System Number	Rating	Description	Sheet Number
		HEAD-OF-WALL JOINTS	
HW-D-0079	1 & 2 HR	GYPSUM WALL - MAX 3/4" JOINT - ES SEALANT	SHEET 1
HW-D-0044	1 & 2 HR	GYPSUM WALL - MAX 2-1/2" JOINT -MINERAL WOOL + AS200 SPRAY	SHEET 1
HW-D-0696	1 & 2 HR	GYPSUM WALL - 1" JOINT - TRACK TOP GASKET	SHEET 1
HW-D-0548	1 & 2 HR	GYPSUM SHAFT WALL - MAX 1-1/2" JOINT - ONE SIDE APPLICATION - MINERAL WOOL + AS200 SPRAY	SHEET 2
HW-D-0699	1 & 2 HR	GYPSUM SHAFT WALL - MAX 3/4" JOINT - TRACK TOP GASKET	SHEET 2
HW-D-1034	3 HR	CONCRETE OR BLOCK WALL - MAX 4" JOINT - MINERAL WOOL + AS200 SPRAY	SHEET 2
HW-D-0156	4 HR	CONCRETE OR BLOCK WALL - MAX 2" JOINT - MINERAL WOOL + ES SEALANT	SHEET 2
		BOTTOM-OF-WALL JOINTS	
BW-S-0003	1 & 2 HR	GYPSUM WALL - SEALANT ONLY	SHEET 2
BW-S-0017	1 & 2 HR	GYPSUM WALL - TRACK TOP GASKET	SHEET 2
BW-S-0020	1 & 2 HR	GYPSUM SHAFT WALL - SEALANT ONLY	SHEET 3
BW-S-0038	1 & 2 HR	GYPSUM SHAFT WALL - TRACK TOP GASKET	SHEET 3
		FLOOR TO FLOOR JOINTS	
FF-D-1001	3 HR	CONCRETE FLOOR TO CONCRETE FLOOR - MAX 4" JOINT - MINERAL WOOL + SIL300 SILICONE	SHEET 3
FF-D-1007	2 HR	CONCRETE FLOOR TO CONCRETE FLOOR - MAX 4" JOINT - MINERAL WOOL + AS200 SPRAY	SHEET 3
FF-D-1008	3 HR	CONCRETE FLOOR TO CONCRETE FLOOR - MAX 4" JOINT - MINERAL WOOL + ES SEALANT	SHEET 3
		FLOOR TO WALL JOINTS	
FW-D-1001	3 HR	CONCRETE FLOOR TO CONCRETE/BLOCK WALL - MAX 4" JOINT - MINERAL WOOL + SIL300 SILICONE	SHEET 3
FW-D-1006	2 HR	CONCRETE FLOOR TO CONCRETE/BLOCK WALL - MAX 4" JOINT - MINERAL WOOL +AS200 SPRAY	SHEET 3
FW-D-1007	3 HR	CONCRETE FLOOR TO CONCRETE/BLOCK WALL - MAX 4" JOINT - MINERAL WOOL + ES SEALANT	SHEET 3
		WALL-TO-WALL JOINTS	
WW-S-0052	1, 2, 3 & 4 HR	GYPSUM WALL TO CONCRETE/BLOCK WALL - SEALANT ONLY	SHEET 3
WW-S-0063	1 & 2 HR	GYPSUM WALL TO CONCRETE/BLOCK WALL - TRACK TOP GASKET	SHEET 4
WW-S-0064	1 & 2 HR	GYPSUM SHAFT WALL TO CONCRETE/BLOCK WALL - TRACK TOP GASKET	SHEET 4
WW-D-1004	3 HR	CONCRETE/BLOCK WALLS - MAX 1" JOINT - BACKER ROD + ES SEALANT	SHEET 4
WW-D-1007	3 HR	CONCRETE/BLOCK WALLS - MAX 4" JOINT - MINERAL WOOL + ES SEALANT	SHEET 4
WW-D-1037	3 HR	CONCRETE/BLOCK WALLS - MAX 4" JOINT - MINERAL WOOL + AS200 SPRAY	SHEET 4
		METAL PIPE/CONDUIT PENETRATIONS	
C-AJ-1353	2 & 3 HR	CONCRETE FLOOR OR CONCRETE/BLOCK WALL - METAL PIPE/CONDUIT - OPTIONAL SLEEVE - MINERAL WOOL + SEALANT	SHEET 4
C-AJ-1080	3 HR	CONCRETE FLOOR OR CONCRETE/BLOCK WALL - METAL PIPE/CONDUIT - NO SLEEVE - SEALANT ONLY	SHEET 4
F-A-1110	2 & 3 HR	CONCRETE FLOOR - MAX 6" METAL PIPE/CONDUIT - CAST-IN DEVICE	SHEET 5
F-C-1074	1 HR	WOOD FLOOR ASSEMBLY - MAX 4" METAL PIPE/CONDUIT - SEALANT ONLY	SHEET 5
W-L-1049	1 & 2 HR	GYPSUM WALL - METAL/PIPE CONDUIT - OPTIONAL SLEEVE - SEALANT ONLY	SHEET 5
W-L-1168	1 & 2 HR	GYPSUM WALL - MULTIPLE METAL PIPES/CONDUITS - RECTANGULAR OPENING - SEALANT ONLY	SHEET 5
W-L-1251	1 & 2 HR	GYPSUM SHAFT WALL - METAL PIPE/CONDUIT -METAL SLEEVE - SEALANT + BACKING	SHEET 5
		INSULATED METAL PIPE PENETRATIONS	
C-AJ-5087	2 HR	CONCRETE FLOOR OR CONCRETE/BLOCK WALL - METAL PIPE WITH GLASS FIBER INSULATION - SEALANT & BACKING	SHEET 5
C-AJ-5021	3 HR	CONCRETE FLOOR OR CONCRETE/BLOCK WALL - METAL PIPE WITH GLASS FIBER OR AB/PVC INSULATION - SEALANT & BACKING	SHEET 6
C-AJ-5133	3 HR	CONCRETE FLOOR OR CONCRETE/BLOCK WALL - METAL PIPE WITH AB/PVC (FOAM RUBBER) INSULATION - SEALANT & BACKING	SHEET 6
F-A-5041	3 HR	CONCRETE FLOOR - METAL PIPE WITH GLASS FIBER INSULATION - CAST-IN DEVICE	SHEET 6
F-A-5045	3 HR	CONCRETE FLOOR - METAL PIPE WITH AB/PVC (FOAM RUBBER) INSULATION - CAST-IN DEVICE	SHEET 6
F-C-5043	1 HR	WOOD FLOOR ASSEMBLY - INSULATED METAL PIPE - SEALANT ONLY	SHEET 6
W-L-5014	1 & 2 HR	GYPSUM WALL - MAX 12" METAL PIPE WITH MAX 2" GLASS FIBER INSULATION	SHEET 7
W-L-5054	1 & 2 HR	GYPSUM WALL - MAX 4" METAL PIPE WITH 3/4"-1" AB/PVC (FOAM RUBBER) INSULATION	SHEET 7
W-L-5262	1 & 2 HR	GYPSUM SHAFT WALL - MAX 2" METAL PIPE WITH 1" GLASS FIBER INSULATION	SHEET 7
		PLASTIC PIPE/CONDUIT PENETRATIONS	
C-AJ-2297	2 & 3 HR	CONCRETE FLOOR OR CONCRETE/BLOCK WALL - MAX 6" PLASTIC PIPE - FIRESTOP COLLAR	SHEET 7
C-AJ-2578	3 HR	CONCRETE FLOOR OR CONCRETE/BLOCK WALL - MAX 2" PLASTIC PIPE/CONDUIT - SEALANT & BACKING	SHEET 7
F-A-2073	3 HR	CONCRETE FLOOR - MAX 4" PLASTIC PIPE - DROP-IN COLLAR + SEALANT & BACKING	SHEET 7
F-A-2246	2 & 3 HR	CONCRETE FLOOR - MAX 4" PLASTIC PIPE - CAT-IN DEVICE	SHEET 8
F-C-2032	1 HR	WOOD FLOOR ASSEMBLY - MAX 2" PLASTIC PIPE - SEALANT ONLY	SHEET 8
F-C-2253	1 HR	WOOD FLOOR ASSEMBLY - MAX 3" PLASTIC PIPE - WRAP STRIP & SEALANT	SHEET 8
F-C-2158	1 HR	WOOD FLOOR ASSEMBLY - MAX 4" PLASTIC PIPE - OPTIONAL BRANCH PIPE - FIRESTOP COLLAR & SEALANT	SHEET 8
F-C-2322	1 HR	WOOD FLOOR ASSEMBLY - CLOSET FLANGE, MAX 4" PLASTIC DRAIN - SEALANT ONLY	SHEET 8
F-C-2320	1 HR	WOOD FLOOR ASSEMBLY - TUB DRAIN WITH OVERFLOW - PLYWOOD/GYPSUM PATCH & SEALANT	SHEET 8
W-L-2241	1 & 2 HR	GYPSUM WALL - MAX 2" PLASTIC PIPE - SEALANT ONLY	SHEET 9
W-L-2237	1 & 2 HR	GYPSUM WALL - MAX 4" PLASTIC PIPE - FIRESTOP COLLARS	SHEET 9
W-L-2257	2 HR	GYPSUM SHAFT WALL - MAX 4" PLASTIC PIPE - FIRESTOP COLLAR	SHEET 9
		CABLE PENETRATIONS (NOT IN CONDUIT)	
C-AJ-3154	2, 3, & 4 HR	CONCRETE/BLOCK FLOOR OR WALL - OPTIONAL SLEEVE - SEALANT & BACKING	SHEET 9
F-A-3054	2, 3, & 4 HR	CONCRETE FLOOR - OPTIONAL 6" SLEEVE - SINGLE EZ-PATH 44+ (FOR FREQUENT CABLE CHANGES)	SHEET 9
F-A-3055	2 & 3 HR	CONCRETE FLOOR - CABLE BUNDLE - CAST-IN DEVICE	SHEET 9
F-C-3010	1 HR	WOOD FLOOR ASSEMBLY - CABLES - MAX 3" DIA. HOLE - SEALANT ONLY	SHEET 10
W-L-3210	1 & 2 HR	GYPSUM WALL - OPTIONAL SLEEVE - SEALANT & BACKING	SHEET 10
W-L-3377	1, 2, 3 & 4 HR	GYPSUM WALL - SINGLE EZ-PATH SERIES 22, 33, 44, 44+ (FOR FREQUENT CABLE CHANGES)	SHEET 10
W-L-3379	1 & 2 HR	GYPSUM WALL - ONE OR MORE CABLES UP TO 1/2" DIA - CABLE GROMMET RFG2	SHEET 10
		DUCT PENETRATIONS (WITHOUT DAMPERS)	
C-AJ-7027	2 & 3 HR	CONCRETE FLOOR OR CONCRETE/BLOCK WALL - LARGE RECTANGULAR DUCT - SEALANT & BACKING + RETAINING ANGLES	SHEET 10
C-AJ-7023	2 & 3 HR	CONCRETE FLOOR OR CONCRETE/BLOCK WALL - MAX 24" DIA. ROUND DUCT - OPTIONAL SLEEVE - SEALANT & BACKING	SHEET 11
F-C-7014	1 HR	WOOD FLOOR ASSEMBLY - MAX 4" DUCT - SEALANT ONLY	SHEET 11
F-C-7023	1 HR	WOOD FLOOR ASSEMBLY - RECTANGULAR DUCT - SEALANT ONLY	SHEET 11
W-L-7025	1 & 2 HR	GYPSUM WALL - MAX 100" X 100" DUCT - SEALANT & ANGLE	SHEET 11
W-L-7026	1 & 2 HR	GYPSUM WALL - MAX 24" DIA. ROUND DUCT - SEALANT ONLY	SHEET 11
W-L-7029	1 & 2 HR	GYPSUM WALL - MAX 24" X 24" DUCT - SEALANT ONLY	SHEET 12
W-L-7145	1 & 2 HR	GYPSUM WALL - INSULATED RECTANGULAR DUCT - SEALANT & BACKING	SHEET 12
W-L-7179	1 & 2 HR	GYPSUM WALL - INSULATED ROUND DUCT - SEALANT ONLY	SHEET 12
W-L-7066	1 & 2 HR	GYPSUM SHAFT WALL - MAX 6" DIA. ROUND DUCT THRU SLEEVE - SEALANT & BACKING	SHEET 12
W-L-7090	1 & 2 HR	GYPSUM SHAFT WALL - MAX 8" X 8" DUCT, NO SLEEVE - SEALANT & BACKING	SHEET 12
W-L-7252	1 & 2 HR	GYPSUM SHAFT WALL - MAX 12" X 12" DUCT THRU SLEEVE - SEALANT & BACKING	SHEET 12
W-L-7238	1 & 2 HR	GYPSUM SHAFT WALL - MAX 24" X 40" DUCT, NO SLEEVE - FYRE FLANGE	SHEET 13
W-L-7253	1 & 2 HR	GYPSUM SHAFT WALL - STEEL STRUT, CHANNEL, CABLE OR THREADED ROD	SHEET 13
		LARGE OPENINGS & MIXED PENETRANTS	
C-AJ-8113	2 HR	CONCRETE FLOOR OR CONCRETE/BLOCK WALL - LARGE OPENING, MIXED PENETRANTS - SEALANT & BACKING	SHEET 13
C-AJ-8093	2 & 3 HR	CONCRETE FLOOR OR CONCRETE/BLOCK WALL - LARGE OPENING, MIXED PENETRANTS - FIRESTOP PILLOWS	SHEET 14
F-A-8036	3 HR	CONCRETE FLOOR - A/C LINE SETS - CAST-IN DEVICE	SHEET 14
F-C-8029	1 HR	WOOD FLOOR ASSEMBLY - RECTANGULAR OPENING - MULTIPLE PIPES & CABLES - SEALANT ONLY	SHEET 14
F-C-8021	1 HR	WOOD FLOOR ASSEMBLY - A/C LINE SETS - MAX 4.5" DIA. OPENING - SEALANT ONLY	SHEET 14
W-L-8025	1 & 2 HR	GYPSUM WALL - SINGLE A/C LINE SET - SEALANT ONLY	SHEET 15
W-L-8117	1 & 2 HR	GYPSUM WALL - MULTIPLE A/C LINE SETS - SEALANT + WRAP STRIP + COLLAR	SHEET 15
W-L-8026	1 & 2 HR	GYPSUM WALL - LARGE OPENING, MIXED PENETRANTS - SEALANT & BACKING	SHEET 15
W-L-8050	1 & 2 HR	GYPSUM WALL - LARGE OPENING, MIXED PENETRANTS - FIRESTOP PILLOWS	SHEET 15
		ELECTRICAL & UTILITY BOXES	
W-J-1217	2 HR	CONCRETE/BLOCK WALL - PULL OR JUNCTION BOX - SEALANT ONLY	SHEET 16
CLIV.R14288	1 & 2 HR	GYPSUM WALL - ELEC BOX - PUTTY PADS OR ELEC BOX INSERTS	SHEET 16
W-L-1448	1 & 2 HR	GYPSUM WALL - PULL OR JUNCTION BOX - SEALANT ONLY	SHEET 16
W-L-7307	1 & 2 HR	GYPSUM WALL - ELEC, UTILITY OR MED GAS VALVE BOX - E-WRAP	SHEET 16
		CIRCUIT INTEGRITY	
STI/AF 120-01	1 & 2 HR	MIN 1" STEEL CONDUIT - E-WRAP	SHEET 16
		FUEL LINE PROTECTION	
FP-3	2 HR	1" - 4" STEEL PIPE - E-WRAP	SHEET 17
FP-4	2 HR	3" - 4" OUTER CONTAINMENT PIPE - E-WRAP	SHEET 17
C-AJ-5437	2 HR F & T	PIPE PENETRATION - MAX 4" METAL PIPE WITH E-WRAP THRU CONCRETE/BLOCK FLOOR OR WALL - PUTTY OR SEALANT	SHEET 17

UL FIRE RESISTANCE DIRECTORY NOMENCLATURE

Through Penetrations

First letter represents what is being penetrated:

- F = Floor
- W = Wall
- C = Floors or Walls (combined)

Second letter(s) provide more information about the floor or wall:

- A = Concrete Floors with a min thickness that is Less than or Equal to 5".
- B = Concrete Floors with a min thickness that is Greater than 5".
- C = Framed Floors
- E = For-Ceiling Assemblies consisting of Concrete with Membrane Protection.
- J = Concrete or Masonry Walls with a min thickness that is Less than or Equal to 8".
- L = Framed Walls

Four digit number describes the penetrating item(s):

- 0000-0999 = Blank Openings
- 1000-1999 = Metal Pipe, Conduit, or Tubing
- 2000-2999 = Non-Metallic Pipe, Conduit, or Tubing
- 3000-3999 = Cables
- 4000-4999 = Cable Trays
- 5000-5999 = Insulated Pipes
- 6000-6999 = Miscellaneous Electrical (Busway)
- 7000-7999 = Miscellaneous Mechanical
- 8000-8999 = Mixed Penetrating Items
- 9000-9999 = Reserved for Future Use

Example: C-AJ-1150

- C = Floor or Wall Penetration
- A = Concrete Floor that is 5" or less
- J = Concrete or Masonry Walls that are 8" or less
- 1150 = Metal Pipe, Conduit, or Tubing

Joint Systems

First letter identifies the type joint:

- CJ = Floor
- FF = Wall
- WW = Floors or Walls (combined)
- FW = Floor to Wall
- HW = Head to Wall
- BW = Bottom of Wall

Second letter(s) provide more information about the floor or wall:

- S = No Movement (Static)
- D = Allows Movement (Dynamic)

Four digit number describes the joint width:

- 0000-0999 = Less than or Equal to 2"
- 1000-1999 = Greater than 2" and Less than or Equal to 6"
- 2000-2999 = Greater than 6" and Less than or Equal to 12"
- 3000-3999 = Greater than 12" and Less than or Equal to 24"
- 4000-4999 = Greater than 24"

Example: HW-D-0757

- HW = Head to Wall
- D = Allows Movement (Dynamic)
- 0757 = Less than or Equal to 2"

GENERAL NOTES:

1. Refer to section 07 84 00 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:
   - 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. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   - UL Fire Resistance Directory; Current Edition or UL Product iQ™
   - NFPA 101 Life Safety Code
   - All governing local and regional building codes
   - Intertek Directory of Building Products
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

PROJECT NAME:

PROJECT_NAME:

PROJECT LOCATION:

PROJECT_LOCATION:

ARCHITECT/CONSULTANT:

ARCHITECT/CONSULTANT:

TITLE:

Typical Firestop Details - Wood Frame on Podium Deck

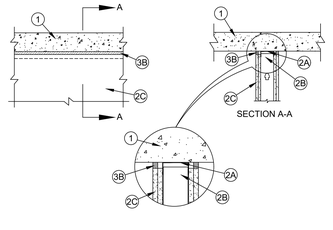
Specified Technologies Inc.
210 Evans Way Somerville, NJ 08876
Toll Free: (800)992-1180
Phone: (908)526-8000
FAX (908)231-8415
E-Mail:techserv@stifirestop.com
Website:www.stifirestop.com

INDEX

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 2079

System No. HW-D-0079

Assembly Ratings - 1 and 2 Hr (See Item 2)
Joint Width - 3/4 in. Maximum
L Rating At Ambient - Less Than 1 CFM/Lin Ft
L Rating At 400°F - Less Than 1 CFM/Lin Ft
Class II Movement Capabilities - 25% Compression



1. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick steel-reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Floor may also be constructed of any min 6 in. thick (152 mm) UL Classified hollow-core **Precast Concrete Units***
   See **Precast Concrete Units** (CFTV) category in Fire Resistance Directory for names of manufacturers.
2. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Steel Floor and Ceiling Runners -** Floor and ceiling runners of wall assembly shall consist of galv steel channels sized to accommodate steel studs (Item 2B) with min 1-1/4 in. (32 mm) long flanges. Ceiling runner secured to concrete floor slab with steel masonry anchors spaced max 24 in. (610 mm) OC.
   A1. **Light Gauge Framing* - Slotted Ceiling Runner -** As an alternate to the ceiling runner in Item 2A, ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2B). Ceiling runner secured to concrete floor slab with steel masonry anchors spaced max 24 in. (610 mm) OC.
   CALIFORNIA EXPANDED METAL PRODUCTS CO - CST
   BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS - SLP-TRK
   MARINO/WARE, DIV OF WARE INDUSTRIES INC - Type SLT
   A2. **Light Gauge Framing* - Vertical Deflection Ceiling Runner -** As an alternate to the ceiling runner in Item 2A, vertical deflection ceiling runner to consist of galv steel channel with slotted vertical deflection clips mechanically fastened within runner. Slotted clip provided with step bushings for permanent fastening of steel studs. Flanges sized to accommodate steel studs (Item 2B). Deflection ceiling runner secured to concrete floor slab with steel masonry anchors spaced max 24 in. (610 mm) OC. The ceiling runner (Item 2A) is installed within the deflection channel to maintain a 1/2 to 3/4 in. (13 to 19 mm) gap between the top of the ceiling runner and the top of the deflection channel. The ceiling runner nests inside the deflection channel without attachment.
   THE STEEL NETWORK INC - VertiTrack VTD358, VTD400, VTD600 and VTD800

A3. **Light Gauge Framing* - Notched Ceiling Runner -** As an alternate to the ceiling runners in Items 2A through 2A3, notched ceiling runners to consist of C-shaped galv steel channel with notched return flanges sized to accommodate steel studs (Item 2B). Notched ceiling runner secured to concrete floor slab with steel masonry anchors spaced max 24 in. (610 mm) OC.
OLMAR SUPPLY INC - Type SCR

A4. **Steel Framing Members* - Sound Isolation Clips -** (Not Shown) - As an alternate attachment means for the ceiling runner to the underside of the floor assembly, sound isolation clips installed in accordance with the accompanying installation instructions. Sound isolation clip installed through nom 1 in. (25 mm) diam hole in ceiling runner and attached to top of ceiling runner using four min No. 8 by 1/2 in. (13 mm) long self-tapping galv steel screws. Sound isolation clips to be installed adjacent to every stud location but not more than 24 in. (610 mm) OC and attached to the underside of floor assembly using min 3/16 in. (5 mm) diam by 2-1/2 in. (64 mm) long steel masonry anchors.
PAC INTERNATIONAL INC - Type RSIC-U-HD

B. **Studs -** Steel studs to be min 3-1/2 in. (89 mm) wide. Studs cut 1/2 in. (13 mm) to 3/4 in. (19 mm) less in length than assembly height with bottom nesting in and resting on floor runner and with top nesting in ceiling runner without attachment. When deflection channel (Item 3A) is used, steel studs attached to ceiling runner with sheet metal screws located 1/2 in. (13 mm) below the bottom of the deflection channel. When slotted ceiling runner (Item 2A2) is used, steel studs secured to slotted ceiling runner with No. 8 by 1/2 in. (13 mm) long wafer head steel screws at midheight of slot on each side of wall. When vertical deflection ceiling runner (Item 2A3) is used, steel studs secured to slotted vertical deflection clips, through bushings, with steel screws at midheight of each slot. Stud spacing not to exceed 24 in. (610 mm) OC.

C. **Gypsum Board* -** Gypsum board sheets installed to a min total thickness of 5/8 in. (16 mm) and 1-1/4 in. (32 mm) on each side of wall for 1 and 2 hr fire rated assemblies, respectively. Wall to be constructed as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory, except that a nom 3/4 in. (19 mm) gap shall be maintained between the top of the gypsum board and the bottom surface of the floor. In addition, the top row of screws shall be installed into the steel studs 1/2 to 1 in. (13 to 25 mm) below the bottom edge of the ceiling runner flange.
The hourly fire rating of the joint system is dependent on the hourly fire rating of the wall assembly in which it is installed.

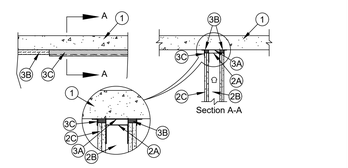
3. **Joint System - Max separation between bottom of floor and top of wall is 3/4 in. (19 mm). The joint system is designed to accommodate a max 25 percent compression from its installed width.** The joint system consists of the following:
   A. **Forming Material* -** (Not Shown) - In 2 hr fire rated wall assemblies, polyethylene backer rod, mineral wool batt insulation or fiberglass batt insulation friction fit into joint opening. When sound isolation clips (Item 2A3) are used to secure ceiling runner to underside of floor in 1 or 2 hr fire rated wall assemblies, the space between the top of the ceiling runner and the underside of the floor shall be tightly packed with mineral wool batt insulation. The forming material shall be recessed from each surface of wall to accommodate the required thickness of fill material.
   ROCK WOOL MANUFACTURING CO - Delta Safing
   ROCKWOOL MALAYSIA SDN BHD - Safe
   ROCKWOOL - Safe
   THERMAFIBER INC - Type SAF
   B. **Fill, Void or Cavity Material* - Sealant -** Min 1/2 in. (13 mm) thickness of fill material applied within joint opening on both sides of wall, flush with both surfaces of wall. As an option in 1 hr fire rated walls, bond breaker tape applied to ceiling channel (Item 2A) prior to installation of fill material.
   SPECIFIED TECHNOLOGIES INC - SpecSeal ES Sealant

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

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

System No. HW-D-0044

ANSI/UL2079	CAN/ULC S115
Assembly Ratings - 1, 2, 3 and 4 Hr (See Item 2)	F Ratings - 1, 2, 3, and 4 Hr (See Item 2)
Nominal Joint Widths - 1-1/2 and 2-1/2 In. (See Item 3)	FT Ratings - 1, 2, 3, and 4 Hr (See Item 2)
Class II Movement Capabilities - 40 or 50% Compression or Extension (See Item 3)	FH Ratings - 1, 2, 3, and 4 Hr (See Item 2)
L Rating At Ambient - Less Than 1 CFM/Lin Ft	FTH Ratings - 1, 2, 3, and 4 Hr (See Item 2)
L Rating At 400 F - Less Than 1 CFM/Lin Ft	Nominal Joint Widths - 1-1/2 and 2-1/2 In. (See Item 3)
	Class II Movement Capabilities - 40 or 50% Compression or Extension (See Item 3)
	L Rating At Ambient - Less Than 1 CFM/Lin Ft
	L Rating At 400 F - Less Than 1 CFM/Lin Ft



1. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick steel-reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete.
2. **Wall Assembly -** 1, 2, 3 or 4 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Steel Floor and Ceiling Runners -** Floor and ceiling runners of wall assembly shall consist of galv steel channels sized to accommodate steel studs (Item 2B). When deflection channel (Item 3A) is used, flange height of ceiling runner is to be equal to or greater than flange height of deflection channel and the ceiling runner is to nest within the deflection channel with a 3/4 to 1 in. (19 to 25 mm) gap maintained between the top of the ceiling runner and the top of the deflection channel. When deflection channel is not used, flange height of ceiling runner shall be min 3/4 in. (19 mm) greater than nom joint width. Ceiling runner is secured to concrete floor slab with steel masonry anchors spaced max 24 in. (610 mm) OC.

A1. **Light Gauge Framing* - Slotted Ceiling Runner -** When nom joint width is less than or equal to 1-3/4 in. (45 mm), slotted ceiling runner may be used as an alternate to the ceiling runner in Item 2A. Slotted ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2B). Ceiling runner secured to concrete floor slab with steel masonry anchors spaced max 24 in. (610 mm) OC. When slotted ceiling runner is used, deflection channel (Item 3A) shall not be used.
BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS - SLP-TRK
CALIFORNIA EXPANDED METAL PRODUCTS CO - CST
CLARKDIETRICH BUILDING SYSTEMS - Type SLT, SLT-H
MARINO/WARE, DIV OF WARE INDUSTRIES INC - Type SLT
METAL-LITE INC - The System
RAM SALES L L C - RAM Slotted Track
SCAFCO STEEL STUD MANUFACTURING CO
TELLING INDUSTRIES L L C - True-Action Deflection Track

A2. **Light Gauge Framing* - Vertical Deflection Ceiling Runner -** When nom joint width is less than or equal to 1 in. (25 mm), vertical deflection ceiling runner may be used as an alternate to the ceiling runner in Items 3A and 3A1. Vertical deflection ceiling runner to consist of galv steel channel with slotted vertical deflection clips mechanically fastened within runner. Slotted clips, provided with step bushings, for permanent fastening of steel studs. Vertical deflection ceiling runner secured to concrete floor slab with steel masonry anchors spaced max 24 in. (610 mm) OC. When vertical deflection ceiling runner is used, deflection channel (Item 4A) shall not be used.

A3. **Light Gauge Framing* - Notched Ceiling Runner -** As an alternate to the ceiling runners in Items 2A through 2A3, notched ceiling runners to consist of C-shaped galv steel channel with notched return flanges sized to accommodate steel studs (Item 2B). Notched ceiling runner secured to concrete floor slab with steel masonry anchors spaced max 24 in. (610 mm) OC. When notched ceiling runner is used, deflection channel (Item 3A) shall not be used.
OLMAR SUPPLY INC - Type SCR

A4. **Light Gauge Framing* - Vertical Deflection Clip* -** (Optional) - Steel clips can be used in conjunction with steel studs (Item 2B), ceiling runner (Item 2A) or deflection channel (Item 3A). Clips installed over the top of studs and inserted within the ceiling runner or deflection channel. Clip shall be secured to the ceiling runner or deflection channel with No. 8 self drilling, self tapping steel fasteners through holes provided within the clip. Clip may be secured to the stud with No. 6 pan head steel screw through holes provided within the clip. As an alternate, the legs of the clip may be installed over the top of the stud without attachment in accordance with manufacturer's installation instructions.
FLEX-ABILITY CONCEPTS L L C - Three Legged Dog Deflection Clip

A5. **Steel Framing Members* - Sound Isolation Clips -** (Not Shown, For Max 2 Hr Rating) - As an alternate attachment means for the ceiling runner to the underside of the floor when no deflection channel (Item 3A) is used, sound isolation clips installed in accordance with the accompanying installation instructions. Sound isolation clip installed through nom 1 in. (25 mm) diam hole in ceiling runner and attached to top of ceiling runner using four min No. 8 by 1/2 in. (13 mm) long self-tapping galv steel screws. Sound isolation clips to be installed adjacent to every stud location but not more than 24 in. (610 mm) OC and attached to the underside of floor assembly using min 3/16 in. (5 mm) diam by 2-1/2 in. (64 mm) long steel masonry anchors.
PAC INTERNATIONAL L L C - Type RSIC-U-HD

B. **Studs -** Steel studs to be min 3-1/2 in. (89 mm) wide. Studs cut 1/2 to 1 in. (13 to 25 mm) less in length than assembly height with bottom nesting in and secured to floor runner. When deflection channel (Item 3A) is used, steel studs attached to ceiling runner (Item 2A) with sheet metal screws located 1/2 in. (13 mm) below the bottom to the deflection channel. When deflection channel is not used, studs to nest in ceiling runner without attachment. When slotted ceiling runner (Item 2A1) is used, steel studs secured to slotted ceiling runner with No. 8 by 1/2 in. (13 mm) long wafer head steel screws at mid-height of slot on each side of wall. When vertical deflection ceiling runner (Item 2A2) is used, steel studs secured to slotted vertical deflection clips, through the bushings, with steel screws at mid-height of each slot. Stud spacing not to exceed 24 in. (610 mm) OC.

C. **Gypsum Board* -** Gypsum board sheets installed to a min total 5/8 in., 1-1/4 in., 1-1/2 in. or 2 in. (16, 32, 38 or 51 mm) thickness on each side of wall for 1, 2, 3 or 4 hr rated assemblies, respectively. Wall to be constructed as specified in the individual U400, V400 or W400 Series Design in the UL Fire Resistance Directory, except that a max 1 or 2-1/2 in. (25 or 64 mm) gap (See Item 3) shall be maintained between the top of the gypsum board and the lower surface of the floor . The screws attaching the gypsum board to the studs along the top of the wall shall be located 1 in. (25 mm) below the bottom of the ceiling runner. No gypsum board attachment screws shall be driven into the ceiling runner or into the optional deflection channel.
The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.

3. **Joint System - Max separation between bottom of floor and top of gypsum board (at time of installation of joint system) is 2-1/2 in. (64 mm) for 1 and 2 hr ratings and 1 in. (25 mm) for 3 and 4 hr ratings. The joint system is designed to accommodate a max 50 percent compression or extension from its installed width for max 1-1/2 in. (38 mm) wide joints and a max 40 percent compression or extension from its installed width for max 2-1/2 in. (64 mm) wide joints.** The joint system shall consist of forming and fill materials, with or without a deflection channel (Item 3A), as follows:
   A. **Deflection Channel -** (Optional) - Max 3 in. (76 mm) deep min 24 gauge galv steel channel sized to accommodate ceiling runner (Item 2A). Deflection channel secured to concrete floor slab with steel masonry anchors spaced max 24 in. (610 mm) OC. The ceiling runner (Item 2A) is installed within the deflection channel to maintain a 1/2 to 3/4 in. (13 to 19 mm) gap between the top of the ceiling runner and the top of the deflection channel. The ceiling runner nests inside the deflection channel without attachment.
   B. **Forming Material* -** Sections of min 4 pcf (64 kg/m3) density mineral wool batt compressed 50 percent in thickness and installed cut edge first to completely fill the gap between the top of the gypsum board and the bottom of the concrete floor. When sound isolation clips (Item 2A6) are used, the space between the top of the ceiling runner and the underside of the floor shall be tightly packed with mineral wool batt insulation. The forming material shall be installed flush with both surfaces of wall.
   INDUSTRIAL INSULATION GROUP L L C - MinWool-1200 Safing
   ROCK WOOL MANUFACTURING CO - Delta Board
   ROCKWOOL MALAYSIA SDN BHD - Safe
   ROCKWOOL - Safe
   THERMAFIBER INC - SAF
   C. **Fill, Void or Cavity Material* - Sealant -** Min 1/16 in. (1.6 mm) dry thickness (1/8 in. or 3.2 mm wet thickness) of fill material spray applied on each side of the wall between the top of the wall and the bottom of the floor, and overlap a min 1/2 in. (13 mm) onto gypsum board on both sides of wall. Additional 1/16 in. (1.6 mm) dry thickness (1/8 in. or 3.2 mm wet thickness) of fill material shall overlap a min 1/2 in. (13 mm) onto the floor on both sides of wall.
   SPECIFIED TECHNOLOGIES INC - SpecSeal AS200 Elastomeric Spray

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

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

System No. HW-D-0696

ANSI/UL2079	CAN/ULC S115
Assembly Ratings - 1 and 2 Hr (See Item 2)	F Ratings - 1 and 2 Hr (See Item 2)
Nominal Joint Width - 1 in.	FT Ratings - 1 and 2 Hr (See Item 2)
Class II or III Movement Capabilities - 100% Compression (See Item 3)	FH Ratings - 1 and 2 Hr (See Item 2)
L Rating at Ambient - Less Than 1 CFM/Lin Ft	FTH Ratings - 1 and 2 Hr (See Item 2)
L Rating at 400°F - Less Than 1 CFM/Lin Ft	Nominal Joint Width - 25 mm
	Class II or III Movement Capabilities - 100% Compression (See Item 3)
	L Rating at Ambient - Less Than 1.55 L/s/m
	L Rating at 204°C - Less Than 1.55 L/s/m

1. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick steel-reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Floor may also be constructed of any min 6 in. thick (152 mm) UL Classified hollow-core **Precast Concrete Units***
   See **Precast Concrete Units** (CFTV) category in Fire Resistance Directory for names of manufacturers.
2. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Steel Floor and Ceiling Runners -** Floor and ceiling runners of wall assembly shall consist of galv steel channels sized to accommodate steel studs (Item 2B). Length of flange to equal fully extended width of joint plus 1/4 in. (6 mm). Ceiling runner secured to concrete floor slab with steel masonry anchors spaced max 24 in. (610 mm) OC or min 1 in. (25 mm) long steel masonry or powder actuated fasteners spaced at a max of 24 in. (610 mm) OC.

A1. **Light Gauge Framing* - Vertical Deflection Ceiling Runner -** As an alternate to the ceiling runner in Item 2A, vertical deflection ceiling runner to consist of galv steel channel with slotted vertical deflection clips mechanically fastened within runner. Slotted clip provided with step bushings for permanent fastening of steel studs. Flanges sized to accommodate steel studs (Item 2B). Vertical deflection ceiling runner secured to concrete floor slab with steel masonry anchors spaced max 24 in. (610 mm) OC.
THE STEEL NETWORK INC - VertiTrack VTD358, VTD400, VTD600 and VTD800

A2. **Light Gauge Framing* - Notched Ceiling Runner -** As an alternate to the ceiling runners in Items 2A or 2A1, notched ceiling runners to consist of C-shaped galv steel channel with notched return flanges sized to accommodate steel studs (Item 2B). Notched ceiling runner secured to concrete floor slab with steel masonry anchors spaced max 24 in. (610 mm) OC.
OLMAR SUPPLY INC - Type SCR

B. **Studs -** Steel studs to be min 3-1/2 in. (89 mm) wide. Studs cut 1 in. (25 mm)-less in length than assembly height with bottom nesting in and resting on floor runner and with top nesting in ceiling runner without attachment. When vertical deflection ceiling runner (Item 2A1) is used, steel studs secured to slotted vertical deflection clips, through bushings, with steel screws at mid-height of each slot. Stud spacing not to exceed 24 in. (610 mm) OC.

C. **Batts and Blankets* -** (Not Shown) - As an alternate to the forming material (Item 3B), min 2.5 pcf (40 kg/m3) mineral wool batt insulation, of a width and thickness to completely fill stud cavity. Insulation batts friction fit to completely fill all stud cavities below the bottom surface of the steel ceiling runner.
See **Batts and Blankets** (BZJZ) category in the Fire Resistance Directory for names of manufacturers.

D. **Batts and Blankets* -** (Not Shown) - In 1 hr fire rated wall assemblies as an alternate to the forming material (Item 3B), any glass fiber insulation bearing the UL Classification Marking as to fire resistance or surface burning characteristics, of a width and thickness to completely fill stud cavity. Insulation batts friction fit to completely fill all stud cavities below the bottom surface of the steel ceiling runner. At the steel ceiling runner, the top 6 in. (152 mm) section of insulation to be folded back upon itself to double the density at this location.
See **Batts and Blankets** (BZJZ) category in the Fire Resistance Directory for names of manufacturers.

E. **Gypsum Board* -** Gypsum board sheets installed to a min total thickness of 5/8 in. (16 mm) and 1-1/4 in. (32 mm) on each side of wall for 1 and 2 hr fire rated assemblies, respectively. Wall to be constructed as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory, except that a nom 1 in. (25 mm) gap shall be maintained between the top of the gypsum board and the bottom surface of the floor. In addition, the top row of screws shall be installed into the steel studs 1 to 5 in. (25 to 127 mm) below the bottom edge of the ceiling runner flange.
The hourly ratings of the joint system are equal to the hourly rating of the wall.

3. **Joint System - Max separation between bottom of floor and top of wall is 1 in. (25 mm). The joint system is designed to accommodate a max 100 percent compression from its installed width.** The joint system consists of the following:
   A. **Fill, Void or Cavity Material* -** Factory-supplied intumescent gasket installed and nominally centered over the ceiling runner (Item 2A, 2A1, 2A2) prior to attachment to underside of concrete floor. Gypsum wallboard layers to be installed on both sides of the wall maintaining a minimum 1/8 in. (3 mm) overlap over the intumescent gasket at time of installation.
   SPECIFIED TECHNOLOGIES INC - Speed Flex Track Top Gasket
   B. **Forming Material* -** When stud cavities are not filled with mineral wool batt insulation or glass fiber insulation (Items 2C or 2D), nom 4 in. (102 mm) thick by 6 in. (152 mm) wide sections of 4 pcf (64 kg/m3) mineral wool batt insulation installed between studs (Item 2B) flush with the bottom surface of the steel ceiling runner.
   INDUSTRIAL INSULATION GROUP L L C - MinWool-1200 Safing
   JOHNS MANVILLE - Safing
   ROCK WOOL MANUFACTURING CO - Delta Board
   ROCKWOOL MALAYSIA SDN BHD - Safe
   ROCKWOOL - Safe
   THERMAFIBER INC - SAF

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

GENERAL NOTES:

1. Refer to section 07 84 00 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:
   - 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. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   - UL Fire Resistance Directory; Current Edition
   - NFPA 101 Life Safety Code
   - All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:
PROJECT_NAME:

PROJECT LOCATION:
PROJECT_LOCATION:

ARCHITECT/CONSULTANT:
ARCHITECT/CONSULTANT:

TITLE:
STI FIRESTOP SYSTEMS

Specified Technologies Inc.
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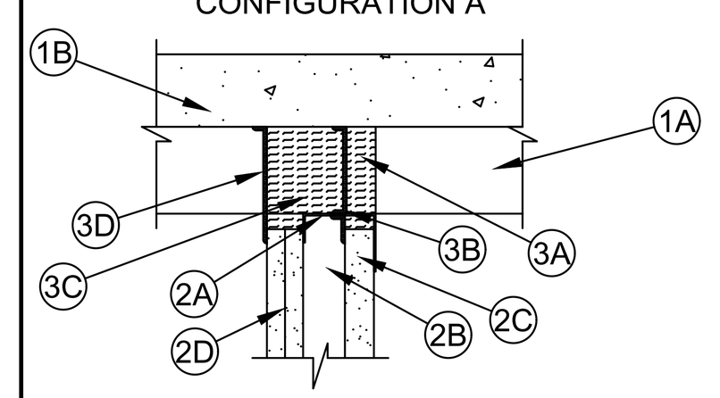
INDEX

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

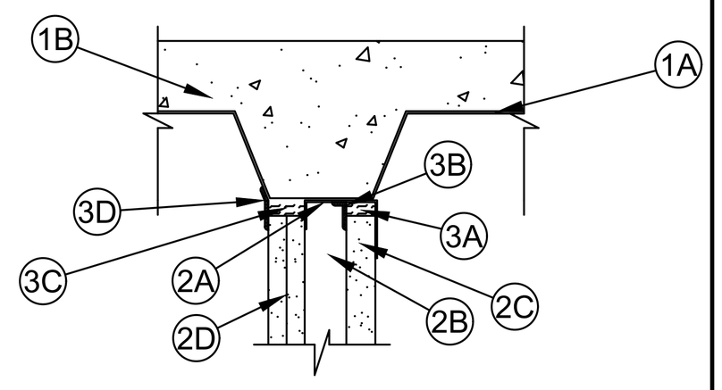
System No. HW-D-0548

ANSI/UL2079	CAN/ULC S115
Assembly Ratings - 1 and 2 Hr (See Item 2)	F Ratings - 1 and 2 Hr (See Item 2)
Maximum Joint Width - 3/4, 1 or 1-1/2 In. (See Item 3)	FT Ratings - 1 and 2 Hr (See Item 2)
Class II Movement Capabilities - 50 or 100 %Compression or Extension (See Item 3)	FH Ratings - 1 and 2 Hr (See Item 2)
L Rating At Ambient - Less Than 1 CFM/sq ft	FTH Ratings - 1 and 2 Hr (See Item 2)
L Rating At 400 F - Less Than 1 CFM/sq ft	Maximum Joint Width - 19, 25 or 38 mm (See Item 3)
	Class II Movement Capabilities - 50 or 100 % Compression or Extension (See Item 3)
	L Rating At Ambient - Less Than 1 CFM/sq ft
	L Rating At 400 F - Less Than 1 CFM/sq ft

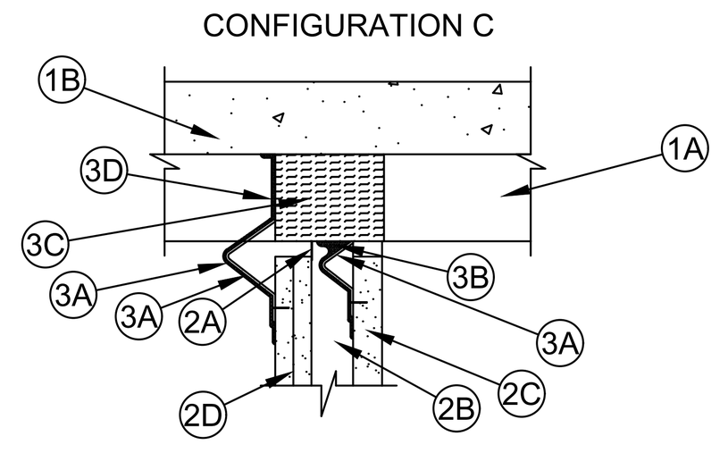
CONFIGURATION A



CONFIGURATION B



CONFIGURATION C



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HW-D-0548
PAGE 1 OF 5

1. **Floor Assembly -** The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D900 Series Floor-Ceiling Design in the UL Fire Resistance Directory. The hourly fire rating of the floor assembly shall be equal to or greater than the hourly fire rating of the wall assembly. The floor assembly shall include the following construction features:
   A. **Steel Floor and Form Units* -** Max 3 in. (76 mm) deep galv steel fluted floor units.
   B. **Concrete -** Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units.

1A. **Roof Assembly -** (Not Shown) - As an alternate to the floor assembly (Item 1), a fire rated fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual P900 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The hourly fire rating of the roof assembly shall be equal to or greater than the hourly fire rating of the wall assembly. The roof assembly shall include the following construction features:
   A. **Steel Roof Deck -** Max 3 in. (76 mm) deep galv steel fluted roof deck.
   B. **Roof Insulation -** Min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the steel roof deck.

1B. **Floor Assembly -** As an alternate to the floor assembly (Item 1), min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Floor may also be constructed of any UL Classified hollow-core **Precast Concrete Units***.
See **Precast Concrete Units** (CFTV) in Fire Resistance Directory for names of manufacturers.

2. **Shaft Wall Assembly -** The 1 or 2 hr fire rated shaft wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Floor and Ceiling Runners -** "J"-shaped runner, min 2-1/2 in. (64 mm) wide with unequal legs of min 1-1/2 in. (38 mm) and min 2 in. (51 mm), fabricated from min 24 MSG galv steel. Runners positioned with short leg toward finished side of wall. Flange height of ceiling runner shall be min 1/4 in. (6 mm) greater than max extended joint width. Runners attached to walls and floor with steel fasteners spaced max 24 in. (610 mm) OC. As an alternate to the "J"-shaped runner, a min 2-1/2 in. (64 mm) wide by 1 in. or 1 1/4 in. (25 or 32 mm) deep channel formed from min 24 MSG galv steel may be used for the floor runner. Ceiling runner installed parallel with or perpendicular to direction of fluted steel deck and secured to steel deck valley withy steel fasteners or welds spaced max 24 in. (610 mm) OC.
   A1. **Floor And Ceiling Runners -** As an alternate to Item 2A, floor and ceiling runners of wall assembly shall consist of galv steel channels sized to accommodate steel "C-H" studs. Flange height of ceiling runner shall be min 1/2 in. (13 mm) greater than nom joint width. Ceiling runner installed parallel with or perpendicular to direction of fluted steel deck and secured with steel masonry anchors or welds spaced max 24 in. (610 mm) OC.
   A2. **Light Gauge Framing* - Slotted Ceiling Track - (for use in Configuration A Only)** As an alternate to Item 2A, slotted ceiling track shall consist of galv steel channels with slotted flanges. Slotted ceiling track sized to accommodate steel "C-H" studs (Item 2C). Attached to concrete at ceiling with steel fasteners spaced max 12 in. OC (305 mm).
   BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS - SLP-TRK, SLPTRK325
   CALIFORNIA EXPANDED METAL PRODUCTS CO - CST, CST325
   CLARKDIETRICH BUILDING SYSTEMS - Type SLT, SLT-H
   MARINO/WARE, DIV OF WARE INDUSTRIES INC - Type SLT
   RAM SALES L L C - RAM Slotted Track
   SCAFCO STEEL STUD MANUFACTURING CO
   TELLING INDUSTRIES L L C - True-Action Deflection Track
   A3. **Light Gauge Framing* - Slotted Ceiling Runner -** As an alternate to the ceiling runner in Items 2A through 2A3, slotted ceiling runner to consist of galv steel channel with 3-1/4 in. (83 mm) high slotted flanges sized to accommodate steel studs (Item 2B). Ceiling runner installed parallel or perpendicular with direction of fluted steel deck and secured to steel deck valley with steel fasteners or welds spaced max 24 in. (610 mm) OC.
   BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS - SLPTRK325

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HW-D-0548
PAGE 2 OF 5

   B. **Steel Studs -** "C-H"-shaped steel studs to be min 2-1/2 in. (64 mm) wide and formed of min 24 MSG galv steel. For configuration A studs cut 1/2 to 1-1/4 in. (13 to 32 mm) less in length than assembly height or for configuration B studs cut 1 to 1-1/2 in. (25 to 38 mm) less in length than assembly height with bottom nesting in and resting on floor runner and with top nesting in ceiling runner or slotted ceiling track. Studs spaced 24 in. (610 mm) OC. After installation of gypsum board liner panels (Item 2D), studs secured to flange of floor runner on finished side of wall with No. 6 by 1/2 in. (13 mm) long self-drilling, self-tapping steel screws. Studs secured to flange of slotted ceiling track on finished side of wall only with No. 8 by 1/2 in. (13 mm) long self-drilling, self-tapping wafer head steel screws at slot midheight.
   C. **Gypsum Board* -** 1 in. (25 mm) thick by 24 in. (610 mm) wide gypsum board liner panels. Panels cut 1 in. (25 mm) less in length than floor to ceiling height. Vertical edges inserted in "H"-shaped section of "C-H" studs. Free edge of end panels attached to long leg of "J" runner (Item 2A) with 1-5/8 in. (41 mm) long Type S steel screws spaced max 12 in. (305 mm) OC.
   D. **Gypsum Board* -** Gypsum board sheets, 1/2 or 5/8 in. (13 or 16 mm) thick, applied vertically or horizontally in one or two layers on finished side of wall as specified in the individual U400 or V400-Series Wall and Partition Design. A max 1 in. (25 mm) gap shall be maintained between the top of the gypsum board and the bottom surface of the concrete floor. The screws attaching the gypsum board layers to the C-H studs shall be located 1 in. (25 mm) below the bottom of the slotted ceiling track (Item 2C). No gypsum board attachment screws are to penetrate the slotted ceiling track.
   The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.

