe to be installed either concentrically or eccentrically within the firestop system. The annular space between pipe and periphery of opening shall be continuous contact, 0 in. (point contact) to max 1/4 in. or 0 in. (point contact) to make 1 in. (See Item 4). Pipe to be rigidly supported on both sides of the floor-ceiling assembly. The following types and sizes of nonmetallic penetrants may be used:
 A. Polyvinyl Chloride (PVC) Pipe - Nom 4 in. diam (or smaller) Schedule 40 solid core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
 B. Chlorinated Polyvinyl Chloride (CPVC) Pipe - Nom 4 in. diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
 C. Acrylonitrile Butadiene Styrene (ABS) Pipe - Nom 4 in. diam (or smaller) Schedule 40 cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
 4. Fill, Void or Cavity Material - Sealant - Min 3/16 in. (5 mm) thick, 1 1/2 in. (38 mm) wide intumescent wrap strip continuously wrapped around the pipe. Wrap strip bolted tightly against both surfaces of wall.
 HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. - CP648-E-W/451-3/4
 *Bearing the UL Classification Mark



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System No. F-C-2232
 F Rating - 1 Hr
 T Rating - 3/4 and 1 Hr (See Item 3)



1. Floor-Ceiling Assembly - The 1 hr fire-rated solid or trussed lumber joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory. The general construction features of the floor-ceiling assembly are summarized below.
 A. Flooring System - Lumber or plywood subfloor with finish floor of lumber, plywood or Floor Topping Mixture as specified in the individual Floor-Ceiling Design. Max diam of opening shall be 5 in.
 B. Wood Joists - Nom 10 in. deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or Structural Wood Members with bridging as required and with ends firestopped.
 C. Gypsum Board - Nom 5/8 in. thick, 4 ft wide as specified in the individual Floor-Ceiling Design. Max diam of opening shall be 5 in.
 2. Through Penetrants - One nonmetallic pipe or conduit to be installed concentrically or eccentrically within the firestop system. Annular space between pipe or conduit and edge of opening to be min 0 in. (point contact) and max 1/2 in. Pipe or conduit to be rigidly supported on both sides of floor-ceiling assembly. The following types and sizes of nonmetallic pipes or conduits may be used:
 A. Polyvinyl Chloride (PVC) Pipe - Nom 4 in. diam (or smaller) Schedule 40 solid or cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
 B. Chlorinated Polyvinyl Chloride (CPVC) Pipe - Nom 4 in. diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.
 3. Firestop System - The firestop system shall consist of the following:
 A. Fill, Void or Cavity Material - Wrap Strip - Nom 3/16 in. (5 mm) thick by 1-3/4 in. wide intumescent wrap strip. Layers of wrap strip continuously wrapped around the pipe and held in place with wrap. Wrap strip bolted tightly against surface of ceiling.
 HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. - CP648-E-W/451-3/4 Wrap Strip
 *Bearing the UL Classification Mark

Nom Diam of Pipe, in.	Number of Wraps	Min/Max Annular Space, in.	T-Rating - Hr.
2	1	0 - 1/4	1
3	2	0 - 1/2	3/4
4	2	0 - 1/2	3/4

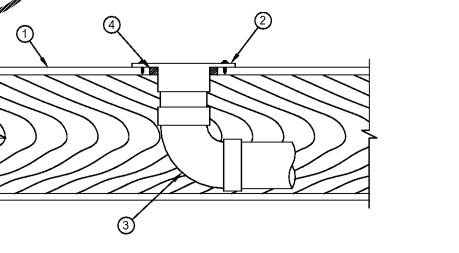
B. Steel Collar - Collar fabricated from coils of precast min 0.017 in. (0.43 mm) thick (No. 28 MSG) galv steel available from the sealant manufacturer. Collar shall be nom 1-3/4 in. deep with 1 in. wide by 2 in. long anchor tabs on 2 in. centers for securement to floor-ceiling assembly. The collar shall incorporate retainer tabs, 1/2 in. wide by 3/16 in. long, prebent toward the pipe surface. Collar shall be tightly wrapped over the wrap strip, overlapping min 1-1/2 in. (38 mm) at seams. A nom 1/2 in. wide stainless steel hose clamp shall be secured to the collar at its mid height. Anchor tabs of collar secured to gypsum ceiling with 1/4 in. diam by 1-1/2 in. long steel toggle bolts in conjunction with 1/4 in. by 1/2 in. diameter steel washers.
 C. Fill, Void or Cavity Material - Sealant - Min 5/8 in. thickness of fill material applied within the annulus, flush with the bottom surface of the gypsum board ceiling. Min 5/8 in. thickness of fill material applied within the annulus, flush with the top surface of the floor.
 HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. - FS - ONE Sealant.
 *Bearing the UL Classification Mark



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System No. F-C-2203
 F Rating - 1 Hr
 T Rating - 1 1/2 Hr