Configuration A

3. **Joint System - Max separation between bottom of floor and top of liner panel (Item 2C) and between bottom of floor and top of gypsum board sheets (Item 2D) at time of installation of joint system 1-1/2 in. (38 mm). The joint system is designed to accommodate a maximum 50 percent compression or extension from its installed width.** The joint system consists of forming material and sealant, as follows:
   A. **Forming Material* -** In floor or roof assembly constructed with steel fluted floor units, compression-fit a minimum 1 in. (25 mm) depth of nom 4 pcf (64 kg/m3) mineral wool batt insulation into far recess of flute valley as a permanent form. Strips of mineral wool batt insulation cut to width of gypsum liner panel (Item 2C) and compressed 50 percent in thickness. Strip installed between top of gypsum liner panel and bottom of steel ceiling runner.
   INDUSTRIAL INSULATION GROUP L L C - MinWool 1200 Safing
   JOHNS MANVILLE - Safing
   ROCK WOOL MANUFACTURING CO - Delta Board
   ROCKWOOL MALAYSIA SDN BHD - SAFE
   ROCKWOOL - SAFE
   THERMAFIBER INC - SAF
   B. **Fill, Void or Cavity Material*- Sealant -** Min 1/8 in. (3.2 mm) wet thickness (min 1/16 in. or 1.5 mm dry thickness) of spray applied to cover mineral wool batt insulation within joint cavity (when present; Item 3A) and mineral wool batt installed above gypsum liner panel (Item 2C). Maintain min 1/2 in. (13 mm) overlaps onto surrounding substrates.
   SPECIFIED TECHNOLOGIES INC - SpecSeal AS200 Elastomeric Spray
   C. **Forming Material* -** Sections of min 4 pcf (64kg/m3) density mineral wool batt insulation cut to fill flute area (when present) flush with interior surface of wall after installation of spray (Item 3B). Strips of mineral wool batt insulation cut to width of gypsum board layers (Item 2D) and compressed 50 percent in thickness. Strips installed above gypsum board layers on finished side of wall assembly flush with the wall surface.
   INDUSTRIAL INSULATION GROUP L L C - MinWool 1200 Safing
   JOHNS MANVILLE - Safing
   ROCK WOOL MANUFACTURING CO - Delta Board
   ROCKWOOL MALAYSIA SDN BHD - SAFE
   ROCKWOOL - SAFE
   THERMAFIBER INC - SAF

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HW-D-0548
PAGE 3 OF 5

   D. **Fill, Void or Cavity Material*- Sealant -** Min 1/8 in. (3.2 mm) wet thickness (min 1/16 in. or 1.5 mm dry thickness) of spray applied to cover mineral wool batt insulation on finished side of wall. Maintain min 1/2 in. (13 mm) overlaps onto surrounding substrates.
   SPECIFIED TECHNOLOGIES INC - SpecSeal AS200 Elastomeric Spray

Configuration B

3. **Joint System - Max separation between bottom of floor and top of liner panel (Item 2C) and between bottom of floor and top of gypsum board sheets (Item 2D) at time of installation of joint system is 1-1/2 in. (38 mm). The joint system is designed to accommodate a maximum 50 percent compression or extension from its installed width.** The joint system consists of forming material and sealant, as follows:
   A. **Forming Material* -** Strips of min 4 pcf (64kg/m3) density mineral wool batt insulation cut to width of gypsum liner panel (Item 2C) and compressed 50 percent in thickness. Strip installed between top of gypsum liner panel and bottom of steel ceiling runner.
   INDUSTRIAL INSULATION GROUP L L C - MinWool 1200 Safing
   JOHNS MANVILLE - Safing
   ROCK WOOL MANUFACTURING CO - Delta Board
   ROCKWOOL MALAYSIA SDN BHD - SAFE
   ROCKWOOL - SAFE
   THERMAFIBER INC - SAF
   B. **Fill, Void or Cavity Material*- Sealant -** Min 1/8 in. (3.2 mm) wet thickness (min 1/16 in. or1.5 mm dry thickness) of spray applied to cover mineral wool batt insulation within joint cavity. Maintain min 1/2 in. (13 mm) overlaps onto surrounding substrates.
   SPECIFIED TECHNOLOGIES INC - SpecSeal AS200 Elastomeric Spray
   C. **Forming Material* -** Strips of min 4 pcf (64kg/m3) density mineral wool batt insulation cut to width of gypsum board layers (Item 2D) and compressed 50 percent in thickness. Strips installed above gypsum board layers on finished side of wall assembly flush with the wall surface.
   INDUSTRIAL INSULATION GROUP L L C - MinWool 1200 Safing
   JOHNS MANVILLE - Safing
   ROCK WOOL MANUFACTURING CO - Delta Board
   ROCKWOOL MALAYSIA SDN BHD - SAFE
   ROCKWOOL - SAFE
   THERMAFIBER INC - SAF
   D. **Fill, Void or Cavity Material*- Sealant -** Min 1/8 in. (3.2 mm) wet thickness (min 1/16 in. or 1.5 mm dry thickness) of spray applied to cover mineral wool batt insulation on finished side of wall. Maintain min 1/2 in. (13 mm) overlaps onto surrounding substrates.
   SPECIFIED TECHNOLOGIES INC - SpecSeal AS200 Elastomeric Spray

Configuration C

3. **Joint System - Max separation between bottom of floor and top of liner panel (Item 2C) and between bottom of floor and top of gypsum board sheets (Item 2D) at time of installation of joint system is 3/4 or 1 in. (19 or 25 mm). The joint system is designed to accommodate a maximum 100 percent compression or extension for 3/4 in. (19 mm) wide joints and a maximum 100 percent compression only for 1 in. (25 mm) wide joints, from its installed width.** The joint system consists of the following:

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PAGE 4 OF 5

   A. **Forming Material* -** Nom 3/16 in. (4.8 mm) thick by 4 in. (102 mm) high joint forming material profile installed on both sides of the wall assembly. Profile installed on the shaft side of the wall by first marking a line across the top of the wall 3 in. (76 mm) below the bottom plane of the bottom of the "J" or ceiling runner on the interior surface of the gypsum liner. Joint profile material on shaft side positioned with its top edge against both the underside of the ceiling runner with its bottom edge on the line scribed on the shaft liner. Profile installed on the finished side of the wall by first marking a line across the top of the wall 3 in. (76 mm) below the bottom plane of the steel floor or roof deck valleys. Joint profile material on finished side positioned with its top edge against both the underside of the floor or steel deck with its bottom edge on the line scribed on the finished side of the wall assembly. Bottom of the joint profile attached to gypsum board with nom 1/2 in. (13 mm) long steel staples spaced not greater than 8 in. (203 mm) OC. Adjoining lengths of profile to overlap approx 3/4 in. (19 mm) at shiplapped ends.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Speed Flex Joint Profile
   B. **Fill, Void or Cavity Material*- Sealant -** Min 1/8 in. (3.2 mm) wet thickness (min 1/16 in. or1.5 mm dry thickness) of spray applied to cover forming material within joint cavity (Item 3A) and forming material installed above gypsum liner panel (Item 2D). Maintain min 1/2 in. (13 mm) overlaps onto surrounding substrates.
   SPECIFIED TECHNOLOGIES INC - SpecSeal AS200 Elastomeric Spray
   C. **Forming Material* -** Sections of min 4 pcf (64kg/m3) density mineral wool batt insulation cut to fill flute area (when present) flush with interior surface of wall after installation of spray (Item 3B). Strips of mineral wool batt insulation cut to width of gypsum board layers (Item 2E) and compressed 50 percent in thickness. Strips installed above gypsum board layers on finished side of wall assembly flush with the wall surface.
   INDUSTRIAL INSULATION GROUP L L C - MinWool 1200 Safing
   ROCK WOOL MANUFACTURING CO - Delta Board
   ROCKWOOL MALAYSIA SDN BHD - SAFE
   ROCKWOOL - SAFE
   THERMAFIBER INC - SAF
   D. **Fill, Void or Cavity Material*- Sealant -** Min 1/8 in. (3.2 mm) wet thickness (min 1/16 in. or 1.5 mm dry thickness) of spray applied to cover forming material (Item 3C) on finished side of wall. Maintain min 1/2 in. (13 mm) overlaps onto surrounding substrates.
   SPECIFIED TECHNOLOGIES INC - SpecSeal AS200 Elastomeric Spray

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

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PAGE 5 OF 5

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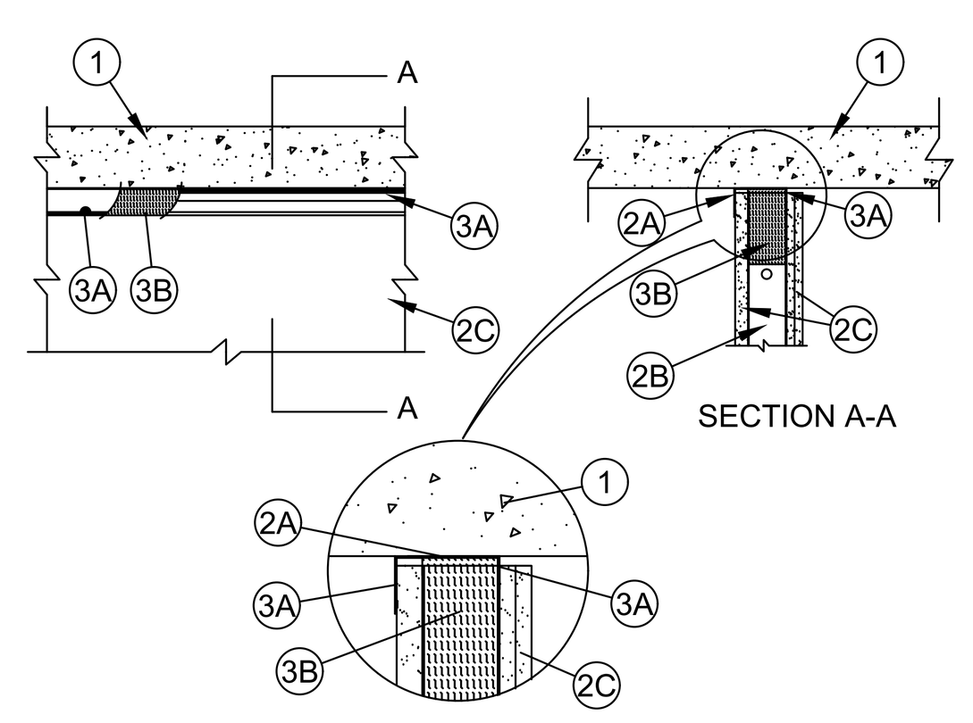
to ANSI/UL 2079 and CAN/ULC S115

System No. HW-D-0699

ANSI/UL2079	CAN/ULC S115
Assembly Ratings - 1 and 2 Hr (See Item 2)	F Ratings - 1 and 2 Hr (See Item 2)
Nominal Joint Width - 3/4 in.	FT Ratings - 1 and 2 Hr (See Item 2)
Class II or III Movement Capabilities - 100% Compression or Extension (See Item 3)	FH Ratings - 1 and 2 Hr (See Item 2)
L Rating at Ambient - Less Than 1 CFM/Lin Ft	FTH Ratings - 1 and 2 Hr (See Item 2)
L Rating at 400°F - Less Than 1 CFM/Lin Ft	Nominal Joint Width - 19 mm
	Class II or III Movement Capabilities - 100% Compression or Extension (See Item 3)
	L Rating at Ambient - Less Than 1 CFM/Lin Ft
	L Rating at 400°F - Less Than 1 CFM/Lin Ft



1. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick steel-reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Floor may also be constructed of any min 6 in. thick (152 mm) UL Classified hollow-core **Precast Concrete Units***.
   See **Precast Concrete Units** (CFTV) category in Fire Resistance Directory for names of manufacturers.
2. **Wall Assembly -** The 1 or 2 hr fire rated gypsum board/steel stud shaft wall assembly shall be constructed of the materials and in the manner specified in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory. The wall shall include the following construction features:
   A. **Steel Floor Runner -** "J"-shaped runners, min 2-1/2 in. (63 mm) deep, with unequal legs of 1 in. (25 mm) and 2 in. (51 mm), fabricated from min 24 MSG galv steel. Runners positioned with short leg toward finished side of wall. Runners attached to structural supports with steel fasteners located not greater than 2 in. (51 mm) from ends and not greater than 24 in. (610 mm) OC.

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HW-D-0699
PAGE 1 OF 2

   B. **Studs -** "C-H", "E" (back-to-back), "I" or "C-T"-shaped studs, min 2-1/2 in. (64 mm) deep, fabricated from min 25 MSG galv steel. Cut to lengths 3/4 in. (19 mm) less than floor-to-ceiling height and spaced 24 in. (610 mm) OC.
   C. **Gypsum Board* -** 1 in. (25 mm) thick gypsum liner panels and 1/2 in., 5/8 in. or 3/4 in. (13, 16 or 19 mm) thick gypsum panels installed as specified in the individual designs in the UL Fire Resistance Directory.
   The hourly ratings of the joint system are equal to the hourly rating of the wall.
3. **Joint System - Max separation between bottom of floor and top of wall is 3/4 in. (19 mm). The joint system is designed to accommodate a max 100 percent compression or extension from its installed width.** The joint system consists of the following:
   A. **Fill, Void or Cavity Material* -** Factory-supplied intumescent gasket installed over the steel "J" shaped ceiling runner (Item 2A) prior to attachment to bottom of concrete floor. Gypsum liner panel to be installed maintaining a maximum 3/4 in. (19 mm) gap between the top of the liner panel and the bottom surface of the ceiling runner. Gypsum wallboard layer(s) to be installed on finished side of the wall maintaining a minimum 1/8 in. (3 mm) overlap over the intumescent gasket at time of installation.
   SPECIFIED TECHNOLOGIES INC - Speed Flex Track Top Gasket
   B. **Forming Material* -** Nom 2 in. (51 mm) thick by 6 in. (152 mm) wide sections of 4 pcf (64 kg/m3) mineral wool batt insulation installed between studs (Item 2 B) flush with the bottom surface of the steel "J" shaped floor runner.
   IIG MINWOOL L L C - MinWool-1200 Safing
   ROCK WOOL MANUFACTURING CO - Delta Board
   ROCKWOOL MALAYSIA SDN BHD - Safe
   ROCKWOOL - Safe
   THERMAFIBER INC - SAF

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HW-D-0699
PAGE 2 OF 2

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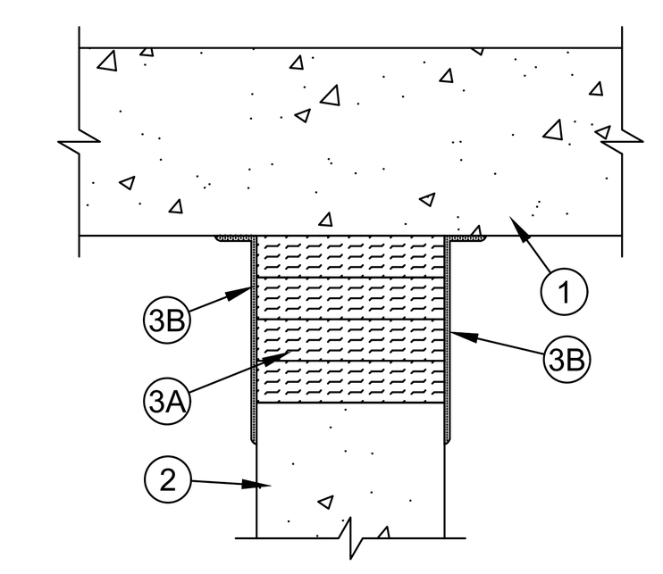
System No. HW-D-1034

Assembly Rating-3 Hr
Nominal Joint Width-4 In.
L Rating At Ambient - Less Than 1 CFM/Lin Ft
L Rating At 400°F - Less Than 1 CFM/Lin Ft
Class II Movement Capabilities-25% Compression or Extension



1. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick lightweight or normal weight reinforced (100-150 pcf or 1600-2400 kg/m3) structural concrete.
2. **Wall Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural 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.
3. **Joint System - Max width of joint (at time of installation of joint system) is 4 in. (102 mm). The joint system is designed to accommodate a max 25 percent compression or extension from its installed width**. The joint system shall consist of forming and fill materials, as follows:
   A. **Forming Material* -** Min 4 pcf (64 kg/m3) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4-1/2 in. (114 mm) and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 50 percent in thickness and such that the compressed batt sections are flush with each surface of the wall. Adjoining lengths of batt to be tightly butted with butted seams spaced min 16 in. (406 mm) apart along the length of the joint.
   IIG MINWOOL L L C - MinWool-1200 Safing
   JOHNS MANVILLE INTERNATIONAL INC - Safing
   ROCK WOOL MANUFACTURING CO - Delta Board
   ROCKWOOL MALAYSIA SDN BHD - SAFE
   ROCKWOOL - SAFE
   THERMAFIBER INC - Type SAF
   B. **Fill, Void or Cavity Material* - Sealant -** Min 1/8 in. (3.2 mm) wet thickness or 1/16 in. (1.6 mm) dry thickness of fill material applied to cover the surface of the mineral wool batt forming material and to lap min 1/2 in. (13 mm) onto the concrete on each side of the joint opening on both sides of the wall.
   SPECIFIED TECHNOLOGIES INC - SpecSeal AS200 Elastomeric Spray

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

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HW-D-1034
PAGE 1 OF 1

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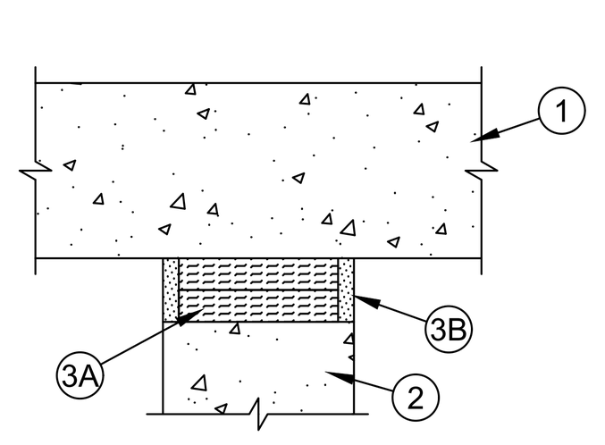
System No. HW-D-0156

Assembly Rating - 4 Hr
Nominal Joint Width - 2 in.
L Rating At Ambient - Less Than 1 CFM/Lin Ft
L Rating At 400°F - Less Than 1 CFM/Lin Ft
Class II Movement Capabilities - 12.5% Compression or Extension



1. **Floor Assembly -** Min 5-1/2 in. (140 mm) thick steel reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete.
2. **Wall Assembly -** Min 6 in. (152 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural 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.
3. **Joint System - Max width of joint (at time of installation of joint system) is 2 in. (51 mm). The joint system is designed to accommodate a max 12.5 percent compression or extension from its installed width.** The joint system shall consist of forming and fill materials, as follows:
   A. **Forming Material* -** Min 4 pcf (64 kg/m3) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 5 in. (127 mm) and installed vertically, edge-first into joint opening, such that batt sections are compressed min 50 percent in thickness and that the compressed batt sections are recessed from each surface of the wall as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly butted with butted seams spaced min 16 in. (406 mm) apart along the length of the joint.
   IIG MINWOOL L L C - MinWool-1200 Safing
   JOHNS MANVILLE INTERNATIONAL INC - Safing
   ROCK WOOL MANUFACTURING CO - Delta Board
   ROCKWOOL MALAYSIA SDN BHD - SAFE
   ROCKWOOL - SAFE
   THERMAFIBER INC - Type SAF
   B. **Fill, Void or Cavity Material* - Sealant -** Min 1/2 in. (13 mm) thickness of fill material applied within the joint on each side of wall, flush with wall surfaces.
   SPECIFIED TECHNOLOGIES INC - SpecSeal ES Sealant

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

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PAGE 1 OF 1

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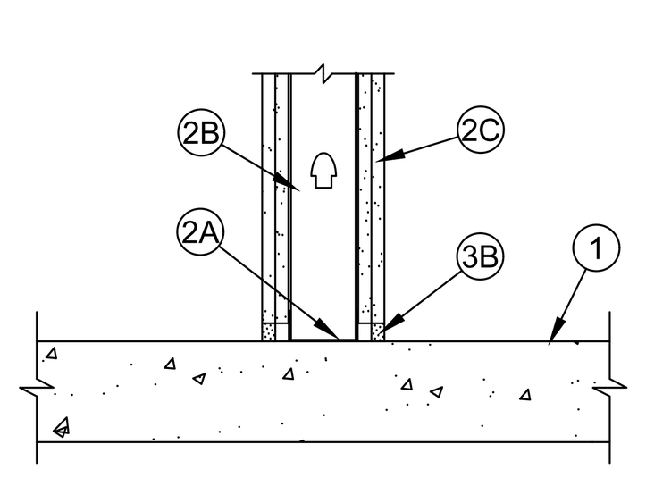
System No. BW-S-0003

Assembly Ratings - 1 and 2 Hr (See Item 2)
L Rating At Ambient - Less Than 1 CFM/Lin Ft (See Item 3B)
L Rating At 400°F - Less Than 1 CFM/Lin Ft (See Item 3B)
Joint Width - 3/4 In. Max



1. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Floor may also be constructed of any 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units*.**
   See **Precast Concrete Units** category in the Fire Resistance Directory for names of manufactures.
2. **Wall Assembly -** The 1 or 2 h fire-rated gypsum board/steel stud wall assembly shall be constructed of the materials and in the manner specified in the individual U400 or V400 Series Wall or Partition Design in the UL Fire Resistance Directory. In addition, the wall may incorporate a head-of-wall joint system constructed as specified in the HW Series Joint Systems in the UL Fire Resistance Directory. The wall shall include the following construction features:
   A. **Steel Floor Runner -** Floor runners of wall assembly shall consist of min No. 25 gauge galv steel channels sized to accommodate steel studs (Item 2B). Floor runners to be provided with min 1-1/4 in. (32 mm) flanges. Runners secured with steel fasteners spaced 12 in. (305 mm) OC.
   B. **Studs -** Steel studs to be min 3-1/2 in. (89 mm) wide. Studs cut 1/2 to 3/4 in. (13 to 19 mm) less in length than assembly height with bottom nesting in, resting on and fastened to floor runner with sheet metal screws. Stud spacing not to exceed 24 in. (610 mm) OC.
   C. **Gypsum Board* -** Gypsum board installed to a min total thickness of 5/8 in. (16 mm) or 1-1/4 in. (32 mm) on each side of wall for a 1 or 2 hr fire rated wall, respectively. Wall to be constructed as specified in the individual U400 or V400 Series Design in the UL Fire Resistance Directory except that a max 3/4 in. (19 mm) gap shall be maintained between the bottom of the gypsum board and the top of the concrete floor.
   The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.
3. **Joint System - Max separation between top of floor and bottom of gypsum board is 3/4 in. (19 mm).** The joint system consists of a packing material and a fill material, as follows:
   A. **Packing Material -** (Optional, Not Shown) - Mineral wool batt insulation, polyethylene backer rod or glass fiber insulation firmly packed into the gap between the bottom of the gypsum board and the top of the concrete floor and recessed from each surface of the wall 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 installed on each side of the wall between the bottom of the gypsum board and the top of the concrete floor, flush with each surface of the wall. When mineral wool batt insulation is used as a packing material, min thickness of fill material on each side of the wall is 1/4 in. (6 mm).
   SPECIFIED TECHNOLOGIES INC - SpecSeal ES Sealant, SpecSeal LCI Sealant, SpecSeal LC150 Sealant, Pensil 300 Sealant or SpecSeal Series SIL300.
   Note: L Ratings apply when SpecSeal ES Sealant is used.
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PAGE 1 OF 1

Classified by
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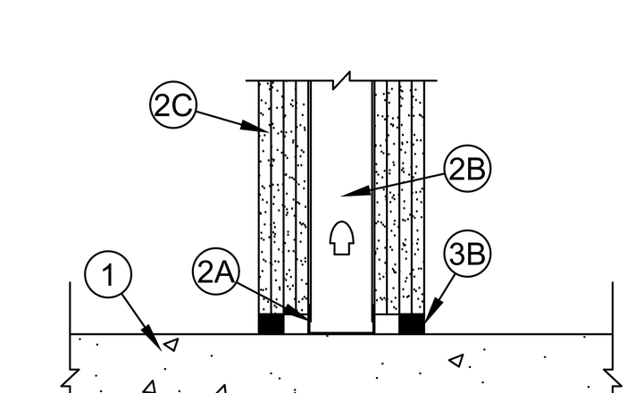
System No. BW-S-0017

Assembly Ratings - 3 and 4 Hr (See Item 2)
Joint Width - 3/4 In. (19 mm) Max



1. **Floor Assembly -** Min 4-1/2 in. (115 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Floor may also be constructed of any 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units***.
   See **Precast Concrete Units** category in the Fire Resistance Directory for names of manufactures.
2. **Wall Assembly -** The 3 or 4 h fire-rated gypsum board/steel stud wall assembly shall be constructed of the materials and in the manner specified in the individual U400 or V400 Series Wall or Partition Design in the UL Fire Resistance Directory. In addition, the wall may incorporate a head-of-wall joint system constructed as specified in the HW Series Joint Systems in the UL Fire Resistance Directory. The wall shall include the following construction features:
   A. **Steel Floor Runner -** Floor runners of wall assembly shall consist of min No. 25 gauge (0.56 mm) galv steel channels sized to accommodate steel studs (Item 2B). Floor runners to be provided with min 1-1/4 in. (31 mm) flanges. Runners secured with steel fasteners spaced 12 in. (305 mm) OC.
   B. **Studs -** Steel studs to be min 3-1/2 in. (89 mm) wide. Studs cut 1/2 to 3/4 in. (13 to 19 mm) less in length than assembly height with bottom nesting in, resting on and fastened to floor runner with sheet metal screws. Stud spacing not to exceed 24 in. (610 mm) OC.
   C. **Gypsum Board* -** Multiple layers of min 1/2 in. (13 mm) thick gypsum board. Wall to be constructed as specified in the individual U400 or V400 Series Design in Wall and Partition Design in the UL Fire Resistance Directory, except that a max 3/4 in. (19 mm) gap shall be shall be maintained between the bottom of the gypsum board and the top of the concrete floor.
   The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.
3. **Joint System - Max separation between top of floor and bottom of gypsum board is 3/4 in. (19 mm).** The joint system consists of a packing material and a fill material, as follows:
   A. **Packing Material -** (Optional, Not Shown) - Mineral wool batt insulation, polyethylene backer rod or glass fiber insulation firmly packed into the gap between the bottom of the gypsum board and the top of the concrete floor and recessed from each surface of the wall to accommodate the required thickness of fill material.
   B. **Fill, Void or Cavity Material*-Sealant -** Min 1 in. (13 mm) thickness of fill material installed on each side of the wall between the bottom of the gypsum board and the top of the concrete floor, flush with each surface of the wall.
   SPECIFIED TECHNOLOGIES INC - SpecSeal ES Sealant, Pensil 300 Sealant or SpecSeal Series SIL300
   * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

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BW-S-0017
PAGE 1 OF 1

GENERAL NOTES:

1. Refer to section 07 84 00 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:
   · 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. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   · UL Fire Resistance Directory; Current Edition
   · NFPA 101 Life Safety Code
   · All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:
PROJECT_NAME:

PROJECT LOCATION:
PROJECT_LOCATION:

ARCHITECT/CONSULTANT:
ARCHITECT/CONSULTANT:

TITLE:
STI FIRESTOP SYSTEMS

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INDEX

Classified by
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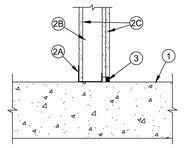
System No. BW-S-0020

Assembly Ratings - 1 and 2 Hr (See Item 2)
Joint Width - 1/2 In. Max
L Rating At Ambient - Less Than 1 CFM/Lin Ft
L Rating At 400 F - Less Than 1 CFM/Lin Ft



1. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Floor may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units***.

   See **Precast Concrete Units** (CFTV) category in the Fire Resistance Directory for names of manufactures.
2. **Wall Assembly -** The 1 or 2 hr fire rated gypsum board/steel stud shaft wall assembly shall be constructed of the materials and in the manner specified in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory. In addition, the wall may incorporate a head-of-wall joint system constructed as specified in the HW Series Joint Systems in the UL Fire Resistance Directory. The wall shall include the following construction features:
   A. **Steel Floor Runner -** "J"-shaped runners, min 2-1/2 in. (64 mm) deep, with unequal legs of 1 in. (25 mm) and 2 in. (51 mm), fabricated from min 24 MSG galv steel. Runners positioned with short leg toward finished side of wall. Runners attached to structural supports with steel fasteners located not greater than 2 in. (51 mm) from ends and not greater than 24 in. (610 mm) OC.
   B. **Studs -** "C-H", "E" (back-to-back) or "C-T"-shaped studs, min 2-1/2 in. (64 mm) deep, fabricated from min 25 MSG galv steel. Cut to lengths 3/8 to 1/2 in. (10 to 13 mm) less than floor-to-ceiling height and spaced 24 in. (610 mm) OC.
   C. **Gypsum Board* -** 1 in. (25 mm) thick gypsum liner panels and 1/2 in., 5/8 in. or 3/4 in. (13, 16 or 19 mm) thick gypsum panels installed as specified in the individual U400 or V400 Series shaft wall designs in the UL Fire Resistance Directory.

   The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.
3. **Fill, Void or Cavity Material* - Sealant -** Max separation between top of floor and bottom of gypsum board on the finish side of wall is 1/2 in. (13 mm). Min 1/2 in. (13 mm) thickness of fill material installed on finish side of the wall between the bottom of the gypsum board and the top of the concrete floor, flush with surface of the finish side of wall.

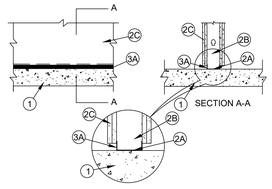
   SPECIFIED TECHNOLOGIES INC - SpecSeal ES Sealant, SpecSeal LCI Sealant, SpecSeal LC150 Sealant, Pensil 300 Sealant or SpecSeal Series SIL300 Silicone Firestop Sealant

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

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

System No. BW-S-0028

ANSI/UL2079	CAN/ULC S115
Assembly Ratings - 1 and 2 Hr (See Item 2)	F Ratings - 1 and 2 Hr (See Item 2)
Nominal Joint Width - 1 in.	FT Ratings - 1 and 2 Hr (See Item 2)
L Rating at Ambient - Less Than 1 CFM/Lin Ft	FH Ratings - 1 and 2 Hr (See Item 2)
L Rating at 400°F - Less Than 1 CFM/Lin Ft	FTH Ratings - 1 and 2 Hr (See Item 2)
	Nominal Joint Width - 25 mm
	L Rating at Ambient - Less Than 1 CFM/Lin Ft
	L Rating at 400°F - Less Than 1 CFM/Lin Ft



1. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick steel-reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Floor may also be constructed of any min 6 in. thick (152 mm) UL Classified hollow-core **Precast Concrete Units***.

   See **Precast Concrete Units** (CFTV) category in Fire Resistance Directory for names of manufacturers.
2. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Steel Floor Runner -** Floor runners of wall assembly shall consist of min No. 25 gauge galv steel channels sized to accommodate steel studs (Item 2B). Floor runners to be provided with min 1-1/4 in. (32 mm) flanges. Runners secured with steel fasteners spaced 12 in. (305 mm) OC.

   B. **Studs -** Steel studs to be min 3-1/2 in. (89 mm) wide. Stud spacing not to exceed 24 in. (610 mm) OC.
   C. **Gypsum Board* -** Gypsum board sheets installed to a min total thickness of 5/8 in. (16 mm) and 1-1/4 in. (32 mm) on each side of wall for 1 and 2 hr fire rated assemblies, respectively. Wall to be constructed as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory except that a max 1 in. (25 mm) gap shall be maintained between the bottom of the gypsum board and the top of the concrete floor.

   The hourly ratings of the joint system are equal to the hourly rating of the wall.
3. **Joint System - Max separation between bottom of floor and top of wall is 1 in. (25 mm).** The joint system consists of the following:
   A. **Fill, Void or Cavity Material* -** Factory-supplied intumescent gasket installed and nominally centered over the steel floor runner (Item 2A) prior to attachment to top of concrete floor. Gypsum wallboard layers to be installed on both sides of the wall maintaining a minimum 1/8 in. (3 mm) overlap over the intumescent paper profile at time of installation.

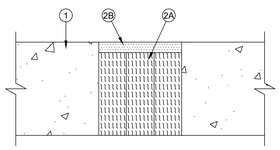
   SPECIFIED TECHNOLOGIES INC - Speed Flex Track Top Gasket

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

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 2079

System No. FF-D-1001

Assembly Rating - 3 Hr
L Rating At Ambient - Less Than 1 CFM/Lin Ft
L Rating At 400 F - Less Than 1 CFM/Lin Ft
Nominal Joint Width - 4 In.
Class II Movement Capabilities - 15% or 25% Compression or Extension (See Item 3B)



1. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete.
2. **Joint - Max width of joint (at time of installation of joint system) is 4 in. (102 mm). The joint system is designed to accommodate a max 15 or 25 percent compression or extension from it's installed width.** The joint system shall consist of the following:
   A. **Forming Material* -** Min 4 pcf (64 kg/m3) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4 in. (102 mm) and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 33 percent in thickness and that the compressed batt sections are recessed from top surface of the floor as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 16 in. (406 mm) apart along the length of the joint.

   IIG MINWOOL L L C - MinWool-1200 Safing

   JOHNS MANVILLE INTERNATIONAL INC - Safing

   ROCK WOOL MANUFACTURING CO - Delta Board

   ROCKWOOL MALAYSIA SDN BHD - SAFE

   ROCKWOOL - SAFE

   THERMAFIBER INC - Type SAF
   B. **Fill, Void or Cavity Material* -** Min 1/8 in. (3.2 mm) wet thickness or 1/16 in. (1.6 mm) dry thickness of fill material applied within the joint, flush with top surface of floor and lapping a min 1 in. (25 mm) onto the top surface of the floor.

   SPECIFIED TECHNOLOGIES INC - SpecSeal AS200 Elastomeric Spray

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

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 2079

System No. FF-D-1007

Assembly Rating - 2 Hr
Nominal Joint Width - 4 In.
L Rating At Ambient - Less Than 1 CFM/Lin Ft
L Rating At 400°F - Less Than 1 CFM/Lin Ft
Class II Movement Capabilities - 15% Compression or Extension

1. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete.
2. **Joint System - Max width of joint (at time of installation of joint system) is 4 in. (102 mm). The joint system is designed to accommodate a max 15 percent compression or extension from it's installed width.** The joint system shall consist of the following:
   A. **Forming Material* -** Min 4 pcf (64 kg/m3) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4 in. and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 33 percent in thickness and that the compressed batt sections are recessed from top surface of the floor as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 16 in. (406 mm) apart along the length of the joint.

   IIG MINWOOL L L C - MinWool-1200 Safing

   JOHNS MANVILLE INTERNATIONAL INC - Safing

   ROCK WOOL MANUFACTURING CO - Delta Board

   ROCKWOOL MALAYSIA SDN BHD - SAFE

   ROCKWOOL - SAFE

   THERMAFIBER INC - Type SAF
   B. **Fill, Void or Cavity Material* - Spray -** Min 1/8 in. (3.2 mm) wet thickness or 1/16 in. (1.6 mm) dry thickness of fill material applied within the joint, flush with top surface of floor and lapping a min 1 in. (25 mm) onto the top surface of the floor.

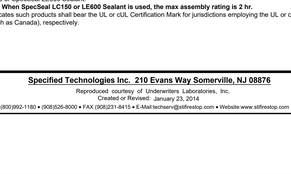
   SPECIFIED TECHNOLOGIES INC - SpecSeal AS200 Elastomeric Spray

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

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 2079

System No. FF-D-1008

Assembly Rating - 3 Hr
Nominal Joint Width - 4 In.
L Rating At Ambient - Less Than 1 CFM/Lin Ft
L Rating At 400°F - Less Than 1 CFM/Lin Ft
Class II Movement Capabilities - 15% Compression or Extension



1. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete.
2. **Joint System - Max width of joint (at time of installation of joint system) is 4 in. (102 mm). The joint system is designed to accommodate a max 15 percent compression or extension from it's installed width.** The joint system shall consist of the following:
   A. **Forming Material* -** Min 4 pcf (64 kg/m3) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4 in. (102 mm) and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 33 percent in thickness and that the compressed batt sections are recessed from top surface of the floor as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 16 in. (406 mm) apart along the length of the joint.

   IIG MINWOOL L L C - MinWool-1200 Safing

   JOHNS MANVILLE INTERNATIONAL INC - Safing

   ROCK WOOL MANUFACTURING CO - Delta Board

   ROCKWOOL MALAYSIA SDN BHD - SAFE

   ROCKWOOL - SAFE

   THERMAFIBER INC - Type SAF
   B. **Fill, Void or Cavity Material* - Sealant -** Min 1/2 in. (13 mm) thickness of fill material applied within the joint, flush with top surface of floor.

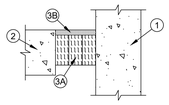
   SPECIFIED TECHNOLOGIES INC - SpecSeal ES Sealant

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

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 2079

System No. FW-D-1001

Assembly Ratings - 1, 2 & 3 Hr (See Item 1)
L Rating At Ambient - Less Than 1 CFM/LIN Ft
L Rating At 400 F - Less Than 1 CFM/Lin Ft
Nominal Joint Width - 4 In.
Class II Movement Capabilities - 25% Compression Or Extension



1. **Wall Assembly -** Lightweight or normal weight reinforced (100-150 pcf or 1600-2400 kg/m3) structural concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***. The hourly rating of the joint system is dependent upon the min thickness of the wall as tabulated below:

Min Thickness of Wall, In (mm)	Assembly Rating, Hr
2-1/2 (64)	1
3-1/4 (83)	2
4-1/2 (114)	3

   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete.
3. **Joint System - Joint System Max separation between edge of floor and face of wall (at time of installation of joint system) is 4 in. (102 mm). The joint system is designed to accommodate a max 25 percent compression or extension from it's installed width.** The joint system shall consist of the following:
   A. **Forming Material* -** Min 4 pcf (64 kg/m3) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4 in. (102 mm) and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 50 percent in thickness and such that the compressed batt sections are recessed from top surface of floor to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 16 in. (406 mm) apart along the length of the joint.

   IIG MINWOOL L L C - MinWool-1200 Safing

   JOHNS MANVILLE INTERNATIONAL INC - Safing

   ROCK WOOL MANUFACTURING CO - Delta Board

   ROCKWOOL MALAYSIA SDN BHD - SAFE

   ROCKWOOL - SAFE

   THERMAFIBER INC - Type SAF
   B. **Fill, Void or Cavity Material* - Sealant -** Min 1/2 in. (13 mm) thickness of fill material applied within the joint, flush with top surface of floor.

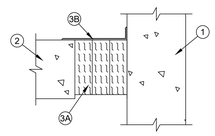
   SPECIFIED TECHNOLOGIES INC - Pensil 300, Pensil 300 S/L, SpecSeal Series SIL300 or SpecSeal Series SIL300SL Sealants

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

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 2079

System No. FW-D-1006

Assembly Rating - 2 Hr
Nominal Joint Width - 4 In.
L Rating At Ambient - Less Than 1 CFM/Lin Ft
L Rating At 400°F - Less Than 1 CFM/Lin Ft
Class II Movement Capabilities - 15% Compression or Extension



1. **Wall Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***.

   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100 - 150 pcf or 1600-2400 kg/m3) structural concrete.
3. **Joint System - Max separation between edge of floor and face of wall (at time of installation of joint system) is 4 in. (102 mm). The joint system is designed to accommodate a max 15 percent compression or extension from it's installed width.** The joint system shall consist of the following:
   A. **Forming Material* -** Min 4 pcf (64 kg/m3)mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4 in. (102 mm) and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 33 percent in thickness and such that the compressed batt sections are recessed from top surface of the floor as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 16 in. (406 mm) apart along the length of the joint.

   IIG MINWOOL L L C - MinWool-1200 Safing

   JOHNS MANVILLE INTERNATIONAL INC - Safing

   ROCK WOOL MANUFACTURING CO - Delta Board

   ROCKWOOL MALAYSIA SDN BHD - SAFE

   ROCKWOOL - SAFE

   THERMAFIBER INC - Type SAF
   B. **Fill, Void or Cavity Material* - Spray -** Min 1/8 in. (3.2 mm) wet thickness or 1/16 in. (1.6 mm) dry thickness of fill material applied within the joint, flush with top surface of floor and lapping a min 1 in. (25 mm) onto the top surface of the floor and side of wall.

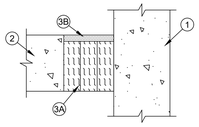
   SPECIFIED TECHNOLOGIES INC - SpecSeal AS200 Elastomeric Spray

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

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 2079

System No. FW-D-1007

Assembly Rating - 3 Hr
Nominal Joint Width - 4 In.
L Rating At Ambient - Less Than 1 CFM/Lin Ft
L Rating At 400°F - Less Than 1 CFM/Lin Ft
Class II Movement Capabilities - 15% Compression or Extension



1. **Wall Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***.

   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100 - 150 pcf or 1600-2400 kg/m3) structural concrete.
3. **Joint System - Joint System Max separation between edge of floor and face of wall (at time of installation of joint system) is 4 in. (102 mm). The joint system is designed to accommodate a max 15 percent compression or extension from it's installed width.** The joint system shall consist of the following:
   A. **Forming Material* -** Min 4 pcf (64 kg/m3) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4 in. and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 33 percent in thickness and such that the compressed batt sections are recessed from top surface of the floor as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 16 in. (406 mm) apart along the length of the joint.

   IIG MINWOOL L L C - MinWool-1200 Safing

   JOHNS MANVILLE INTERNATIONAL INC - Safing

   ROCK WOOL MANUFACTURING CO - Delta Board

   ROCKWOOL MALAYSIA SDN BHD - SAFE

   ROCKWOOL - SAFE

   THERMAFIBER INC - Type SAF
   B. **Fill, Void or Cavity Material* - Sealant -** Min 1/2 in. (13 mm) thickness of fill material applied within the joint, flush with top surface of floor.

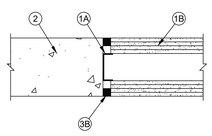
   SPECIFIED TECHNOLOGIES INC - SpecSeal ES Sealant

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

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 2079

System No. WW-S-0052

Assembly Rating - 1, 2, 3 and 4 Hr (See Items 2 and 3B)
Joint Width - 1 In. Max
L Rating At Ambient - Less Than 1 CFM/lin ft
L Rating At 400 °F - Less Than 1 CFM/lin ft



1. **Wall Assembly -** The 1, 2, 3 or 4 hr fire-rated gypsum board/steel stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs -** Steel studs to be min 3-1/2 in. (89 mm) wide by 1-1/4 in. (32 mm) deep corrosion protected min 25 MSG steel channels. Stud spacing not to exceed 24 in. (610 mm) OC. Stud installed nominally centered at joint location.
   B. **Gypsum Board* -** Gypsum board sheets installed to a min total thickness of 5/8 in. (16 mm), 1-1/4 in. (32 mm), 1-1/2 in. (38 mm) or 2 in. (51 mm) on each side of wall for 1, 2, 3 and 4 hr fire rated assemblies, respectively. Wall to be constructed in the individual U400 or V400 Series Design in the UL Fire Resistance Directory.

   The hourly rating of the joint system is dependent on the hourly fire rating of the wall assembly in which it is installed.
2. **Wall Assembly -** Min 6 in. (152 mm) thick steel-reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. When the hourly rating is greater than 3 hr, the min thickness of the wall shall be 7-5/8 in. (194 mm) 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.
3. **Joint System - Max width of joint is 1 in. (25 mm).** The joint system consists of the following:
   A. **Forming Material -** (Optional, Not Shown) - In 2, 3 or 4 hr fire rated wall assemblies, polyethylene backer rod, mineral wool batt insulation or fiberglass batt insulation friction fit into joint opening, flush with both surfaces of wall.
   B. **Fill, Void or Cavity Material* - Sealant -** In 1 hr fire rated wall assemblies, min 5/8 in. (16 mm) thickness of fill material applied within joint opening. In 2, 3 or 4 hr fire rated wall assemblies, min 1 in. (25 mm) thickness of fill material applied within joint opening. Sealant applied on both sides of wall, flush with both surfaces of the wall.

   SPECIFIED TECHNOLOGIES INC - SpecSeal ES Sealant, Pensil 300 Sealant, SpecSeal Series SIL300 Sealant, SpecSeal LC150 or SpecSeal LE600 Sealant.

   Note: When SpecSeal LC150 or LE600 Sealant is used, the max assembly rating is 2 hr.

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

GENERAL NOTES:

1. Refer to section 07 84 00 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:
   - 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. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   - UL Fire Resistance Directory; Current Edition
   - NFPA 101 Life Safety Code
   - All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:

PROJECT_NAME:

PROJECT LOCATION:

PROJECT_LOCATION:

ARCHITECT/CONSULTANT:

ARCHITECT/CONSULTANT:

TITLE:

STI FIRESTOP SYSTEMS

Specified Technologies Inc.
210 Evans Way Somerville, NJ 08876

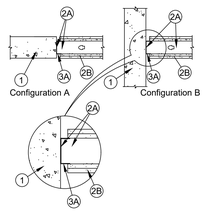
STI.
Toll Free: (800)992-1180
Phone: (908)526-8000
FAX (908)231-8415
E-Mail:techserv@stifirestop.com
Website:www.stifirestop.com

INDEX

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

System No. WW-S-0063

ANSI/UL2079	CAN/ULC S115
Assembly Ratings 1 and 2 Hr (See Item 2)	F Ratings 1 and 2 Hr (See Item 2)
Nominal Joint Width 1 in. (25 mm)	FT Ratings 1 and 2 Hr (See Item 2)
L Rating at Ambient Less Than 1 CFM/Lin Ft	FH Ratings 1 and 2 Hr (See Item 2)
L Rating at 400°F Less Than 1 CFM/Lin Ft	FTH Ratings 1 and 2 Hr (See Item 2)
	Nominal Joint Width 25 mm
	L Rating at Ambient Less Than 1 CFM/Lin Ft
	L Rating at 400°F Less Than 1 CFM/Lin Ft



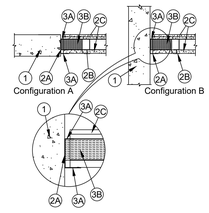
1. **Wall Assembly -** Min 6 in. (152 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Additionally, thickness of concrete wall shall be equal to or greater than thickness of gypsum board wall. Wall may also be constructed of any UL Classified **Concrete Blocks***.
   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs -** Steel studs to be min 3-1/2 in. (89 mm) wide. Stud spacing not to exceed 24 in. (610 mm) OC.

B. **Gypsum Board* -** Gypsum board sheets installed to a min total thickness of 5/8 in. (16 mm) and 1-1/4 in. (32 mm) on each side of wall for 1 and 2 hr fire rated assemblies, respectively. Wall to be constructed as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory, except that a nom 1 in. (25 mm) gap shall be maintained between the gypsum board and the surface of the wall (Item 1).
   The hourly ratings of the joint system are equal to the hourly rating of the wall.
3. **Joint System - Max separation between the gypsum board and the surface of the wall (Item 1) is 1 in. (25 mm).** The joint system consists of the following:
   A. **Fill, Void or Cavity Material* -** Factory-supplied intumescent gasket installed and nominally centered over the stud (Item 2A) prior to attachment concrete wall (Item 1). Gypsum wallboard layers to be installed on both sides of the wall maintaining a minimum 1/8 in. (3 mm) overlap over the intumescent paper profile at time of installation.
   SPECIFIED TECHNOLOGIES INC - Speed Flex Track Top Gasket
   * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

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

System No. WW-S-0064

ANSI/UL2079	CAN/ULC S115
Assembly Ratings - 1 and 2 Hr (See Item 2)	F Ratings - 1 and 2 Hr (See Item 2)
Nominal Joint Width - 3/4 in.	FT Ratings - 1 and 2 Hr (See Item 2)
L Rating at Ambient - Less Than 1 CFM/Lin Ft	FH Ratings - 1 and 2 Hr (See Item 2)
L Rating at 400°F - Less Than 1 CFM/Lin Ft	FTH Ratings - 1 and 2 Hr (See Item 2)
	Nominal Joint Width - 19 mm
	L Rating at Ambient - Less Than 1 CFM/Lin Ft
	L Rating at 400°F - Less Than 1 CFM/Lin Ft



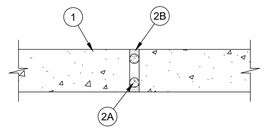
1. **Wall Assembly -** Min 6 in. (152 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Additionally, thickness of concrete wall shall be equal to or greater than thickness of gypsum board wall. Wall may also be constructed of any UL Classified **Concrete Blocks***.
   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Steel Runner -** "J"-shaped runners, min 4 in. (102 mm) deep, with unequal legs of 1 in. (25 mm) and 2 in. (51 mm), fabricated from min 24 MSG galv steel. Runners positioned with short leg toward finished side of wall. Runners attached to structural supports with steel fasteners located not greater than 2 in. (51 mm) from ends and not greater than 24 in. (610 mm) OC.

B. **Studs -** "C-H", "E" (back-to-back), "I" or "C-T"-shaped studs, min 2-1/2 in. (64 mm) deep, fabricated from min 25 MSG galv steel. Cut to lengths 3/8 to 1/2 in. (10 to 13 mm) less than floor-to-ceiling height and spaced 24 in. (610 mm) OC.
C. **Gypsum Board* -** 1 in. (25 mm) thick gypsum liner panels and 1/2 in., 5/8 in. or 3/4 in. (13, 16 or 19 mm) thick gypsum panels installed as specified in the individual designs in the UL Fire Resistance Directory.
   The hourly ratings of the joint system are equal to the hourly rating of the wall.
3. **Joint System - Max separation between bottom of floor and top of wall is 3/4 in. (19 mm).** The joint system consists of the following:
   A. **Fill, Void or Cavity Material* -** Factory-supplied intumescent gasket installed over the steel "J" shaped floor runner (Item 2A) prior to attachment to top of concrete floor. Gypsum liner panel to be installed maintaining a maximum 3/4 in. (19 mm) gap between the bottom of the liner panel and the top surface of the floor runner. Gypsum board layer(s) to be installed on finished side of the wall maintaining a minimum 1/8 in. (3 mm) overlap over the intumescent paper profile at time of installation.
   SPECIFIED TECHNOLOGIES INC - Speed Flex Track Top Gasket
   B. **Forming Material* -** Nom 4 in. (102 mm) thick by 6 in. (152 mm) wide sections of 4 pcf (64 kg/m3) mineral wool batt insulation installed the entire length and flush with the surface of the steel "J"-shaped runner (Item 2 A).
   IIG MINWOOL L L C - MinWool-1200 Safing
   JOHNS MANVILLE INTERNATIONAL INC - Safing
   ROCK WOOL MANUFACTURING CO - Delta Board
   ROCKWOOL MALAYSIA SDN BHD - Safe
   ROXUL INC - Safe
   THERMAFIBER INC - SAF
   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 2079

System No. WW-D-0004

Assembly Rating - 3 Hr
Nominal Joint Width - 1 In.
L Rating At Ambient - Less Than 1 CFM/Lin Ft
L Rating At 400°F - Less Than 1 CFM/Lin Ft
Class II Movement Capabilities - 12.5% Compression Or Extension

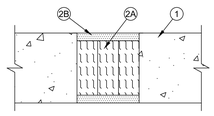


1. **Wall Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***.
   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Joint System - Max width of joint (at time of installation of joint system) is 4 in. (102 mm). The joint system is designed to accommodate a max 12.5 percent compression or extension from its installed width.** The joint system shall consist of the following:
   A. **Packing Material -** Open or closed cell polyethylene or polyurethane foam backer rod used as a form to prevent the leakage of fill material. Packing material to be recessed from both surfaces of the wall 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 joint, flush with both surfaces of wall.
   SPECIFIED TECHNOLOGIES INC - SpecSeal ES Sealant
   * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 2079

System No. WW-D-1007

Assembly Rating - 3 Hr
Nominal Joint Width - 4 In.
L Rating At Ambient - Less Than 1 CFM/Lin Ft
L Rating At 400°F - Less Than 1 CFM/Lin Ft
Class II Movement Capabilities - 15% Compression or Extension

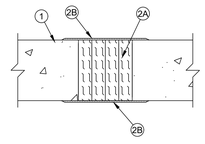


1. **Wall Assembly -** Min 5 in. (127 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***.
   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Joint System - Max width of joint (at time of installation of joint system) is 4 in. (102 mm). The joint system is designed to accommodate a max 15 percent compression or extension from it's installed width.** The joint system shall consist of the following:
   A. **Forming Material* -** Min 4 pcf (64 kg/m3) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4 in. (102 mm) and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 33 percent in thickness and that the compressed batt sections are recessed from each surface of the wall as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 16 in. (406 mm) apart along the length of the joint.
   IIG MINWOOL L L C - MinWool-1200 Safing
   JOHNS MANVILLE INTERNATIONAL INC - Safing
   ROCK WOOL MANUFACTURING CO - Delta Board
   ROCKWOOL MALAYSIA SDN BHD - SAFE
   ROCKWOOL - SAFE
   THERMAFIBER INC - Type SAF
   B. **Fill, Void or Cavity Material* - Sealant -** Min 1/2 in. (13 mm) thickness of fill material applied within the joint, flush with each surface of wall.
   SPECIFIED TECHNOLOGIES INC - SpecSeal ES Sealant
   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 2079

System No. WW-D-1037

Assembly Rating-3 Hr
Nominal Joint Width-4 In.
Class II Movement Capabilities-25% Compression

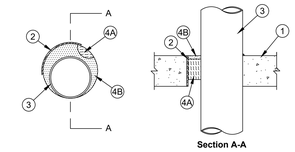


1. **Wall Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***.
   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Joint System - Max width of joint (at time of installation of joint system) is 4 in. (102 mm). The joint system is designed to accommodate a max 25 percent compression or extension from its installed width.** The joint system shall consist of forming and fill materials, as follows:
   A. **Forming Material* -** Min 4 pcf (64 kg/m3) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4-1/2 in. (114 mm) and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 50 percent in thickness and such that the compressed batt sections are flush with each surface of the wall. Adjoining lengths of batt to be tightly butted with butted seams spaced min 16 in. (406 mm) apart along the length of the joint.
   IIG MINWOOL L L C - MinWool-1200 Safing
   JOHNS MANVILLE INTERNATIONAL INC - Safing
   ROCK WOOL MANUFACTURING CO - Delta Board
   ROCKWOOL MALAYSIA SDN BHD - SAFE
   ROXUL INC - SAFE
   THERMAFIBER INC - Type SAF
   B. **Fill, Void or Cavity Material* - Sealant -** Min 1/8 in. (3.2 mm) wet thickness or (1/16 in. (1.6 mm) dry) thickness of fill material applied to cover the surface of the mineral wool batt forming material and to lap min 1/2 in. (13 mm) onto the concrete on each side of the joint opening on both sides of the wall.
   SPECIFIED TECHNOLOGIES INC - SpecSeal AS200 Elastomeric Spray
   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115

System No. C-AJ-1353

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating - 3 Hr	F Rating - 3 Hr
T Rating - 0 Hr	FT Rating - 0 Hr
L Rating At Ambient - Less Than 1 CFM/sq ft	FH Rating - 3 Hr
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Rating - 0 Hr
	L Rating At Ambient - Less Than 1 CFM/sq ft
	L Rating At 400 F - Less Than 1 CFM/sq ft



1. **Floor or Wall Assembly -** Lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete floor or wall. Min thickness of concrete is shown in table in Item 4B. Floor may also be constructed of any min 6 in. (152 mm) thick hollow-core **Precast Concrete Units***. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening is 14 in. (356 mm). Max diam of opening in floors constructed of hollow-core is 7 in. (178 mm).
   See **Concrete Blocks** (CAZT) or **Precast Concrete Units** (CFTV) categories in the Fire Resistance Directory for names of manufacturers.
2. **Steel Sleeve -** (Optional) - Nom 14 in. (356 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe or No. 26 ga (0.022 in. or 0.56 mm thick) sheet steel sleeve with square anchor flange spot welded to the sleeve at approx mid-height. Sleeve cast or grouted in place flush with floor or wall surfaces. Steel pipe sleeve may project a max of 2 in. (51 mm) beyond the floor or wall surfaces.
3. **Through Penetrant -** One metallic pipe, conduit or tube to be installed eccentrically or concentrically within the firestop system. The annular space between the pipe, conduit or tube and the periphery of the opening shall be min 0 in. (point contact). The max annular space is 1 in. or 2 in. (25 or 51 mm) as shown in the table in Item 4B . Pipe, conduit or tube to be rigidly supported on both sides of the floor or wall assembly. The following types and sizes of metallic pipes, conduits and tubes may be used:
   A. **Steel Pipe -** Nom 12 in. (305 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 12 in. (305 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Conduit -** Nom 6 in. (152 mm) diam (or smaller) rigid steel conduit, nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing (EMT) or nom 4 in. (102 mm) diam (or smaller) flexible steel conduit.
   D. **Copper Pipe -** Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
   E. **Copper Tube -** Nom 4 in. (102 mm) diam (or smaller) Regular L (or heavier) copper tube.

3A. **Through Penetrating Product* - Flexible Metal Piping -** As an alternate to Item 3, one nom 2 in. (51 mm) diam (or smaller) flexible steel pipe (with or without plastic jacketing) to be installed either concentrically or eccentrically within the firestop system. The annular space between the pipe, conduit or tube and the periphery of the opening shall be min 0 in. (0 mm or point contact). The max annular space is 1 or 2 in. (25 or 51 mm) as shown in the table in Item 4B. Pipe to be rigidly supported on both sides of the floor or wall assembly.
   OMEGA FLEX INC
   GASTITE, DIV OF TITEFLEX
   WARD MFG L L C
4. **Firestop System -** The firestop system shall consist of the following:
   A. **Packing Material -** When required as shown in the table in Item 4B, min 4 pcf (64 kg/m3) mineral wool batt insulation compressed and tightly packed to min 2-1/4 in. (57 mm) thickness. Packing material recessed from top surface of floor or both surfaces of wall as required to accommodate fill material (Item 4B). When packing material is shown as being optional, mineral wool or glass fiber insulation or polyethylene foam backer rod may be used as a permanent form to facilitate installation of the fill material. In floors constructed of hollow-core precast concrete units, packing material to be recessed from both top and bottom surfaces of floor, as required to accommodate fill material (Item 4B). When steel sleeve projects from top of floor or from both sides of wall, the thickness of mineral wool batt packing material should be increased by an amount equal to the distance that the sleeve extends past the floor or wall surface.
   B. **Fill, Void or Cavity Material* - Sealant -** Fill material applied within annulus, flush with top surface of floor assembly or top edge of steel sleeve. In walls and in floors constructed from hollow core precast concrete units, fill material applied symmetrically on both sides of assembly flush with wall/floor surfaces or both ends of steel sleeve. At point contact location, apply min 1/4 in. (6 mm) diam bead of fill material at pipe/concrete interface or pipe/steel sleeve interface on top surface of floor or both surfaces of wall or precast concrete units. The fill material thickness shall be as specified in the following table:

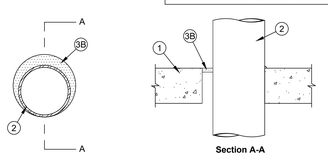
Min Concrete Thickness In. (mm)	Steel Sleeve	Max Annular Space, In. (mm)	Packing Material	Min Fill Material Thickness In. (mm)	F Rating
2-1/2 (64)	Optional	2 (51)	Required	1/4 (6)	3 hr
4-1/2 (114)	Optional	1 (25)	Optional	1/2 (13)	2 hr

   SPECIFIED TECHNOLOGIES INC - SpecSeal LCI Sealant
   * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115

System No. C-AJ-1080

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating - 3 Hr	F Rating - 3 Hr
T Rating - 0 Hr	FT Rating - 0 Hr
L Rating At Ambient - Less Than 1 CFM/sq ft	FH Rating - 3 Hr
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Rating - 0 Hr
	L Rating At Ambient - Less Than 1 CFM/sq ft
	L Rating At 400 F - Less Than 1 CFM/sq ft



1. **Floor or Wall Assembly -** Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening is 32 in.
   See **Concrete Block** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Through Penetrants -** One metallic pipe, conduit or tubing to be centered within the firestop system. The annular space shall range from min 0 in. (point contact) to max 2 in. Pipe, conduit or tubing to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
   A. **Steel Pipe -** Nom 30 in. diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 30 in. diam (or smaller) cast or ductile iron pipe.
   C. **Conduit -** Nom 4 in. diam (or smaller) electrical metallic tubing or nom 6 in. diam (or smaller) rigid galv steel conduit.
   D. **Copper Tubing -** Nom 6 in. diam (or smaller) Type M (or heavier) copper tubing.
   E. **Copper Pipe -** Nom 6 in. diam (or smaller) Regular (or heavier) copper pipe.
3. **Firestop System -** The firestop system shall consist of the following:
   A. **Packing Material -** (Optional, Not Shown) - Mineral wool batt insulation, polyethylene backer rod or glass fiber batt insulation friction fitted into annular space. Packing material to be recessed from top surface of floor or both surfaces of wall as required to accommodate the required thickness of fill material.
   B. **Fill, Void or Cavity Material* - Caulk -** Min 1/2 in. thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall. At point contact location, apply min 1/4 in. diam bead of sealant at the pipe/concrete interface on the top surface of the floor or both surfaces of wall.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant or SpecSeal LCI Sealant
   * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.(such

GENERAL NOTES:

1. Refer to section 07 84 00 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:
   · 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. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   · UL Fire Resistance Directory; Current Edition
   · NFPA 101 Life Safety Code
   · All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:
PROJECT_NAME:

PROJECT LOCATION:
PROJECT_LOCATION:

ARCHITECT/CONSULTANT:
ARCHITECT/CONSULTANT:

TITLE:
STI FIRESTOP SYSTEMS

Specified Technologies Inc.
210 Evans Way Somerville, NJ 08876
Toll Free: (800)992-1180
Phone: (908)526-8000
FAX (908)231-8415
E-Mail:techserv@stifirestop.com
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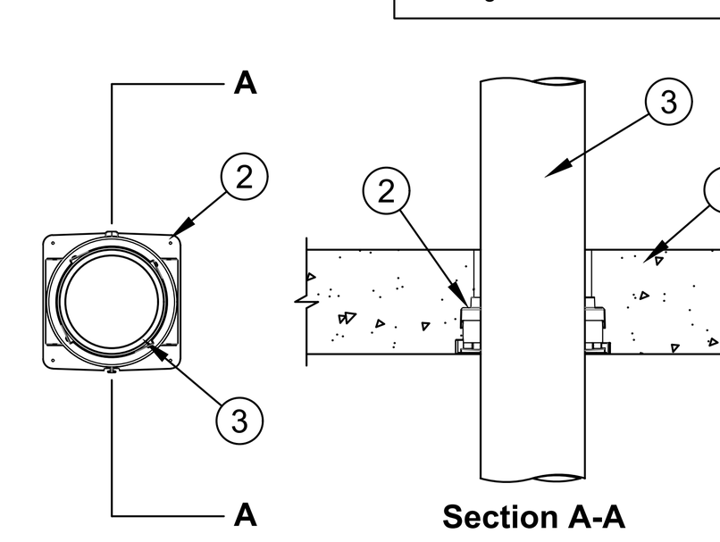
INDEX

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. F-A-1110**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 2 and 3 Hr (See Items 1 and 1A)	F Ratings - 3 Hr (See Items 1 and 1A)
T Ratings - 0 and 1/4 Hr (See Items 1 and 1A)	FT Ratings - 0 and 1/4 Hr (See Items 1 and 1A)
L Rating At Ambient - Less Than 1 CFM/ft2 (See Items 3, 4 and 6)	FH Ratings - 3 Hr (See Items 1 and 1A)
L Rating At 400 F - Less Than 1 CFM/ft2 (See Items 3, 4 and 6)	FTH Ratings - 0 and 1/4 Hr (See Items 1 and 1A)
W Rating - Class 1 (See Items 4 and 6)	L Rating At Ambient - Less Than 5.1 L/s/m2 (See Items 3, 4 and 6)
	L Rating At 400 F - Less Than 5.1 L/s/m2 (See Items 3, 4 and 6)



Section A-A

1. **Floor Assembly -** Min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete floor. When concrete thickness is min 4-1/2 in. (114 mm), the F and FH Ratings are 3 hr and the T, FT and FTH Ratings are 1/4 hr. When concrete thickness is min 2-1/2 in. (64 mm), the F and FH Ratings are 2 hr and the T, FT and FTH Ratings are 0 hr.

1A. **Floor Assembly -** (Not Shown) - As an alternate to Item 1, the fire rated unprotected concrete and steel floor assembly shall be constructed of the material 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 topping, as measured from the top plane of the steel floor units. When concrete thickness is min 4-1/2 in. (114 mm), the F and FH Ratings are 3 hr and the T, FT and FTH Ratings are 1/4 hr. When concrete thickness is min 2-1/2 in. (64 mm), the F and FH Ratings are 2 hr and the T, FT and FTH Ratings are 0 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. **Firestop Device* -** Cast in place firestop device permanently embedded during the concrete pour or grouted into the concrete assembly in accordance with the accompanying installation instructions. The throat of the firestop device may be cut flush with the top surface of the floor or extend beyond the top surface of the floor.
   SPECIFIED TECHNOLOGIES INC - SpecSeal CD200, CD201, CD201C, CD202, CD200M, CD300, CD301, CD301C, CD302, CD300M, CD400, CD401, CD402, CD400M, CD600 or CD600M Cast In Firestop Device

2A. **Firestop Device* -** (Not Shown) - When Item 1A is used, a steel deck adapter kit consisting of steel plates and a nonmetallic extension tube shall be used in conjunction with Item 2. The deck adapter shall be installed in accordance with the accompanying installation instructions.
   SPECIFIED TECHNOLOGIES INC - SpecSeal CD200DK, CD201DK, CD300DK, CD301DK, CD400DK, CD401DK or CD600DK Cast In Firestop Device Deck Adapter

2B. **Firestop Device* -** (Not Shown) - When the concrete floor slab or concrete topping thickness over steel deck exceeds 8 in. (203 mm), a nonmetallic extension tube shall be used in conjunction with Item 2. The extension tube shall be installed in accordance with the accompanying installation instructions. The extension tube may be cut flush with the top surface of the floor or extend beyond the top surface of the floor.
   SPECIFIED TECHNOLOGIES INC - SpecSeal CD200X, CD300X, CD400X or CD600X Cast In Firestop Device Extension

3. **Through Penetrant -** One metallic pipe, tube or conduit to be centered within the firestop system. Pipe, conduit or tube to be rigidly supported on both sides of the floor assembly. The following types and sizes of through penetrant 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) rigid steel conduit or steel electrical metallic tubing (EMT).
   D. **Copper Pipe or Tubing -** Nom 4 in. (102 mm) diam (or smaller) Type M (or heavier) copper tubing or Regular (or heavier) copper pipe.

Nom Pipe Diam (a)	Firestop Device
1-1/2 or 2 in. (38 or 51 mm)	CD200, CD201, CD201C, CD202, CD200M
2-1/2 or 3 in. (64 or 76 mm)	CD300, CD301, CD301C, CD302, CD300M
3-1/2 or 4 in. (89 or 102 mm)	CD400, CD401, CD402, CD400M
6 in. (152 mm)(b)	CD600, CD600M (b)

(a) When metallic pipe, conduit, or tubing with diam smaller than those shown in the table above are used, packing material and/or fill material shall be installed into the device as described in Items 4 and 5. L Ratings for these penetrants only apply when the fill material is used. Otherwise, the L Rating for each firestop device is less than 1 CFM/ft2 (5.1 L/s/m2) at ambient and 400F.

(b) When Firestop Device CD600 or CD600M are used, the concrete thickness (See Items 1 and 1A) shall be min 4-1/2 in. (114 mm).

4. **Packing Material -** (Not Shown) - When required under Item 3, min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool firmly packed into device flush with top edge of device (Item 2), and extending a min 1 in. (25 mm) below the top surface of the floor. When W Ratings for penetrants are required, min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool firmly packed into device recessed 1/4 in. (6 mm) from top edge of device (Item 2) to accommodate sealant (Item 6). When L Ratings for penetrants with a diam smaller than those shown in the table above are required, recess mineral wool 1/4 in. (6 mm) from top edge of device to accommodate sealant (Item 6).

5. **Fill, Void, or Cavity Material* - Putty -** (Not Shown) - When required under Item 3, as an option to Item 4, min 1 in. (25 mm) depth of fill material applied to fill annulus between penetrant and throat of firestop device at top of floor.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Putty

6. **Fill, Void, or Cavity Material* -** (Optional, Not Shown) - To achieve W Ratings for penetrants or to achieve L Ratings for penetrants with a diam smaller than those shown in the table of Item 3, apply min 1/4 in. (6 mm) depth of sealant atop packing material (Item 4) flush with top edge of device (Item 2).
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SIL300 Sealant or SpecSeal Series SIL300SL

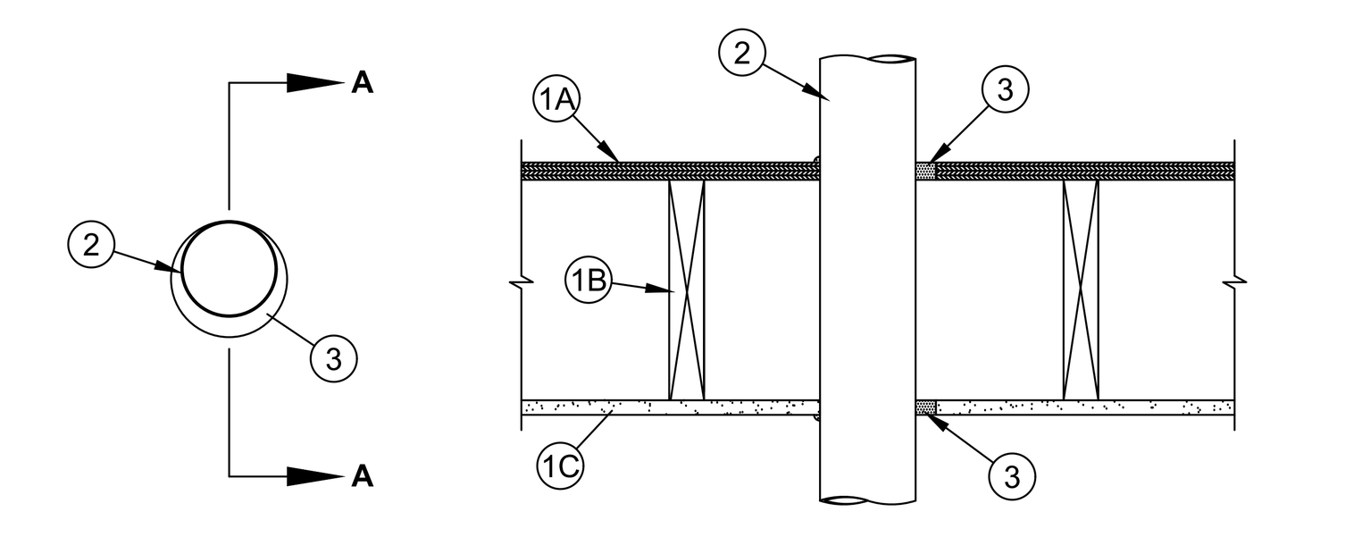
7. **Pipe Tee Fitting System -** (Optional, Not Shown) - For use with Iron Pipe (Item 3B) only, One nom 6 in. (152 mm) diam (or smaller) PVC TESTRITE TEE Fitting (matched to penetrant diameter). The PVC TESTRITE TEE Fitting is secured to metallic penetrant (Item 3B) with compression type pipe coupling elastomeric gasket with stainless steel jacket and stainless steel band clamps for use in vented (drain, waste or vent) iron pipe systems. Installed (Item 3B) penetrant shall extend a minimum of 6 in. (152 mm) above the surface of the floor and minimum 12 in. (302 mm) below the bottom surface of the floor above assembly.

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

+Bearing the UL Listing Mark

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. F-C-1074**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 Hr and 2 Hr (See Item 1)	F Ratings - 1 Hr and 2 Hr (See Item 1)
T Ratings - 1/4, 1/2 and 1 Hr (See Item 2)	FT Ratings - 1/4, 1/2 and 1 Hr (See Item 2)
L Rating At Ambient - Less Than 1 CFM/sq ft	FH Ratings - 1 Hr and 2 Hr (See Item 1)
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Ratings - 1/4, 1/2 and 1 Hr (See Item 2)
	L Rating At Ambient - Less Than 5.1 L/s/m2
	L Rating At 400 F - Less Than 5.1 L/s/m2



Section A-A

1. **Floor - Ceiling Assembly -** The 1 hr fire-rated wood joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Designs in the UL Fire Resistance Directory. The 2 hr fire-rated wood joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in Design Nos. L505, L511 or L536 in the UL Fire Resistance Directory. **The F and FH Ratings of the firestop system are equal to the fire rating of the floor-ceiling assembly**. The general construction features of the floor assembly are summarized below:
   A. **Flooring System -** Lumber or plywood subfloor with finish floor of lumber, plywood or **Floor Topping Mixture*** as specified in the individual Floor-Ceiling Design. Diam of opening to be max 1 in. (25 mm) larger than diam of pipe. As an alternate, the opening may be square-cut with a max dimension 1 in. (25 mm) greater than the diam of the pipe.
   B. **Wood Joists -** Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or **Structural Wood Members*** with bridging as required and with ends firestopped.
   C. **Gypsum Board* -** Thickness, type, number of layers and fasteners as required in the individual Floor-Ceiling Design. Diam of opening to be max 1 in. (25 mm) greater than diam of pipe.
   D. **Furring Channel -** (Not Shown) - In 2 hr fire-rated assemblies, resilient galv steel furring channels installed perpendicular to wood joists between base and face layers of gypsum board (Item C). Furring channels spaced max 24 in. (610 mm) OC with additional short lengths of furring channel installed adjacent to and max 3 in. (76 mm) from two opposing sides of penetrant.

1A. **Chase Wall -** (Optional, Not Shown) - The through penetrant (Item 2) may be routed through a single, double or staggered wood stud/gypsum board chase wall. Depth of chase wall stud cavity to be min 1 in. (25 mm) greater than the diameter of the through penetrant (Item 2). The chase wall shall include the following construction features:
   A. **Studs -** Nom 2 by 4 in. (51 by 102 mm), 2 by 6 in. (51 by 152 mm) or double nom 2 by 4 in. (51 by 102 mm) lumber studs.
   B. **Sole Plate -** Nom 2 by 4 in. (51 by 102 mm), 2 by 6 in. (51 by 152 mm) or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Diam of opening is to be max 1 in. (25 mm) larger than diam of pipe. As an alternate, the opening may be square-cut with a max dimension 1 in. (25 mm) greater than the diam of the pipe. Plates may be discontinuous over opening, terminating at two opposing edges of opening. Max length of discontinuity is 5-1/2 in. (140 mm).
   C. **Top Plate -** The single or double top plate shall consist of two nom 2 by 4 in. (51 by 102 mm), or one or two nom 2 by 6 in. (51 by 152 mm), or one or two sets of parallel 2 by 4 in. (51 by 102 mm), lumber plates, tightly butted. Diam of opening is to be max 1 in. (25 mm) larger than diam of pipe. As an alternate, the opening may be square-cut with a max dimension 1 in. (25 mm) greater than the diam of the pipe. Plates may be discontinuous over opening, terminating at two opposing edges of opening. Max length of discontinuity is 5-1/2 in. (140 mm).
   D. **Steel Plate -** When lumber plates are discontinuous, nom 1-1/2 in. (38 mm) wide No. 20 gauge (or heavier) galv steel plates shall be installed to connect discontinuous lumber plates and to provide a form for the fill material. Steel plates sized to lap 2 in. (51 mm) onto each discontinuous lumber plate and secured to lumber plates with steel screws or nails.
   E. **Gypsum Board* -** Min. 1./2 in. thick rated or non-rated gypsum board.

2. **Through Penetrant -** One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the opening. Annular space to be min 0 in. (point contact) to max 1 in. (0 to 25 mm). Penetrant to be rigidly supported on both sides of floor-ceiling assembly. The following types and sizes of metallic pipe, conduit or tubing may be used:
   A. **Steel Pipe -** Nom 4 in. (102 mm) diam (or smaller) Schedule 5 (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 conduit, steel electrical metallic tubing or flexible steel conduit.
   D. **Copper Pipe or Tube -** Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe or Type L (or heavier) copper tube.
   The T, FT and FTH Ratings are 1/4 hr when copper pipe or tube is used in 1 hr fire-rated assemblies. The T, FT and FTH Ratings are 1/2 hr when copper pipe or tube is used in 2 hr fire-rated assemblies. When steel pipe, iron pipe, steel conduit or flexible metal piping (Item 2A) is used, T, FT and FTH Ratings are 1 hr.

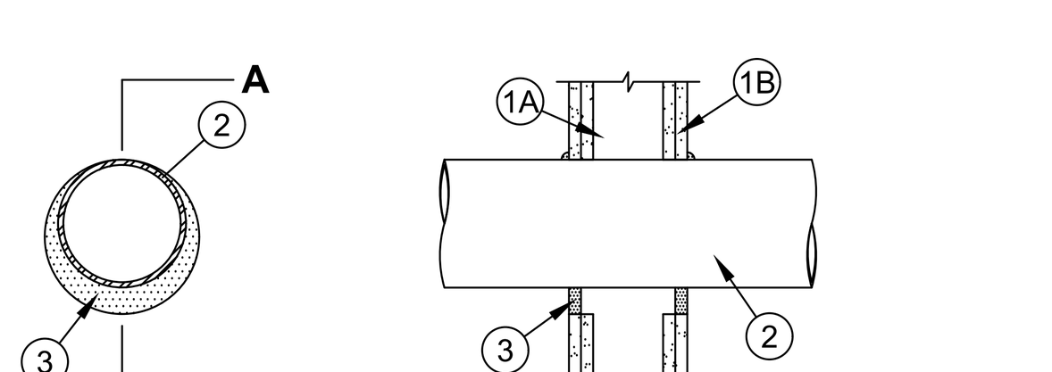
2A. **Through Penetrating Product* - Flexible Metal Piping -** As an alternate to Item 2, one nom 2 in. (51 mm) diam (or smaller) steel flexible metal pipe to be installed either concentrically or eccentrically within the firestop system. Annular space to be min 0 in. (point contact) to max 1 in. (0 to 25 mm). Penetrant to be rigidly supported on both sides of floor-ceiling assembly.
   OMEGA FLEX INC
   GASTITE, DIV OF TITEFLEX
   WARD MFG L L C

3. **Fill, Void or Cavity Material* - Sealant -** Min 3/4 in. (19 mm) thickness of fill material applied within the annulus, flush with the top surface of the floor or sole plate. Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with bottom surface of ceiling or top plate. Min 1/4 in. (6 mm) diam bead of fill material applied at point contact location on the top surface of floor or sole plate and at the penetrant/ceiling or top plate interface.
   SPECIFIED TECHNOLOGIES INC - SpecSeal LCI Sealant or Type WF300 Firestop Caulk

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

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-L-1049**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Rating - 1 and 2 Hr (See Item 1)
T Rating - 0 Hr	FT Rating - 0 Hr
L Rating At Ambient - Less Than 1 CFM/sq ft	FH Rating - 1 and 2 Hr (See Item 1)
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Rating - 0 Hr
	L Rating At Ambient - Less Than 1 CFM/sq ft
	L Rating At 400 F - Less Than 1 CFM/sq ft



Section A-A

1. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner described in the individual U300 or U400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs -** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-5/8 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC. When steel studs are used and the diam of opening exceeds the width of stud cavity, the opening shall be framed on all sides using lengths of steel stud installed between the vertical studs and screw-attached to the steel studs at each end. The framed opening in the wall shall be 4 to 6 in. (102 to 152 mm) wider and 4 to 6 in. (102 to 152 mm) higher than the diam of the penetrating item such that, when the penetrating item is installed in the opening, a 2 to 3 in. (51 to 76 mm) clearance is present between the penetrating item and the framing on all four sides.
   B. **Gypsum Board* -** 5/8 in. (16 mm) thick, 4 ft (1.22 m) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 26 in. (660 mm) for steel stud walls. Max diam of opening is 14-1/2 in. (368 mm) for wood stud walls.
   The hourly F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall assembly in which it is installed.

1A. **Metallic Sleeve -** (Optional, Not Shown) - Cylindrical sleeve fabricated from min 0.016 in. (0.41 mm) to max 0.105 in. (2.7 mm) thick sheet steel. Length of steel sleeve to be equal to the thickness of wall. Longitudinal seam of sleeve welded or overlapped min 1 in. (25 mm). The ends of the steel sleeve shall be flush or recessed max 1/4 in. (6 mm) from wall surfaces.

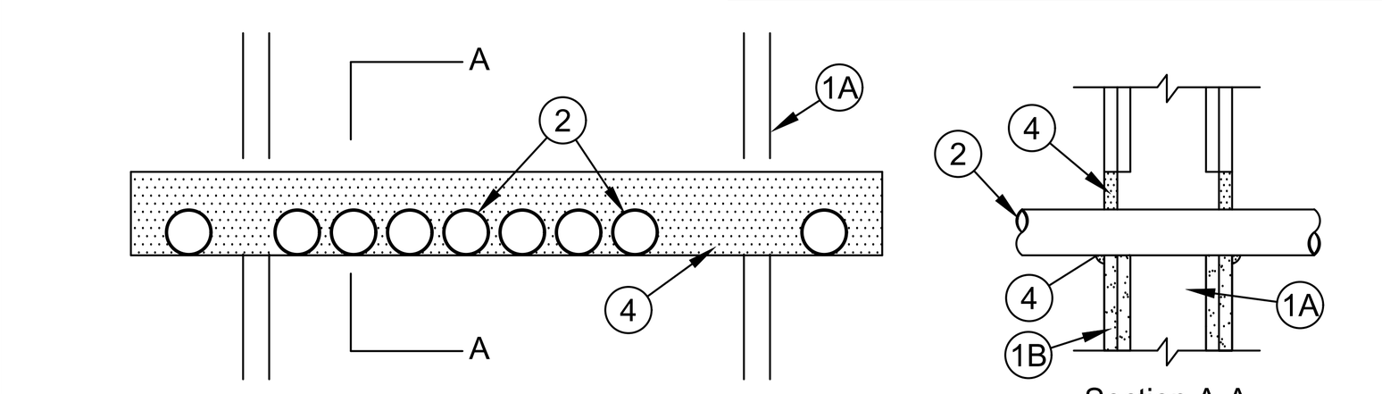
2. **Through Penetrant -** One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. Pipe, conduit or tubing may be installed at an angle not greater than 45 degrees from perpendicular. The annular space between pipe, conduit or tubing and periphery of opening shall be min 0 in. (0 mm, point contact) to max 2 in. (51 mm). For maximum 16 in. (406 mm) diam (or smaller) pipes, annular space shall be min 0 in. (0 mm, point contact) to max 2 in. (51 mm). Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
   A. **Steel Pipe -** Nom 36 in. (914 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 36 in. (914 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Conduit -** Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing, nom 6 in. (152 mm) diam (or smaller) steel conduit or nom 1 in. (25 mm) diam (or smaller) flexible steel conduit.
   D. **Copper Tubing -** Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.
   E. **Copper Pipe -** Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe.

3. **Fill, Void or Cavity Material* - Sealant -** Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall. At the point contact location between through penetrant and gypsum board, a min 3/8 in. (10 mm) diam bead of fill material shall be applied at the gypsum board/through penetrant interface on both surfaces of wall.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant or SpecSeal LCI Sealant

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

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-L-1168**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings - 1 and 2 Hr (See Item 1)
T Ratings - 1/4, 3/4 and 1 Hr (See Items 2 and 4)	FT Ratings - 1/4, 3/4 and 1 Hr (See Items 2 and 4)
L Rating At Ambient - Less Than 1 CFM/sq ft	FH Ratings - 1 and 2 Hr (See Item 1)
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Ratings - 1/4, 3/4 and 1 Hr (See Items 2 and 4)
	L Rating At Ambient - Less Than 1 CFM/sq ft
	L Rating At 400 F - Less Than 1 CFM/sq ft



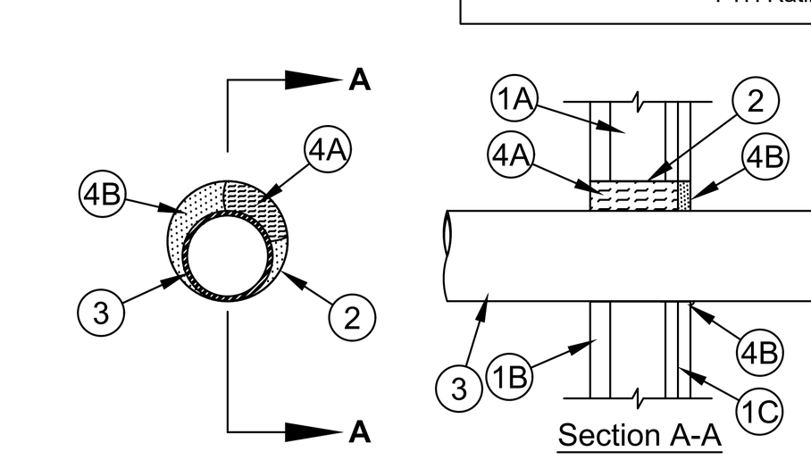
Section A-A

1. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall or Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs -** Wall framing shall consist of min 3-5/8 in. (92 mm) wide steel studs spaced max 24 in. (610 mm) OC.
   B. **Gypsum Board* -** Thickness, type, number of layers and fasteners , as specified in the individual U400, V400 or W400 Series design. Max height of opening is 6 in. (152 mm). Max width of opening is 36 in. (914 mm).
   The hourly F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall assembly in which it is installed.
2. **Through Penetrants -** Multiple pipes or conduits installed in single layer array within the firestop system. The annular space between the pipes and conduits and the edges of the opening shall be min 0 in. (point contact) to max 3 in. (76 mm). The separation between pipes and conduits to be min 1/4 in. (6 mm) to max 3 in. (76 mm). Pipes and conduits to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipe or conduit may be used:
   A. **Steel Pipe -** Nom 4 in. (102 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. **Conduit -** Nom 4 in. (102 mm) diam (or smaller) rigid steel conduit or steel electrical metallic tubing (EMT).
   When diam of pipe or conduit is greater than 2 in. (51 mm), T, FT and FTH Ratings are 1/4 hr. Otherwise, T, FT and FTH Ratings are 3/4 hr or 1 hr as detailed in Item 4.
3. **Forming Material -** (Optional, Not Shown) - Foam backer rod, mineral wool batt insulation or glass fiber insulation packed into opening and recessed min 5/8 in. (16 mm) from each surface of the wall to accommodate fill material.
4. **Fill Void or Cavity Materials* - Sealant -** Min 5/8 in. (16 mm) thickness of fill material installed to completely fill annular space between pipes, conduits and gypsum wallboard flush with each surface of wall. Min 1/4 in. (6 mm) diam bead of fill material applied to the pipe/wall interface at the point contact locations on both sides of the wall.
   SPECIFIED TECHNOLOGIES INC - SpecSeal LC150 Sealant, SpecSeal Series SSS Sealant or SpecSeal LCI Sealant. **When SpecSeal LC150 Sealant is used with max 2 in. (51 mm) diam pipe or conduit, T, FT and FTH Ratings are 3/4 hr. Otherwise, when SpecSeal LCI or SpecSeal Series SSS Sealant is used with max 2 in. (51 mm) diam pipe or conduit, T, FT and FTH Ratings are 1 hr.**

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

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-L-1251**

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



Section A-A

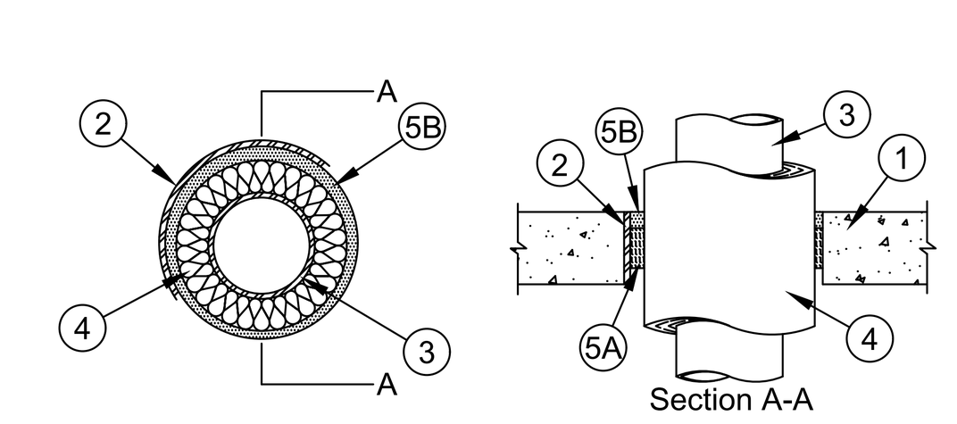
1. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum board/stud shaft wall assembly shall be constructed of the materials and in the manner specified in the individual U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall incorporate the following construction features:
   A. **Steel Studs -** "C-H" or "C-T" shaped studs, min 2-1/2 in. (64 mm) wide by 1-1/2 in. (38 mm) deep, fabricated from min No. 25 gauge (0.6 mm thick) galv steel, spaced max 24 in. (610 mm) OC.
   B. **Gypsum Board* -** 1 in. (25 mm) thick, 24 in. (610 mm) wide gypsum liner panels installed vertically. Max diam of circular cutout in gypsum liner panel is 10 in. (254 mm).
   C. **Gypsum Board* -** 1/2 in. or 5/8 in. (13 or 16 mm) thick, 48 in. (1.2 m) wide gypsum boards. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max diam of circular cutout in gypsum board is 10 in. (254 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. **Metallic Sleeve -** Cylindrical sleeve fabricated from min No. 30 gauge (0.3 mm thick) galv sheet steel and having a min 2 in. (51 mm) lap along the longitudinal seam. Length of the sleeve to be equal to the thickness of the wall. Sleeve installed by coiling the sheet steel to a diam smaller than the through opening, inserting the coil through the opening and releasing the coil to let it uncoil against the circular cutouts in the gypsum board layers. The ends of the steel sleeve shall be flush with each surface of the wall.
3. **Through Penetrant - -** One metallic pipe, tube or conduit installed concentrically or eccentrically within the firestop system. The annular space between the pipe, tube or conduit and the periphery of the sleeved opening to be min 0 in. (0 mm, point contact) to max 2 in. (51 mm). Pipe, tube or conduit to be rigidly supported on both sides of wall assembly. One of the following types and sizes of pipe, tube or conduit may be used:
   A. **Steel Pipe -** Nom 8 in. (203 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 8 in. (203 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Conduit -** Nom 4 in. (102 mm) diam (or smaller) rigid steel conduit, steel electrical metallic tubing (EMT) or flexible steel conduit.
   D. **Copper Pipe or Tube -** Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe or Type L (or heavier) copper tube.

4. **Firestop System -** The firestop system consist of the following items:
   A. **Packing Material -** Min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into sleeved opening as a permanent form. Packing material to extend throughout thickness of wall except for a 1 in. (25 mm) deep recess on the finished side of wall to accommodate the fill material.
   B. **Fill Void or Cavity Materials* - Sealant or Putty -** Min 1 in. (25 mm) thickness of fill material applied within sleeve, flush with finished surface of wall. At the point contact location, a min 3/8 in. (10 mm) diam bead of fill material shall be applied at the penetrant/sleeve interface.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant, SpecSeal LCI Sealant, or SpecSeal Putty

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

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. C-AJ-5087**

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



Section A-A

1. **Floor or Wall Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete floor or min 5 in. (127 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete wall. Floor may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units***. Wall may also be constructed of any UL Classified **Concrete Blocks*** Max diam of opening is 30 in. (762 mm). Max diam of opening in floor constructed of hollow-core precast concrete units is 7 in. (178 mm).
   See **Concrete Blocks** (CAZT) and **Precast Concrete Units** (CFTV) categories in the Fire Resistance Directory for names of manufacturers.
2. **Steel Sleeve - (Optional) -** Nominal 30 in. (762 mm) diam (or smaller) Sch 10 (or heavier) steel pipe sleeve or No. 26 ga (0.022 in. or 0.56 mm thick) sheet steel sleeve with square anchor flange spot welded to the sleeve at approx mid-height. Sleeve cast or grouted into floor or wall assembly, flush with floor or wall surfaces.
3. **Through Penetrants -** One metallic pipe to be installed either concentrically or eccentrically within the firestop system. Pipe to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes may be used:
   A. **Steel Pipe -** Nom 24 in. (610 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 24 in. (610 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Copper Tubing -** Nom 6 in. (152 mm) diam (or smaller) Type M (or heavier) copper tubing.
   D. **Copper Pipe -** Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe.