1. Floor-Ceiling Assembly - The 1 hr fire-rated solid or trussed lumber joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory. The general construction features of the floor-ceiling assembly are summarized below.
 A. Flooring System - Lumber or plywood subfloor with finish floor of lumber, plywood or Floor Topping Mixture as specified in the individual Floor-Ceiling Design. Max diam of opening shall be 5 in.
 B. Wood Joist - Nom 10 in. deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or Structural Wood Members with bridging as required and with ends firestopped.
 C. Gypsum Board - Nom 5/8 in. thick, 4 ft wide as specified in the individual Floor-Ceiling Design.
 2. Close Fit Flange - Acrylonitrile butadiene styrene (ABS) or polyvinyl chloride (PVC) close fit flange to accommodate drain pipe. Close flange installed over drain piping within floor opening with flange secured to plywood floor with steel screws. Diam of circular opening through flooring (Item 1A) to be max 1/4 in. larger than outside diam of close fit flange.
 3. Drain Piping - Nom 4 in. diam (or smaller) Schedule 40 acrylonitrile butadiene styrene (ABS) or polyvinyl chloride (PVC) drain pipe and 90 degree elbow for use in vented (drain, waste or vent) piping systems. Pipe installed concentrically within firestop system.
 4. Fill, Void or Cavity Material - Sealant - Min 3/4 in. (19 mm) thickness of fill material applied within the annulus, flush with the bottom surface of floor.
 HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. - FS - ONE Sealant.
 *Bearing the UL Classification Mark



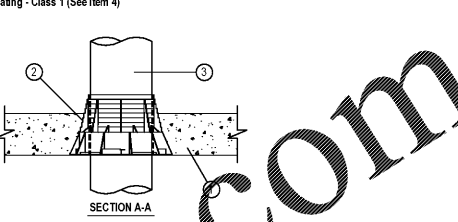
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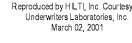
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System No. F-A-2054
 F Rating - 3 Hr
 T Rating - 0 and 3 Hr (See Item 3)
 W Rating - Class 1 (See Item 3)



1. Floor Assembly - Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete.
 2. Floor Assembly (Optional - Not Shown) - The fire rated unprotected concrete and reinforcement shall be constructed in the manner specified in the individual U300 Series designs in the UL Fire Resistance Directory. The following types and sizes of nonmetallic pipes or conduits may be used:
 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. Steel fluid loss tested as specified in the individual Floor-Ceiling Design.
 2. Firestop Device - Cast in place firestop device permanently embedded in concrete assembly and in concrete assembly in accordance with accompanying installation instructions. The firestop device shall be max 2 in. (51 mm) above the top surface of the concrete. The max extension above the top surface of the concrete shall be max 2 in. (51 mm) above the top surface of the concrete. The firestop device shall be max 2 in. (51 mm) above the top surface of the concrete. The firestop device shall be max 2 in. (51 mm) above the top surface of the concrete. The firestop device shall be max 2 in. (51 mm) above the top surface of the concrete.
 HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. - CP648-E-W/451-3/4
 *Bearing the UL Classification Mark

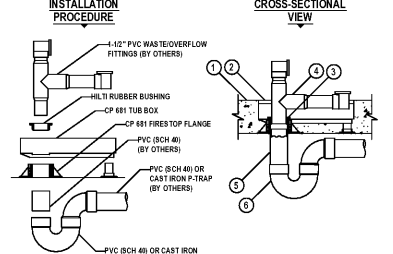


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UL SYSTEM NO. F-A-2084
 PLASTIC PIPE AND TUB FITTINGS THROUGH CONCRETE FLOOR ASSEMBLY

F-RATING = 3-HR.
 T-RATING = 3/4-HR.
 W-RATING = CLASS I



- LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR ASSEMBLY (MINIMUM 4-1/2" THICK (3-HR. FIRE-RATING)).
- HILTI CP 681 TUB BOX KIT, CONSISTING OF 4-1/2" x 12" x 2" DEEP ABS TUB BOX WITH ADJUSTABLE LEGS AND INTUMESCENT COUPLING, FASTENED TO FORM WORK AND PERMANENTLY EMBEDDED DURING CONCRETE PLACEMENT. MINIMUM 2" OF CONCRETE SHALL BE MAINTAINED BELOW TUB BOX.
- ELASTOMERIC RUBBER BUSHING PROVIDED BY HILTI, INC. INSERTED INTO TOP OF DEVICE. ELASTOMERIC BUSHING SIZED TO PROVIDE TIGHT FIT AROUND DRAIN PIPE (ITEM NO. 4).
- MAXIMUM 1-1/2" NOMINAL DIAMETER PVC PLASTIC PIPE (THIN WALL OR SCHEDULE 40) WASTEWATER/DRAIN FITTINGS.
- MAXIMUM 2" NOMINAL DIAMETER PVC PLASTIC PIPE (SCHEDULE 40) SECURED INTO BOTTOM OF DEVICE WITH PVC GLUE.
- PVC CAST IRON PIPING AND TRAPS PROPERLY SECURED TO DRAIN PIPING (ITEM NO. 5).

*NOTE: DRINK WATER PIPING (ITEMS NO. 4 AND NO. 5) SHOULD BE PROPERLY SUPPORTED AWAY FROM THE TUB BOX WITH SUITABLE HANGERS.



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