4. **Pipe Coverings -** One of the following types of pipe coverings shall be used:
   A. **Pipe and Equipment Covering Materials* -** Nom 2 in. (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 self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. Annular space shall be min 1/2 in. (13 mm) thick to max 1-1/2 in. (38 mm). When the nom pipe diam is less than 2 in. (51 mm), annular space may be min 1/4 in. (6 mm).
   See **Pipe and Equipment Covering-Materials** (BRGU) category in Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
   B. **Pipe Covering Materials* -** Nom 2 in. (51 mm) thick unfaced mineral fiber pipe insulation having a nom density of 3.5 pcf (56 kg/m3) (or heavier) and sized to the outside diam of pipe or tube. Pipe insulation secured with min No. 8 AWG steel wire spaced max 12 in. (305 mm) OC.
   IIG MINWOOL L L C - High Temperature Pipe Insulation 1200, High Temperature Pipe Insulation BWT or High Temperature Pipe Insulation Thermaloc
   C. **Sheathing Material* -** Used in conjunction with Item 4B . Foil-scrim-kraft or all service jacket material shall be wrapped around the outer circumference of the pipe insulation (Item 4B) with the kraft side exposed. Longitudinal joints and transverse joints sealed with metal fasteners or butt tape. Annular space shall be min 1/2 in. (13 mm) thick to max 1-1/2 in. (38 mm). When the nom pipe diam is less than 2 in. (51 mm), annular space may be min 1/4 in. (6 mm).
   See **Sheathing Materials*** - (BVDV) category in the Building Materials Directory for names of manufacturers. Any sheathing 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.
5. **Firestop System -** The firestop system shall consist of the following:
   A. **Packing Material -** Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool batt insulation compressed and firmly packed within annular space. Packing material to be recessed from top surface of floor or from both surfaces of wall to accommodate the required thickness of fill material (Item 5B).
   B. **Fill, Void or Cavity Material* - Sealant -** Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall. When min annular space is less than 1/2 in. (13 mm), fill material to be installed to min 1 in. (25 mm) thickness.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant or SpecSeal LCI Sealant

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

GENERAL NOTES:

1. Refer to section 07 84 00 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:
   · 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. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   · UL Fire Resistance Directory; Current Edition
   · NFPA 101 Life Safety Code
   · All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:
PROJECT_NAME:

PROJECT LOCATION:
PROJECT_LOCATION:

ARCHITECT/CONSULTANT:
ARCHITECT/CONSULTANT:

TITLE:
STI FIRESTOP SYSTEMS

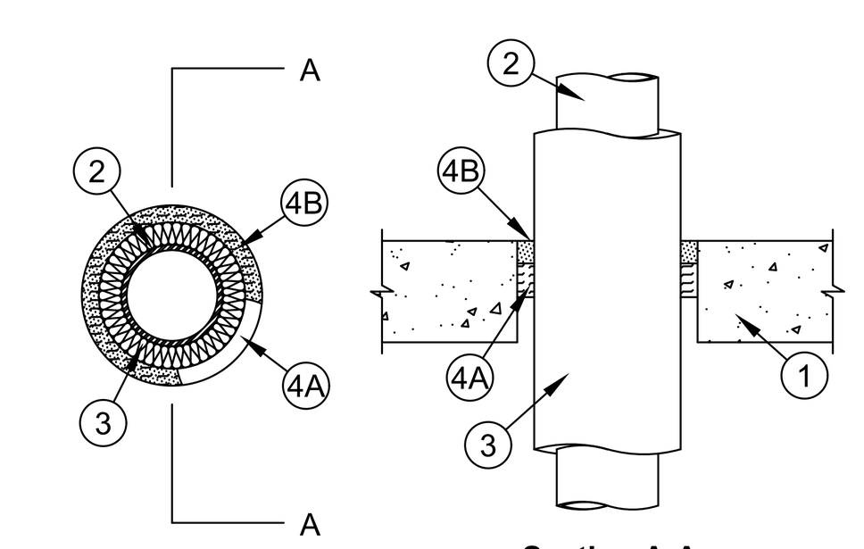
Specified Technologies Inc.
210 Evans Way Somerville, NJ 08876
Toll Free: (800)992-1180
Phone: (908)526-8000
FAX (908)231-8415
E-Mail:techserv@stifirestop.com
Website:www.stifirestop.com

INDEX

Classified by
Underwriters Laboratories, Inc.
to ASTM/UL1479 (ASTM E814)

System No. C-AJ-5021

F Rating - 2 and 3 Hr (See Item 3)
T Rating - 1/2 and 1 Hr (See Item 3)
L Rating At Ambient - Less Than 1 CFM/sq ft
L Rating At 400 F - Less Than 1 CFM/sq ft



Section A-A

1. **Floor or Wall Assembly -** Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening is 8 in.

   See **Concrete Block** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Through Penetrants -** One metallic pipe or tubing to be centered within the firestop system. Pipe or tubing to be rigidly supported on both sides of floor or wall assembly.
   A. **Steel Pipe -** Nom 4 in. diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. **Copper Tubing -** Nom 4 in. diam (or smaller) Type L (or heavier) copper tubing.
   C. **Copper Pipe -** Nom 4 in. diam (or smaller) Regular (or heavier) copper pipe.
3. **Pipe Coverings -** One of the following types of pipe coverings shall be used:
   A. **Pipe and Equipment Coverings - Materials* -** Nom 1/2 or 1 in. thick hollow cylindrical heavy density (min 3.5 pcf) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. The annular space between the insulated through penetrant and periphery opening shall be a nom 5/16 in.

   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.

   B. **Pipe Covering Materials* -** Nom 1/2 or 1 in. thick unfaced mineral fiber pipe insulation sized to the outside diam of pipe or tube. Pipe insulation secured with min 8 AWG steel wire spaced max 12 in. OC. The annular space between the insulated through penetrant and periphery opening shall be a nom 5/16 in.

   IIG MINWOOL L L C - High Temperature Pipe Insulation 1200, High Temperature Pipe Insulation BWT or High Temperature Pipe Insulation Thermaloc

C. **Sheathing Material* -** (Not Shown) - Used in conjunction with Item 3B. Foil-scrim-kraft or all service jacket material shall be wrapped around the outer circumference of the pipe insulation (Item 3B) with the kraft side exposed. Longitudinal joints and transverse joints sealed with metal fasteners or butt tape.

See **Sheathing Materials** (BVDV) category in the Building Materials Directory for names of manufacturers. Any sheathing 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.

The F and T Ratings of the firestop system are dependent upon the max diam of the through penetrant, nom thickness of pipe covering and the nom annular space within the firestop system as tabulated below:

Max Diam of Through Penetrant In.	Nom Thkns of Pipe Covering In.	Nom Annular Space In.	H Rating hr	T Rating hr
3	1/2	15/16	3	1/2
4	1	7/16	2	1

4. **Firestop System -** The firestop system shall consist of the following:
   A. **Packing Material -** Min 1-1/2 in. thickness of min 6 pcf mineral wool batt insulation firmly packed into opening as a permanent form. Packing 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.
   B. **Fill, Void or Cavity Material* - Caulk -** Min 1 in. thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall.

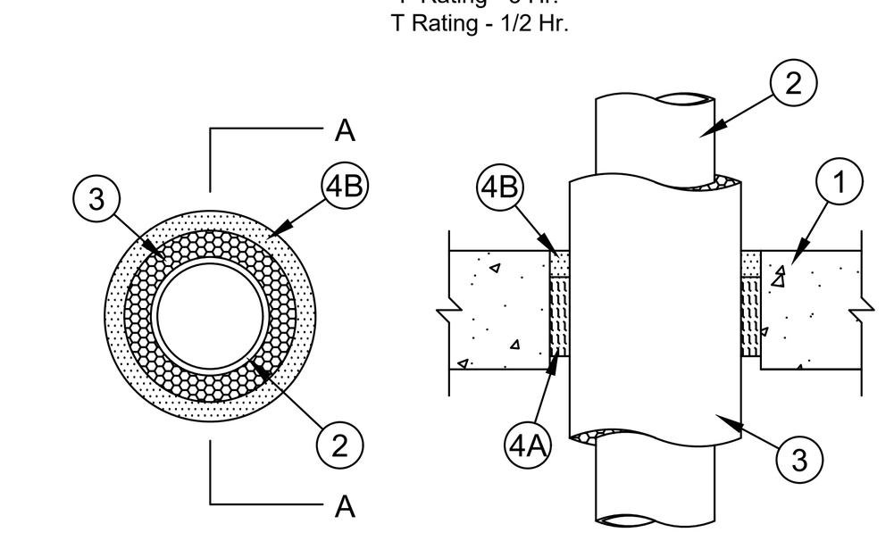
   SPECIFIED TECHNOLOGIES INC - SpecSeal 100, 101 or 105 Sealant

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

Classified by
Underwriters Laboratories, Inc.
to ASTM/UL1479 (ASTM E814)

System No. C-AJ-5133

F Rating - 3 Hr.
T Rating - 1/2 Hr.



Section A-A

1. **Floor or Wall Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete floor or min 5 in. (127 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete wall. Floor may also be constructed of any UL Classified hollow-core **Precast Concrete Units***. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening is 8 in. (203 mm). Max diam of opening in floor constructed of hollow-core precast concrete units is 7 in. (178 mm).

   See **Concrete Blocks** (CAZT) and **Precast Concrete Units** (CFTV) categories in the Fire Resistance Directory for names of manufacturers.
2. **Through Penetrants -** One metallic pipe or tube to be installed concentrically within the firestop system. Pipe or tubing to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes or tubing may be used:
   A. **Steel Pipe -** Nom 4 in. (102 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 4 in. (102 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Copper Tubing -** Nom 4 in. (102 mm) diam (or smaller) Type M (or heavier) copper tubing.
   D. **Copper Pipe -** Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
3. **Tube Insulation - Plastics+ -** Nom 1 in. (25 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. An annular space of min 3/4 in. (19 mm) to max 1-1/4 in. (32 mm) is required within the firestop system.

   See **Plastics+** (QMFZ2) category in the Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL 94 Flammability Classification of 94-5A may be used.
4. **Firestop System -** The firestop system shall consist of the following:
   A. **Packing Material -** Min 3 in. (76 mm) thickness of min 4 pcf (64 kg/m3) density mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of concrete floor or from both surfaces of wall assembly to accommodate required thickness of fill material.
   B. **Fill, Void or Cavity Material* - Sealant -** Min 1 in. (25 mm) thickness of fill material applied within annulus, flush with top surface of concrete floor or with both surfaces of wall assembly. When floor is constructed of hollow-core precast concrete unit, fill material to be installed symmetrically on both sides of floor, flush with floor surfaces.

   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant or SpecSeal LCI Sealant

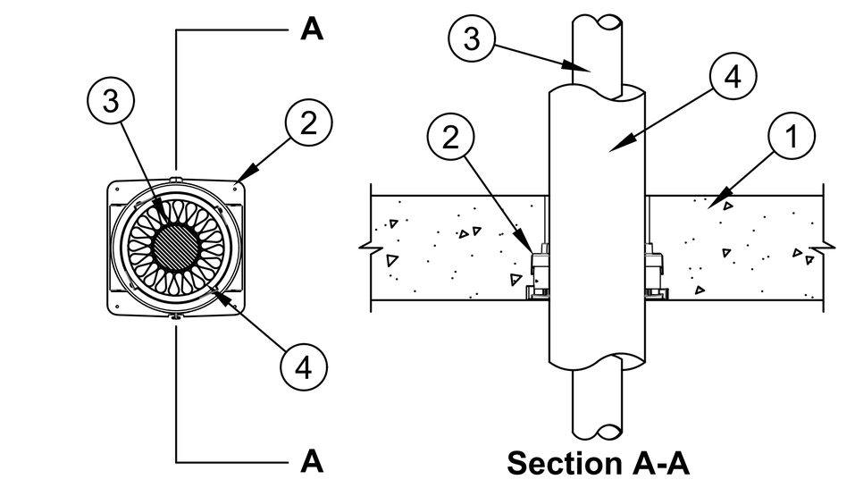
   \+ Bearing the UL Recognized Component Mark

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

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115

System No. F-A-5041

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 2 and 3 Hr (See Items 1 and 1A)	F Ratings - 2 and 3 Hr (See Items 1 and 1A)
T Ratings - 3/4 and 1 Hr (See Item 3)	FT Rating - 3/4 and 1 Hr (see Item 3)
L Rating At Ambient - Less Than 1 CFM/ft2 (See Items 5 and 7)	FH Ratings - 2 and 3 Hr (See Items 1 and 1A)
L Rating At 400 F - Less Than 1 CFM/ft2 (See Items 5 and 7)	FTH Rating - 3/4 and 1 Hr (see Item 3)
W Rating - Class 1 (See Items 4A, 5 and 7)	L Rating At Ambient - Less Than 5.1 L/s/m2 (See Items 5 and 7)
	L Rating At 400 F - Less Than 5.1 L/s/m2 (See Items 5 and 7)



Section A-A

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

1A. **Alternate Floor Assembly -** (Not Shown) - The fire rated unprotected concrete and steel deck floor assembly shall be constructed of the material 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, as measured from the top plane of the steel floor units. When concrete thickness is min 4-1/2 in. (114 mm), the F and FH Ratings are 3 hr. When concrete thickness is min 2-1/2 in. (64 mm), the F and FH Ratings are 2 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. **Firestop Device* -** Cast in place firestop device permanently embedded during the concrete pour or grouted into the concrete assembly in accordance with the accompanying installation instructions. The devices may be cut flush or extend above the top surface of the floor.

   SPECIFIED TECHNOLOGIES INC - SpecSeal CD200, CD201, CD201C, CD202, CD200M, CD300, CD301, CD301C, CD302, CD300M, CD400, CD401, CD402, CD400M, CD600 or CD600M Cast In Firestop Device

2A. **Firestop Device* -** (Not Shown) - When Item 1A is used, a steel deck adapter kit consisting of steel plates and a nonmetallic extension tube is used in conjunction with Item 2. Install the deck adapter in accordance with the accompanying installation instructions.

   SPECIFIED TECHNOLOGIES INC - SpecSeal CD200DK, CD201DK, CD300DK, CD301DK, CD400DK, CD401DK or CD600DK Cast In Firestop Device Deck Adapter

2B. **Firestop Device* -** (Not Shown) - When the concrete thickness exceeds 8 in. (203 mm), a nonmetallic extension tube is used in conjunction with Item 2. Install the extension tube in accordance with the accompanying installation instructions.

   SPECIFIED TECHNOLOGIES INC - SpecSeal CD200X, CD300X, CD400X or CD600X Cast In Firestop Device Extension

3. **Through Penetrants -** One metallic pipe or tube to be installed within the firestop system. Penetrants to be rigidly supported on both sides of floor assembly. The following types and sizes of penetrants 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. **Copper Pipe -** Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
   D. **Copper Tube -** Nom 4 in. (102 mm) diam (or smaller) Type M (or heavier) copper tube.

Nom Pipe Diam (a), in. (mm)	Nom Thickness of Pipe Insulation, in. (mm)	Firestop Device
1/2 (13)	1 (25)	CD200, CD201, CD201C, CD202 or CD200M
1 (25)	1 (25)	CD300, CD301, CD301C, CD302 or CD300M
1-1/4 (32)	1 (25)	CD300, CD301, CD301C, CD302 or CD300M
2 (51)	1 (25)	CD400, CD401, CD402 or CD400M
4 (102) (b)	1 (25)	CD600 and CD600M (b)

(a) When nom diam of metallic pipe or tubing is smaller than that shown in the table, fill material or packing material shall be installed into the device as described within Item 5 and 6. **When nom diam of metallic pipe or tube is 2 in. (51 mm) or smaller, T, FT and FTH Ratings are 1 hr. When nom diam of metallic pipe or tube is larger than 2 in. (51 mm), T, FT and FTH Ratings are 3/4 hr.**

(b) When Firestop Device CD600 or CD600M are used, the concrete thickness (See Items 1 and 1A) shall be min 4-1/2 in. (114).

4. **Pipe or Tube Covering* -** Nom 1 in. (25 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.

   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 50 or less may be used.

4A. **PVC Jacket+ -** (Optional, Not Shown) - When W Ratings are required, an additional PVC jacket, supplied in sheet form, shall be tightly wrapped around the all service jacket on the pipe covering. The longitudinal seam of the PVC jacket shall be continuously sealed using the adhesive supplied with the jacket. The jacket is to be nom 48 in. (1.22 m) wide by nom 20 or 30 mil (0.5 or 0.8 mm) thick. The PVC jacket shall be positioned with its top edge located 37 in. to 40 in. (0.94 to 1.02 m) above the top surface of the floor assembly and shall extend downward into and/or through the floor opening.

   See **Plastics+** (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component plastic material meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.

5. **Packing Material -** (Not Shown) - When required under Item 3, min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool firmly packed into device flush with top edge of device (Item 2) and extending a min 1 in (25 mm) below the top surface of the floor. When L or W Ratings are required, min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool firmly packed into the top of the device (Item 2) and recessed min 1/4 in. (6 mm) from top edge of device to accommodate sealant (Item 7).

6. **Fill, Void, or Cavity Material* - Putty -** (Not Shown) - When required under Item 3, as an option to Item 5, min 1 in. (25 mm) depth of fill material applied to fill annulus between penetrant and throat of firestop device at top of floor.

   SPECIFIED TECHNOLOGIES INC - SpecSeal Putty

7. **Fill, Void, or Cavity Material* -** (Optional, Not Shown) - To achieve L or W Ratings, apply min 1/4 in. (6 mm) depth of sealant atop packing material (Item 5) flush with top edge of device.

   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SIL300 Sealant or SpecSeal Series SIL300SL Sealant

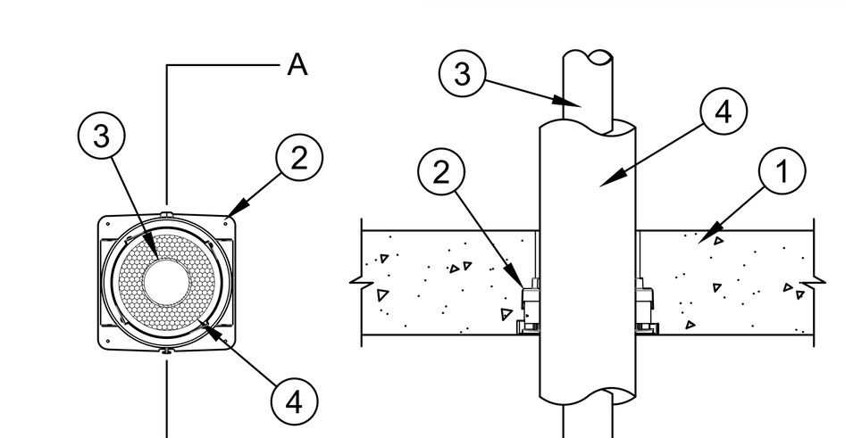
   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

   +Bearing the UL Listing Mark

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115

System No. F-A-5045

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 2 and 3 Hr (See Item 3)	F Ratings - 2 and 3 Hr (See Item 3)
T Rating - 1/4 Hr	FT Rating - 1/4 Hr
L Rating At Ambient - Less Than 1 CFM/sq ft (See Items 5 and 7)	FH Rating - 3 Hr
L Rating At 400 F - Less Than 1 CFM/sq ft (See Items 5 and 7)	FTH Rating - 1/4 Hr
W Rating - Class 1 (See Items 5 and 7)	L Rating At Ambient - Less Than 5.1 L/s/m2 (See Items 5 and 7)
	L Rating At 400 F - Less Than 5.1 L/s/m2 (See Items 5 and 7)



Section A-A

1. **Floor Assembly -** Reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete floor. Except as footnoted in the table under Item 3, min thickness of concrete floor assembly is 4-1/2 in. (114 mm).

1A. **Alternate Floor Assembly -** (Not Shown) - The fire rated unprotected concrete and steel deck floor assembly shall be constructed of the material and in the manner specified in the individual D900 Series designs in the UL Fire Resistance Directory and as summarized below:
   A. **Concrete -** Reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete, except as footnoted in the table under Item 3, min thickness of concrete as measured from the top plane of the steel floor units is 4-1/2 in. (114 mm).
   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 the concrete pour or grouted into the concrete assembly in accordance with the accompanying installation instructions. The devices may be cut flush or extend above the top surface of the floor.

   SPECIFIED TECHNOLOGIES INC - SpecSeal CD200, CD201, CD201C, CD202, CD200M, CD300, CD301, CD-301C, CD302, CD300M, CD400, CD401, CD402, CD400M, CD600 or CD600M Cast In Firestop Device

2A. **Firestop Device* -** (Not Shown) - When Item 1A is used, a steel deck adapter kit consisting of steel plates and a nonmetallic extension tube is used in conjunction with Item 2. Install the deck adapter in accordance with the accompanying installation instructions.

   SPECIFIED TECHNOLOGIES INC - SpecSeal CD200DK, CD201DK. CD300DK, CD301DK, CD400DK or CD401DK Cast In Firestop Device Deck Adapter

2B. **Firestop Device* -** (Not Shown) - When the concrete thickness exceeds 8 in. (203 mm), a nonmetallic extension tube is used in conjunction with Item 2. Install the extension tube in accordance with the accompanying installation instructions.

   SPECIFIED TECHNOLOGIES INC - SpecSeal CD200X, CD300X, or CD400X Cast In Firestop Device Extension

3. **Through Penetrant -** One metallic pipe or tube to be installed within the firestop system. Pipe or tube to be rigidly supported on both sides of the floor assembly. Penetrants to be rigidly supported on both sides of floor assembly. The following types and sizes of penetrants 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. **Copper Pipe -** Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
   D. **Copper Tube -** Nom 4 in. (102 mm) diam (or smaller) Type M (or heavier) copper tube.

Nom Pipe Diam (a), in. (mm)	Nom Thickness of Pipe Insulation, in. (mm)	Min Concrete Thickness in. (mm)	F and FH Ratings	Firestop Device
1/2 (13)	3/4 (19)	2-1/2 (64)	2	CD200, CD201, CD201C, CD202 or CD200M
1-1/2 (38)	3/4 (19)	2-1/2 (64)	2	CD300, CD301, CD301C, CD302 or CD300M
2-1/2 (64)	3/4 (19)	2-1/2 (64)	2	CD400, CD401, CD402 or CD400M
1/2 (13)	1 (25)	4-1/2 (114)	3	CD200, CD201, CD201C, CD202 or CD200M
1 (25)	1 (25)	4-1/2 (114)	3	CD300, CD301, CD301C, CD302 or CD300M
1-1/4 (32)	1 (25)	4-1/2 (114)	3	CD300, CD301, CD301C, CD302 or CD300M
2 (51)	1 (25)	4-1/2 (114)	3	CD400, CD401, CD402 or CD400M
4 (102)	1 (25)	4-1/2 (114)	3	CD600 or CD600M

(a) When nom diam of metallic pipe or tubing is smaller than that shown in the table, fill material or packing material shall be installed in the device as described within Item 5 and 6.

4. **Pipe or 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** (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.

5. **Packing Material -** (Not Shown) - When required under Item 3, min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool firmly packed into device flush with top edge of device (Item 2), and extending a min 1 in. (25 mm) below the top surface of the floor. When L or W Rating is required, min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool firmly packed into the top of the device (Item 2) and recessed min 1/4 in. (6 mm) from top edge of device to accommodate for sealant (Item 7).

6. **Fill, Void, or Cavity Material* - Putty -** (Not Shown) - When required under Item 3, as an option to Item 5, min 1 in. (25 mm) depth of fill material applied to fill annulus between penetrant and throat of firestop device at top of floor (Item 2).

   SPECIFIED TECHNOLOGIES INC - SpecSeal Putty

7. **Fill, Void, or Cavity Material* -** (Optional, Not Shown) - To achieve L or W Ratings, apply min 1/4 in. (6 mm) depth of sealant atop packing material (Item 5) flush with top edge of device.

   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SIL300 Sealant or SpecSeal Series SIL300SL Sealant

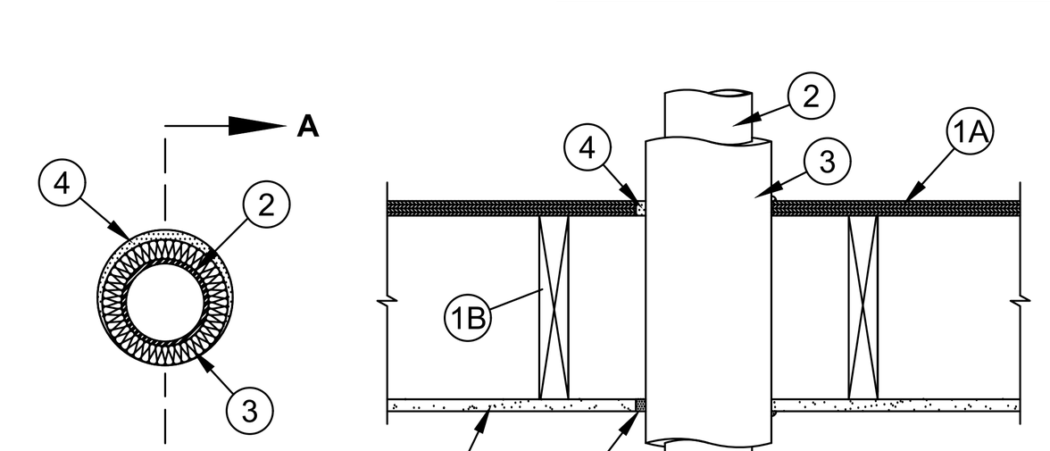
   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

   +Bearing the UL Listing Mark

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115

System No. F-C-5043

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings -1 and 2 Hr (See Items 1, 3A and 3D)	F Ratings - 1 and 2 Hr (See Items 1, 3A and 3D)
T Ratings - 3/4 and 1 Hr (See Item 3)	FT Ratings - 3/4 and 1 Hr (See Item 3)
L Rating At Ambient - Less Than 1 CFM/sq ft	FH Ratings - 1 and 2 Hr (See Items 1, 3A and 3D)
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Ratings - 3/4 and 1 Hr (See Item 3)
	L Rating At Ambient - Less Than 1 CFM/sq ft
	L Rating At 400 F - Less Than 1 CFM/sq ft



Section A-A

1. **Floor - Ceiling Assembly -** The 1 hr fire-rated wood joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Designs in the UL Fire Resistance Directory. The 2 hr fire-rated wood joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in Design Nos. L505, L511 or L536 in the UL Fire Resistance Directory. **The F Rating of the firestop system is equal to the fire rating of the floor-ceiling assembly**. The general construction features of the floor assembly are summarized below:
   A. **Flooring System -** Lumber or plywood subfloor with finish floor of lumber, plywood or **Floor Topping Mixture*** as specified in the individual Floor-Ceiling Design. Diam of opening to be max 1 in. (25 mm) larger than diam of insulated pipe. As an alternate, the opening may be square-cut with a max dimension 1 in. (25 mm) greater than the diam of the insulated pipe.
   B. **Wood Joists -** Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or **Structural Wood Members*** with bridging as required and with ends firestopped.
   C. **Gypsum Board* -** Thickness, type, number of layers and fasteners as required in the individual Floor-Ceiling Design. Diam of opening is to be max 1 in. (25 mm) larger than diam of insulated metallic pipe.
   D. **Furring Channel -** (Not Shown) - In 2 hr fire-rated assemblies, resilient galv steel furring channels installed perpendicular to wood joists between base and face layers of gypsum board (Item C). Furring channels spaced max 24 in. (610 mm) OC with additional short lengths of furring channel installed adjacent to and max 3 in. (76 mm) from two opposing sides of penetrant.

1A. **Chase Wall -** (Optional, Not Shown) - The through penetrant (Item 2) may be routed through a 1 or 2 hr fire rated single, double or staggered wood stud/gypsum board chase wall. Depth of chase wall stud cavity to be min 1 in. (25 mm) greater than the diameter of the insulated pipe (Item 2). The chase wall shall be constructed of the materials and in the manner specified in the individual U300 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs -** Nom 2 by 4 in. (51 by 102 mm), 2 by 6 in. (51 by 152 mm) or double nom 2 by 4 in. (51 by 102 mm) lumber studs.

   B. **Sole Plate -** Nom 2 by 4 in. (51 by 102 mm), 2 by 6 in. (51 b7 152 mm) or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Diam of opening is to be max 1 in. larger than diam of insulated metallic pipe. As an alternate for pipes insulated with max 1 in. (25 mm) thick glass fiber insulation (Item 3A), the opening may be square-cut with a max dimension 1 in. (25 mm) greater than the diam of the insulated pipe. Plates may be discontinuous over opening, terminating at two opposing edges of opening. Max length of discontinuity is 7 in. (178 mm).
   C. **Top Plate -** The double top plate shall consist of two nom 2 by 4 in. (51 by 102 mm), two nom 2 by 6 in. (51 by 152 mm) or two sets of parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Diam of opening is to be max 1 in. larger than diam of insulated metallic pipe. As an alternate for pipes insulated with max 1 in. (25 mm) thick glass fiber insulation (Item 3A), the opening may be square-cut with a max dimension 1 in. (25 mm) greater than the diam of the insulated pipe. Plates may be discontinuous over opening, terminating at two opposing edges of opening. Max length of discontinuity is 7 in. (178 mm).
   D. **Steel Plate -** (Not Shown) - When lumber plates are discontinuous, nom 1-1/2 in. (38 mm) wide No. 20 gauge (or heavier) galv steel plates shall be installed to connect discontinuous lumber plates and to provide a form for the fill material. Steel plates sized to lap 2 in. (51 mm) onto each discontinuous lumber plate and secured to lumber plates with steel screws or nails.
   E. **Gypsum Board* -** Thickness, type, number of layers and fasteners shall be as specified in the individual Wall and Partition Design.

2. **Through Penetrants -** One metallic pipe or tubing to be installed either concentrically or eccentrically within the opening. Penetrants to be rigidly supported on both sides of floor-ceiling assembly. The following types and sizes of metallic pipe or tubing may be used:
   A. **Steel Pipe -** Nom 4 in. (102 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 4 in. (102 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Copper Pipe or Tube -** Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe or Type L (or heavier) copper tube.

3. **Pipe Covering* -** One of the following types of pipe coverings may be used:
   A. **Pipe and Equipment Covering Materials* -** 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 self-sealing lap tape. Transverse joints secured with metal fasteners or butt tape supplied with the product. The annular space between the insulated through penetrant and periphery of opening shall be min 0 in. (point contact) to max 1 in. (25 mm). When 1-1/2 in. (38 mm) thick insulation is used, max F Rating is 1 hr. When 1 in. (25 mm) thick insulation is used, max F Rating is 2 hr.

   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:

   B. **Pipe Covering Materials* -** Max 1 in. (25 mm) thick unfaced mineral fiber pipe insulation having a nom density of 3.5 pcf (56 kg/m3) (or heavier) and sized to the outside diam of pipe or tube. Pipe insulation secured with min No. 18 AWG steel wire spaced max 12 in. (305 mm) OC. The annular space between the insulated through penetrant and periphery of opening shall be min 0 in. (point contact) to max 1 in. (25 mm).

   IIG MINWOOL L L C - High Temperature Pipe Insulation 1200, High Temperature Pipe Insulation BWT or High Temperature Pipe Insulation Thermaloc.

   C. **Sheathing Material* -** Used in conjunction with Item 3B. Foil-scrim-kraft or all service jacket material shall be wrapped around the outer circumference of the pipe insulation (Item 3B) with the kraft side exposed. Longitudinal joints and transverse joints sealed with metal fasteners or butt tape.

   See **Sheathing Materials** (BVDV) category in the Building Materials Directory for names of manufacturers. Any sheathing 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.

   D. **Tube Insulation - Plastics# -** Nom 1 in. (25 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The annular space between the insulated through penetrant and periphery of opening shall be min 0 in. (point contact) to max 1 in. (25 mm). When AB/PVC insulation is used, max F Rating is 1 hr.

   See **Plastics** (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.

   When Item 3A or 3B pipe covering is used, T Rating is 1 hr. When Item 3D pipe covering is used, T Rating is 3/4 hr.

4. **Fill, Void or Cavity Material* - Sealant -** Min 3/4 in. (19 mm) thickness of fill material applied within the annulus, flush with the top surface of the floor or sole plate. Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with bottom surface of ceiling or top plate. Min 1/4 in. (6 mm) diam bead of fill material applied at point contact location on the top surface of floor or sole plate and at the insulated metallic pipe/ceiling or top plate interface.

   SPECIFIED TECHNOLOGIES INC - SpecSeal LCI Sealant or Type WF300 Firestop Caulk

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

   #Bearing the UL Recognized Component Mark

GENERAL NOTES:

1. Refer to section 07 84 00 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:
   · 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. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   · UL Fire Resistance Directory; Current Edition
   · NFPA 101 Life Safety Code
   · All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:
PROJECT_NAME:

PROJECT LOCATION:
PROJECT_LOCATION:

ARCHITECT/CONSULTANT:
ARCHITECT/CONSULTANT:

TITLE:
STI FIRESTOP SYSTEMS

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INDEX

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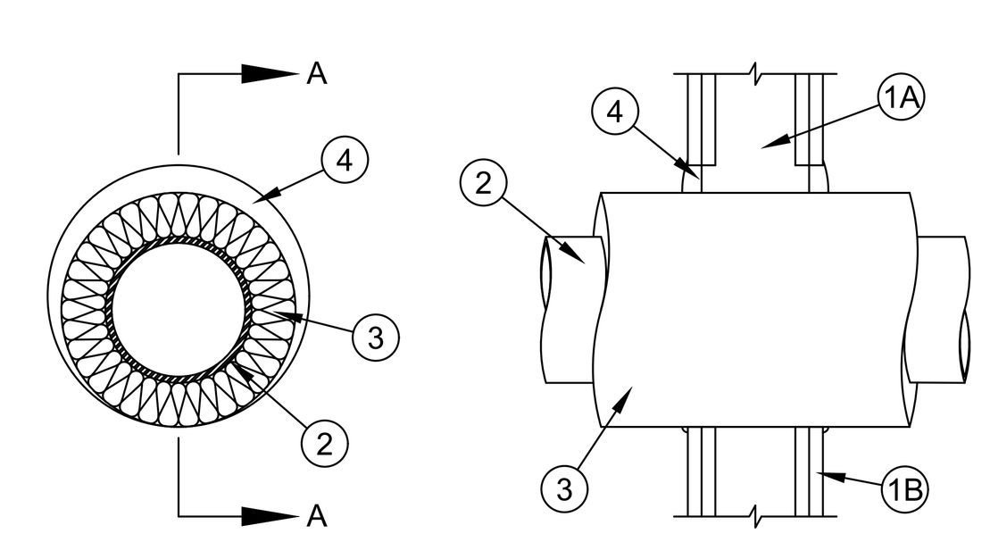
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115

System No. W-L-5014

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



Section A-A

1. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U300, U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs -** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced max 16 in. (406 mm) OC. Steel studs to be min 3-5/8 in. (92 mm) wide and spaced max 24 in. (610 mm) OC.
   B. **Gypsum Board* -** 5/8 in. (16 mm) thick, 4 ft (1.2 m) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300, U400 or V400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 18 in. (457 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.

1A. **Metallic Sleeve -** (Optional, Not Shown) - Cylindrical sleeve fabricated from min 0.016 in. (0.41 mm) to max 0.105 in. (2.7 mm) thick sheet steel. Length of steel sleeve to be equal to the thickness of wall. Longitudinal seam of sleeve welded or overlapped min 1 in. (25 mm). The ends of the steel sleeve shall be flush or recessed max 1/4 in. (6 mm) from wall surfaces.

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W-L-5014 PAGE 1 OF 2

2. **Through Penetrants -** One metallic pipe or tubing to be installed either concentrically or eccentrically within the firestop system. Pipe or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes or tubing may be used:
   A. **Steel Pipe -** Nom 12 in. (305 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 12 in. (305 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Copper Tubing -** Nom 4 in. (102 mm) diam (or smaller) Type M (or heavier) copper tube.
   D. **Copper Pipe -** Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
3. **Pipe Coverings* -** One of the following types of pipe coverings shall be used:
   A. **Pipe and Equipment Covering Materials* -** Max 2 in. (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 self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. The annular space between insulated penetrating item and the edge of the through opening shall be min 0 in. (point contact) to max 1-1/4 in. (32 mm).
   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.
   B. **Pipe Covering Materials* -** Max 2 in. (51 mm) thick unfaced mineral fiber pipe insulation sized to the outside diam of pipe or tube. Pipe insulation secured with min 18 SWG steel wire spaced max 12 in. (305 mm) OC. The annular space between insulated penetrating item and the edge of the through opening shall be min 0 in. (point contact) to max 1-1/4 in. (32 mm).
   IIG MINWOOL L L C - High Temperature Pipe Insulation 1200, High Temperature Pipe Insulation BWT or High Temperature Pipe Insulation Thermaloc.
   C. **Sheathing Material* -** Used in conjunction with Item 3B. Foil-scrim-kraft or all service jacket material shall be wrapped around the outer circumference of the pipe insulation (Item 3B) with the kraft side exposed. Longitudinal joints and transverse joints sealed with metal fasteners or butt tape.
   See **Sheathing Materials** (BVDV) category in the Building Materials Directory for names of manufacturers. Any sheathing 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.
4. **Fill, Void or Cavity Material* - Sealant -** Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall. At point contact location between insulated through penetrant and gypsum board, a min 3/8 in. (10 mm) bead of fill material shall be applied to the insulated through penetrant/gypsum board interface on both sides of the wall.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant or SpecSeal LCI Sealant

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

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W-L-5014 PAGE 2 OF 2

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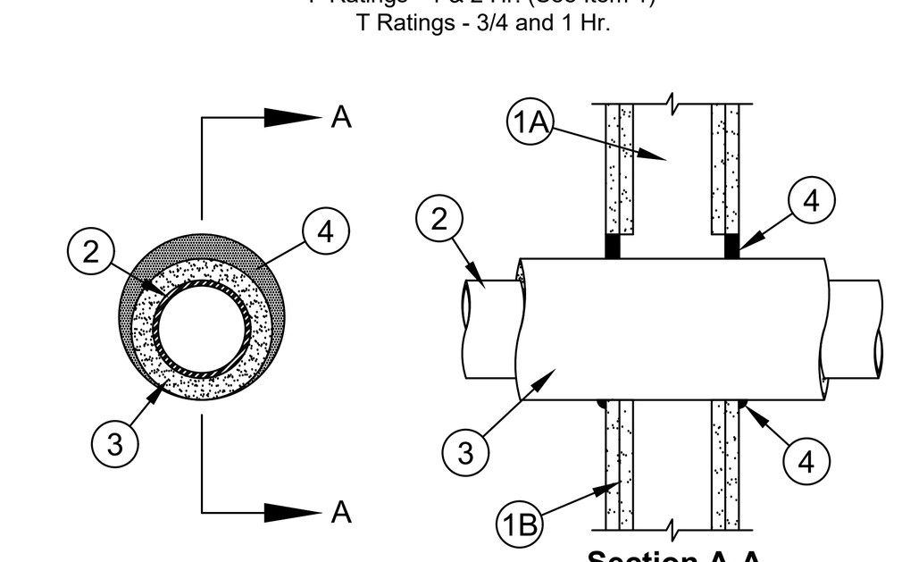
to ASTM/UL1479 (ASTM E814)

System No. W-L-5054

F Ratings - 1 & 2 Hr. (See Item 1)
T Ratings - 3/4 and 1 Hr.



Section A-A

1. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner described in the individual U300 or U400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs -** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. O.C. with nom 2 by 4 in. lumber end plates and cross braces. Steel studs to be min 3-1/2 in. wide and spaced max 24 in. O.C.
   B. **Gypsum Board* -** 5/8 in. thick, 4 ft wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 7-5/8 in.
   The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.
2. **Through Penetrant -** One metallic pipe or tubing to be installed either concentrically or eccentrically within the firestop system. Pipe or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes or tubing may be used:
   A. **Steel Pipe -** Nom 4 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 4 in. diam (or smaller) cast or ductile iron pipe.
   C. **Copper Tubing -** Nom 4 in. diam (or smaller) Type L (or heavier) copper tubing.
   D. **Copper Pipe -** Nom 4 in. diam (or smaller) Regular (or heavier) copper pipe.
3. **Tube Insulation - Plastics+ -** Nom 3/4 in. or 1 in. thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The annular space between penetrating item and periphery of opening shall be min 0 in. (point contact) to max 1-1/2 in. **When 1 in. thick AB/PVC insulation is used, T Rating is 3/4 hr. When 3/4 in. thick AB/PVC insulation is used, T Rating is 1 hr.**
   See **Plastics+** (QMFZ2) category in the Recognized Component Directory of names for manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.
4. **Fill, Void or Cavity Material* - Sealant -** Min 5/8 in. Thickness of fill material applied within annulus, flush with both surfaces of wall. Min 1/4 in. diam bead of sealant to be applied at the point contact location between the AB/PVC insulation and the gypsum board.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant or SpecSeal LCI Sealant

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

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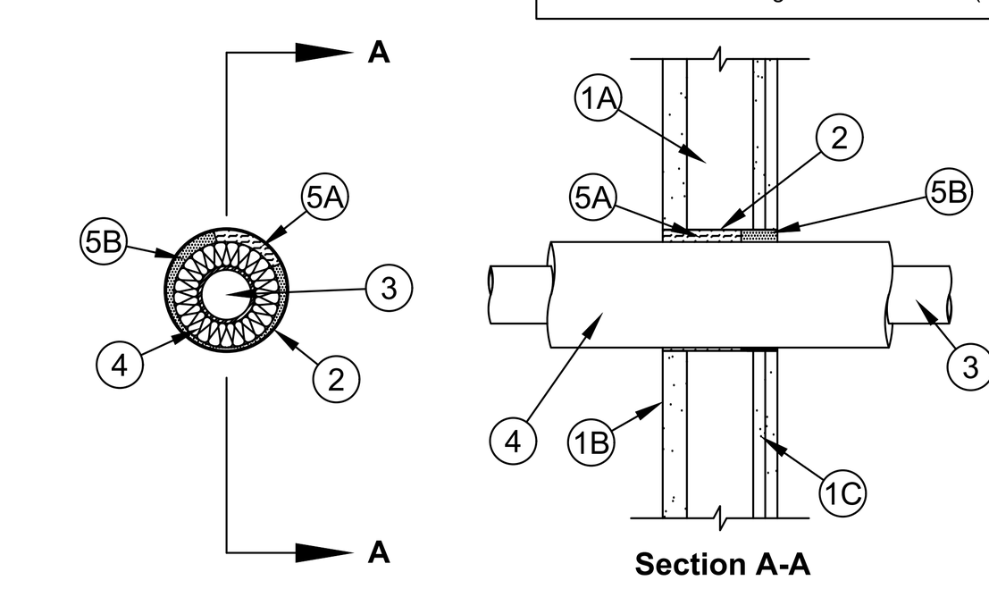
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115

System No. W-L-5262

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings - 1 and 2 Hr (See Item 1)
T Ratings - 1 and 1-1/4 Hr (See Item 1)	FT Ratings - 1 and 1-1/4 Hr (See Item 1)
	FH Ratings - 1 and 2 Hr (See Item 1)
	FTH Ratings - 1 and 1-1/4 Hr (See Item 1)



Section A-A

1. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum board/stud shaft wall assembly shall be constructed of the materials and in the manner specified in the individual U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall incorporate the following construction features:
   A. **Steel Studs -** "C-H" or "C-T" shaped studs, min 2-1/2 in. (64 mm) wide by 1-1/2 in. (38 mm) deep, fabricated from min No. 25 gauge (0.6 mm thick) galv steel, spaced max 24 in. (610 mm) OC.
   B. **Gypsum Board* -** 1 in. (25 mm) thick, 24 in. (610 mm) wide gypsum liner panels installed vertically. Max diam of circular cutout in gypsum liner panel is 5 in. (127 mm).
   C. **Gypsum Board* -** 1/2 in. or 5/8 in. (13 or 16 mm) thick, 48 in. (1.2 m) wide gypsum boards. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max diam of circular cutout in gypsum board is 5 in. (127 mm).
   The hourly F Rating of the firestop system is equal to the hourly rating of the wall assembly in which it is installed. The hourly T Rating is 1 hr in 1 hr walls and 1-1/4 hr in 2 hr walls.
2. **Metallic Sleeve -** Cylindrical sleeve fabricated from min No. 30 gauge (0.3 mm thick) galv sheet steel and having a min 2 in. (51 mm) lap along the longitudinal seam. Length of the sleeve to be equal to the thickness of the wall. Sleeve installed by coiling the sheet steel to a diam smaller than the through opening, inserting the coil through the opening and releasing the coil to let it uncoil against the circular cutouts in the gypsum board layers. The ends of the steel sleeve shall be flush with each surface of the wall.
3. **Through Penetrant -** One metallic pipe, tube or conduit installed concentrically or eccentrically within the firestop system. Pipe, tube or conduit to be rigidly supported on both sides of wall assembly. One of the following types and sizes of pipe, tube or conduit may be used:
   A. **Steel Pipe -** Nom 2 in. (51 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 2 in. (51 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Copper Pipe or Tube -** Nom 2 in. (51 mm) diam (or smaller) Regular (or heavier) copper pipe or Type L (or heavier) copper tube.

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W-L-5262 PAGE 1 OF 2

4. **Pipe Coverings* -** One of the following types of pipe coverings shall be used:
   A. **Pipe and Equipment Covering Materials* -** Max 1 in. (25 mm) thick hollow cylindrical heavy density (min 3.5 pcf (56 kg/m3)) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. The annular space between insulated penetrating item and the edge of the through opening shall be min 1/8 in. (3 mm) to max 3/4 in. (19 mm).
   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.
   B. **Pipe Covering Materials* -** Max 1 in. (25 mm) thick unfaced mineral fiber pipe insulation sized to the outside diam of pipe or tube. Pipe insulation secured with min 8 AWG steel wire spaced max 12 in. (305 mm) OC. The annular space between insulated penetrating item and the edge of the through opening shall be min 1/8 in. (3.2 mm) to 3/4 in. (19 mm) max.
   IIG MINWOOL L L C - High Temperature Pipe Insulation 1200, High Temperature Pipe Insulation BWT or High Temperature Pipe Insulation Thermaloc.
   C. **Sheathing Material* -** Used in conjunction with Item 3B. Foil-scrim-kraft or all service jacket material shall be wrapped around the outer circumference of the pipe insulation (Item 3B) with the kraft side exposed. Longitudinal joints and transverse joints sealed with metal fasteners or butt tape.
   See **Sheathing Materials** (BVDV) category in the Building Materials Directory for names of manufacturers. Any sheathing 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.
5. **Firestop System -** The firestop system shall consist of the following:
   A. **Packing Material -** Min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into sleeved opening as a permanent form. Packing material to extend throughout thickness of wall except for a 1-1/2 in. (38 mm) deep recess on the finished side of wall to accommodate the fill material.
   B. **Fill, Void or Cavity Material* - Sealant or Putty -** Min 1-1/2 in. (38 mm) thickness of fill material applied within sleeve, flush with finished surface of wall.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant, SpecSeal LCI Sealant, or SpecSeal Putty

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

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W-L-5262 PAGE 2 OF 2

Classified by
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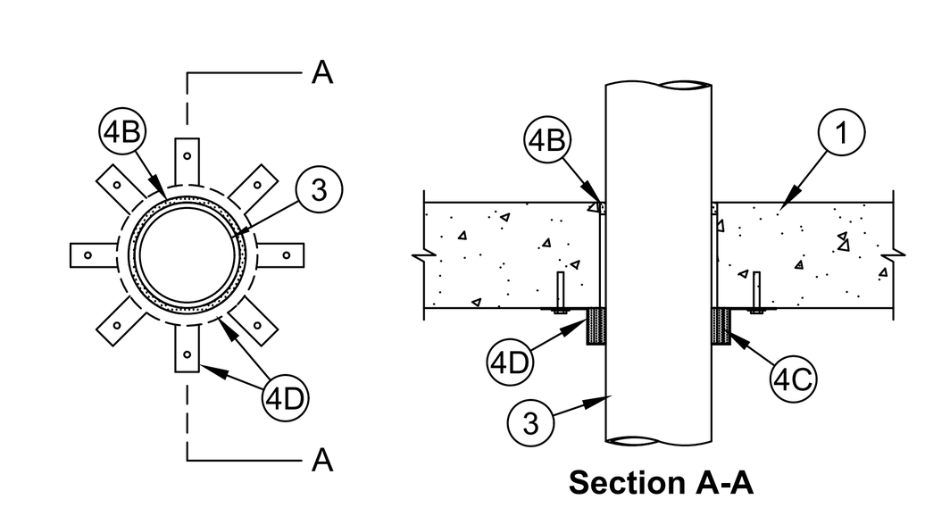
to ASTM/UL1479 (ASTM E814)

System No. C-AJ-2297

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



Section A-A

1. **Floor or Wall Assembly -** Lightweight or normal weight (100-150 pcf or 1600-2400 kg/ m3) concrete. Except as footnoted in the table under Item 4C, min thickness of concrete floor or wall assembly is 4-1/2 in. (114 mm). Floor may also be constructed of any min 6 in. (152 mm) thick hollow-core **Precast Concrete Units***. Wall may also be constructed of any UL Classified **Concrete Blocks***. Diam of opening to be min 1/8 in. (3.2 mm) to max 1-1/2 in. (38 mm) larger than outside diam of pipe or conduit.
   See **Concrete Blocks** (CAZT) or **Precast Concrete Units** (CFTV) categories in the Fire Resistance Directory for names of manufacturers.
2. **Steel Sleeve -** (Optional, Not Shown) - Nom 5 in. (127 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe or nom 5 in. (127 mm) diam (or smaller) No. 26 ga (0.022 in. or 0.56 mm thick) sheet steel sleeve with nom 2 in. wide square or circular anchor flange spot welded to the sleeve at it\'s approx mid-height. Sleeve cast or grouted into min 4-1/2 in. (114 mm) thick floor or wall assembly, flush with floor or wall surfaces.
3. **Through Penetrant -** One nonmetallic pipe or conduit to be installed eccentrically or concentrically within the firestop system. Pipe or conduit to be rigidly supported on both sides of the floor or wall 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) solid or cellular core Schedule 40 polyvinyl chloride (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) SDR 13.5 chlorinated polyvinyl chloride (CPVC) pipe for use in closed (process or supply) piping systems.
   C. **Rigid Nonmetallic Conduit+ -** Nom 6 in. (152 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with Article 347 of the National Electrical Code (NFPA 70).
   D. **Acrylonitrile Butadiene Styrene (ABS) Pipe -** Nom 6 in. (152 mm) diam (or smaller) solid or cellular core Schedule 40 acrylonitrile butadiene styrene (ABS) pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   E. **Fire Retardant Polypropylene (FRPP) Pipe -** Nom 6 in. (152 mm) diam (or smaller) solid or cellular core Schedule 40 fire retardant polypropylene (FRPP) pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   F. **High Density Polyethylene (HDPE) Pipe -** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 HDPE pipe for use in closed (process or supply) piping systems.
4. **Firestop System -** The firestop system shall consist of the following:
   A. **Packing Material -** (Not Shown) - When required, min 4 pcf (64 kg/m3) mineral wool batt insulation compressed and installed to the thickness specified in the table under Item 4C. Packing material to be recessed from top surface of floor or both surfaces of wall as required to accommodate sealant (Item 4B).

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C-AJ-2297 PAGE 1 OF 3

B. **Fill, Void or Cavity Material* - Sealant or Putty -** Fill material installed flush with top surface of floor or both surfaces of wall, as specified in the table under Item 4C.
SPECIFIED TECHNOLOGIES INC - SpecSeal LCI Sealant, SpecSeal Series SSS Sealant, SpecSeal Putty, Pensil 300 Sealant or SpecSeal Series SIL300 Sealant for floors or walls and Pensil 300 S/L Sealant or SpecSeal Series SIL300 Sealant for floors only.
W Rating applies only when a min 1/2 in. (13 mm) depth of Pensil 300, SpecSeal Series SIL300 Sealant ,Pensil 300 S/L or SpecSeal Series SIL300SL Sealants are used.

C. **Fill, Void or Cavity Material* - Wrap Strip -** Nom 1/8 in. (3.2 mm) by 1-1/2 in. (38 mm) wide (RED2), nom 1/4 in. (6 mm) thick by 1-1/2 in. (38 mm) wide (RED), 3/16 in. (4.8 mm) by 2 in. (51 mm) wide (BLU) or 1/8 in. (3.2 mm) by 2 in. (51 mm) wide (BLU2) intumescent strips faced on both sides with a plastic film. Strips tightly wrapped around nonmetallic pipe with edges butted against the underside of the floor or both surfaces of the wall. The wrap strips may be installed with butted seams with butted seams in successive layers aligned or offset or continuously wrapped around through penetrant. Wrap strips are temporarily held in place with masking tape. The min number of layers required is dependent upon the pipe type, nom pipe diam, floor or wall thickness and the hourly F and T Ratings required, as shown in the following table:

Pipe Type	Max Diam. Pipe in. (mm)	Min Concrete Thickness, Layers	Wrap Strip Type	Min No of Wrap Strip Layers	F Rating, Hr	T Rating, Hr	Min Packing Material Depth in. (mm)	Min Fill Material Depth in. (mm)	Max Annular Space in. (mm)
PVC, ccPVC, CPVC RNC, ABS, ccABS	2 (51)	2-1/2 (64)	RED, RED2, BLU or BLU2	1	2	1	NA	1/2 (13)	1/16 (1.6)
HDPE	2 (51)	2-1/2 (64)	RED, RED2, BLU or BLU2	1	2	2	NA	1/2 (13)	1/16 (1.6)
PVC, ccPVC, CPVC RNC, ABS, ccABS	2 (51)	2-1/2 (64)	RED, RED2, BLU or BLU2	1	2	1	2 (51)	1/2 (13)	3/4 (19)
HDPE	2 (51)	2-1/2 (64)	RED, RED2, BLU or BLU2	1	2	2	2 (51)	1/2 (13)	3/4 (19)
PVC, ccPVC, CPVC RNC, ABS, ccABS	4 (102)	2-1/2 (64)	RED, RED2, BLU or BLU2	2	2	1	2 (51)	1/2 (13)	3/4 (19)
HDPE	4 (102)	2-1/2 (64)	RED, RED2, BLU or BLU2	2	2	2	2 (51)	1/2 (13)	3/4 (19)
PVC, ccPVC, CPVC, RNC	2 (51)	4-1/2 (114)	RED, RED2, BLU or BLU2	1	3	2	NA	1/4 (6)	1/4 (6)
HDPE	2 (51)	4-1/2 (114)	RED, RED2, BLU or BLU2	1	3	2	NA	1/4 (6)	1/4 (6)
PVC, ccPVC, CPVC, RNC	3 (76)	4-1/2 (114)	RED, RED2, BLU or BLU2	2	3	2	NA	1/4 (6)	1/4 (6)
HDPE	3 (76)	4-1/2 (114)	RED, RED2, BLU or BLU2	2	3	2	NA	1/4 (6)	1/4 (6)
PVC, ccPVC, CPVC, RNC	4 (102)	4-1/2 (114)	RED, RED2, BLU or BLU2	3	3	2	NA	1/4 (6)	1/4 (6)
HDPE	4 (102)	4-1/2 (114)	RED, RED2, BLU or BLU2	3	3	2	NA	1/4 (6)	1/4 (6)
PVC, ccPVC, CPVC, RNC	6 (152)	4-1/2 (114)	RED, RED2	3(a)	3	0	NA	1/4 (6)	1/2 (13)
PVC, CPVC, RNC	6 (152)	4-1/2 (114)	RED, RED2, BLU or BLU2	4*	3	3	4 (102)	1/2 (13)	1/4 (6)
PVC, ccPVC, CPVC, RNC, FRPP	6 (152)	4-1/2 (114)	BLU or BLU2	3(a)	3	2	NA	1/4 (6)	3/16 (4.8)
ABS, ccABS	2 (51)	4-1/2 (114)	RED, RED2	1	3	0	NA	1/4 (6)	1/2 (13)
ABS, ccABS	2 (51)	4-1/2 (114)	BLU or BLU2	1	3	2	NA	1/4 (6)	1/2 (13)
ABS, ccABS	3 (76)	4-1/2 (114)	RED, RED2	2	2	0	NA	1/4 (6)	1/2 (13)
ABS, ccABS	3 (76)	4-1/2 (114)	BLU or BLU2	2	3	2	NA	1/4 (6)	1/2 (13)
ABS, ccABS	4 (102)	4-1/2 (114)	RED, RED2	3	2	0	NA	1/4 (6)	1/2 (13)
ABS, ccABS	4 (102)	4-1/2 (114)	BLU or BLU2	3	3	2	NA	1/4 (6)	1/2 (13)
ABS, ccABS	6 (152)	4-1/2 (114)	RED, RED2, BLU or BLU2	4*	2	2	4 (102)	1/2 (13)	1/4 (6)
ABS, ccABS	6 (152)	4-1/2 (114)	RED, RED2	3(a)	3	0	NA	1/2 (13)	3/8 (10)
ABS, ccABS, FRPP	6 (152)	4-1/2 (114)	BLU or BLU2	3(a)	3	3	NA	1/2 (13)	3/8 (10)

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C-AJ-2297 PAGE 2 OF 3

(a) Where indicated, two sets of three wrap strip layers are "stacked" to attain a 3 in. (76 mm) wrap strip width for RED or RED2 wrap strip or a 4 in. (102 mm) wrap strip width for BLU or BLU2 wrap strip

* One stack of four layers of wrap strip, two layers of steel collar. See Item 4D.

SPECIFIED TECHNOLOGIES INC - SpecSeal RED Wrap Strip, SpecSeal RED2 Wrap Strip, SpecSeal BLU Wrap Strip or SpecSeal BLU2 Wrap Strip

C1. **Fill, Void, or Cavity Material - Wrap Strip -** (Not Shown) - As an alternate to Item 4C for nom 2 in., 3 in. and 4 in. (51, 76 and 102 mm) diam pipes, precut intumescent wrap strip faced on both sides with a plastic film sized to fit the OD of the pipe. The size of the intumescent wrap strip for each pipe size is tabulated below:

Nom Pipe Diam. In. (mm)	Wrap Strip	Wrap Strip Size, thick. x width x length, in. (mm)
2 (51)	SSW 125	1/8 x 1-1/2 x 8-1/8 (3 x 38 x 206)
3 (76)	SSW 250	1/4 x 1-1/2 x 12-1/8 (6 x 38 x 308)
4 (102)	SSW 375	3/8 x 1-1/2 x16 (10 x 38 x 406)

SPECIFIED TECHNOLOGIES INC - SpecSeal SSW125, SSW250, or SSW375 Wrap Strip

D. **Steel Collar -** Nom 1-1/2 in. (38 mm), 2 in. (51 mm), 3 in. (76 mm) or 4 in. (102 mm) deep collar, dependent upon wrap strip width, with 1 in. (25 mm) wide by 2 in. (51 mm) long anchor tabs for attachment to concrete and min 3/4 in. (19 mm) wide retaining tabs tapering down to 1/4 in. (6 mm) wide and located opposite the anchor tabs. Steel collar, with anchor tabs bent outward 90 deg, wrapped tightly around wrap strip layers with min 1 in. (25 mm) overlap at seam. Retainer tabs to be bent 90 deg toward pipe to lock wrap strips in position. Anchor tabs to be pressed tightly against floor or wall surface(s), and collar to be secured in place with one 1/2 in. (13 mm) wide by 0.028 in. (0.7 mm) thick stainless steel hose clamp. Two band clamps are required for 3 in. high (or higher) collar on 6 in. (152 mm) pipe. As an alternate to the hose clamps on 1-1/2 in. (38 mm) and 2 in. (51 mm) deep collar, collar secured together by means of three No. 8 by 1/4 in. (6 mm) long steel screws. Collar to be secured to floor or wall surface(s) with 1/4 in. (6 mm) diam by min 1-1/4 in. (32 mm) long steel concrete screws in conjunction with min 1 in. (25 mm) diam steel fender washers. As an alternate to the steel concrete screws, nom 1-1/4 in. (32 mm) long steel powder actuated fasteners provided with 3/4 in. (19 mm) diam steel washers or nom 3/4 in. (19 mm) long steel powder actuated fasteners provided with 1 in. (25 mm) diam steel washers may be used to secure anchor tabs. The number of fasteners is dependent upon the nom diam of the through penetrant. Min two fasteners , symmetrically located, are required for nom 1-1/2 in. (38 mm) through 2 in. (51 mm) diam through penetrants. Min three fasteners , symmetrically located, are required for nom 2-1/2 in. (64 mm) through 3 in. (76 mm) diam through penetrants. Min four fasteners , symmetrically located, are required for nom 3-1/2 in. (89 mm) through 4 in. (102 mm) diam through penetrants. Min six fasteners , symmetrically located, are required for nom 6 in. (152 mm) diam through penetrants.
*When using one stack of four layers of wrap strip for nom 6 in. (152 mm) diam pipes, two layers of nom 1-1/2 or 2 in. (38 or 51 mm) deep collar (dependent upon wrap strip width) is to be wrapped around wrap strip and penetrant with min 1 in. (25 mm) overlap.

E. **Firestop Device* -** (Not Shown) - As an alternate to Items C and D, a firestop device consisting of a galv steel collar lined with an intumescent material sized to fit the specific diam of the through penetrant may be used. Device shall be installed around through-penetrant in accordance with the accompanying installation instructions. Device incorporates anchor tabs for securement to bottom surface of floor or both surfaces of wall assembly by means of 1/4 in. (6 mm) diam by min 1-1/4 in. (32 mm) long steel concrete screws in conjunction with min 1 in. (25 mm) diam steel fender washers. As an alternate to the steel concrete screws, nom 1-1/4 in. (32 mm) long steel powder actuated fasteners provided with 3/4 in. (19 mm) diam steel washers or nom 3/4 in. (19 mm) long steel powder actuated fasteners provided with 1 in. (25 mm) diam steel washers may be used to secure anchor tabs.
SPECIFIED TECHNOLOGIES INC - SpecSeal Firestop Collar, SpecSeal LCC Firestop Collar or SpecSeal SSC Collar.

+Bearing the UL Listing Mark

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

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C-AJ-2297 PAGE 3 OF 3

Classified by
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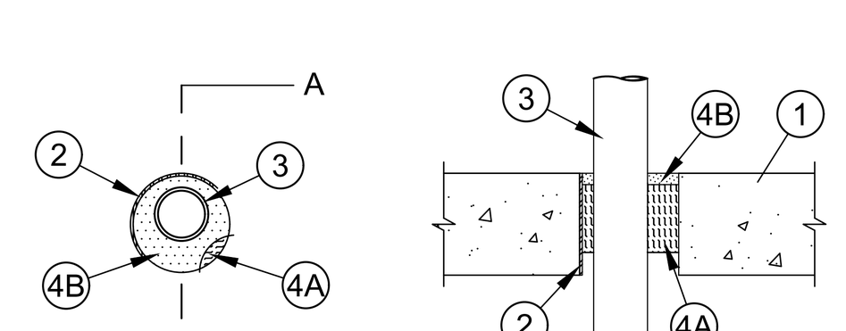
to ASTM/UL1479 (ASTM E814)

System No. C-AJ-2578

F Rating - 3 Hr
T Rating - 3 Hr
L Rating At Ambient - Less Than 1 CFM/sq ft
L Rating At 400 F - Less Than 1 CFM/sq ft
W Rating - Class 1 (See Item 4B)



Section A-A

1. **Floor or Wall Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete floor or min 5 in. (127 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete wall . Wall may also be constructed of any UL Classified **Concrete Blocks***. Floor may also be constructed of any 6 in. (152 mm) thick UL Classified hollow core **Precast Concrete Units.** Max diam of opening is 4 in. (102 mm).
   See **Concrete Blocks** (CAZT) and **Precast Concrete Units*** (CFTV) categories in the Fire Resistance Directory for names of manufacturers.
2. **Steel Sleeve -** (Optional) Nom 4 in. (102 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe or nom 4 in. (102 mm) diam (or smaller) No. 26 GA (0.022 in. or 0.56 mm thick) sheet metal sleeve with square flange spot welded to the sleeve at approx mid-height and sized to be a min of 2 in. larger than the sleeve diam cast or grouted into floor or wall assembly cast or grouted into floor or wall assembly, flush with floor or wall surfaces.
3. **Through Penetrants -** One nonmetallic pipe to be installed either concentrically or eccentrically within the firestop system. The annular space between pipe and sleeve (Item 2) shall be min 1/4 in. (6 mm) to max 1-3/8 in. (35 mm). When steel sleeve (Item 2) is not provided, the annular space between pipe and periphery of opening shall be min 0 in. (point contact) to max 1-5/8 in. (41 mm). Pipe to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of nonmetallic pipes may be used:
   A. **Polyvinyl Chloride (PVC) Pipe -** Nom. 2 in. (51 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.
   B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe -** Nom 2 in. (51 mm) diam (or smaller) SDR17 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   C. **Rigid Nonmetallic Conduit+ -** Nom 2 in. (51 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with Article 347 of the National Electrical Code (NFPA 70).
   D. **Crosslinked Polyethylene (PEX) Tubing -** Nom 2 in. (51 mm) diam (or smaller) SDR 9 PEX tubing for use in closed (process or supply) piping systems.
4. **Firestop System -** The firestop system shall consist of the following:
   A. **Packing Material -** Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or both surfaces of wall to accommodate the required thickness of fill material. When precast concrete units are used, packing material to be recessed from top surface of floor to accommodate the required thickness of fill material and to be installed flush with bottom surface of floor.
   B. **Fill, Void or Cavity Material* - Sealant -** Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or both surfaces of wall assembly. Additionally, nom 1/2 in. (13 mm) bead of fill material applied between concrete and penetrant interface.
   SPECIFIED TECHNOLOGIES INC - SpecSeal LCI Sealant, SpecSeal Series SSS Sealant, Pensil 300 Silicone Sealant, or SpecSeal Series SIL300 Sealant for floors or walls and Pensil 300 S/L Silicone Sealant or SpecSeal Series SIL300SL Sealant for floors only.
   W Ratings apply when Pensil 300, SpecSeal Series SIL300, Pensil 300S/L SpecSeal Series SIL300SL Sealants are used.

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

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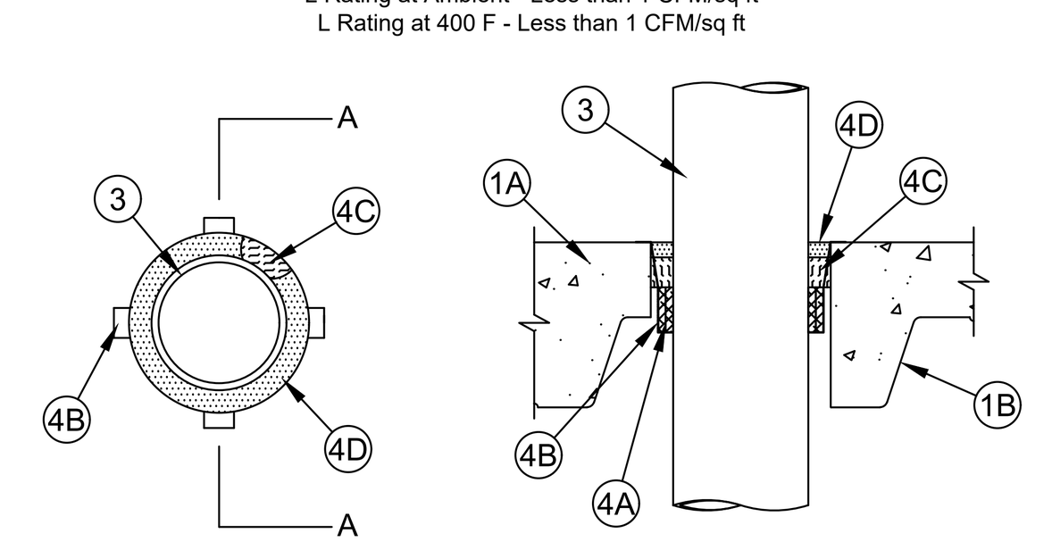
C-AJ-2578 PAGE 1 OF 1

Classified by
Underwiters Laboratories, Inc.
to ASTM/UL1479 (ASTM E814)

System No. F-A-2073

F Rating - 3 Hr
T Ratings - 3/4 and 1 Hr (See Item 2)
L Rating at Ambient - Less than 1 CFM/sq ft
L Rating at 400 F - Less than 1 CFM/sq ft



Section A-A

1. **Floor Assembly -** The fire-rated 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 noncomposite min 1-1/2 in. (38 mm) deep fluted galv units as specified in the individual Floor-Ceiling design. Max diam of opening through floor is 6 in.
   Floor Assembly - (Not Shown) - As an alternate to Items 1A and 1B, min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete slab floor assembly. Max diam of opening is 6 in. (152 mm).
2. **Metallic Sleeve -** (Optional, Not Shown) - Nom 6 in. (152 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe or No. 26 ga (0.022 in. or 0.56 mm thick) sheet steel sleeve with square anchor flange spot welded to the sleeve at approx mid-height. Sleeve cast or grouted into concrete slab floor assembly, flush with floor surfaces. **When steel sleeve is used, the T Rating is 3/4 hr**.
3. **Through Penetrants -** One nonmetallic pipe or conduit to be centered within the opening. Nom 1-1/2 and 2 in. (38 and 51 mm) diam pipes installed with a 1/4 to 1/2 in. (6 to 13 mm) annular space. Nom 2-1/2 to 4 in. (64 to 102 mm) diam pipes installed with a 1/2 to 3/4 in. (13 to 19 mm) annular space. Pipe to be rigidly supported on both sides of floor assembly. The following types and sizes of nonmetallic pipes and conduits may be used:
   A. **Polyvinyl Chloride (PVC) Pipe -** Nom 4 in. (102 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. **Rigid Nonmetallic Conduit++ -** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electric Code (NFPA No. 70).
   C. **Chlorinated Polyvinyl Chloride (CPVC) Pipe -** Nom 4 in. (102 mm) diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.
   D. **Acrylonitrile Butadiene Styrene (ABS) Pipe -** Nom 4 in. (102 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.
   E. **Flame Retardant Polypropylene (FRPP) Pipe -** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 FRPP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

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F-A-2073 PAGE 1 OF 2

4. **Firestop System -** The firestop system shall consist of the following:
   A. **Fill, Void or Cavity Materials* - Wrap Strip -** Nom 1-1/2 in. (38 mm) wide by 1/4 in. (6 mm) thick (RED), nom 2 in. (51 mm) wide by 3/16 in. (4.8 mm) thick (BLU) or nom 2 in. (51 mm) wide by 1/8 in. (3.2 mm) thick (BLU2) intumescent strips. For nom 1-1/2 and 2 in. (38 and 51 mm) diam pipe, one layer wrapped around the through penetrant with the ends butted and held in place with tape. For nom 2-1/2 through 4 in. (64 through 102 mm) diam pipe, two layers wrapped around the through penetrant with the ends butted and held in place with tape. Butted ends in successive layers to be aligned or offset.
   SPECIFIED TECHNOLOGIES INC - SpecSeal RED Wrap Strip, SpecSeal Blu Wrap Strip or SpecSeal BLU2 Wrap Strip
   B. **Steel Collar -** Collar fabricated from coils of precut 0.016 in. (0.4 mm) thick galv sheet steel available from wrap strip manufacturer. Collar shall be nom 1-1/2 or 2 in. (38 or 51 mm) deep (dependent on width of wrap strip) with min four 1 in. (25 mm) wide by 2 in. (51 mm) long anchor tabs. Retainer tabs, 3/4 in. (19 mm) wide tapering down to 1/4 in. (6 mm) wide and located opposite the anchor tabs are folded 90 degrees toward through-penetrant to maintain the annular space around the through-penetrant and to retain the wrap strips. Steel collar wrapped around wrap strips and through penetrant with a 1 in. (25 mm) wide overlap along its perimeter joint and secured together by means of three No. 8 by 1/4 in. (6 mm) long steel sheet metal screws or one stainless steel hose clamp. Steel collar/wrap strip assembly slid along through penetrant into annulus of opening until the bottom of the collar extends 3/4 in. (19 mm) below the crest of the steel deck or the bottom surface of the concrete slab floor. Mounting tabs shall be bent 90 degree outward to lap onto floor surface by 1/2 in. (13 mm). For thicker concrete, fabricate hanger straps extensions from min 0.022 in. (0.6 mm) thick galv sheet steel. Taper straps from 1/4 in. (6 mm) wide to 1 in. (25 mm) wide with sufficient length to allow 1/2 in. (13 mm) lap onto floor. Straps secured to collar by inserting 1/4 in. (6 mm) wide end into hole on mounting tab and bending 180 degrees.
   C. **Packing Material -** Min 1 in. (25 mm) thickness of min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into annular space. Recess packing material from top surface of floor as required to accommodate the required thickness of fill material.
   D. **Fill, Void or Cavity Materials* - Sealant -** Min 3/8 in. (10 mm) thickness of fill material applied within the annulus, flush with top surface of floor.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant or SpecSeal LCI Sealant
   E. **Firestop Device* -** As an alternate to the wrap strip and steel collar (Item Nos. 4A and 4B), a firestop device consisting of steel collar lined with an intumescent material sized to fit the specific diam of the nonmetallic through penetrant may be used. Device shall be installed in accordance with the installation instructions provided with the product. Firestop device slid along through penetrant into annulus of opening until the bottom of the device extends 3/4 in. (19 mm) below the bottom surface of the floor. Mounting tabs shall be bent 90 degree outward to lap onto floor surface by 1/2 in. (13 mm). For thicker concrete, fabricate hanger straps extensions from min 0.022 in. (0.6 mm) thick galv sheet steel. Taper straps from 1/4 in. (6 mm) wide to 1 in. (25 mm) wide with sufficient length to allow 1/2 in. (13 mm) lap onto floor. Straps secured to collar by inserting 1/4 in. (6 mm) wide end into hole on mounting tab and bending 180 degrees.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Firestop Collar, SpecSeal LCC Collar or SpecSeal SSC Collar

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

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F-A-2073 PAGE 2 OF 2

GENERAL NOTES:

1. Refer to section 07 84 00 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:
   · 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. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   · UL Fire Resistance Directory; Current Edition
   · NFPA 101 Life Safety Code
   · All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:
PROJECT_NAME:

PROJECT LOCATION:
PROJECT_LOCATION:

ARCHITECT/CONSULTANT:
ARCHITECT/CONSULTANT:

TITLE:
STI FIRESTOP SYSTEMS

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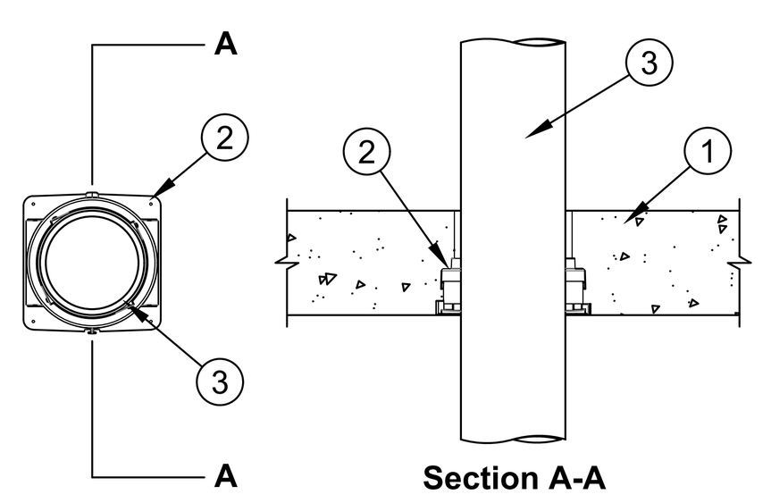
to ASTM/UL1479 (ASTM E814)

System No. F-A-2246

F Ratings - 2 and 3 Hr (See Item 3)
T Ratings - 0, 1/4, 1-1/4, 1-1/2 and 3 Hr (See Item 3)
L Rating At Ambient - Less Than 1 CFM/sq ft (See Items 3, 4 and 6)
L Rating At 400 F - Less Than 1 CFM/sq ft (See Items 3, 4 and 6)
W Rating - Class 1 (See Item 4 and 6)



1. **Floor Assembly -** Reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete floor. Except as footnoted in the table under Item 3, min thickness of concrete floor assembly is 4-1/2 in. (114 mm).

1A. **Floor Assembly -** (Not Shown) - As an alternate to Item 1, the fire rated unprotected concrete and steel floor assembly shall be constructed of the material and in the manner specified in the individual D900 Series designs in the UL Fire Resistance Directory and as summarized below:
   A. **Concrete -** Reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete floor. Except as footnoted in the table under Item 3, min thickness of concrete floor assembly is 4-1/2 in. (114 mm).
   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 the concrete pour or grouted into the concrete assembly in accordance with the accompanying installation instructions. The devices may be cut flush or extend above the top surface of the floor.
   SPECIFIED TECHNOLOGIES INC - SpecSeal CD201, CD201C, CD202, CD301, CD301C, CD302, CD401 or CD402 Cast In Firestop Device

2A. **Firestop Device* -** (Not Shown) - When Item 1A is used, a steel deck adapter kit consisting of steel plates and a nonmetallic extension tube is used in conjunction with Item 2. Install the deck adapter in accordance with the accompanying installation instructions.
   SPECIFIED TECHNOLOGIES INC - SpecSeal CD201DK, CD301DK or CD401DK Cast In Firestop Device Deck Adapter

3. **Through Penetrants -** One nonmetallic pipe or conduit to be installed within the firestop system. Pipe or conduit to be rigidly supported on both sides of the floor assembly. The following types and sizes of nonmetallic pipes or conduits may be used:
   A. **Polyvinyl Chloride (PVC) Pipe -** Nom 4 in. (102 mm) diam (or smaller) solid or cellular core Schedule 40 polyvinyl chloride (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. (102 mm) diam (or smaller) SDR 13.5 chlorinated polyvinyl chloride (CPVC) pipe for use in closed (process or supply) piping systems.

C. **Rigid Nonmetallic Conduit+ -** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA 70).

D. **Acrylonitrile Butadiene Styrene (ABS) Pipe -** Nom 4 in. (102 mm) diam (or smaller) solid or cellular core Schedule 40 acrylonitrile butadiene styrene (ABS) pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

E. **Fire Retardant Polypropylene (FRPP) Pipe -** Nom 2 in. (51 mm) diam (or smaller) solid or cellular core Schedule 40 fire retardant polypropylene (FRPP) pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

Pipe Type	Nom Pipe Diam (a)	Min Concrete Thickness in. (mm)	F Rating Hr	T Rating Hr	Firestop Device
PVC, CPVC, RNC	1-1/2 or 2 in. (38 or 51 mm)	2-1/2 (64)	2	1-1/4	CD201, CD201C, CD202
PVC, CPVC, RNC	2-1/2 or 3 in. (64 or 76 mm)	2-1/2 (64)	2	1-1/2	CD301, CD301C, CD302
PVC, CPVC, RNC	3-1/2 or 4 in. (89 or 102 mm)	2-1/2 (64)	2	1/4	CD401, CD402
PVC, CPVC, RNC	1-1/2 or 2 in. (38 or 51 mm)	4-1/2 (114)	3	3	CD201, CD201C, CD202
PVC, CPVC, RNC	2-1/2 or 3 in. (64 or 76 mm)	4-1/2 (114)	3	3	CD301, CD301C, CD302
PVC, CPVC, RNC	3-1/2 or 4 in. (89 or 102 mm)	4-1/2 (114)	3	3	CD401, CD402
ABS, FRPP	1-1/2 or 2 in. (38 or 51 mm)	4-1/2 (114)	3	0	CD201, CD201C, CD202
ABS	2-1/2 or 3 in. (64 or 76 mm)	4-1/2 (114)	3	0	CD301, CD301C, CD302
ABS	3-1/2 or 4 in. (89 or 102 mm)	4-1/2 (114)	3	0	CD401, CD402

(a) When nonmetallic pipe or conduit with diam smaller than those shown in the table above is used, packing material and/or fill material shall be installed into the device as described in Items 4 and 5. L Ratings for these penetrants only apply when the fill material is used. Otherwise, the L Rating for each firestop device is less than 1 CFM/ft2 at ambient and at 400F.

4. **Packing Material -** (Not Shown) - When required under Item 3, min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool firmly packed into device flush with top edge of device (Item 2), and extending a min 1 in. (25 mm) below the top surface of the floor. When W Ratings for penetrants are required, min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool firmly packed into device recessed 1/4 in. (6 mm) from top edge of device (Item 2) to accommodate sealant (Item 6). When L Ratings for penetrants with a diam smaller than those shown in the table above are required, recess mineral wool 1/4 in. (6 mm) from top edge of device to accommodate sealant (Item 6).

5. **Fill, Void, or Cavity Material* - Putty -** (Not Shown) - When required under Item 3, as an option to Item 4, min 1 in. (25 mm) depth of fill material applied to fill annulus between penetrant and throat of firestop device at top of floor.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Putty

6. **Fill, Void, or Cavity Material* -** (Optional, Not Shown) - To achieve W Ratings for penetrants, or to achieve L Ratings for penetrants with a diam smaller than those shown in the table above, apply min 1/4 in. (6 mm) depth of sealant atop packing material (Item 4) flush with top edge of device.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SIL300 Sealant or SpecSeal SIL300SL Sealant

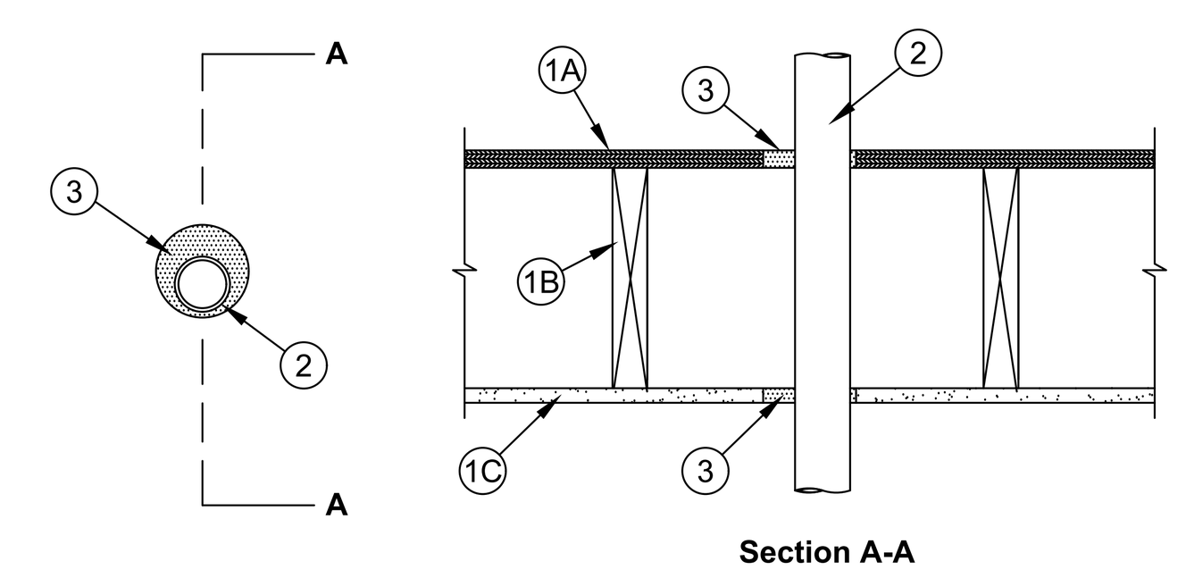
*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

+Bearing the UL Listing Mark

Classified by
Underwriters Laboratories, Inc.
to ASTM/UL1479 (ASTM E814)

System No. F-C-2032

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



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 individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory. The general construction details of the floor-ceiling assembly are summarized below:
   A. **Flooring System -** Lumber or plywood subfloor with finish floor of lumber, plywood or **Floor Topping Mixture*** as specified in the individual Floor-Ceiling Design. Max diam of floor opening is 4 in. (102 mm).
   B. **Wood Joists -** Nom 2 by 10 in. (51 by 254 mm) lumber joists spaced 16 in. (406 mm) OC with nom 1 by 3 in. (25 by 76 mm) lumber bridging and with ends firestopped. As an alternate to lumber joists, nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or **Structural Wood Members*** with bridging as required and with ends firestopped.
   C. **Furring Channels -** (Not Shown) - Resilient galv steel furring installed perpendicular to wood joists (Item 1B) between gypsum board (Item 1D) and wood joists as required in the individual Floor-Ceiling Design.
   D. **Gypsum Board* -** Nom 4 ft (1.2 m) wide by 5/8 in. (16 mm) thick as specified in the individual Floor-Ceiling Design. Gypsum board secured to wood joists or furring channels as specified in the individual Floor-Ceiling Design. Max diam of ceiling opening is 4 in. (102 mm).

1.1 **Chase Wall -** (Optional. Not Shown) - The through penetrant (Item No. 2) may be routed through a fire rated or non fire rated single, double or staggered wood stud/gypsum board chase wall. When fire rated the chase wall shall be constructed of the materials and in the manner specified in the individual U300 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs -** Nom 2 by 4 in. (51 by 102 mm), 2 by 6 in. (51 by 152 mm) or double 2 by 4 in. (51 by 102 mm) lumber studs.
   B. **Sole Plate -** Nom 2 by 4 in. (51 by 102 mm), 2 by 6 in. (51 by 152 mm) or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted.
   C. **Top Plate -** The double top plate shall consist of two nom 2 by 4 in. (51 by 102 mm) or 2 by 6 in. (51 by 152 mm) or two sets of parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max diam of opening is 4 in. (102 mm).
   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, conduit or tubing to be installed within the firestop system. Diam of openings hole-sawed through flooring system and through gypsum board ceiling to be 1/4 to 1-5/8 in. (6 to 41 mm) larger than the outside diam of through-penetrant. Pipe, conduit or tubing to be rigidly supported on both sides of the floor-ceiling assembly. The following types and sizes of nonmetallic pipes, conduits or tubing may be used:
   A. **Polyvinyl Chloride (PVC) Pipe -** Nom 2 in. (51 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. **The T Rating for the firestop system when this penetrant is used is 1 hr except that when nom diam of pipe exceeds 1 in. (25 mm), the T Rating is 1/4 hr.**
   B. **Rigid Nonmetallic Conduit (RNC)+ -** Nom 2 in. (51 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with Article 347 of the National Electrical Code (NFPA No. 70). **The T Rating for the firestop system when this penetrant is used is 1 hr except that when nom diam of pipe exceeds 1 in. (25 mm), the T Rating is 1/4 hr.**
   C. **Chlorinated Polyvinyl Chloride (CPVC) Pipe -** Nom 2 in. (51 mm) diam (or smaller) SDR 17 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems. **The T Rating for the firestop system when this penetrant is used is 1 hr except that when nom diam of pipe exceeds 1 in. (25 mm), the T Rating is 1/4 hr.**
   D. **Acrylonitrile Butadiene Styrene (ABS) Pipe -** Nom 2 in. (51 mm) diam (or smaller) Schedule 40 cellular or solid core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems. **The T Rating for the firestop system when this penetrant is used is 0 hr.**
   E. **Polybutylene (PB) Pipe -** Nom 1 in. (25 mm) diam (or smaller) SDR 11 PB pipe for use in closed (process or supply) piping systems. **The T Rating for the firestop system when this penetrant is used is 1 hr.**
   F. **Cross Linked Polyethylene Aluminum-Cross Linked Polyethylene (PEX AL-PEX) Tubing -** Nom 1 in. (25 mm) diam (or smaller) SDR 5 PEX-AL-PEX tubing for use in closed (process or supply) piping systems. **The T Rating for the firestop system when this penetrant is used is 3/4 hr.**
   G. **Cross Linked Polyethylene (PEX) Tubing -** Nom 2 in. (51 mm) diam (or smaller) SDR 9 PEX tubing for use in closed (process or supply) piping systems. **The T Rating for the firestop system when this penetrant is used is 1 hr.**
   H. **Electrical Nonmetallic Tubing (ENT)+ -** Nom 2 in. (51 mm) diam (or smaller) PVC tubing installed in accordance with Article 331 of the National Electrical Code (NFPA No. 70). **The T Rating for the firestop system when this penetrant is used is 1 hr except that when nom diam of tube exceeds 1 in. (25 mm), the T Rating is 1/4 hr.**
   I. **Chlorinated Polyvinyl Chloride (CPVC) Pipe -** Nom 2 in. (51 mm) diam (or smaller) Schedule 80 CPVC pipe for use in closed (process or supply) piping systems.
   When 2A, 2B, 2C, 2E, 2F, 2G, 2H or 2I is used, the annular space shall be min 0 in. (point contact) to max 1-5/8 in. (41 mm). When 2D is used, the annular space shall be min 0 in. (point contact) to max 1 in. (25 mm) except that when nom pipe diam exceeds 1-1/2 in. (38 mm), the max annular space is 5/8 in. (16 mm).

3. **Fill, Void or Cavity Material* - Sealant -** Min 3/4 in. (19 mm) thickness of fill material applied within annulus on top surface of floor. Min 5/8 in. (16 mm) thickness of fill material applied within annulus on bottom surface of ceiling or lower top plate of chase wall assembly. Additional fill material to be installed such that a min 1/8 in. (3 mm) crown is formed around the through penetrant on bottom surface of ceiling or lower plate of chase wall assembly.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant, r SpecSeal LCI Sealant, or Type WF300 Firestop Caulk

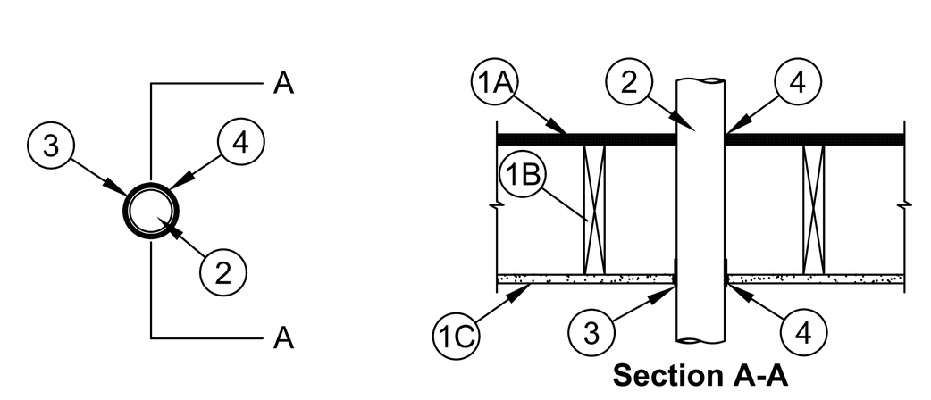
+Bearing the UL Listing Mark

*Bearing the UL Classification Marking

Classified by
Underwiters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115

System No. F-C-2253

ANSI/UL1479	CAN/ULC S115
F Rating - 1 Hr	F Rating - 1 Hr
T Rating - 0 or 3/4 Hr (See Item 1 or 1A)	FT Rating - 0 or 3/4 Hr (See Item 1 or 1A)
L Rating At Ambient - Less Than 1 CFM/sq ft	FH Rating - 1 Hr
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Rating - 0 or 3/4 Hr (See Item 1 or 1A)
	L Rating At Ambient - Less Than 1 CFM/sq ft
	L Rating At 400 F - Less Than 1 CFM/sq ft



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

1. **Floor-Ceiling Assembly -** The 1 hr fire-rated wood joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Designs in the UL Fire Resistance Directory, as summarized below:
   A. **Flooring System -** Lumber or plywood subfloor with finish floor of lumber, plywood or **Floor Topping Mixture*** as specified in the individual Floor-Ceiling Design. Max diam of opening is 4 in. (102 mm).
   B. **Wood Joists -** Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or **Structural Wood Members*** with bridging as required and with ends firestopped.
   C. **Gypsum Board* -** Thickness, type, number of layers and fasteners as required in the individual Floor-Ceiling Design. Max diam of opening is 4-1/8 in. (105 mm). When opening is larger than 4 in. (102 mm), the T-Rating is 0 Hr.

1A. **Chase Wall -** (Optional, Not Shown) - The through penetrant (Item 2) may be routed through a 1 hr fire rated single, double or staggered wood stud/gypsum board chase wall. Depth of chase wall stud cavity to be min 1/2 in. (13 mm) greater than diameter of opening cut in sole and top plates to accommodate the through penetrant (Item 2). The chase wall shall be constructed of the materials and in the manner specified in the individual U300 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs -** Nom 2 by 4 in. (51 by 102 mm), 2 by 6 in. (51 by 152 mm) or double nom 2 by 4 in. (51 by 102 mm) lumber studs.
   B. **Sole Plate -** Nom 2 by 4 in. (51 by 102 mm), 2 by 6 in. (51 by 152 mm) or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max diam of opening is 4-1/8 in. (105 mm).
   C. **Top Plate -** The double top plate shall consist of two nom 2 by 4 in. (51 by 102 mm), two nom 2 by 6 in. (51 by 152 mm) or two sets of parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max diam of opening is 4-1/8 in. (105 mm).
   D. **Gypsum Board* -** Thickness, type, number of layers and fasteners shall be as specified in the individual Wall and Partition Design.

2. **Through Penetrants -** One nonmetallic pipe or conduit to be installed within the opening. Annular space between the pipe or conduit and the periphery of the opening shall be min 1/4 in. (6 mm) to max 3/8 in. (10 mm). Penetrant to be rigidly supported on both sides of floor-ceiling assembly. The following types and sizes of nonmetallic pipe or conduit may be used:
   A. **Polyvinyl Chloride (PVC) Pipe -** Nom 3 in. (76 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 3 in. (76 mm) diam (or smaller) SDR 13.5 CPVC pipe for use in closed (process or supply) piping systems.
   C. **Rigid Nonmetallic Conduit (RNC)+ -** Nom 3 in. (76 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with Article 347 of the National Electrical Code (NFPA 70).
   D. **Acrylonitrile Butadiene Styrene (ABS) Pipe -** Nom 3 in. (76 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.

3. **Fill, Void or Cavity Material* - Wrap Strip -** One layer wrapped around pipe and secured with complete wrap of aluminum foil tape. Wrap strip layer slid into opening such that the bottom edge of the wrap strip protrudes 1/4 in. (6 mm) from the bottom surface of the gypsum board ceiling or from the bottom surface of the chase wall top plate.
   SPECIFIED TECHNOLOGIES INC - SpecSeal BLU Wrap Strip or SpecSeal BLU2 Wrap Strip

3A. **Fill, Void, or Cavity Material* - Wrap Strip -** As an alternate to Item 3, nom 1/8 in. (3.2 mm) thick intumescent material faced on both sides with a plastic film sized to fit the OD of the pipe. See table for min width of intumescent wrap strip. One layer wrapped around pipe and secured with complete wrap of aluminum foil tape. Wrap strip layer slid into opening such that the bottom edge of the wrap strip protrudes 1/4 in. (6 mm) from the bottom surface of the gypsum board ceiling or from the bottom surface of the chase wall top plate.

Nom Pipe Diam, in, (mm)	Wrap Strip	Wrap Strip Width, in (mm)
2 (51)	BLU220	1-1/2 (38)
3 (76)	BLU230	3 (76)

   SPECIFIED TECHNOLOGIES INC - SpecSeal BLU220 or BLU230 Wrap Strip

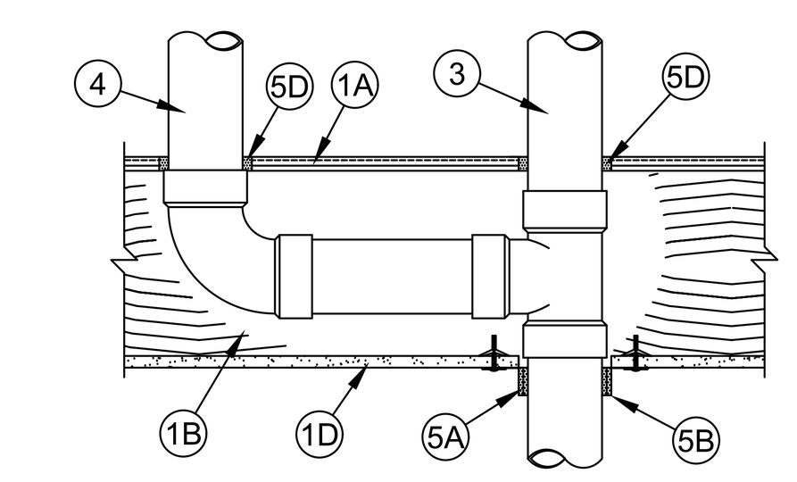
4. **Fill, Void or Cavity Material* - Sealant -** Min 3/4 in. (19 mm) thickness of fill material applied within the annulus, flush with the top surface of the floor or the chase wall sole plate. Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with the bottom surface of the gypsum board ceiling or the chase wall top plate.
   SPECIFIED TECHNOLOGIES INC - SpecSeal LCI Sealant, SpecSeal Series SSS Sealant or Type WF300 Firestop Caulk

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

Classified by
Underwiters Laboratories, Inc.
to ASTM/UL1479 (ASTM E814)

System No. F-C-2158

F Ratings - 1 and 2 Hr (See Item 1)
T Ratings - 1 and 2 Hr (See Item 1)
L Rating At Ambient - Less Than 1 CFM/sq ft
L Rating At 400 F - Less Than 1 CFM/sq ft



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 2 hr fire-rated wood joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in Design Nos. L505, L511 or L536 in the UL Fire Resistance Directory. **The F and T Ratings of the firestop system are equal to the rating of the floor-ceiling assembly.** The general construction features of the floor-ceiling assembly are summarized below:
   A. **Flooring System -** Lumber or plywood subfloor with finish floor of lumber, plywood or **Floor Topping Mixture*** as specified in the individual Floor-Ceiling Design. Diam of opening hole-sawed in flooring shall be max 1 in. (25 mm) larger than diam of through penetrant (Item 3) or branch piping (Item 4). As an option, the opening for the branch piping (Item 4) may be rectangular, 8 in. by 12 in. (204 by 305 mm) max, for 1 hr rated assemblies only. Cutout to be patched on underside of subfloor using one layer of min 3/4 in. (19 mm) thick plywood or min 5/8 in. (16 mm) thick gypsum wallboard (Item 1C) sized to lap min 2 in. (51 mm) beyond each edge of rectangular cutout. Diam of opening hole sawed through patch to accommodate branch piping (Item 4) to be max 1 in. (25 mm) larger than diam of branch piping. Patch split into two pieces at opening hole-sawed for branch piping. Two pieces positioned around branch piping, with cut edges tightly-butted, and screw attached to the underside of subfloor using 1-1/4 in. (32 mm) long Type S steel screws spaced max 6 in. (152 mm) OC.
   B. **Wood Joists* -** For 1 hr fire-rated floor-ceiling assemblies nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or **Structural Wood Members*** with bridging as required and with ends firestopped. For 2 hr fire-rated floor-ceiling assembly, nom 2 by 10 in. (51 by 254 mm) lumber joists spaced 16 in. (406 mm) OC with nom 1 by 3 in. (25 by 76 mm) lumber bridging with ends firestopped.
   C. **Furring Channels -** Not Shown)-Resilient galv steel furring installed perpendicular to wood joists between first and second layers of gypsum board (Item 1D) in 2 hr fire-rated assembly.
   D. **Gypsum Board* -** Nom 4 ft (1.2 m) wide by 5/8 in. (16 mm) thick as specified in the individual Floor-Ceiling Design. First layer of gypsum board nailed to wood joists. Second layer of gypsum board (2 hr fire-rated assembly) screw-attached to furring channels. Diam of opening shall be max 1 in. (25 mm) larger than nom diam of through penetrant (Item 3).

2. **Chase Wall -** (Optional, not shown)-The through-penetrant (Item 3) may be routed through a 1 or 2 hr fire-rated single, double or staggered wood stud/gypsum board chase wall 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 which includes the following construction features:
   A. **Studs -** Nom 2 by 6 in. (51 by 152 mm) or double nom 2 by 4 in. (51 by 102 mm) lumber studs.
   B. **Sole Plate -** Nom 2 by 6 in. (51 by 152 mm) or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Diam of opening hole-sawed in sole plate to be max 1 in. (25 mm) larger than diam of through penetrant (Item 3).
   C. **Top Plate -** The double top plate shall consist of two nom 2 by 6 in. (51 by 152 mm) or two sets of parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Diam of opening shall be max 1 in. (25 mm) larger than diam of through penetrant (Item 3).
   D. **Gypsum Board* -** Thickness, type, number of layers and fasteners shall be as specified in the individual Wall or Partition Design.

3. **Through-Penetrant -** One nonmetallic pipe to be centered within the firestop system. Pipe to be rigidly supported on both sides of floor-ceiling assembly. The annular space between pipe and periphery of opening shall be min 0 in. (point contact) to max 1/2 in. (0 to 13 mm). Pipe may be installed with continuous point contact where it passes through gypsum board ceiling. The following types and sizes of nonmetallic pipes may be used:
   A. **Polyvinyl Chloride (PVC) Pipe -** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular or solid core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
   B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe -** Nom 4 in. (102 mm) diam (or smaller) SDR17 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
   C. **Acrylonitrile Butadiene Styrene (ABS) Pipe -** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular or solid core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.

4. **Branch Piping -** (Optional)-One nonmetallic pipe with or without nom 4 in. (102 mm) diam (or smaller) toilet flange (not shown) connected to through penetrant (Item 3) within concealed space above ceiling and centered within opening in subfloor. The annular space between pipe and periphery of opening shall be min 0 in. (point contact) to max 1/2 in. (0 to 13 mm). Branch piping may terminate in a max 4 in. (102 mm) diam toilet flange that corresponds to the type of branch piping. The following types and sizes of nonmetallic pipes may be used:
   A. **Polyvinyl Chloride (PVC) Pipe -** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular or solid core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
   B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe -** Nom 4 in. (102 mm) diam (or smaller) SDR17 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
   C. **Acrylonitrile Butadiene Styrene (ABS) Pipe -** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular or solid core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.

5. **Firestop System -** The details of the firestop system shall be as follows:
   A. **Fill, Void or Cavity Material* - Wrap Strip -** Nom 1/8 or 1/4 in. (3.2 or 6 mm) thick intumescent material faced on both sides with a plastic film, supplied in 1-1/2 in. or 2 in. (38 or 51 mm) wide strips. Nom 1-1/2 in. or 2 in. (38 or 51 mm) wide strips tightly wrapped around through penetrant (Item 3) with the edges butted against the underside of the gypsum board ceiling (Item 1D) or top plate of chase wall (Item 2C) around the entire perimeter of the hole-sawed opening. For nom 1/2 in. to 2 in. (13 to 51 mm) diam pipes, a min of one layer of wrap strip is required. For nom 2-1/2 in. to nom 4 in. (64 to 102 mm) diam pipes, a min of two layers of wrap strip is required. Each layer of wrap strip to be installed with butted seams, butted seams in successive layers to be staggered or aligned. Wrap strip layer(s) secured together with masking tape.
   SPECIFIED TECHNOLOGIES INC - SpecSeal RED Wrap Strip, SpecSeal RED2, SpecSeal BLU Wrap Strip or SpecSeal BLU2 Wrap Strip

B. **Steel Collar -** Collar fabricated from coils of precut 0.016 in. (0.4 mm) thick (30 MSG) galv sheet steel available from wrap strip manufacturer. Collar shall be nom 1-1/2 in. or 2 in. (38 or 51 mm) deep dependent upon wrap strip width with 1 in. (25 mm) wide by 2 in. (51 mm) long anchor tabs for attachment to underside of ceiling or top plate. Retainer tabs, 3/4 in. (19 mm) wide tapering down to 1/4 in. (6 mm) wide and located opposite the anchor tabs, folded 90 degrees toward through penetrant surface to maintain the annular space and to retain the wrap strips. Collar wrapped around wrap strips and through-penetrant with a 1 in. (25 mm) wide overlap along its perimeter joint and secured with a min 1/2 in. (13 mm) wide by 0.028 in. (0.7 mm) thick stainless steel hose clamp at the mid-height of the steel collar. As an alternate to the steel hose clamp, the steel collar may be secured together by means of three No. 8 steel sheet metal screws. The length of the steel screws is dependent upon the number of layers of wrap strip used within the steel collar. For steel collars incorporating a single layer of wrap strip, the length of the steel screws shall be 1/4 in. (6 mm) long. For steel collars incorporating two or more layers of wrap strip, the length of the steel screws shall be 3/8 in. (10 mm) long. Collar secured to the bottom of ceiling with min 3/16 in. (4.8 mm) diam by 2 in. (51 mm) long toggle bolts in conjunction with min 1/4 in. by 1-1/4 in. (6 by 32 mm) steel fender washers. Collar secured to bottom of chase wall top plate with min 3/4 in. (19 mm) long steel wood screws in conjunction with min 1/4 in. by 1 in. (6 by 25 mm) steel fender washers, respectively. The number of screws is dependent upon the nom diam of the through penetrant. Two screws, symmetrically located, are required for nom 1/2 in. through 2 in. (13 to 51 mm) diam through-penetrants. Three screws, symmetrically located, are required for nom 2-1/2 in. and 3 in. (64 to 76 mm) diam through-penetrants. Four screws, symmetrically located, are required for nom 3-1/2 in. and 4 in. (89 to 102 mm) diam through-penetrants. Steel collar is not required to be installed around branch piping at the underside of the flooring.

C. **Firestop Device* -** (Not Shown)-As an alternate to Items 5A and 5B for through-penetrant (Item 3), a firestop device consisting of a steel collar lined with intumescent material and sized to fit the specific diam of the nonmetallic pipe may be used. Firestop device to be installed on underside of ceiling or top plate in accordance with the accompanying installation instructions.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Firestop Collar, SpecSeal LCC Collar or SpecSeal SSC Collar

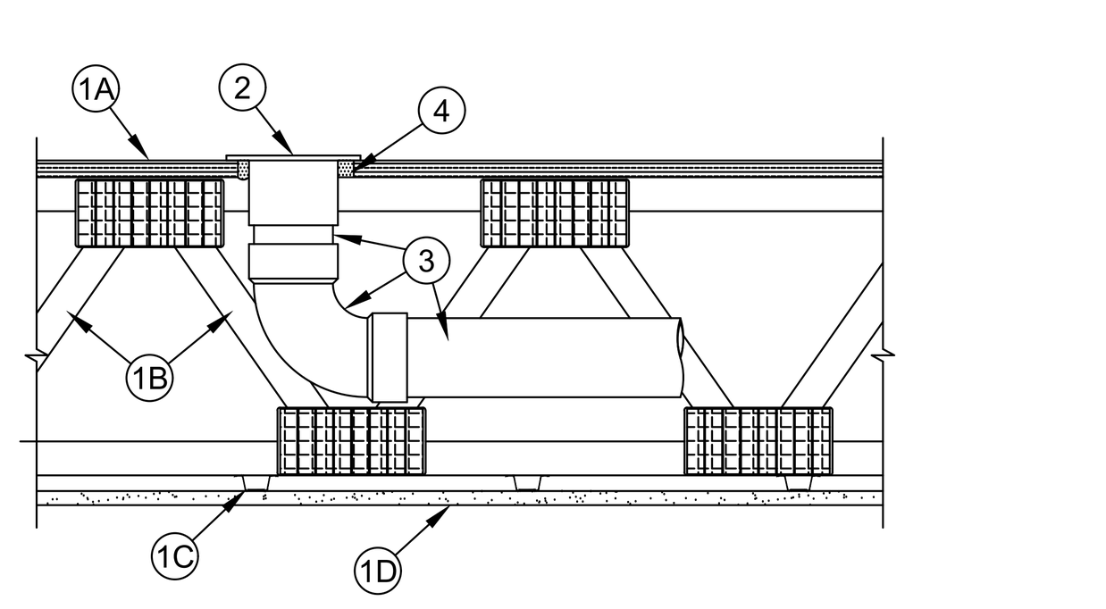
D. **Fill, Void or Cavity Material* -Sealant -** Min 3/4 in. (19 mm) thickness of fill material applied within annular space around perimeter of through penetrant (Item 3) and branch piping (Item 4), flush with top surface of floor or top of chase wall sole plate. Min 1/2 in. (13 mm) diam bead applied at point contact locations at pipe/floor interface and the pipe/plate interface.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series Sealant or SpecSeal LCI Sealant

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

Classified by
Underwiters Laboratories, Inc.
to ASTM/UL1479 (ASTM E814)

System No. F-C-2322

F Rating - 1 Hr
T Rating - 1 Hr



1. **Floor-Ceiling Assembly -** The 1 hr fire-rated solid or trussed lumber joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory, as summarized below:
   A. **Flooring System -** Lumber or plywood subfloor with finish floor of lumber, plywood or **Floor Topping Mixture*** as specified in the individual Floor-Ceiling Design. Max diam of opening is 5 in. (127 mm).
   B. **Wood Joists -** Nom 2 by 10 in. (51 by 254 mm) lumber joists spaced 16 in. (406 mm) OC with nom 1 by 3 in. (25 by 76 mm) lumber bridging and with ends firestopped. As an alternate to lumber joists, nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists trusses or **Structural Wood Members*** with bridging as required with ends firestopped.
   C. **Furring Channels -** (Not Shown) - Resilient galv steel furring installed perpendicular to wood joists (Item 1B) between gypsum board (Item 1D) and wood joists as required in the individual Floor-Ceiling Design.
   D. **Gypsum Board* -** Nom 4 ft (1.22 mm) wide by 5/8 in. (16 mm) thick as specified in the individual Floor-Ceiling Design. Gypsum board secured to wood joists as specified in the individual Floor-Ceiling Design.

2. **Closet Flange -** Polyvinyl chloride (PVC) or acrylonitrile butadiene styrene (ABS) closet flange installed in hole-sawed opening in flooring system with flange secured to top of flooring with steel screws. Diam of circular opening through flooring (Item 1A) to be max 1/2 in. (13 mm) larger than outside diam of closet flange.

3. **Drain Piping -** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 PVC or ABS drain piping and fittings. Short length of pipe with 90 degree elbow fitting cemented into bottom socket of closet flange. Drain piping to soil stack cemented into elbow.

4. **Fill, Void or Cavity Material* - Sealant -** Fill material forced into annulus between closet stub and periphery opening in flooring to max extent possible, flush with bottom surface of floor. Additional fill material to be installed such that a min 3/8 in. (10 mm) crown is formed around the closet stub on bottom surface of floor.
   SPECIFIED TECHNOLOGIES INC - Type WF300 Caulk

5. **Water Closet -** (Not Shown) - Floor mounted vitreous china water closet.

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

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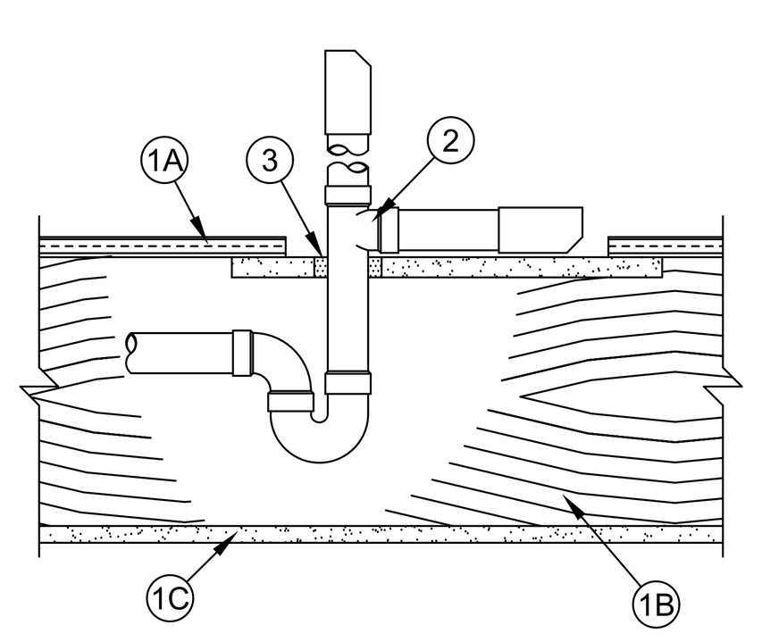
System No. F-C-2320

F Rating - 1 Hr
T Rating - 1 Hr



1. **Floor-Ceiling Assembly -** The 1 hr fire-rated solid or trussed lumber joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory. The general construction features of the floor-ceiling assembly are summarized below:
   A. **Flooring System -** Lumber or plywood subfloor with finish floor of lumber, plywood or **Floor Topping Mixture*** as specified in the individual Floor-Ceiling Design. Rectangular cutout in flooring to accommodate the bathtub drain piping (Item 2) to be max 8 by 12 in. (203 by 305 mm). Cutout to be patched on underside of subfloor using one layer of min 3/4 in. (19 mm) thick plywood or min 5/8 in. (16 mm) thick gypsum wallboard (Item 1C) sized to lap min 2 in. (51 mm) beyond each edge of rectangular cutout. Diam of opening hole-sawed through patch to accommodate drain piping (Item 2) to be 1 in. (25 mm) larger than outside diam of drain piping and positioned such that drain piping is centered in opening. Patch split into two pieces at opening hole-sawed for bathtub drain piping. Two pieces positioned around drain piping, with cut edges tightly butted, and screw-attached to underside of subfloor with 1-1/4 in. (32 mm) long Type S steel screws spaced max 6 in. (152 mm) OC.
   B. **Wood Joists* -** Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or **Structural Wood Members*** with bridging as required and with ends firestopped.
   C. **Gypsum Board* -** Nom 4 ft (1.22 m) wide by 5/8 in. (16 mm) thick, attached as described in the individual Floor-Ceiling Design.

2. **Drain Piping -** Nom 1-1/2 in. (38 mm) diam (or smaller) Schedule 40 cellular or solid core polyvinyl chloride (PVC) or acrylonitrile butadiene styrene (ABS) pipe and drain fittings cemented together and provided with PVC or ABS bathtub waste/overflow fittings. The annular space shall be a min 3/8 in. (10 mm) to max 5/8 in. (16 mm).

3. **Fill, Void or Cavity Material* - Sealant -** Min 5/8 in. (16 mm) depth of fill material applied within annular space, flush with both surfaces of plywood or gypsum wallboard patch.
   SPECIFIED TECHNOLOGIES INC - Type WF300 Caulk

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

GENERAL NOTES:

1. Refer to section 07 84 00 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:
   · 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. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   · UL Fire Resistance Directory; Current Edition
   · NFPA 101 Life Safety Code
   · All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:
PROJECT_NAME:

PROJECT LOCATION:
PROJECT_LOCATION:

ARCHITECT/CONSULTANT:
ARCHITECT/CONSULTANT:

TITLE:
STI FIRESTOP SYSTEMS

Specified Technologies Inc.
210 Evans Way Somerville, NJ 08876
Toll Free: (800)992-1180
Phone: (908)526-8000
FAX (908)231-8415
E-Mail:techserv@stifirestop.com
Website:www.stifirestop.com

INDEX

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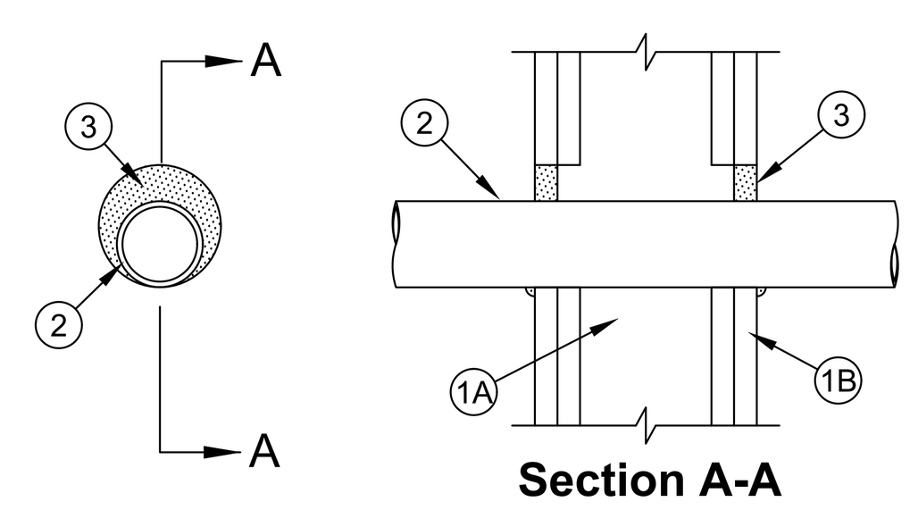
to ASTM/UL1479 (ASTM E814)

System No. W-L-2241

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



Section A-A

1. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs -** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced max 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.
   B. **Gypsum Board* -** Thickness, type, number of layers and fasteners as specified in the individual Wall and Partition Design. Diam of opening to be 1 in. to 1-1/8 in. (25 to 29 mm) larger than outside diam of pipe.
   The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed. When Item 2G or 2H is used, the hourly F Rating is 1 hr.
2. **Through Penetrant -** One nonmetallic pipe, conduit or tube to be installed eccentrically or concentrically within the firestop system. Pipe, conduit or tube to be rigidly supported on both sides of the wall assembly. The following types and sizes of nonmetallic pipes, conduits and tubes may be used:
   A. **Polyvinyl Chloride (PVC) Pipe -** Nom 2 in. (51 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. Annular space shall be min 0 in. (0 mm, point contact) to max 1 in. (25 mm).
   B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe -** Nom 2 in. (51 mm) diam (or smaller) SDR 13.5 or Schedule 80 CPVC pipe for use in closed (process or supply) piping systems. Annular space shall be min 0 in. (0 mm, point contact) to max 1 in. (25 mm).
   C. **Rigid Nonmetallic Conduit+ -** Nom 2 in. (51 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with Article 347 of the National Electrical Code (NFPA 70). Annular space shall be min 0 in. (0 mm, point contact) to max 1 in. (25 mm).
   D. **Electrical Nonmetallic Tubing+ -** Nom 2 in. (51 mm) diam (or smaller) PVC tubing installed in accordance with Article 331 of the National Electrical Code (NFPA 70). Annular space shall be min 0 in. (0 mm, point contact) to max 1 in. (25 mm).
   E. **Cross Linked Polyethylene (PEX) Tubing -** Nom 1 in. (25 mm) diam (or smaller) SDR9 PEX tubing for use in closed (process or supply) piping systems. Annular space shall be min 0 in. (0 mm, point contact) to max 1 in. (25 mm).

   F. **Acrylonitrile Butadiene Styrene (ABS) pipe -** Nom 1-1/2 in. (38 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. Annular space shall be min 1/4 in. (6 mm) to max 3/4 in. (19 mm).
   G. **Polyvinyl Chloride (PVC) Pipe -** Nom 3 in. (76 mm) diam (or smaller) Schedule 40 solid or cellular core PVC pipe for use in closed (process or supply) piping systems. Annular space shall be min 0 in. (0 mm, point contact) to max 1 in. (25 mm).
   H. **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. Annular space shall be min 0 in. (0 mm, point contact) to max 1 in. (25 mm).
   When Item 2A or 2B is used, the T Rating is 1/4 hr. When Item 2C, 2D, or 2E is used, the T Rating is 1 hr and 1-3/4 hr for 1 hr and 2 hr fire rated walls, respectively. When Item 2F, 2G, or 2H is used, T Rating is 0 hr.
3. **Fill, Void or Cavity Material* - Sealant -** Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall assembly. At point contact location, min 1/4 in. (6 mm) diam bead of fill material applied at nonmetallic pipe/gypsum board interface on both surfaces of wall.
   SPECIFIED TECHNOLOGIES INC - SpecSeal LCI Sealant or Type WF300 Firestop Caulk (for wood studs only)
   * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

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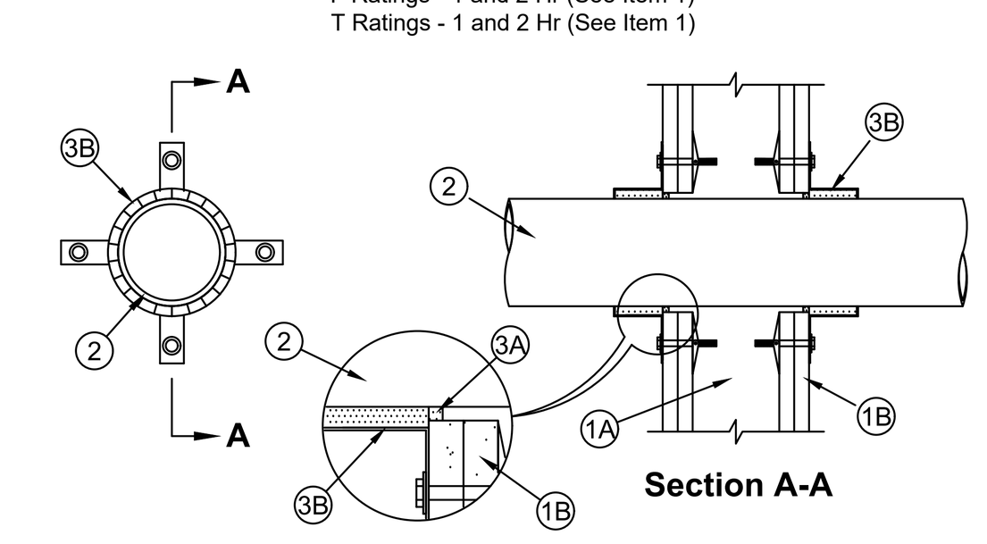
System No. W-L-2237

F Ratings - 1 and 2 Hr (See Item 1)
T Ratings - 1 and 2 Hr (See Item 1)



Section A-A

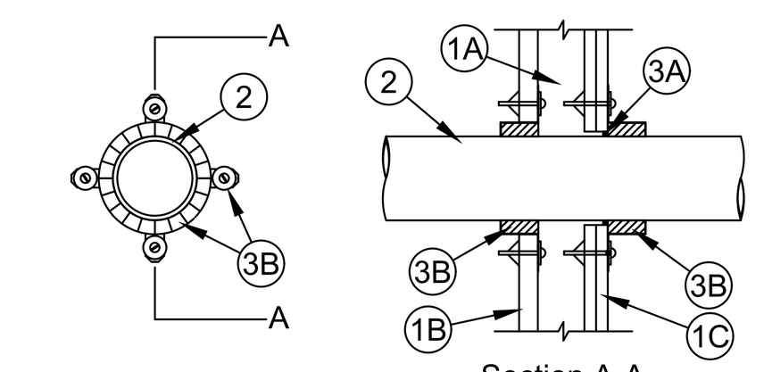
1. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall incorporate the following construction features:
   A. **Studs -** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. OC. Steel studs to be min 3-5/8 in. wide and spaced max 24 in. OC.
   B. **Gypsum Board* -** Thickness, type, number of layers and fasteners as required in the individual Wall and Partition Designs. For nom 2-1/2 in. diam and smaller pipes and conduits, diam of opening shall be max 1/4 in. larger than nom pipe diam. For pipes and conduits greater than nom 2-1/2 in. diam of opening shall be max 1/2 in. larger than nom pipe diam.
   The hourly F and T Ratings of the firestop system are equal to the hourly fire rating of the wall assembly in which it is installed.
2. **Through Penetrants -** One nonmetallic pipe or conduit to be centered within opening with a max annular space between pipe or conduit and periphery of 1/8 in. for nom 2-1/2 in. diam and smaller pipes and conduits and 1/4 in. for pipes and conduits greater than 2-1/2 in. diam. Pipe or conduit to be rigidly supported on both sides of the wall assembly. The following types and sizes of nonmetallic pipes and 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) SDR17 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 solid or cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   D. **Rigid Nonmetallic Conduit+ -** Nom 4 in. diam (or smaller) Schedule 40 PVC conduit installed in accordance with Article 347 of the National Electrical Code (NFPA 70).
3. **Firestop System -** The firestop system consists of the following:
   A. **Fill, Void or Cavity Material* - Sealant -** Min 1/4 in. thickness applied within annulus, flush with both surfaces of wall.
   SPECIFIED TECHNOLOGIES INC - SpecSeal LCI Sealant
   B. **Firestop Device* -** Galv steel collar lined with an intumescent material sized to fit the specific diam of the through penetrant. Device shall be installed around through penetrant in accordance with the accompanying installation instructions. Device incorporates anchor tabs for securement to both surfaces of wall assembly by means of 3/16 in. diam steel toggle bolts in conjunction with min 1-1/4 in. diam steel fender washers.
   SPECIFIED TECHNOLOGIES INC - SpecSeal LCC Collar or SpecSeal SSC Collar
   * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

+Bearing the UL Listing Mark

Classified by
Underwriters Laboratories, Inc.
to ASTM/UL1479 (ASTM E814)

System No. W-L-2257

F Rating - 2 Hr
T Rating - 2 Hr



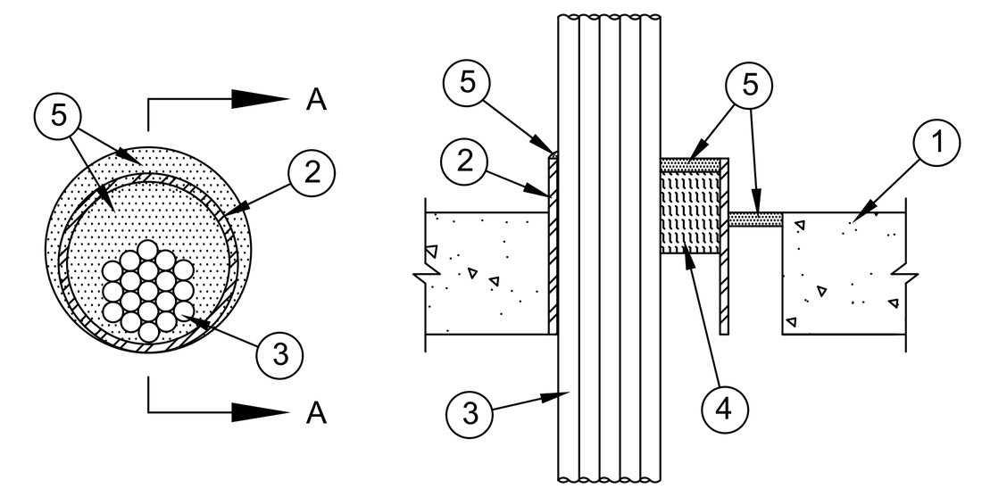
Section A-A

1. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum board/stud shaft wall assembly shall be constructed of the materials and in the manner specified in the individual U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall incorporate the following construction features:
   A. **Steel Studs -** "C-H" or "C-T" shaped studs, min 2-1/2 in. (64 mm) wide by 1-1/2 in. (38 mm) deep, fabricated from min No. 25 gauge (0.6 mm thick) galv steel, spaced max 24 in. (610 mm) OC.
   B. **Gypsum Board* -** 1 in. (25 mm) thick, 24 in. (610 mm) wide gypsum liner panels installed vertically. Diam of circular cutout in gypsum liner panel to be equal to outside diam of firestop device (Item 3B).
   C. **Gypsum Board* -** 1/2 in. or 5/8 in. (13 to 16 mm) thick, 48 in. (1.2 m) wide gypsum boards. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Diam of circular cutout in gypsum board to be max 1/2 in. (13 mm) larger than diam of through penetrant (Item 2).
   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 Penetrant -** One nonmetallic pipe or conduit installed centered within the firestop system. Pipe or conduit to be rigidly supported on both sides of wall assembly. One of the following types and sizes of nonmetallic pipe or conduit may be used:
   A. **Polyvinyl Chloride (PVC) Pipe -** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 PVC solid or cellular core PVC pipe for use in vented (drain, waste or vent) or closed (process or supply) piping systems.
   B. **Acrylonitrile Butadiene Styrene (ABS) Pipe -** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 ABS solid or cellular core PVC pipe for use in vented (drain, waste or vent) or closed (process or supply) piping systems.
   C. **Chlorinated Polyvinyl Chloride (CPVC) Pipe -** Nom 4 in. (102 mm) diam (or smaller) SDR17 CPVC pipe for use in vented (drain, waste or vent) or closed (process or supply) piping systems.
   D. **Rigid Nonmetallic Conduit+ -** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with Article 347 of the National Electrical Code (NFPA 70).
3. **Firestop System -** The firestop system consist of the following items:
   A. **Fill Void or Cavity Materials* - Sealant or Putty -** (Optional) - Min 1/4 in. (6 mm) thickness of fill material applied within annulus of gypsum board on finished side of wall.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant or SpecSeal LCI Sealant or SpecSeal Putty
   B. **Firestop Device* -** Firestop device sized to the specific diam of the through penetrant to be friction fit into circular cutout in gypsum liner panel from the interior of the wall. Diam of circular cutout in gypsum liner panel to be equal to outside diam of firestop device. Device shall be secured to the gypsum liner panel with min 3/16 in. (5 mm) diam steel toggle bolts or molly bolts in conjunction with 1-1/4 in. (32 mm) diam steel fender washers in accordance with the accompanying installation instructions. Second firestop device sized to the specific diam of the through penetrant installed around the through penetrant on the finished side of the wall and secured to the gypsum board with min 3/16 in. (5 mm) diam steel toggle bolts or molly bolts in conjunction with 1-1/4 in. (32 mm) diam steel fender washers in accordance with the accompanying installation instructions.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Firestop Collar, SpecSeal LCC Collar or SpecSeal SSC Collar
   * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115

System No. C-AJ-3154

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 2, 3 and 4 Hr (See Item 5)	F Ratings - 2, 3 and 4 Hr (See Item 5)
T Ratings - 0, 1/2 and 2-3/4 Hr (See Item 5)	FT Ratings - 0, 1/2 and 2-3/4 Hr (See Item 5)
	FH Ratings - 2, 3 and 4 Hr (See Item 5)
	FTH Ratings - 0, 1/2 and 2-3/4 Hr (See Item 5)



Section A-A

1. **Floor or Wall Assembly -** Min 2-1/2 in. (64 mm) or 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***. Floor may also be constructed of any UL Classified hollow-core **Precast Concrete Units***. Max diam of opening is 10 in. (254 mm).
   See **Concrete Blocks** (CAZT) and **Precast Concrete Units** (CFTV) categories in the Fire Resistance Directory for names of manufacturers.
2. **Sleeve -** (Optional) - Nom 6 in. (152 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe sleeve, nom 6 in. (152 mm) diam (or smaller) No. 26 ga (0.022 in. or 0.56 mm thick) sheet steel sleeve with square anchor flange spot welded to sleeve at approx mid-height or nom 6 in. (152 mm) diam (or smaller) Schedule 40 polyvinyl chloride (PVC) pipe sleeve cast or grouted into floor or wall flush with floor or wall surfaces. Steel pipe sleeve may be installed to project a max of 6 in. (152 mm) beyond the floor or wall surfaces. Steel sleeve to be supported on top side of floor and both sides of wall when not cast or grouted into floor. The annular space between sleeve and periphery of opening shall be min 0 in. (0 m, point contact) to max 3-3/8 in. (86 mm).
3. **Cables -** Aggregate cross-sectional area of cables in sleeve to be max 45 percent of the cross-sectional area of the sleeve. See Item 5 for specific cable fill requirements. Tight bundle of cables to be installed in the steel sleeve. The annular space within the firestop system shall be a min of 0 in. (point contact) to a max of 2 in. (51 mm). In 4 hr fire rated assemblies, the annular space within the firestop system shall be a min of 1/4 in. (6 mm) to a max of 1 in. (25 mm). Cables to be rigidly supported on both sides of the floor or wall assembly. Any combination of the following types and sizes of cables may be used:
   A. Max 400 pair No. 24 AWG (or smaller) copper conductor cable with polyvinyl chloride (PVC) or plenum-rated jacketing and insulation.
   B. Max 3/C No. 2/0 AWG (or smaller) aluminum or copper conductor service entrance cable with PVC insulation and jacket.
   C. Max 3/C No. 2/0 AWG (or smaller) copper conductor PVC jacketed aluminum clad or steel clad TECK 90 cable.
   D. Max 3/C No. 8 AWG (or smaller) nonmetallic sheathed (Romex) cable with copper conductors, PVC insulation and jacket.
   E. Max 1/C 1000 kcmil (or smaller) copper conductor power cable with XLPE or PVC insulation and XLPE or PVC jacket.

   F. Max RG59/U (or smaller) coaxial cable with fluorinated ethylene or plenum-rated insulation and jacketing.
   G. Max 62.5/48 fiber optic cable with PVC or plenum-rated insulation and jacketing.
   H. Max 4 pair No. 24 AWG (or smaller) copper conductor data cable with PVC or plenum-rated insulation and jacket.

3A. **Through Penetrating Product* -** (Not Shown) - Max 4/C No. 2/0 AWG (or smaller) steel or aluminum Armored Cable+ or Metal Clad Cable+ with copper or aluminum conductors. Diam of cable bundle (Item 3) including armored cable not to exceed 4 in. Through penetrating product to be rigidly supported on both sides of a floor or wall assembly.
   AFC CABLE SYSTEMS INC
4. **Packing Material -** Min 2, 3 or 4 in. (51, 76 or 102 mm) thickness of min 4 pcf (64 kg/m3) density mineral-wool batt insulation tightly packed into opening as a permanent form for 2, 3 or 4 hr fire rated assemblies, respectively . Packing material to be recessed from top edge of sleeve or from top surface of concrete in cast concrete floor assemblies to accommodate the required thickness of fill material. Packing material to be recessed from both edges of sleeve or from both surfaces of assembly in walls and in floor constructed with hollow-core precast concrete units to accommodate the required thickness of fill material. When the annular space between the sleeve and the periphery of the opening exceeds 2 in. (51 mm), mineral-wool batt insulation tightly packed to a 3 in. depth and recessed from the top surface of the floor or both surfaces of the wall in order to accommodate the required thickness of sealant (Item 5, not shown). Otherwise, packing material is optional in annular space between the sleeve and the periphery of the opening.
5. **Fill, Void or Cavity Material* - Sealant or Putty -** Min 1/2 in. (13 mm) thickness of sealant applied within the annulus between steel sleeve and periphery of the opening, flush with the top surface of the floor or both surfaces of the wall. Min 1/2 in. (13 mm) diam bead of sealant shall be applied at point contact locations between sleeve and concrete interface on top surface of floor or both surfaces of the wall. Min 1/2 in. (13 mm) thickness of fill material applied within the annulus for 2 and 3 hr F Ratings. Min 3/4 in. (19 mm) thickness of fill material applied with the annulus for 4 hr F Rating. In floors, fill material to be installed flush with top edge of sleeve or top surface of floor. In walls and in floor constructed of hollow-core precast concrete units, fill material to be installed flush with both ends of sleeve or both surfaces of assembly. F and T Ratings of firestop system are dependent upon the through opening size, thickness of concrete, sleeve type and percent cable fill, as shown in the following table:

Max Opening Diam	Min Concrete Thickness	Optional Sleeve Type	Cable Type	Percent Cable Fill	F Rating	T Rating
6 in. (152mm)	2-1/2 in. (64mm)	PVC	A to H, 3A	37	2 hr	0 hr
6 in. (152mm)	2-1/2 in. (64mm)	PVC	H	45	2 hr	0 hr
6 in. (152mm)	2-1/2 in. (64mm)	Steel	A to H, 3A	37	2 hr	0 hr
6 in. (152mm)	2-1/2 in. (64mm)	Steel	H	45	2 hr	0 hr
6 in. (152mm)	4-1/2 in. (114mm)	Steel	A to H, 3A	34	3 hr	1/2 hr
6 in. (152mm)	4-1/2 in. (114mm)	Steel	H	45	3 hr	1/2 hr
2 in. (52mm)	4-1/2 in. (114mm)	Steel	H	40	3 hr	2-3/4 hr
2 in. (52mm)	4-1/2 in. (114mm)	Steel	H	40	4 hr	2-3/4 hr

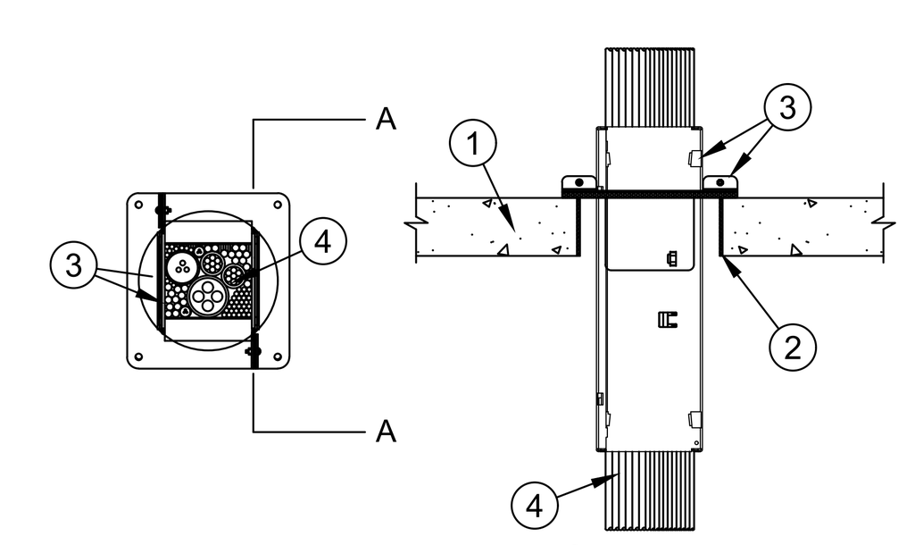
SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant or SpecSeal LCI Sealant. When min floor or wall thickness is 4-1/2 in. (114 mm), SpecSeal Putty may be used.

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

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115

System No. F-A-3054

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 2, 3 and 4 Hr (See Items 1 and 4)	F Ratings - 2, 3 and 4 Hr (See Items 1 and 4)
T Ratings - 0 and 1/2 Hr (See Item 4)	FT Ratings - 0 and 1/2 Hr (See Item 4)
L Rating At Ambient - Less than 1 to 2.3 CFM/Device Module (See Item 3)	FH Ratings - 2, 3 and 4 Hr (See Items 1 and 4)
L Rating At 400 F - Less than 1 to 2.3 CFM/Device Module (See Item 3)	FTH Ratings - 0 and 1/2 Hr (See Item 4)
	L Rating At Ambient - Less than 1 to 2.3 CFM/Device Module (See Item 3)
	L Rating At 400 F - Less than 1 to 2.3 CFM/Device Module (See Item 3)



Section A-A

1. **Floor Assembly -** Min 2-1/2 in (64 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete floor. Min 4 1/2 in. (114 mm) floor thickness required for 3 and 4 Hr F and FH Ratings. Floor may also be constructed of any UL Classified hollow-core **Precast Concrete Units***. Diam of opening is 6 in. (152 mm). Steel sleeve (Item 2) is required for floors constructed of hollow-core Precast Units.
   See **Precast Concrete Units** (CFTV) category in the Fire Resistance Directory for names of manufacturers.
2. **Steel Sleeve -** (Optional) - Nom 6 in. (152 mm) diam Schedule 10 to Schedule 40 steel pipe or rigid steel conduit cast or grouted into concrete floor flush with floor surfaces.
3. **Firestop Device* -** The firestop device module consists of a 4 by 4 5/8 by 14 in. (102 by 118 by 356 mm) long galv steel tube with an intumescent material lining. Firestop device module to be installed in accordance with the accompanying installation instructions. Firestop device module secured in place by means of two "L" shaped steel floor brackets installed with gasket material supplied with the product. Each floor bracket is secured to the device module by means of an integral hook and eye window attachment. Floor brackets are secured together forming the rectangular floor plate by means of steel screws and nuts supplied with the product. Floor plate to be secured to the top surface of the floor through predrilled holes in the floor plate using nom 3/16 in. (4.8 mm) by min 1-1/4 in. (32 mm) long concrete screws. As an option, the device may be cast or grouted into floor assembly. When the device is cast or grouted in place, the split floor plate is optional. The L Ratings vary according to whether the device module is blank (no cables) or loaded (with cables) and which cable type and size is used, as tabulated below:

Device	Cable Type	L-Rating (CFM)	
		Ambient	400 °F
0%	-	Less Than 1	Less Than 1
1-25%	4A-4I	1.5	1.5
26-50%	4A-4I	2.3	2.3
51-75%	4A-4I	2.3	2.3
76-100%	4A-4I	2.3	2.3

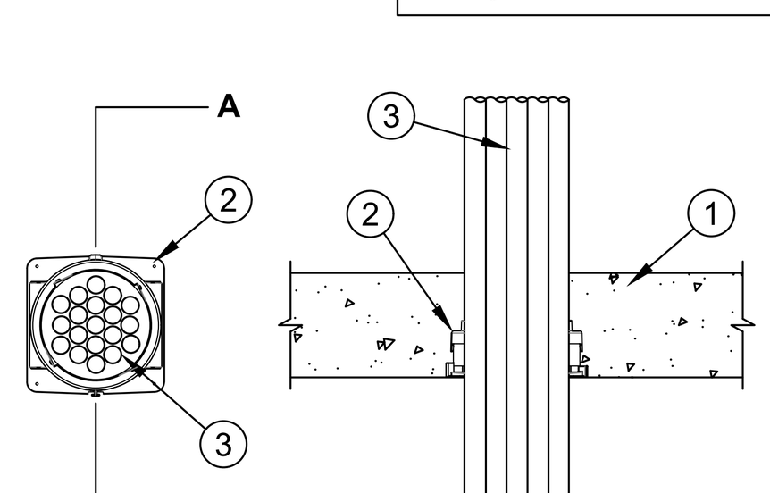
SPECIFIED TECHNOLOGIES INC - EZ PATH Series 44+ Fire Rated Pathway

3A. **Firestop Device* - Extension Module -** (Optional, Not Shown) - Module attached to ends of firestop device (Item 3) to increase its length to facilitate installation in thicker floors. Each module consists of a 4 by 4-5/8 by 6 in. (102 by 118 by 152 mm) long galv steel tube with an intumescent material lining. Extension module to be installed in accordance with the accompanying installation instructions.
   SPECIFIED TECHNOLOGIES INC - EZ PATH Series 44+ Extension
4. **Cables -** Cables may represent a 0 to max 100 percent visual fill within the loading area for the firestop device module. Cables to be rigidly supported on both sides of the floor assembly. Any combination of the following types of cables may be used:
   A. Max 400 pair No. 24 AWG (or smaller) copper conductor telecommunication cable with polyvinyl chloride (PVC) or plenum-rated jacketing and insulation.
   B. Max 750 kcmil single copper conductor power cable with XLPE jacket and insulation
   C. Max 7/C No. 12 AWG copper conductor control cable with PVC or XLPE jacket and insulation.
   D. Max 3/C No. 2/0 AWG metal clad or armored cable with steel or aluminum jacket.
   E. Max 3/C No. 8 AWG NM cable (Romex) with PVC insulation and jacket.
   F. Max four pair No. 22 AWG (or smaller) copper conductor data cable with PVC or plenum rated jacketing and insulation.
   G. Coaxial cable with fluorinated ethylene or PVC insulation and jacketing having a max diam of 5/8 in. (16 mm).
   H. Optical fiber cable with PVC or polyethylene (PE) jacket and insulation and having a max diam of 5/8 in. (16 mm).
   I. Max RG6/U coaxial cable with fluorinated ethylene, polyethylene (PE), PVC or plenum rated jacketing and insulation.
   When Item 4A, 4B, 4C, 4D, 4E or 4I is used, the max F and FH Ratings are 3 hr. When Item 4F, 4G, or 4H is used, the max F and FH Ratings are 4 hr. When cable fill within the device is min 0 percent (empty) to max 20 percent, the T, FT and FTH Ratings are 0 Hr. When cable fill within the device is greater than 20 percent, the T, FT and FTH Ratings are 1/2 Hr.
   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115

System No. F-A-3055

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 2 and 3 Hr (See Items 1 and 1A)	F Ratings - 2 and 3 Hr (See Items 1 and 1A)
T Rating - 0 Hr	FT Rating - 0 H
L Rating At Ambient - Less Than 1 CFM/ft2 (See Items 3, 4 and 6)	FH Ratings - 3 Hr (See Items 1 and 1A)
L Rating At 400 F - Less Than 1 CFM/ft2 (See Items 3, 4 and 6)	FTH Rating - 0 Hr
W Rating - Class 1 (See Items 3, 4 and 6)	L Rating At Ambient - Less Than 5.1 L/s/m2 (See Items 3, 4 and 6)
	L Rating At 400 F - Less Than 5.1 L/s/m2 (See Items 3, 4 and 6)



Section A-A

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

1A. **Alternate Floor Assembly -** (Not Shown) - The fire rated unprotected concrete and steel deck floor assembly shall be constructed of the material 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, as measured from the top plane of the steel floor units. When concrete thickness is min 4-1/2 in. (114 mm), the F and FH Ratings are 3 hr. When concrete thickness is min 2-1/2 in. (64 mm), the F and FH Ratings are 2 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. **Firestop Device* -** Cast in place firestop device permanently embedded during the concrete pour or grouted into the concrete assembly in accordance with the accompanying installation instructions. The devices may be cut flush or extend above the top surface of the floor.
   SPECIFIED TECHNOLOGIES INC - SpecSeal CD200, CD201, CD201C, CD202, CD200M, CD300, CD301, CD301C, CD302, CD300M, CD400, CD401, CD402 or CD400M Cast In Firestop Device

2A. **Firestop Device* -** (Not Shown) - When Item 1A is used, a steel deck adapter kit consisting of steel plates and a nonmetallic extension tube is used in conjunction with Item 2. Install the deck adapter in accordance with the accompanying installation instructions.
   SPECIFIED TECHNOLOGIES INC - SpecSeal CD200DK, CD201DK, CD300DK, CD301DK, CD400DK or CD401DK Cast In Firestop Device Deck Adapter

2B. **Firestop Device* -** (Not Shown) - When the concrete thickness exceeds 8 in. (203 mm), a nonmetallic extension tube is used in conjunction with Item 2. Install the extension tube in accordance with the accompanying installation instructions.
   SPECIFIED TECHNOLOGIES INC - SpecSeal CD200X, CD300X, or CD400X Cast In Firestop Device Extension
3. **Cables -** Cables to be rigidly supported on both sides of the assembly. When L or W Ratings are required, aggregate cross-sectional area of cables in device to be max 40 percent of the cross-sectional area of the opening in device. Min separation between cables and between cables and periphery of opening is 1/8 in. (3 mm). See table below for max cable bundle diameter. Any combination of the following types and sizes of cables may be used:
   A. Max 1/C 750 kcmil cable with crosslinked polyethylene (XLPE) jacket.
   B. Max 7/C No. 12 AWG or max 12/C No. 14 AWG cable with XLPE insulation and jacket.
   C. Max 400 pair No. 24 AWG cable with PVC or plenum-rated insulation and jacket.
   D. Max 3/8 in. diam optical fiber communication cable with PVC or plenum-rated jacket.
   E. Max 1/2 in. diam aluminum or steel armored optical fiber communication cable with PVC or plenum-rated jacket.
   F. Max 4 pair No. 24 AWG Cat 5, Cat 5E or Cat 6 cable with PVC or plenum-rated jacket.
   G. Coaxial cable with fluorinated ethylene insulation and jacket having a max diam of 5/8 in. (16 mm).

Max Cable Diam, in. (mm) (a)	Firestop Device
2-3/8 (60)	CD200, CD201, CD201C, CD202 and CD200M
3-1/2 (89)	CD300, CD301, CD301C, CD302 and CD300M
4-1/2 (114)	CD400, CD401, CD402 and CD400M

(a) When cable bundle diam is smaller than those shown in the table above, fill material or packing material shall be installed into the device as described within Item 4 and 5.

4. **Packing Material -** (Not Shown) - When required under Item 3, min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool firmly packed into device flush with top edge of device (Item 2) and extending a min 1 in. (25 mm) below the top surface of the floor. When W or L Ratings are required, min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool firmly packed into the top of the device (Item 2) and recessed min 1/4 in. (6 mm) from top edge of device to accommodate for sealant (Item 6).
5. **Fill, Void, or Cavity Material* - Putty -** (Not Shown) - When required under Item 3, as an option to Item 4, min 1 in. (25 mm) depth of fill material applied to fill annulus between penetrant and throat of firestop device at top of floor.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Putty
6. **Fill, Void, or Cavity Material* -** (Optional, Not Shown) - To achieve L or W Ratings, apply min 1/4 in. (6 mm) depth of sealant atop packing material (Item 4) flush with top edge of device with all interstices between cables filled.
   SPECIFIED TECHNOLOGIES INC - SpecSeal SIL300 Sealant or SpecSeal SIL300 SL Sealant
   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**
   +Bearing the UL Listing Mark

GENERAL NOTES:

1. Refer to section 07 84 00 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:
   · 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. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   · UL Fire Resistance Directory; Current Edition
   · NFPA 101 Life Safety Code
   · All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:
PROJECT_NAME:

PROJECT LOCATION:
PROJECT_LOCATION:

ARCHITECT/CONSULTANT:
ARCHITECT/CONSULTANT:

TITLE:
STI FIRESTOP SYSTEMS

Specified Technologies Inc.
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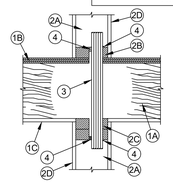
STI.

INDEX

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. F-C-3010**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating - 1 Hr	F Rating - 1 Hr
T Ratings - 1 Hr	FT Ratings - 1 Hr
	FH Rating - 1 Hr
	FTH Ratings - 1 Hr



1. **Floor-Ceiling Assembly -** The 1 hr fire-rated solid or trussed lumber joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory. The general construction features of the floor-ceiling assembly are summarized below:
   A. **Wood Joists -** Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or **Structural Wood Members*** with bridging as required and with ends firestopped.
   B. **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 3 in. (76 mm).
   C. **Gypsum Board* -** Thickness, type, number of layers and fasteners shall be as specified in the individual Floor-Ceiling Design. Max diam of opening is 3 in. (76 mm).
2. **Chase Wall -** (Optional) - The through penetrant (Item 3) may be routed through a single, double or staggered wood stud/gypsum board chase wall and shall include the following construction features:
   A. **Studs -** Nom 2 by 4 in. (51 by 102 mm), 2 by 6 in. (51 by 152 mm) or double nom 2 by 4 in. (51 by 102 mm) lumber studs.
   B. **Sole Plate -** Nom 2 by 4 in. (51 by 102 mm) or 2 by 6 in. (51 by 152 mm) lumber plates or double nom 2 by 4 in. (51 by 102 mm) lumber plates tightly butted together. Circular opening to be centered in sole plate. Sole plate to be min 1 in. (25 mm) wider than diam of opening. Max diam of opening in sole plate is 3 in. (76 mm).
   C. **Top Plate -** The single or double top plate shall consist of one or two nom 2 by 4 in. (51 by 102 mm) or nom 2 by 6 in. (51 by 152 mm) lumber plates or one or two sets of parallel nom 2 by 4 in. (51 by 102 mm) lumber plates tightly butted together. Circular opening to be centered in top plate. Top plate to be min 1 in. (25 mm) wider than diam of opening. Max diam of opening in top plate is 3 in. (76 mm).
   D. **Gypsum Board* -** Min 1/2 in. (13 mm) thick gypsum board.

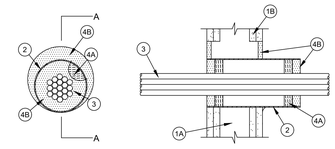
3. **Cables -** Aggregate cross-sectional area of cable in opening to be max 45 percent of the cross-sectional area of the opening. The annular space between the cable bundle and the periphery of the opening to be min 0 in. (point contact) to max 1 in. (0 to 25 mm). Cables to be rigidly supported on both sides of the floor-ceiling assembly. Any combination of the following types and sizes of copper conductor cables may be used:
   A. Max 25 pair No. 24 AWG telephone cable with PVC insulation and jacket.
   B. Type RG 59/U coaxial cable with polyethylene (PE) insulation and PVC jacket.
   C. Max 3/C with ground 2/0 AWG aluminum conductor SER cable with PVC insulation and jacket.
   D. Max 3/C No. 8 AWG steel or aluminum jacketed metal clad or armored clad cable.
   E. Max 3/C No. 10 AWG with ground Type NM nonmetallic sheathed (Romex) cable with PVC insulation and jacket.
4. **Fill, Void or Cavity Material* - Sealant -** Min 1/2 in. (13 mm) thickness of fill material applied around cable bundle within the annulus on top surface of chase wall sole plate or top surface of floor. Min 1/2 in. (13 mm) thickness of fill material applied within the annulus of the top plate flush with the bottom surface of the top plate or bottom surface of gypsum board. Min 1/2 in. (13 mm) bead of fill material applied at the cable/lumber plate or cable/floor or ceiling interfaces at point contact locations on both sides of assembly.

SPECIFIED TECHNOLOGIES INC - Type WF300 Caulk

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

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-L-3210**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings - 1 and 2 Hr (See Item 1)
T Rating - 3/4 Hr	FT Rating - 3/4 Hr
	FH Ratings - 1 and 2 Hr (See Item 1)
	FTH Rating - 3/4 Hr



Section A-A

1. **Wall Assembly -** The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or V400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs -** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (76 mm) wide and spaced max 24 in. (610 mm) OC.
   B. **Gypsum Board* -** Thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300, V300, U400 , V400 or W400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 6-1/2 in. (165 mm) when sleeve (Item 2) is installed. Max diam of opening is 4 in. (102 mm) when sleeve is not used.

   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. **Steel Sleeve - (Optional) -** Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing (EMT), steel conduit, Schedule 5 (or heavier) steel pipe sleeve or min 0.016 in. thick (0.41 mm, No. 28 ga) galv steel sleeve installed flush with wall surfaces. The annular space between the steel sleeve and periphery of opening shall be min 0 in. (continuous point contact) to max 2 in. (51 mm). When Schedule 5 steel pipe or EMT is used, sleeve may be installed flush with or extend up to 18 in. (46 cm) beyond one or both wall surfaces. Steel sleeve may be installed at an angle not greater than 45 degrees from perpendicular. Schedule 5 steel pipe or EMT sleeves may extend continuously beyond one wall surface. Sleeve to be rigidly supported when extending from the wall surfaces.

3. **Cables -** Aggregate cross-sectional area of cables in steel sleeve to be max 48 percent of the aggregate cross-sectional area of the opening or sleeve. Cables to be bundled and rigidly supported on both sides of wall assembly. When the sleeve (Item 2) is installed, the annular space between the cables and the sleeve shall be min 0 in. (point contact) to max 1-1/2 in. (38 mm). When the sleeve (Item 2) is not used, the annular space between the cables and the opening shall be a min 0 in. (point contact) to a max 1/2 in. (13 mm). Cable bundle, using cables described below, may penetrate the wall at an angle not greater than 45 degrees. Any combination of the following types and sizes of copper conductor cable may be used:
   A. Max 200 pair No. AWG (or smaller) copper conductor cable with polyvinyl chloride (PVC) or plenum-rated jacketing and insulation.
   B. Max 3/C No. 2/0 AWG (or smaller) aluminum or copper conductor service entrance cable with PVC insulation and jacket.
   C. Max 3/C No. 8 AWG (or smaller) nonmetallic sheathed (Romex) cable with copper conductors, PVC insulation and jacket.
   D. Max 7/C No. 2/0 AWG (or smaller) multiconductor power and control cables with XLPE or PVC insulation and XLPE or PVC jacket.
   E. Max RG/U (or smaller) coaxial cable with fluorinated ethylene or plenum-rated insulation and jacketing.
   F. Max 62.5/48 fiber optic cable with PVC or plenum-rated insulation and jacketing.
   G. Max 4 pair No. 24 AWG (or smaller) copper conductor data cable with PVC or plenum-rated insulation and jacket.
   H. Max 4/C No. 2/0 aluminum or copper conductor aluminum or steel Metal-Clad# or Armored-Clad# cable.
   I. Max ¼-in. (19 mm) copper ground cable with or without a PVC jacket.
4. **Firestop System -** The firestop system shall consist of the following:
   A. **Packing Material -** When required (See table in Item 4B), min 1 in. (25 mm) thickness of min 4.0 pcf (64 kg/m3) mineral wool batt insulation firmly packed into each end of sleeve as a permanent form. Packing material to be recessed from each end of sleeve as required to accommodate the required thickness of fill material.
   B. **Fill, Void or Cavity Material* - Sealant or Putty -** Fill material applied to appropriate thickness within steel sleeve, flush with edges of steel sleeve on both surfaces of wall. Min 1/2 in. (13 mm) thickness of fill material installed into annular space between sleeve and wall flush with both surfaces of the wall. Min 1/2 in. (13 mm) diam bead of sealant or "rope" of putty shall be applied around the perimeter of the sleeve on each side of the wall when sleeve extends beyond surface of wall and is installed at continuous point contact. See table below for fill material thickness requirements around cables.

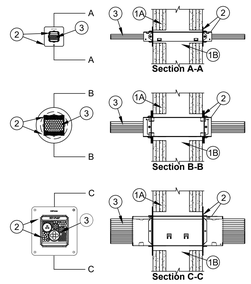
Sealant or Putty Type	Thickness, In. (mm)	Packing Material Required
SpecSeal Series SSS Sealant or LCI Sealant	1/2 in. (13)	Yes
SpecSeal Series SSS Sealant or LCI Sealant	1 in. (25)	No
SpecSeal Putty	1 in. (25)	No

SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant, SpecSeal LCI Sealant or SpecSeal Putty

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

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-L-3377**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1, 2, 3 and 4 Hr (See Items 1 and 3)	F Ratings - 1, 2, 3 and 4 Hr (See Items 1 and 3)
T Rating - 3/4, 1, 1-1/2 and 2 Hr (See Item 3)	FT Rating - 3/4, 1, 1-1/2 and 2 Hr (See Item 3)
L Rating At Ambient - Less than 1 to 7 CFM/Device Module (See Item 2)	FH Ratings - 1, 2, 3 and 4 Hr (See Items 1 and 3)
L Rating At Ambient - Less than 1 to 7 CFM/Device Module (See Item 2)	FTH Rating - 3/4, 1, 1-1/2 and 2 Hr (See Item 3)
	L Rating At Ambient - Less than 1 to 7 CFM/Device Module (See Item 2)
	L Rating at 400 F - Less than 1 to 3 CFM/Device Module (See Item 2)



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 described within the individual U300, U400, V400 or W400 Series Wall or Partition Designs in the UL Fire Resistance Directory and shall incorporate the following construction features:
   A. **Studs -** Wall framing shall consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced max 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.
   B. **Gypsum Board* -** Thickness, type, number of layers and fasteners as specified in the individual Wall and Partition Design. See Table for opening sizes.

   The hourly F and FH Ratings are dependent upon the hourly rating of the wall in which it is installed.
2. **Firestop Device* -** Series 22 EZ Path device modules consist of a 1.4 by 1.4 by 10-1/2 in. (36 by 36 by 267 mm) long galv steel tube with an intumescent material lining. Series 33 EZ Path device modules consist of a 3 by 3 by 10-1/2 in. (76 by 76 by 267 mm) long galv steel tube with an intumescent material lining. Series 44+ EZ Path device modules consist of a 4 by 4-5/8 by 14 in. (102 by 118 by 356 mm) long galv steel tube with an intumescent material lining. Firestop device modules to be installed in accordance with the accompanying installation instructions. Firestop device modules secured in place by means of steel wall plates installed with gasketing material supplied with product. Steel wall plates installed on both sides of wall and secured to each device by means of steel screws provided with device. Firestop device module is to be installed with ends projecting an equal distance beyond each surface of the wall assembly. The annular space between the device and opening shall be min 0 in. (point contact) to max 1/8 in. (3 mm) for Series 22 device, max 1/2 in. (13 mm) for Series 33 device and max 1/4 in. (6 mm) for Series 44 device. The opening size and L Ratings for each device vary according to whether device module is blank (no cables) or loaded (with cables) and which cable type and size is used, as tabulated below:

SPECIFIED TECHNOLOGIES INC - EZ PATH Series 22, 33 or 44+ Fire Rated Pathway

Device	Max Cable Fill	Cable Type	L-Rating (CFM) Ambient	L-Rating (CFM) 400° F	Opening Size Diam or Dimensions, in. (mm)
Series 22	0%	-	1.4	1.4	2 (51) or 1-3/4 x 1-3/4 (44 x 44)
Series 22	1-25%	3A	Less Than 1	Less Than 1	2 (51) or 1-3/4 x 1-3/4 (44 x 44)
Series 22	26-50%	3A	Less Than 1	Less Than 1	2 (51) or 1-3/4 x 1-3/4 (44 x 44)
Series 22	51-75%	3A	Less Than 1	Less Than 1	2 (51) or 1-3/4 x 1-3/4 (44 x 44)
Series 22	76-100%	3A	Less Than 1	Less Than 1	2 (51) or 1-3/4 x 1-3/4 (44 x 44)
Series 22	100%	3F	Less Than 1	Less Than 1	2 (51) or 1-3/4 x 1-3/4 (44 x 44)
Series 33	0%	-	Less Than 1	Less Than 1	4 (102) or 3-1/4 x 3-1/4 (82 x 82)
Series 33	100%	3A	4	3	4 (102) or 3-1/4 x 3-1/4 (82 x 82)
Series 33	100%	3F	1.3	Less Than 1	4 (102) or 3-1/4 x 3-1/4 (82 x 82)
Series 33	100%	3C, 3H	7	2	4 (102) or 3-1/4 x 3-1/4 (82 x 82)
Series 33	100%	3I	1.8	1.8	4 (102) or 3-1/4 x 3-1/4 (82 x 82)
Series 44+	0%	-	Less Than 1	Less Than 1	6 (152) or 4-1/8 x 4-3/8 (120 x 120)
Series 44+	1-25%	3A-3I	1.5	1.5	6 (152) or 4-1/8 x 4-3/8 (120 x 120)
Series 44+	26-50%	3A-3I	2.3	2.3	6 (152) or 4-1/8 x 4-3/8 (120 x 120)
Series 44+	51-75%	3A-3I	2.3	2.3	6 (152) or 4-1/8 x 4-3/8 (120 x 120)
Series 44+	76%-100%	3A-3I	2.3	2.3	6 (152) or 4-1/8 x 4-3/8 (120 x 120)

2A. **Firestop Device* - Extension Module -** (Optional, Not Shown) - Module attached to ends of Series 33, Series 44+ firestop device (Item 2) to increase its length to facilitate installation in thicker walls. Each module consists of a galv steel tube with an intumescent material lining. Extension module to be installed in accordance with the accompanying installation instructions. When module is used, firestop device (Item 2) and extension module(s) secured in place by means of steel wall plates installed with gasketing material supplied with product. Steel wall plates installed on both sides of wall and secured to each device or extension module(s) by means of steel set screws provided with wall plates. Firestop device and extension module(s) assembly to be installed with ends projecting an equal distance beyond each surface of the wall assembly.

SPECIFIED TECHNOLOGIES INC - EZ PATH Series 33 or Series 44+ Extension

3. **Cables -** Cables may represent a 0 to max 100 percent visual fill within the loading area for the firestop device module. Cables to be rigidly supported on both sides of the wall assembly. Any combination of the following types of cables may be used:
   A. Max 400 pair No. 24 AWG (or smaller) copper conductor telecommunication cable with polyvinyl chloride (PVC) or plenum-rated jacketing and insulation.
   B. Max 750 kcmil single copper conductor power cable with XLPE jacket and insulation.
   C. Max 7/C No. 12 AWG copper conductor control cable with PVC or XLPE jacket and insulation.
   D. Max 3/C No. 2/0 AWG metal clad or armored cable with steel or aluminum jacket.
   E. Max 3/C No. 8 AWG NM cable (Romex) with PVC insulation and jacket.
   F. Max four pair No. 22 AWG (or smaller) copper conductor data cable with PVC or plenum rated jacketing and insulation.
   G. Coaxial cable with fluorinated ethylene or PVC insulation and jacketing having a max diam of 5/8 in. (16 mm).
   H. Optical fiber cable with PVC or polyethylene (PE) jacket and insulation and having a max diam of 5/8 in. (16 mm).
   I. Max RG6/U coaxial cable with fluorinated ethylene, polyethylene (PE), PVC or plenum rated jacketing and insulation.

   When Series 22 EZ Path device modules are used and when the hourly rating of the wall assembly is 1 hr, the T, FT and FTH Ratings are 3/4 hr except that for Items 3F, 3G and 3H, the T, FT and FTH Ratings are 1 hr. When the hourly fire rating of the wall assembly is 2 hr or greater, the T, FT and FTH Ratings are 3/4 hr when cables are installed. When no cables are installed within the device module, the T, FT and FTH Ratings are 1 hr in 1 hr walls and 1-1/2 hr for 2, 3 and 4 hr walls. When Item 3A, 3B, 3C, 3D or 3E is used, the maximum F and FH Ratings are 2 hr. When max 200 pair No. 24 AWG telecommunication cable and/or 350 kcmil power cable is used or when Item 3F, 3G, 3H or 3I is used, the maximum F and FH Ratings are 4 hr.

   When Series 33 EZ Path device modules are used and when the hourly rating of the wall assembly is 1 hr, the T, FT and FTH Ratings are 3/4 hr. When the hourly fire rating of the wall assembly is greater than 1 hr, the T, FT and FTH Ratings are 3/4 hr when Item 3A, 3B, 3C, 3D or 3E is used. Otherwise the T, FT and FTH Ratings are 1 hr. When Item 3A, 3B, 3C, 3D or 3E is used, the maximum F and FH Ratings are 2 hr. When max 200 pair No. 24 AWG telecommunication cable is used or when Item 3F, 3G, 3H or 3I is used, the maximum F and FH Ratings are 4 hr.

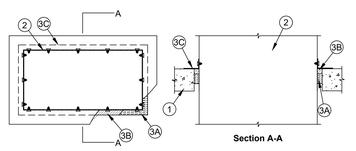
   When Series 44 + EZ Path device modules are used and when Item 3A, 3B, 3C, 3D or 3E is used, the max F and FH Ratings are 3 hr and the T, FT and FTH Ratings are 1 hr. When Item 3F or 3G is used, the max F and FH Ratings are 4 hr and the T, FT and FTH Ratings are 1-1/2 hr. When Item 3H or 3I is used, the max F and FH Ratings are 4 hr and the T, FT and FTH Ratings are 2 hr. When device empty, the T, FT and FTH Ratings are 1-1/2 hr.

   +Bearing the UL Listing Mark

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

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. C-AJ-7027**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 2 and 3 Hr (See Item 3B)	F Ratings - 2 and 3 Hr (See Item 3B)
T Rating - 0 Hr	FT Rating - 0 Hr
L Rating At Ambient - Less Than 1 CFM/sq ft	FH Ratings - 2 and 3 Hr (See Item 3B)
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Rating - 0 Hr
W Rating - Class 1 (See Item 3B)	L Rating At Ambient - Less Than 5.1 L/s/m2
	L Rating At 400 F - Less Than 5.1 L/s/m2



Section A-A

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 area of opening is 2560 in.2 (1.65 m3) with max dimension of 64 in. (1.6 m).

   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Steel Duct -** Max 60 by 36 in. (1524 by 914 mm) steel duct. Steel gauge of duct shall conform with SMACNA requirements. One duct to be installed within the firestop system. The annular space shall be min 0 in. (point contact) to max 2 in. (51 mm) Steel duct to be rigidly supported on both sides of floor or wall assembly.

2A. **Coated Ducts* -** As an alternate to Item 2, max 60 by 36 in. (1524 by 914 mm) steel duct coated with BW11 coating material. Duct sections shall be assembled using bolted flanges or SMACNA approved Transverse Joint Reinforcements. One duct to be installed within the firestop system. The annular space shall be min 0 in. (point contact) to max 2 in. (51 mm). Duct to be rigidly supported on both sides of floor or wall assembly.

   FIRESPRAY INTERNATIONAL LTD - FLAMEBAR BW11 fire rated ductwork

3. **Firestop System -** The firestop system shall consist of the following:
   A. **Packing Material -** Min 3 in. (76 mm) thickness of min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor and from both surfaces of wall 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 top surface of floor and both surfaces of wall. At point contact location between steel duct and concrete floor or wall, apply min 3/8 in. (10 mm) diam bead at steel duct/concrete interface on top surface of floor or both surfaces of wall.

      SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant, SpecSeal LCI Sealant, Pensil 300 Sealant or SpecSeal Series SIL300 Sealant for floors or walls and Pensil 300SL Sealant or SpecSeal Series SIL300SL Sealant for floors only.

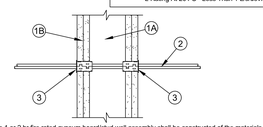
      W Rating applies only when Pensil 300 Sealant, SpecSeal Series SIL300, Pensil 300 S/L or SpecSeal Series SIL300SL Sealants are used.

      F Rating is 2 hr when Pensil 300 Silicone Sealant or Pensil 300SL Silicone Sealant is used. F Rating is 3 Hr when all other sealants are used.
   C. **Retaining Angles -** Min 16 GA galv steel angles sized to lap duct a min of 2 in. (51 mm) and lap periphery of opening a min of 1 in. (25 mm). Angles attached to all four sides of steel duct on top surface of floor or on both surfaces of wall with No. 10 (or larger) steel sheet metal screws spaced 1 in. (25 mm) from each end and max 4 in. (102 mm) OC.

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

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-L-3379**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings - 1 and 2 Hr (See Item 1)
T Ratings - 1 and 2 Hr (See Item 1)	FT Ratings - 1 and 2 Hr (See Item 1)
L Rating At Ambient - Less Than 1 CFM/device	FH Ratings - 1 and 2 Hr (See Item 1)
L Rating At 400 F - Less Than 1 CFM/device	FTH Ratings - 1 and 2 Hr (See Item 1)
	L Rating At Ambient - Less Than 1 L/s/device
	L Rating At 204 C - Less Than 1 L/s/device



1. **Wall Assembly -** The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs -** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.
   B. **Gypsum Board* -** 5/8 in. (16 mm) thick, 4 ft (1.2 m) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Designs in the UL Fire Resistance Directory.

      The hourly F and T Ratings of the firestop system are equal to the hourly fire rating of the wall assembly in which it is installed.
2. **Cables -** One or more cables to be installed through 1 in. (25 mm) diam holes drilled through the gypsum board on both sides of wall. Any combination of the following types of cables may be used:
   A. Max 25 pair No. 24 AWG (or smaller) copper conductor telecommunication cable with polyvinyl chloride (PVC) or plenum-rated jacketing and insulation.
   B. Max 3/C No. 8 AWG NM cable (Romex) with PVC insulation and jacket.
   C. Max four pair No. 22 AWG (or smaller) copper conductor data cable with PVC or plenum rated jacketing and insulation.
   D. Coaxial cable with fluorinated ethylene or PVC insulation and jacketing having a max diam of 1/2 in. (13 mm).
   E. Optical fiber cable with PVC or polyethylene (PE) jacket and insulation and having a max diam of 1/2 in. (13 mm).
3. **Firestop Device* -** Device consisting of plastic grommet halves with foam inserts. Plastic grommet device shall be installed around cable at its egress from the gypsum board on each side of wall and inserted in wall opening in accordance with the accompanying installation instructions.

   SPECIFIED TECHNOLOGIES INC - EZ Firestop Grommet RFG2

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

GENERAL NOTES:

1. Refer to section 07 84 00 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:
   · 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. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   · UL Fire Resistance Directory; Current Edition
   · NFPA 101 Life Safety Code
   · All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:
PROJECT_NAME:

PROJECT LOCATION:
PROJECT_LOCATION:

ARCHITECT/CONSULTANT:
ARCHITECT/CONSULTANT:

TITLE:
STI FIRESTOP SYSTEMS

Specified Technologies Inc.
210 Evans Way Somerville, NJ 08876
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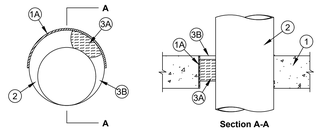
INDEX

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. C-AJ-7023**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 2 and 3 Hr (See Item 3B)	F Ratings - 2 and 3 Hr (See Item 3B)
T 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	FH Ratings - 2 and 3 Hr (See Item 3B)
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Ratings - 0 and 1/4 Hr (See Item 2)
W Rating - Class 1 (See Item 3B)	L Rating At Ambient - Less Than 5.1 L/s/m2
	L Rating At 204 C - Less Than 5.1 L/s/m2



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***. Floor may also be constructed of any min 6 in. (152 mm) thick hollow-core **Precast Concrete Units***. Max diam of opening is 26 in. (660 mm). Max diam of opening in floors constructed of hollow-core precast concrete units is 7 in. (178 mm).
   See **Concrete Block** (CAZT) and **Precast Concrete Units** (CFTV) category in the Fire Resistance Directory for names of manufacturers.

1A. **Steel Sleeve (Optional) -** Nom 26 in. (660 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe or No. 26 ga (0.022 in. or 0.56 mm thick) sheet steel sleeve with square anchor flange spot welded to the sleeve at approx mid-height. Sleeve cast or grouted in place flush with floor or wall surfaces. Steel pipe sleeve may project a max 2 in. (51 mm) beyond the floor or wall surfaces.

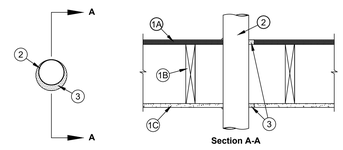
2. **Steel Duct -** Nom 24 in. (610 mm) diam (or smaller) spiral-wound or snap-lock steel duct. Steel gauge of duct shall conform with SMACNA requirements. One steel duct to be installed either concentrically or eccentrically within the firestop system. The annular space between the steel duct and the periphery of the opening shall be min 0 in. (point contact) to a max of 2 in. (51 mm). Steel duct to be rigidly supported on both sides of floor or wall assembly. The T Rating is 1/4 Hr for max 12 in. (305 mm) diam steel ducts. Otherwise, the T Rating is 0 Hr.

2A. **Coated Ducts* -** As an alternate to Item 2, nom 24 in. (610 mm) diam (or smaller) steel duct coated with BW11 coating material. Duct sections shall be assembled using bolted flanges or SMACNA approved Transverse Joint Reinforcements. One duct to be installed either concentrically or eccentrically within the firestop system. The annular space between the duct and the periphery of the opening shall be min 0 in. (point contact) to a max of 2 in. (51 mm). Duct to be rigidly supported on both sides of floor or wall assembly. The T Rating is 1/4 Hr for max 12 in. (305 mm) diam ducts. Otherwise, the T Rating is 0 Hr.
   FIRESPRAY INTERNATIONAL LTD - FLAMEBAR BW11 fire rated ductwork

3. **Firestop System -** The firestop system shall consist of the following:
   A. **Packing Material -** Min 3 in. (76 mm) thickness of min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall 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 top surface of floor or with both surfaces of wall assembly or hollow-core precast concrete floor. Min 3/8 in. (10 mm) diam bead of fill material applied at the point contact location between the steel duct and the concrete floor or wall on the top surface of the floor or both surfaces of the wall or hollow-core precast concrete floor.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant, SpecSeal LCI Sealant, Pensil 300 Sealant or SpecSeal Series SIL300 Sealant for floors or walls and Pensil 300S/L Sealant or SpecSeal Series SIL300SL Sealant for floors only.
   W Rating applies only when Pensil 300 Sealant, SpecSeal Series SIL300, Pensil 300 S/L or SpecSeal Series SIL300SL Sealants are used.
   F Rating is 2 Hr when Pensil 300 Silicone Sealant or Pensil 300SL Silicone Sealant is used. F Rating is 3 Hr when all other sealants are used.
   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. F-C-7014**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating - 1 Hr	F Rating - 1 Hr
T Ratings - 1/4 and 1 Hr (See Item 2)	FT Ratings - 1/4 and 1 Hr (See Item 2)
L Rating At Ambient - Less Than 1 CFM/sq ft	FH Rating - 1 Hr
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Ratings - 1/4 and 1 Hr (See Item 2)
	L Rating At Ambient - Less Than 5.1 L/s/m2
	L Rating At 400 F - Less Than 5.1 L/s/m2



1. **Floor - Ceiling Assembly -** The 1 hr fire-rated wood joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Designs in the UL Fire Resistance Directory, as summarized below:
   A. **Flooring System -** Lumber or plywood subfloor with finish floor of lumber, plywood or **Floor Topping Mixture*** as specified in the individual Floor-Ceiling Design. Diam of opening is to be max 1 in. (25 mm) larger than diam of steel duct.
   B. **Wood Joists -** Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or **Structural Wood Members*** with bridging as required and with ends firestopped.
   C. **Gypsum Board* -** Thickness, type, number of layers and fasteners as required in the individual Floor-Ceiling Design. Diam of opening is to be max 1 in. (25 mm) larger than diam of steel duct.

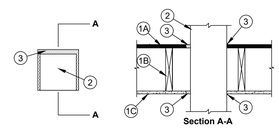
1A. **Chase Wall -** (Optional, Not Shown) - The through penetrant (Item 2) may be routed through a single, double or staggered wood stud/gypsum board chase wall. Depth of chase wall stud cavity to be min 1/2 in. (13 mm) greater than diameter of opening cut in sole and top plates to accommodate the through penetrant (Item 2). The chase wall shall include the following construction features:
   A. **Studs -** Nom 2 by 4 in. (51 by 102 mm), 2 by 6 in. (51 by 152 mm) or double nom 2 by 4 in. (51 by 102 mm) lumber studs.
   B. **Sole Plate -** Nom 2 by 4 in. (51 by 102 mm), 2 by 6 in. (51 by 152 mm)or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Diam of opening is to be max 1 in. (25 mm) larger than diam of steel pipe.
   C. **Top Plate -** The single or double top plate shall consist of one or two nom 2 by 4 in (51 by 102 mm) or one or two nom 2 by 6 in. (51 by 152 mm) or one or two sets of parallel nom 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Diam of opening is to be max 1 in. (25 mm) larger than diam of steel duct.
   D. **Gypsum Board* -** Min 1/2 in. (13 mm) thick rated or nonrated gypsum board.

2. **Steel Duct -** One nom 4 in. (102 mm) diam (or smaller) No. 30 GA (or heavier) steel duct or one nom 10 in. (254 mm) diam (or smaller) No. 28 GA (or heavier) steel duct to be installed either concentrically or eccentrically within the opening. Annular space to be min 0 in. (point contact) to max 1 in. (25 mm). Steel duct to be rigidly supported on both sides of floor-ceiling assembly.
   T, FT and FTH Ratings are 1 hr for nom 4 in. (102 mm) diam (or smaller) ducts. T, FT and FTH Ratings are 1/4 hr for ducts greater than nom 4 in. (102 mm) diam.

3. **Fill, Void or Cavity Material* - Sealant -** Min 3/4 in. (19 mm) thickness of fill material applied within the annulus, flush with the top surface of the floor or sole plate. Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with bottom surface of ceiling or top plate. Min 1/4 in. (6 mm) diam bead of fill material applied at point contact location on the top surface of floor or chase wall sole plate and at the penetrant/ceiling or chase wall top plate interface.
   SPECIFIED TECHNOLOGIES INC - SpecSeal LCI Sealant or Type WF300 Firestop Caulk
   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. F-C-7023**

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



1. **Floor-Ceiling Assembly -** The 1 hr fire-rated wood joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Designs in the UL Fire Resistance Directory, as summarized below:
   A. **Flooring System -** Lumber or plywood subfloor with finish floor of lumber, plywood or **Floor Topping Mixture*** as specified in the individual Floor-Ceiling Design. Square or rectangular opening made to accommodate steel duct (Item 2) to be centered between wood joists. Max area of opening is 81 sq in. (0.05 m2). Length and width dimensions of opening to be max 1 in.(25 mm) larger than outside dimensions of steel duct. Long dimension of rectangular opening to be perpendicular to direction of wood joists.
   B. **Wood Joists -** Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or **Structural Wood Members*** with bridging as required and with ends firestopped.
   C. **Gypsum Board* -** Thickness, type, number of layers and fasteners as required in the individual Floor-Ceiling Design. Max area of opening in gypsum board ceiling is 100 sq in. (0.065 m2). Length and width dimensions of opening to be max 1 in. (25 mm) larger than outside dimensions of steel duct.

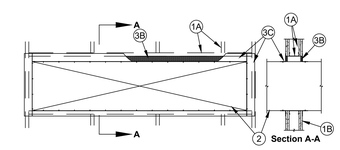
1A. **Chase Wall -** (Optional, Not Shown) - The steel duct may be routed through a 1 hr fire rated single, double or staggered wood stud/gypsum board chase wall. Depth of chase wall stud cavity to be min 1/2 in. (13 mm) greater than width of opening cut in sole and top plates to accommodate the steel duct. The chase wall shall be constructed of the materials and in the manner specified in the individual U300 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs -** Nom 2 by 6 in. (51 by 152 mm) or double nom 2 by 4 in. (51 by 102 mm) lumber studs.
   B. **Sole Plate -** Nom 2 by 6 in. (51 by 152 mm) or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max area of opening is 100 sq in. (0.065 m2). Length and width dimensions of opening to be max 1 in. (25 mm) larger than each side of steel duct.
   C. **Top Plate -** The double top plate shall consist of two nom 2 by 6 in. (51 by 152 mm) or two sets of parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Length and width dimensions of opening to be max 1 in. (25 mm) larger than each side of steel duct.
   D. **Gypsum Board* -** Thickness, type, number of layers and fasteners shall be as specified in the individual Wall and Partition Design.

2. **Steel Duct -** Square or rectangular duct formed from No. 28 gauge (or heavier) galvanized steel. Max cross-sectional area of duct to be 64 sq in. (0.04 m2) with a maximum dimension of 12 in. (305 mm). Annular space between the steel duct and the periphery of the opening shall be min 0 in. (point contact) to max 1 in. (25 mm). Steel duct to be rigidly supported on both sides of floor-ceiling assembly.

3. **Fill, Void or Cavity Material* - Sealant -** Min 3/4 in. (19 mm) thickness of fill material applied within the annulus, flush with the top surface of the floor or sole plate. Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with bottom surface of gypsum board ceiling or top plate. Min 1/4 in. (6 mm) diam bead of fill material applied at point contact location on the top surface of floor or chase wall sole plate and at the penetrant/ceiling or penetrant/chase wall top plate interface.
   SPECIFIED TECHNOLOGIES INC - SpecSeal LCI Sealant or Type WF300 Firestop Caulk
   * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-L-7025**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings - 1 and 2 Hr (See Item 1)
T Rating - 1/2 Hr	FT Rating - 1/2 Hr
L Rating At Ambient - Less Than 1 CFM/sq ft	FH Ratings - 1 and 2 Hr (See Item 1)
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Rating - 1/2 Hr
	L Rating At Ambient - Less Than 5.1 L/s/m3
	L Rating At 204 C- Less Than 5.1 L/s/m3



1. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W 400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs -** Wall framing shall consist of min 3-1/2 in. (89 mm) wide steel channel studs spaced max 24 in. (610 mm) OC. Additional steel studs shall be used to completely frame the opening.
   B. **Gypsum Board* -** 5/8 in. (16 mm) thick, 4 ft (1.22 m) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Design in the UL Fire Resistance Directory. Max area of opening is 73.7 sq ft (6.85 m2) with a max dimension of 104 in. (2.64 m).
   The hourly F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall assembly in which it is installed.

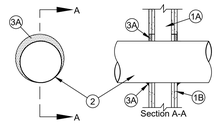
2. **Steel Duct -** Max 100 in. by 100 in. (2.54 by 2.54 m) No. 26 gauge (or heavier) galv steel duct to be installed either concentrically or eccentrically within the firestop system. The space between the steel duct and periphery of opening shall be min 0 in. (0 mm, point contact) to max 2 in. (51 mm). Steel duct to be rigidly supported on both sides of the wall assembly.

2A. **Coated Ducts* -** As an alternate to Item 2, max 60 by 60 in. (1524 by 1524 mm) steel duct coated with BW11 coating material. Duct sections shall be assembled using bolted flanges or SMACNA approved Transverse Joint Reinforcements. Annular space between duct and periphery of opening shall be min 0in. (point contact) to max 2 in. (51 mm). Duct to be rigidly supported on both sides wall assembly.
   FIRESPRAY INTERNATIONAL LTD - FLAMEBAR BW11 fire rated ductwork

3. **Firestop System -** The firestop system shall consist of the following:
   A. **Packing Material -** (Optional, Not Shown) - Polyethylene backer rod, mineral wool batt insulation or fiberglass batt insulation friction fitted into annular space. Packing material to be recessed from both surfaces of wall as required to accommodate the required thickness of fill material.
   B. **Fill, Void or Cavity Material* - Sealant -** Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. Min 1/4 in. (6 mm) diam bead of fill material shall be applied at the point contact location between the steel duct and the gypsum board. For 2 hr Rated walls when LC150 or LE600 Sealant is used, fill material thickness installed to full depth of gypsum board layers on each side of wall assembly.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant, SpecSeal LCI Sealant, SpecSeal LC150 Sealant, or SpecSeal LE600 Sealant
   C. **Steel Retaining Angles -** Min No. 16 gauge (0.059 in. or 15 mm) galv steel angles sized to lap steel duct a min of 2 in. (51 mm) and to lap wall surfaces a min of 1 in. (25 mm). Angles attached to steel duct on both sides of wall with min No. 10 by 1/2 in. (13 mm) long steel sheet metal screws located a max of 1 in. (25 mm) from each end of steel duct and spaced a max of 6 in. (152 mm) OC.
   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-L-7026**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings - 1 and 2 Hr (See Item 1)
T Rating - 0 Hr	FT Rating - 0 Hr
L Rating At Ambient - Less Than 1 CFM/sq ft	FH Ratings - 1 and 2 Hr (See Item 1)
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Rating - 0 Hr
	L Rating At Ambient - Less Than 5.1 L/s/m2
	L Rating At 204 C- Less Than 5.1 L/s/m2



1. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs -** Wall framing shall consist of min 3-1/2 in. (89 mm) wide steel channel studs spaced max 24 in. (610 mm) OC. When diam of opening exceeds width of stud cavity, additional lengths of steel stud installed to frame out opening around steel duct (Item 2).
   B. **Gypsum Board* -** 5/8 in. (16 mm) thick, 4 ft (1.22 m) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Design in the UL Fire Resistance Directory. Max diam of opening is 25-1/2 in. (648 mm).
   The hourly F and FH Rating of the firestop system are equal to the hourly fire rating of the wall assembly in which it is installed.

2. **Steel Duct -** Max 24 in. (610 mm) diam No. 28 gauge (or heavier) galv steel vent duct or No. 26 gauge (or heavier) spiral wound galv steel duct. One steel duct to be installed either concentrically or eccentrically within the firestop system. An annular space of min 0 in. (point contact) to max 1-1/2 in. (38 mm) is required within the firestop system. Steel duct to be rigidly supported on both sides of the wall assembly.

2A. **Coated Ducts* -** As an alternate to Item 2, max 24 in. (610 mm) diam (or smaller) steel duct coated with BW11 coating material. Duct sections shall be assembled using bolted flanges or SMACNA approved Transverse Joint Reinforcements. One duct to be installed either concentrically or eccentrically within the firestop system. The annular space between the duct and the periphery of the opening shall be min 0 in. (point contact) to a max of 1-1/2 in. (38 mm). Duct to be rigidly supported on both sides o wall assembly.
   FIRESPRAY INTERNATIONAL LTD - FLAMEBAR BW11 fire rated ductwork

3. **Firestop System -** The firestop system shall consist of the following:
   A. **Packing Material -** (Optional, Not Shown) - Polyethylene backer rod, mineral wool batt insulation or fiberglass batt insulation friction fit into annular space for 2 hr rated wall assemblies only. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material (Item 3B).
   B. **Fill, Void or Cavity Material* - Sealant -** Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. Min 1/4 in. (6 mm) diam bead of fill material shall be applied at the point contact location between the steel duct and the gypsum board. For 2 hr Rated walls when LC150 or LE600 Sealant is used, fill material thickness installed to full depth of gypsum board layers on each side of wall assembly.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant, SpecSeal LCI Sealant, SpecSeal LC150 Sealant, or SpecSeal LE600 Sealant
   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

GENERAL NOTES:

1. Refer to section 07 84 00 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:
   · 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. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   · UL Fire Resistance Directory; Current Edition
   · NFPA 101 Life Safety Code
   · All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:
PROJECT_NAME:

PROJECT LOCATION:
PROJECT_LOCATION:

ARCHITECT/CONSULTANT:
ARCHITECT/CONSULTANT:

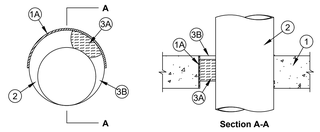
TITLE:
STI FIRESTOP SYSTEMS

Specified Technologies Inc.
210 Evans Way Somerville, NJ 08876
Toll Free: (800)992-1180
Phone: (908)526-8000
FAX (908)231-8415
E-Mail:techserv@stifirestop.com
Website:www.stifirestop.com

INDEX

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. C-AJ-7023**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 2 and 3 Hr (See Item 3B)	F Ratings - 2 and 3 Hr (See Item 3B)
T 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	FH Ratings - 2 and 3 Hr (See Item 3B)
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Ratings - 0 and 1/4 Hr (See Item 2)
W Rating - Class 1 (See Item 3B)	L Rating At Ambient - Less Than 5.1 L/s/m2
	L Rating At 204 C - Less Than 5.1 L/s/m2



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*.** Floor may also be constructed of any min 6 in. (152 mm) thick hollow-core **Precast Concrete Units*.** Max diam of opening is 26 in. (660 mm). Max diam of opening in floors constructed of hollow-core precast concrete units is 7 in. (178 mm).
   See **Concrete Block** (CAZT) and **Precast Concrete Units** (CFTV) category in the Fire Resistance Directory for names of manufacturers.

1A. **Steel Sleeve (Optional) -** Nom 26 in. (660 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe or No. 26 ga (0.022 in. or 0.56 mm thick) sheet steel sleeve with square anchor flange spot welded to the sleeve at approx mid-height. Sleeve cast or grouted in place flush with floor or wall surfaces. Steel pipe sleeve may project a max 2 in. (51 mm) beyond the floor or wall surfaces.

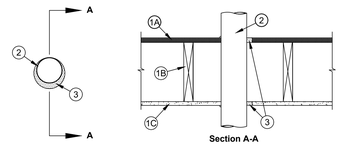
2. **Steel Duct -** Nom 24 in. (610 mm) diam (or smaller) spiral-wound or snap-lock steel duct. Steel gauge of duct shall conform with SMACNA requirements. One steel duct to be installed either concentrically or eccentrically within the firestop system. The annular space between the steel duct and the periphery of the opening shall be min 0 in. (point contact) to a max of 2 in. (51 mm). Steel duct to be rigidly supported on both sides of floor or wall assembly. The T Rating is 1/4 Hr for max 12 in. (305 mm) diam steel ducts. Otherwise, the T Rating is 0 Hr.

2A. **Coated Ducts* -** As an alternate to Item 2, nom 24 in. (610 mm) diam (or smaller) steel duct coated with BW11 coating material. Duct sections shall be assembled using bolted flanges or SMACNA approved Transverse Joint Reinforcements. One duct to be installed either concentrically or eccentrically within the firestop system. The annular space between the duct and the periphery of the opening shall be min 0 in. (point contact) to a max of 2 in. (51 mm). Duct to be rigidly supported on both sides of floor or wall assembly. The T Rating is 1/4 Hr for max 12 in. (305 mm) diam ducts. Otherwise, the T Rating is 0 Hr.
   FIRESPRAY INTERNATIONAL LTD - FLAMEBAR BW11 fire rated ductwork

3. **Firestop System -** The firestop system shall consist of the following:
   A. **Packing Material -** Min 3 in. (76 mm) thickness of min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall 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 top surface of floor or with both surfaces of wall assembly or hollow-core precast concrete floor. Min 3/8 in. (10 mm) diam bead of fill material applied at the point contact location between the steel duct and the concrete floor or wall on the top surface of the floor or both surfaces of the wall or hollow-core precast concrete floor.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant, SpecSeal LCI Sealant, Pensil 300 Sealant or SpecSeal Series SIL300 Sealant for floors or walls and Pensil 300S/L Sealant or SpecSeal Series SIL300SL Sealant for floors only.
   W Rating applies only when Pensil 300 Sealant, SpecSeal Series SIL300, Pensil 300 S/L or SpecSeal Series SIL300SL Sealants are used.
   F Rating is 2 Hr when Pensil 300 Silicone Sealant or Pensil 300SL Silicone Sealant is used. F Rating is 3 Hr when all other sealants are used.
   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. F-C-7014**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating - 1 Hr	F Rating - 1 Hr
T Ratings - 1/4 and 1 Hr (See Item 2)	FT Ratings - 1/4 and 1 Hr (See Item 2)
L Rating At Ambient - Less Than 1 CFM/sq ft	FH Rating - 1 Hr
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Ratings - 1/4 and 1 Hr (See Item 2)
	L Rating At Ambient - Less Than 5.1 L/s/m2
	L Rating At 400 F - Less Than 5.1 L/s/m2



1. **Floor - Ceiling Assembly -** The 1 hr fire-rated wood joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Designs in the UL Fire Resistance Directory, as summarized below:
   A. **Flooring System -** Lumber or plywood subfloor with finish floor of lumber, plywood or **Floor Topping Mixture*** as specified in the individual Floor-Ceiling Design. Diam of opening is to be max 1 in. (25 mm) larger than diam of steel duct.
   B. **Wood Joists -** Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or **Structural Wood Members*** with bridging as required and with ends firestopped.
   C. **Gypsum Board* -** Thickness, type, number of layers and fasteners as required in the individual Floor-Ceiling Design. Diam of opening is to be max 1 in. (25 mm) larger than diam of steel duct.

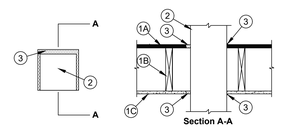
1A. **Chase Wall -** (Optional, Not Shown) - The through penetrant (Item 2) may be routed through a single, double or staggered wood stud/gypsum board chase wall. Depth of chase wall stud cavity to be min 1/2 in. (13 mm) greater than diameter of opening cut in sole and top plates to accommodate the through penetrant (Item 2). The chase wall shall include the following construction features:
   A. **Studs -** Nom 2 by 4 in. (51 by 102 mm), 2 by 6 in. (51 by 152 mm) or double nom 2 by 4 in. (51 by 102 mm) lumber studs.
   B. **Sole Plate -** Nom 2 by 4 in. (51 by 102 mm), 2 by 6 in. (51 by 152 mm)or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Diam of opening is to be max 1 in. (25 mm) larger than diam of steel pipe.
   C. **Top Plate -** The single or double top plate shall consist of one or two nom 2 by 4 in (51 by 102 mm) or one or two nom 2 by 6 in. (51 by 152 mm) or one or two sets of parallel nom 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Diam of opening is to be max 1 in. (25 mm) larger than diam of steel duct.
   D. **Gypsum Board* -** Min 1/2 in. (13 mm) thick rated or nonrated gypsum board.

2. **Steel Duct -** One nom 4 in. (102 mm) diam (or smaller) No. 30 GA (or heavier) steel duct or one nom 10 in. (254 mm) diam (or smaller) No. 28 GA (or heavier) steel duct to be installed either concentrically or eccentrically within the opening. Annular space to be min 0 in. (point contact) to max 1 in. (25 mm). Steel duct to be rigidly supported on both sides of floor-ceiling assembly.
   T, FT and FTH Ratings are 1 hr for nom 4 in. (102 mm) diam (or smaller) ducts. T, FT and FTH Ratings are 1/4 hr for ducts greater than nom 4 in. (102 mm) diam.

3. **Fill, Void or Cavity Material* - Sealant -** Min 3/4 in. (19 mm) thickness of fill material applied within the annulus, flush with the top surface of the floor or sole plate. Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with bottom surface of ceiling or top plate. Min 1/4 in. (6 mm) diam bead of fill material applied at point contact location on the top surface of floor or chase wall sole plate and at the penetrant/ceiling or chase wall top plate interface.
   SPECIFIED TECHNOLOGIES INC - SpecSeal LCI Sealant or Type WF300 Firestop Caulk
   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. F-C-7023**

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



1. **Floor-Ceiling Assembly -** The 1 hr fire-rated wood joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Designs in the UL Fire Resistance Directory, as summarized below:
   A. **Flooring System -** Lumber or plywood subfloor with finish floor of lumber, plywood or **Floor Topping Mixture*** as specified in the individual Floor-Ceiling Design. Square or rectangular opening made to accommodate steel duct (Item 2) to be centered between wood joists. Max area of opening is 81 sq in. (0.05 m2). Length and width dimensions of opening to be max 1 in.(25 mm) larger than outside dimensions of steel duct. Long dimension of rectangular opening to be perpendicular to direction of wood joists.
   B. **Wood Joists -** Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or **Structural Wood Members*** with bridging as required and with ends firestopped.
   C. **Gypsum Board* -** Thickness, type, number of layers and fasteners as required in the individual Floor-Ceiling Design. Max area of opening in gypsum board ceiling is 100 sq in. (0.065 m2). Length and width dimensions of opening to be max 1 in. (25 mm) larger than outside dimensions of steel duct.

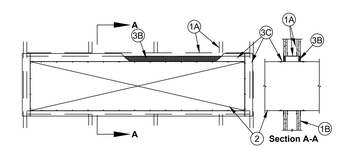
1A. **Chase Wall -** (Optional, Not Shown) - The steel duct may be routed through a 1 hr fire rated single, double or staggered wood stud/gypsum board chase wall. Depth of chase wall stud cavity to be min 1/2 in. (13 mm) greater than width of opening cut in sole and top plates to accommodate the steel duct. The chase wall shall be constructed of the materials and in the manner specified in the individual U300 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs -** Nom 2 by 6 in. (51 by 152 mm) or double nom 2 by 4 in. (51 by 102 mm) lumber studs.
   B. **Sole Plate -** Nom 2 by 6 in. (51 by 152 mm) or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max area of opening is 100 sq in. (0.065 m2). Length and width dimensions of opening to be max 1 in. (25 mm) larger than each side of steel duct.
   C. **Top Plate -** The double top plate shall consist of two nom 2 by 6 in. (51 by 152 mm) or two sets of parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Length and width dimensions of opening to be max 1 in. (25 mm) larger than each side of steel duct.
   D. **Gypsum Board* -** Thickness, type, number of layers and fasteners shall be as specified in the individual Wall and Partition Design.

2. **Steel Duct -** Square or rectangular duct formed from No. 28 gauge (or heavier) galvanized steel. Max cross-sectional area of duct to be 64 sq in. (0.04 m2) with a maximum dimension of 12 in. (305 mm). Annular space between the steel duct and the periphery of the opening shall be min 0 in. (point contact) to max 1 in. (25 mm). Steel duct to be rigidly supported on both sides of floor-ceiling assembly.

3. **Fill, Void or Cavity Material* - Sealant -** Min 3/4 in. (19 mm) thickness of fill material applied within the annulus, flush with the top surface of the floor or sole plate. Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with bottom surface of gypsum board ceiling or top plate. Min 1/4 in. (6 mm) diam bead of fill material applied at point contact location on the top surface of floor or chase wall sole plate and at the penetrant/ceiling or penetrant/chase wall top plate interface.
   SPECIFIED TECHNOLOGIES INC - SpecSeal LCI Sealant or Type WF300 Firestop Caulk
   * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-L-7025**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings - 1 and 2 Hr (See Item 1)
T Rating - 1/2 Hr	FT Rating - 1/2 Hr
L Rating At Ambient - Less Than 1 CFM/sq ft	FH Ratings - 1 and 2 Hr (See Item 1)
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Rating - 1/2 Hr
	L Rating At Ambient - Less Than 5.1 L/s/m3
	L Rating At 204 C- Less Than 5.1 L/s/m3



1. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W 400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs -** Wall framing shall consist of min 3-1/2 in. (89 mm) wide steel channel studs spaced max 24 in. (610 mm) OC. Additional steel studs shall be used to completely frame the opening.
   B. **Gypsum Board* -** 5/8 in. (16 mm) thick, 4 ft (1.22 m) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Design in the UL Fire Resistance Directory. Max area of opening is 73.7 sq ft (6.85 m2) with a max dimension of 104 in. (2.64 m).
   The hourly F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall assembly in which it is installed.

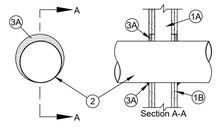
2. **Steel Duct -** Max 100 in. by 100 in. (2.54 by 2.54 m) No. 26 gauge (or heavier) galv steel duct to be installed either concentrically or eccentrically within the firestop system. The space between the steel duct and periphery of opening shall be min 0 in. (0 mm, point contact) to max 2 in. (51 mm). Steel duct to be rigidly supported on both sides of the wall assembly.

2A. **Coated Ducts* -** As an alternate to Item 2, max 60 by 60 in. (1524 by 1524 mm) steel duct coated with BW11 coating material. Duct sections shall be assembled using bolted flanges or SMACNA approved Transverse Joint Reinforcements. Annular space between duct and periphery of opening shall be min 0in. (point contact) to max 2 in. (51 mm). Duct to be rigidly supported on both sides wall assembly.
   FIRESPRAY INTERNATIONAL LTD - FLAMEBAR BW11 fire rated ductwork

3. **Firestop System -** The firestop system shall consist of the following:
   A. **Packing Material -** (Optional, Not Shown) - Polyethylene backer rod, mineral wool batt insulation or fiberglass batt insulation friction fitted into annular space. Packing material to be recessed from both surfaces of wall as required to accommodate the required thickness of fill material.
   B. **Fill, Void or Cavity Material* - Sealant -** Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. Min 1/4 in. (6 mm) diam bead of fill material shall be applied at the point contact location between the steel duct and the gypsum board. For 2 hr Rated walls when LC150 or LE600 Sealant is used, fill material thickness installed to full depth of gypsum board layers on each side of wall assembly.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant, SpecSeal LCI Sealant, SpecSeal LCI Sealant, SpecSeal LC150 Sealant or SpecSeal LE 600 Sealant.
   C. **Steel Retaining Angles -** Min No. 16 gauge (0.059 in. or 15 mm) galv steel angles sized to lap steel duct a min of 2 in. (51 mm) and to lap wall surfaces a min of 1 in. (25 mm). Angles attached to steel duct on both sides of wall with min No. 10 by 1/2 in. (13 mm) long steel sheet metal screws located a max of 1 in. (25 mm) from each end of steel duct and spaced a max of 6 in. (152 mm) OC.
   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-L-7026**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings - 1 and 2 Hr (See Item 1)
T Rating - 0 Hr	FT Rating - 0 Hr
L Rating At Ambient - Less Than 1 CFM/sq ft	FH Ratings - 1 and 2 Hr (See Item 1)
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Rating - 0 Hr
	L Rating At Ambient - Less Than 5.1 L/s/m2
	L Rating At 204 C- Less Than 5.1 L/s/m2



1. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs -** Wall framing shall consist of min 3-1/2 in. (89 mm) wide steel channel studs spaced max 24 in. (610 mm) OC. When diam of opening exceeds width of stud cavity, additional lengths of steel stud installed to frame out opening around steel duct (Item 2).
   B. **Gypsum Board* -** 5/8 in. (16 mm) thick, 4 ft (1.22 m) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Design in the UL Fire Resistance Directory. Max diam of opening is 25-1/2 in. (648 mm).
   The hourly F and FH Rating of the firestop system are equal to the hourly fire rating of the wall assembly in which it is installed.

2. **Steel Duct -** Max 24 in. (610 mm) diam No. 28 gauge (or heavier) galv steel vent duct or No. 26 gauge (or heavier) spiral wound galv steel duct. One steel duct to be installed either concentrically or eccentrically within the firestop system. An annular space of min 0 in. (point contact) to max 1-1/2 in. (38 mm) is required within the firestop system. Steel duct to be rigidly supported on both sides of the wall assembly.

2A. **Coated Ducts* -** As an alternate to Item 2, max 24 in. (610 mm) diam (or smaller) steel duct coated with BW11 coating material. Duct sections shall be assembled using bolted flanges or SMACNA approved Transverse Joint Reinforcements. One duct to be installed either concentrically or eccentrically within the firestop system. The annular space between the duct and the periphery of the opening shall be min 0 in. (point contact) to a max of 1-1/2 in. (38 mm). Duct to be rigidly supported on both sides o wall assembly.
   FIRESPRAY INTERNATIONAL LTD - FLAMEBAR BW11 fire rated ductwork

3. **Firestop System -** The firestop system shall consist of the following:
   A. **Packing Material -** (Optional, Not Shown) - Polyethylene backer rod, mineral wool batt insulation or fiberglass batt insulation friction fit into annular space for 2 hr rated wall assemblies only. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material (Item 3B).
   B. **Fill, Void or Cavity Material* - Sealant -** Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. Min 1/4 in. (6 mm) diam bead of fill material shall be applied at the point contact location between the steel duct and the gypsum board. For 2 hr Rated walls when LC150 or LE600 Sealant is used, fill material thickness installed to full depth of gypsum board layers on each side of wall assembly.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant, SpecSeal LCI Sealant, SpecSeal LC150 Sealant, or SpecSeal LE600 Sealant
   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

GENERAL NOTES:

1. Refer to section 07 84 00 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:
   · 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. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   · UL Fire Resistance Directory; Current Edition
   · NFPA 101 Life Safety Code
   · All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:
PROJECT_NAME:

PROJECT LOCATION:
PROJECT_LOCATION:

ARCHITECT/CONSULTANT:
ARCHITECT/CONSULTANT:

TITLE:
STI FIRESTOP SYSTEMS

Specified Technologies Inc.
210 Evans Way Somerville, NJ 08876
Toll Free: (800)992-1180
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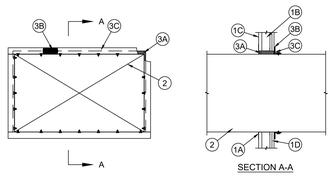
INDEX

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-L-7238**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings - 1 and 2 Hr (See Item 1)
T Ratings - 1/4 Hr	FT Ratings - 1/4 Hr
	FH Ratings - 1 and 2 Hr (See Item 1)
	FTH Ratings - 1/4 Hr

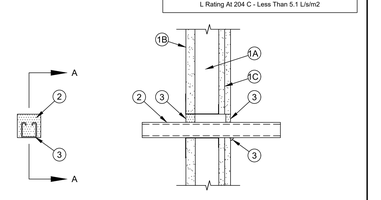


1. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum board/stud shaft wall assembly shall be constructed of the materials and in the manner specified in the individual U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall incorporate the following construction features:
   A. **Steel Runners -** Floor and ceiling "J"-shaped runner, min 2-1/2 in. (64 mm) wide, fabricated from min 24 MSG galv steel in accordance with the individual wall design. Additional "J" runners to be used as the horizontal members to frame the opening.
   B. **Steel Studs -** "C-H" or "C-T" shaped studs, min 2-1/2 in. (64 mm) wide by 1-1/2 in. (38 mm) deep, fabricated from min No. 25 gauge (0.6 mm thick) galv steel, spaced max 24 in. (610 mm) OC. Additional "C-H" or "C-T" shaped studs shall be used as the vertical framing members to completely frame around opening.
   C. **Gypsum Board*** - 1 in. (25 mm) thick, 24 in. (610 mm) wide gypsum liner panels installed vertically. Max area of opening in gypsum liner panel is 7.40 sq ft. (0.69 m2) with a max dimension of 41 in. (1.04 m).
   D. **Gypsum Board*** - 1/2 in. or 5/8 in. (13 or 16 mm) thick, 48 in. (1.2 m) wide gypsum boards. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max area of opening in gypsum board is 7.40 sq ft. (0.69 m2) with a max dimension of 41 in. (1.04 m).
   The F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall in which it is installed.
2. **Steel Duct -** Max 24 by 40 in. (0.61 by 1.02 m) No. 28 gauge (or heavier) steel duct to be installed either concentrically or eccentrically within the opening. The annular space between the steel duct and the periphery of the opening shall be min 0 in. (point contact) to max 1 in. (25 mm). The duct shall be constructed and reinforced in accordance with SMACNA construction standards. Steel duct to be rigidly supported on both sides of wall assembly.

3. **Firestop System -** The firestop system shall consist of the following items:
   A. **Packing Material -** Min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to extend throughout thickness of wall.
   B. **Fill, Void or Cavity Material* -** Factory-supplied intumescent gasket installed and nominally centered to completely cover the outer surfaces of the steel retaining angles (Item 3C) as specified in the accompanying installation instructions.
   SPECIFIED TECHNOLOGIES INC - FyreFlange™ Firestop Gasket
   C. **Steel Retaining Angles -** Nom 2 by 2 by 0.035 in. (51 by 51 by 0.9 mm) thick steel angles to be installed flush to max 1/4 in. (6 mm) from finished side of the wall. Firestop angles shall be attached to the steel duct on finished side of the wall with min No. 10 self-drilling, self-tapping steel screws spaced max 6 in. (152 mm) OC.
   D. **Firestop Device* -** (Optional, Not Shown) - A corner clip may be installed at each corner of the duct on finished side of the wall. Corner clips shall be attached to the steel duct and to the perpendicular leg of the abutting firestop angle with two min No. 10 self-drilling, self-tapping steel screws.
   SPECIFIED TECHNOLOGIES INC - FyreFlange™ Corner Clip
   E. **Firestop Device* -** (Not Shown) - As an option to the intumescent gasket and steel angles (Item Nos. 3B and 3C), a firestop device consisting of 2 by 2 by 0.035 in. (51 by 51 by 0.9 mm) thick steel angles furnished with an intumescent gasket material and corner clips (Item 3D) may be used. Firestop angles to be installed flush to max 1/4 in. (6 mm) from finished side of the wall in accordance with the accompanying installation instructions. Firestop angles shall be attached to the steel duct on finished side of wall with min No. 10 self-drilling, self-tapping steel screws spaced max 6 in. (152 mm) OC. Optional, corner clip may be installed at each corner of the duct on finished side of the wall. When installed, corner clips are attached to the steel duct and to the perpendicular leg of the abutting firestop angle with two min No. 10 self-drilling, self-tapping steel screws. Two short lengths of firestop angle may be joined into a single length of the required size using a splice angle in accordance with the accompanying instructions. When the max duct size is 24 by 40 in. (0.61 by 1.02 m), the corner clips are optional.
   SPECIFIED TECHNOLOGIES INC - FyreFlange™ Firestop Angle, FyreFlange™ Corner Clip, FyreFlange™ Splice Angle
   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-L-7253**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings - 1 and 2 Hr (See Item 1)
T Ratings - 0, 1 and 1-1/2 Hr (See Item 2)	FT Ratings - 0, 1 and 1-1/2 Hr (See Item 2)
L Rating At Ambient - Less Than 1 CFM/sq ft	FH Ratings - 1 and 2 Hr (See Item 1)
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Ratings - 0, 1 and 1-1/2 Hr (See Item 2)
	L Rating At Ambient - Less Than 5.1 L/s/m2
	L Rating At 204 C - Less Than 5.1 L/s/m2

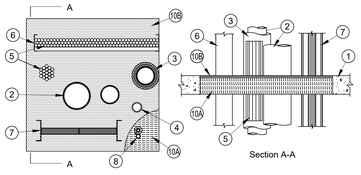


1. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum board/stud shaft wall assembly shall be constructed of the materials and in the manner specified in the individual U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall incorporate the following construction features:
   A. **Steel Studs -** "C-H" or "C-T" shaped studs, min 2-1/2 in. (64 mm) wide by 1-1/2 in. (38 mm) deep, fabricated from min No. 25 gauge (0.6 mm thick) galv steel, spaced max 24 in. (610 mm) OC.
   B. **Gypsum Board*** - 1 in. (25 mm) thick, 24 in. (610 mm) wide gypsum liner panels installed vertically. Max area of opening in gypsum liner panel is 8-3/4 sq in. (56 cm2) with a max dimension of 3-1/2 in. (89 mm). The opening cutout shall follow the contour of the penetrant when steel angle is used.
   C. **Gypsum Board*** - 1/2 in. or 5/8 in. (13 or 16 mm) thick, 48 in. (1.2 m) wide gypsum boards. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max area of opening in gypsum board is 8-3/4 sq in. (56 cm2) with a max dimension of 3-1/2 in. (89 mm). The opening cutout shall follow the contour of the penetrant when steel angle is used.
   The F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall in which it is installed.

2. **Penetrant -** One metallic strut, steel angle, cable or rod service support to be installed either concentrically or eccentrically within the firestop system. The annular space between the penetrant and the periphery of opening shall be min 0 in. (point contact) to max 7/8 in. (22 mm). Penetrant shall be rigidly supported on both sides of the wall assembly. The penetrant may be installed at an angle not greater than 45 degrees from the perpendicular. The following types and sizes of metallic strut, steel angle, cable or rod service support may be used:
   A. **Steel Strut -** Max 1-5/8 by 1-5/8 in. (41 by 41 mm) channel strut formed from min 0.105 in. (2.7 mm) thick galv or painted steel.
   B. **Steel Strut -** Max 3-1/4 by 1-5/8 in. (83 by 41 mm) H strut formed from min 0.105 in. (2.7 mm) thick galv or painted steel.
   C. **Steel Angle -** Max 2 by 2 in. (51 by 51 mm) by min 1/8 in. (3.2 mm) thick or max 3 by 3 in. (76 by 76 mm) by min 1/4 in. (6 mm) thick steel angle.
   D. **Cable -** Max 3/8 in. (9.5 mm) diam unjacketed galv steel cable.
   E. **Threaded Rod -** Max 5/8 in. (16 mm) diam galv steel threaded rod.
   The T, FT and FTH Ratings when Items 2A and 2B are used is 1 hr and 1-1/2 hr for 1 hr and 2 hr fire-rated walls, respectively. Otherwise, the T, FT and FTH Ratings are 0 hr.
3. **Fill, Void or Cavity Materials* - Sealant -** Min 1 in. (25 mm) thickness of fill material applied within annulus and within the channel struts, flush with the surface of the gypsum liner panel. Min 5/8 in. (16 mm) thickness of fill material applied within the annulus and within the channel struts, flush with the surface of the gypsum board on the finished side of the wall. At point contact location, min 3/8 in. (10 mm) diam bead of fill material to be applied at the penetrant/gypsum board interface on the finished side of the wall.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant, SpecSeal LCI Sealant or SpecSeal LC150 Sealant
   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. C-AJ-8113**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating - 2 Hr	F Rating - 2 Hr
T Rating - 0, 1/4, 1/2, 3/4 and 2 Hr (See Items 2 through 9)	FT Rating - 0, 1/4, 1/2, 3/4 and 2 Hr (See Items 2 through 9)
	FH Rating - 2 Hr
	FTH Rating - 0, 1/4, 1/2, 3/4 and 2 Hr (See Items 2 through 9)



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 area of opening is 1024 sq in. (0.66 m2) with a max height of 32 in. (813 mm) when installed in a wall or a max width of 32 in. (813 mm) when installed in a floor.
   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Metallic Penetrants -** One or more metallic pipes, conduits or tubes to be installed within the opening. Annulus between penetrants is min 0 in. (point contact) to max 24 in. (609 mm). Annulus between penetrants and periphery of opening is 0 in. (point contact) to max 24 in. (609 mm). Penetrants rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
   A. **Steel Pipe -** Nom 12 in. (305 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 12 in. (305 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Conduit -** Nom 6 in. (152 mm) diam (or smaller) rigid steel conduit, nom 4 in. (102 mm) diam (or smaller) electrical metallic tubing (EMT), or nom 4 in. (102 mm) diam (or smaller) steel Flexible Metal Conduit#.
   D. **Copper Pipe or Tube -** Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe or Type M (or heavier) copper tube.

Type of Metallic Penetrant	Max Dim of Throught Penetrants, in.(mm)	T Rating, Hr
Steel or Iron Pipe, Conduit	12 (305)	0
Copper Pipe or Tube	6 (152)	0
Steel or Iron Pipe, Conduit or EMT	4 (102)	1/4
Steel or Iron Pipe, Conduit or EMT	2 (51)	1/2
Steel or Iron Pipe, Conduit or EMT	1(25)	3/4

3. **Pipe Insulation -** One or more max 4 in. (102 mm) metallic pipes or tubes may be insulated. Annulus between penetrants is min 0 in. (point contact) to max 24 in. (609 mm). Annulus between penetrants and periphery of opening is 0 in. (point contact) to max 24 in. (609 mm). The annular space between metallic pipes, conduit and tubes and insulated pipes and tubes shall be a min 1/2 in. (13 mm) to max 24 in. (609 mm). Penetrants rigidly supported on both sides of floor or wall assembly. The following types of pipe insulation may be used:
   A. **Pipe and Equipment Covering Materials* -** Nom 1 in. (25 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 self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. **When Item 3A is used, T Rating is 3/4 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.
   B. **Pipe Covering Materials* -** Nom 2 in. (51 mm) thick unfaced mineral fiber pipe insulation having a nom density of 3.5 pcf (56 kg/m3) (or heavier) and sized to the outside diam of the pipe or tube. Pipe insulation secured with min 8 AWG steel wire spaced max 12 in. (305 mm) OC. When **Item 3B is used, T Rating is 2 Hr.**
   INDUSTRIAL INSULATION GROUP L L C - High Temperature Pipe Insulation 1200, High Temperature Pipe Insulation BWT and High Temperature Pipe Insulation Thermaloc
   C. **Sheathing Material* -** Use in conjunction with Item 3B. Foil-scrim-kraft or all service jacket material shall be wrapped around the outer circumference of the pipe insulation (Item 3B) with the kraft side exposed. Longitudinal and transverse joints sealed with metal fasteners or butt tape.
   See Sheathing Materials (BVDV) category in the Building Materials Directory for names of manufacturers. Any sheathing 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.
   D. **Tube Insulation-Plastics## -** Nom 3/4 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. **When Item 3D is used, T Rating is 1/2 Hr.**
   See **Plastics** (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.
   E. **Pipe Covering Materials* - Cellular Glass Insulation -** Nom 2 to 3 in. (51 to 76 mm) thick cellular glass units sized to the outside diam of the pipe or tube and supplied in nom 24 in. (610 mm) long half sections or nom 18 in.(457 mm) long segments. Pipe insulation installed on pipe in accordance with the manufacturer's instructions. **When Item 3E is used, T Rating is 2 Hr.**
   F. **Metal Jacket -** Used in conjunction with Item 3E. Min 12 in. (305 mm) long jacket formed from min 0.010 in. (0.25 mm) thick aluminum sheet cut to wrap tightly around the pipe insulation with a min 2 in. (51 mm) lap and secured using bands and seals of a similar material or min No. 18 AWG steel tie wire. Bands or steel tie wire to be located within 2 in. (51 mm) of each end of the jacket and spaced max 10 in. (254 mm) OC. Jacket installed with edge abutting surface of fill material (Item 9A) on top surface of floor or both surfaces of wall. Metal jacket to be used in addition to any other jacketing material which may be required on the pipe covering.
   G. **Pipe and Equipment Covering Materials* -** Nom 2 to 3 in. (51 to 76 mm) thick hollow cylindrical calcium silicate (min 14 pcf or 224 kg/m3) units sized to the outside diam of the pipe or tube. Pipe insulation secured with stainless steel bands or min 8 AWG stainless steel wire spaced max 12 in. (305 mm) OC. **When Item 3G is used, T Rating is 2 Hr.**

4. **Nonmetallic Penetrants -** One or more nonmetallic pipes, conduits or tubes to be installed within the opening. Annulus between penetrants and periphery of opening is min 1 in. (25 mm) to max 24 in. (609 mm). Separation between metallic and nonmetallic penetrants is min 6 in. (152 mm). Penetrants rigidly supported on both sides of floor or wall assembly. The following types and sizes of nonmetallic pipes, conduits or tubing may be used:
   A. **Polyvinyl Chloride (PVC) Pipe -** Nom 2 in. (51 mm) diam (or smaller) solid or cellular core Schedule 40 PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe -** Nom 2 in. (51 mm) diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.
   C. **Rigid Nonmetallic Conduit -** Nom 2 in. (51 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA 70).
   D. **Electrical Nonmetallic Tubing (ENT)+ -** Nom 2 in. (51 mm) diam (or smaller) corrugated wall ENT formed of polyvinyl chloride (PVC) installed in accordance with the National Electrical Code (NFPA 70).
   E. **Optical Fiber Raceway+ -** Nom 2 in. (51 mm) diam (or smaller) optical fiber raceway (innerduct). Optical fiber raceway installed in accordance with Article 770 of the National Electrical Code (NFPA 70).
   When Item 4 is used, the T Rating of the firestop system is 2 hr.
5. **Cables -** Nom 4 in. (102 mm) diam (or smaller) tight bundle of cables. Annulus between cable bundle and periphery of opening is min 0 in. (point contact) to max 24 in. (609 mm). Separation between cable bundle and metallic or nonmetallic penetrants shall be min 6 in. (152 mm). Cable bundle rigidly supported on both sides of floor or wall assembly. The following types and sizes of cables may be used:
   A. Max 1/C - 1000 kcmil cable with polyvinyl chloride (PVC) or cross-linked polyethylene (XLPE) insulation and jacket.
   B. Max 7/C - No. 12 AWG cable with PVC-nylon insulation and PVC jacket.
   C. Max 400 pair - No. 24 AWG copper conductor telephone cable with PVC insulation and jacket.
   D. Max RG/U coaxial cables with fluorinated ethylene jacket and insulation.
   E. Multiple fiber optic cables with PVC insulation.
   F. **Through Penetrating Products* -** Max 4/C with ground No. 2/O AWG **Metal-Clad Cable+.**
   AFC CABLE SYSTEMS INC
   When cables are used, T Rating is 1/2 hr.
6. **Cable Tray -** Max 30 in. (762 mm) wide by max 6 in. (152 mm) deep open ladder cable tray with channel-shaped side rails formed from min 0.060 in. (1.5 mm) thick (No. 16 MSG) galv steel or min 0.060 in. (1.5 mm) thick aluminum with rungs spaced max 9 in. (229 mm) OC. A max of two cable trays may be installed within the opening with a min vertical separation of 4 in. (102 mm) and a min horizontal separation of 1/4 in. (6 mm) between trays. Max vertical or horizontal separation is 24 in. (609 mm). Annulus between the cable tray and the periphery of the opening is min 0 in. (point contact) to max 24 in. (609 mm). Separation between cable tray and metallic or nonmetallic penetrants is min 6 in. (152 mm). Cable trays to be rigidly supported on both sides of the floor or wall assembly. Aggregate cross-sectional area of cables in cable tray not to exceed 40 percent of the cross-sectional area of the cable tray based on a max 3 in. (76 mm) cable loading depth within tray. Any combination of the cable types specified in Item 5 may be used. **When cable tray is used, T Rating is 1/2 hr.**
7. **Busway+ -** Nom 19 in. (483 mm) wide (or smaller) by 6 in. (152 mm) deep "I" shaped aluminum enclosure containing factory-mounted copper bars rated for 600 V, 5000 A or max 26 in. (660 mm) wide by max 6 in. (152 mm) deep "I" shaped aluminum enclosure containing factory-mounted aluminum bars rated for 600 V, 4000 A. A max of two busways may be installed within the opening with a min separation of 1 in. (25 mm) to max 24 in. (609 mm). The annular space between the busway and the periphery of the opening shall be a min 0 in. (point contact) to a max 24 in. (609 mm). Busways spaced min 6 in. (152 mm) from all other penetrants. Busway to be rigidly supported on both sides of floor or wall assembly. The busway shall bear the UL Listing Mark and shall be installed in accordance with all provisions of the National Electrical Code, NFPA 70. **When busway is used, the T Rating is 1/4 hr.**
8. **Air Conditioning (AC) Line Set -** One or more AC line sets installed within opening. Each AC line set consists of two pipes or tubes (Item 8A); tubing insulation (Item 8B) and a thermostat cable (Item 8C). The space between the AC line sets shall be min 2 in. (51 mm). The space between the AC line sets and the periphery of the opening shall be min 0 in. (point contact) to max 24 in. (609 mm). The AC line sets shall be spaced min 6 in. from uninsulated metallic penetrants and shall be rigidly supported on both sides of the floor or wall assembly.

8A. **Through Penetrant -** A max of two pipes or tubes to be installed in each AC line set. Of the two pipes or tubes, only one may have a nom diam greater than 1/2 in. (13 mm). The following types and sizes of through penetrants may be used:
   A. **Steel Pipe -** Nom 1 in. (25 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 1 in. (25 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Copper Pipe -** Nom 1 in. (25 mm) diam (or smaller) Regular (or heavier) copper pipe.
   D. **Copper Tube -** Nom 1 in. (25 mm) diam (or smaller) Type L (or heavier) copper tube.

8B. **Tube Insulation - Plastics# -** Nom 3/4 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The tube insulation may be installed on one max 3/4 in. (19 mm) diam pipe or tube in each AC line set. The space between the insulated and uninsulated pipes or tubes within each AC line set shall be 0 in. (point contact).
   See **Plastics** (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation meeting the above specifications and having a UL 94 Flammability Classification of 94SVA may be used.

8C. **Cable -** One 4 pair No. 18 AWG (or smaller) thermostat cable with polyvinyl chloride (PVC) insulation and jacket materials may be installed with each AC line set.
   When Item 8 is used, the T Rating of the firestop system is 1/4 hr.
9. **Steel Duct -** (Not Shown) Nom 12 in. (305 mm) diameter (or smaller).No. 30 GA (or heavier) steel duct installed within opening when opening contains no cables or cable tray. A max of two steel ducts may be installed within the through-opening. Ducts to be spaced min 4 in. (102 mm) apart and min 8 in. (203 mm) from insulated penetrants and nonmetallic penetrants. Annulus between the steel duct and the periphery of the opening shall be min 0 in. (point contact) to max 24 in. (0 to 609 mm). Steel ducts to be rigidly supported on both sides of floor or wall assembly. **When steel duct is used, the T Rating is 0 hr.**
10. **Firestop System -** The firestop system shall consist of the following items:
   A. **Packing Material -** Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool batt insulation tightly packed into opening. Packing material recessed from top surface of floor assembly or from both surfaces of wall or precast concrete units to accommodate the required thickness of fill material.
   B. **Fill, Void or Cavity Materials* - Sealant -** Min 1/2 in. (13 mm) depth of fill material applied within the annulus, flush with top surface of floor assembly or with both surfaces of the wall assembly. Additional fill material forced into interstices of grouped cables and grouped cables within cable trays. At point contact location between through penetrant and concrete, a min 3/8 in. (9.6 mm) diam of fill material shall be applied at through penetrant/concrete interface on top surface of floor or both surfaces of the wall.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant or SpecSeal LCI Sealant
   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**
   #Bearing the UL Recognized Components Mark
   +Bearing the UL Listing Mark

GENERAL NOTES:

1. Refer to section 07 84 00 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:
   · 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. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   · UL Fire Resistance Directory; Current Edition
   · NFPA 101 Life Safety Code
   · All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:
PROJECT_NAME:

PROJECT LOCATION:
PROJECT_LOCATION:

ARCHITECT/CONSULTANT:
ARCHITECT/CONSULTANT:

TITLE:
STI FIRESTOP SYSTEMS

Specified Technologies Inc.
210 Evans Way Somerville, NJ 08876
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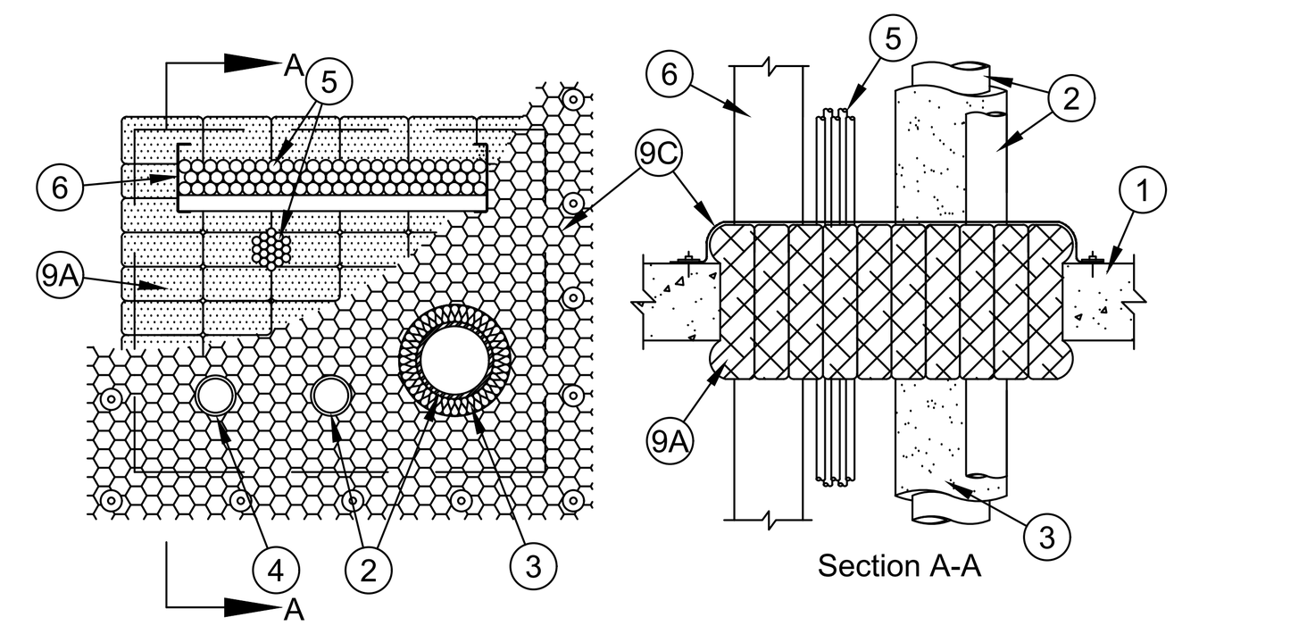
INDEX

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. C-AJ-8093**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 2 and 3 Hr (See Items 3, 4, 6 and 8)	F Ratings - 2 and 3 Hr (See Items 3, 4, 6 and 8)
T Ratings - 0, 1/4, 1/2, 3/4, 1-1/2 and 2 Hr (See Items 2 through 9)	FT Ratings - 0, 1/4, 1/2, 3/4, 1-1/2 and 2 Hr (See Items 2 through 9)
L Rating At Ambient - Less than 1, 1.6, and 3.2 CFM/sq ft (See Item 2, 4, 5, 6, 8 and 9B)	FH Ratings - 2 and 3 Hr (See Items 3, 4, 6 and 8)
L Rating at 400 F - Less than 1, 1.6, and 2 CFM/sq ft (See Item 2, 4, 5, 6, 8 and 9B)	FTH Ratings - 0, 1/4, 1/2, 3/4, 1-1/2 and 2 Hr (See Items 2 through 9)
	L Rating At Ambient - Less than 1, 1.6, and 3.2 CFM/sq ft (See Item 2, 4, 5, 6, 8 and 9B)
	L Rating at 400 F - Less than 1, 1.6, and 2 CFM/sq ft (See Item 2, 4, 5, 6, 8 and 9B)



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

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 area of opening is 18 sq ft with a max single dim of 6 ft (1.6 m) When any dim exceeds 3 ft (0.76 m), see Item 9C.
   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Metallic Penetrants -** One or more metallic pipes, conduits or tubes to be installed within the opening. Min 1/2 in. (13 mm) clearance between penetrants. Min clearance between penetrants and periphery of opening is 0 in. (point contact) (0 mm). Penetrants rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
   A. **Steel Pipe -** Nom 12 in. (305 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 12 in. (305 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Conduit -** Nom 6 in. (152 mm) diam (or smaller) rigid steel conduit, nom 4 in. (102 mm) diam (or smaller) electrical metallic tubing (EMT), or nom 4 in. (102 mm) diam (or smaller) steel **Flexible Metal Conduit#**.
   D. **Copper Pipe or Tube -** Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe or Type M (or heavier) copper tube.

Type of Metallic Penetrant	Max Diam of Throught Penetrant, in. (mm)	T Rating, Hr
Steel or Iron Pipe, Conduit or Copper Pipe or Tube	12 (305)	1/4
Steel or Iron Pipe, Conduit or EMT	4 (102)	3/4
Steel or Iron Pipe, Conduit or EMT	2 (51)	2

The L Rating is Less than 1 CFM/sq ft at ambient and 400 F for metallic penetrants.

3. **Pipe Insulation -** (Optional) - The following types of pipe insulations may be installed on one or more of the metallic pipes or tubing:
   A. **Pipe and Equipment Covering Materials* -** Max 2 in. (51 mm) thick hollow cylindrical heavy density (min 3.5 pcf or 57 kg/m3) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with 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 meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
   B. **Pipe Covering Materials* -** Max 2 in. (51 mm) thick unfaced mineral fiber pipe insulation having a nom density of 3.5 pcf (57 kg/m3) (or heavier) and sized to the outside diam of the pipe or tube. Pipe insulation secured with min 8 AWG steel wire spaced max 12 in. (305 mm) OC.
   INDUSTRIAL INSULATION GROUP L L C - High Temperature Pipe Insulation 1200, High Temperature Pipe Insulation BWT and High Temperature Pipe Insulation Thermaloc
   C. **Sheathing Material* -** Use in conjunction with Item 3B. Foil-scrim-kraft or all service jacket material shall be wrapped around the outer circumference of the pipe insulation (Item 3B) with the kraft side exposed. Longitudinal and transverse joints sealed with metal fasteners or butt tape.
   See **Sheathing Materials** (BVDV) category in the Building Materials Directory for names of manufacturers. Any sheathing 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.
   D. **Tube Insulation - Plastics## -** Max 1 in. (25 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. When tube insulation is used, nom diam of copper pipe or tube shall not exceed 4 in. (102 mm).
   See **Plastics** (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.
   E. **Pipe Covering Materials*- Cellular Glass Insulation -** Max 3 in. (76 mm) thick cellular glass units sized to the outside diam of the pipe or tube and supplied in nom 24 in. (610 mm) long half sections or nom 18 in. (457 mm) long segments. Pipe insulation installed on pipe in accordance with the manufacturer's instructions.
   PITTSBURGH CORNING CORP - FOAMGLAS
   F. **Metal Jacket -** Used in conjunction with Item 3E. Min 12 in. long jacket formed from min 0.010 in. (0.254 mm) thick aluminum sheet cut to wrap tightly around the pipe insulation with a min 2 in. (51 mm) lap and secured using bands and seals of a similar material or min No. 18 AWG steel tie wire. Bands or steel tie wire to be located within 2 in. (51 mm) of each end of the jacket and spaced max 10 in. (254 mm) OC. Jacket installed with edge abutting surface of fill material (Item 9A) on top surface of floor or both surfaces of wall. Metal jacket to be used in addition to any other jacketing material which may be required on the pipe covering.
   G. **Pipe and Equipment Covering Materials* -** Max 3 in. (76 mm) thick hollow cylindrical calcium silicate (min 10.0 pcf or 160 kg/m3) sized to the outside diam of the pipe or tube. Pipe insulation secured with min 8 AWG steel wire spaced max 12 in. (305 mm) OC. 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.
   When Items 3A or 3D are used, the F and FH Ratings are 2 hr. When other pipe covering materials are used, F and FH Ratings are 3 hr. When Item 3D is used, the T, FT and FTH Ratings are 3/4 hr. When other pipe covering materials are used, T, FT and FTH Ratings are 1-1/2 hr.

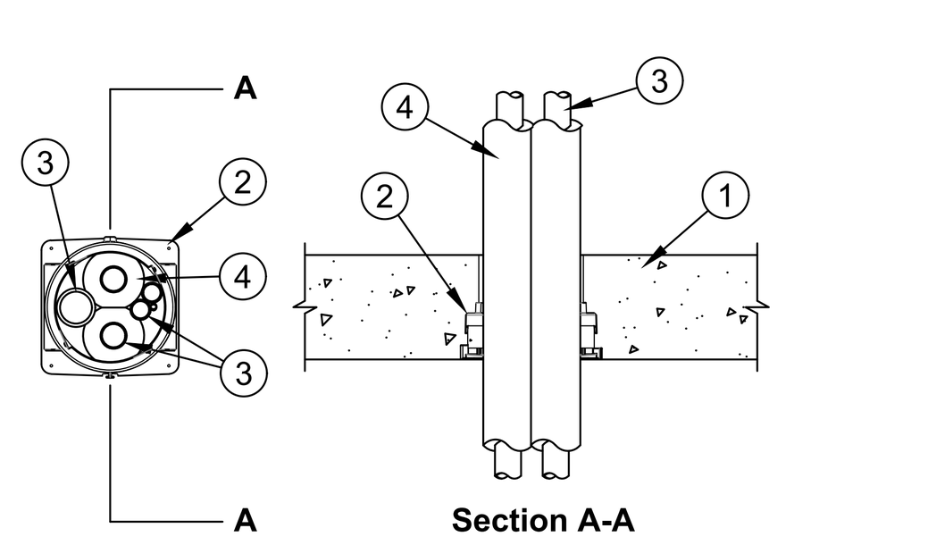
4. **Nonmetallic Penetrants -** One or more nonmetallic pipes, conduits or tubes to be installed within the opening. Min clearance between nonmetallic penetrants to be 1 in. (25 mm). Min clearance between nonmetallic and metallic penetrants to be 4 in. (102 mm) Min clearance between penetrants and periphery of opening is 0 in. (0 mm) (point contact). Penetrants rigidly supported on both sides of floor or wall assembly. The following types and sizes of nonmetallic pipes, conduits or tubing may be used:
   A. **Polyvinyl Chloride (PVC) Pipe -** Nom 2 in. (51 mm) diam (or smaller) solid or cellular core Schedule 40 PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe -** Nom 2 in. (51 mm) diam (or smaller) SDR17 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   C. **Rigid Nonmetallic Conduit+ -** Nom 2 in. (51 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA 70).
   D. **Electrical Nonmetallic Tubing (ENT)+ -** Nom 2 in. (51 mm) diam (or smaller) corrugated wall ENT formed of polyvinyl chloride (PVC) installed in accordance with the National Electrical Code (NFPA 70).
   E. **Optical Fiber Raceway (OFR)+ -** Nom 2 in. (51 mm) diam (or smaller) OFR formed of either polyvinyl chloride (PVC) or polyvinylidene fluoride (PVDF) installed in accordance with the National Electrical Code (NFPA 70).
   When Item 4 is used, the F, T, FT, FH and FTH Ratings of the firestop system are 2 hr. The L Rating is Less than 1 CFM/sq ft at ambient and 400 F.
5. **Cables -** Nom 4 in. (102 mm) diam (or smaller) tight bundle of cables. Cable bundle spaced min 4 in. (102 mm) from all other penetrants. Clearance between cable bundle and periphery of opening is 0 in. (0 mm) (point contact). Cable bundle rigidly supported on both sides of floor or wall assembly. The following types and sizes of cables may be used:
   A. Max 1/C - 350 kcmil cable with polyvinyl chloride (PVC), cross-linked polyethylene (XLPE) or plenum rated insulation and jacket.
   B. Max 7/C - No. 12 AWG cable with PVC-nylon insulation and PVC jacket.
   C. Max 100 pair - No. 24 AWG copper conductor telephone cable with PVC or plenum rated insulation and jacket.
   D. Max RG/U coaxial cables with fluorinated ethylene or plenum rated jacket and insulation.
   E. Multiple fiber optic cables with PVC or plenum rated insulation.
   F. **Through Penetrating Products* -** Max 2/C with ground No. 12 AWG Metal-Clad Cable+.
   AFC CABLE SYSTEMS INC
   When Item 5A or 5F is used, the T, FT and FTH Ratings are 1/2 hr. When other cables are used, T, FT and FTH Ratings are 3/4 hr. The L Rating is Less than 1.6 CFM/sq ft at ambient and 400 F.
6. **Cable Tray -** Max 30 in. (762 mm) wide by max 6 in. (152 mm) deep open ladder cable tray with channel-shaped side rails formed from min 0.060 in. (1.5 mm) thick (No. 16 MSG) galv steel or min 0.060 in. (1.5 mm) thick aluminum with rungs spaced max 9 in. (227 mm) OC. A max of two cable trays may be installed within the opening with a min separation of 8 in. (204 mm) between trays. The min space between the cable tray and the periphery of the opening is 0 in. (0 mm) (point contact). Cable trays to be rigidly supported on both sides of the floor or wall assembly. Aggregate cross-sectional area of cables in cable tray not to exceed 40 percent of the cross-sectional area of the cable tray based on a max 3 in. (76 mm) cable loading depth within tray. Any combination of the cable types specified in Item 5 may be used. **When width of cable tray exceeds 18 in. (457 mm), the F and FH Ratings are 2 hr. The L Rating is 3.2 CFM/sq ft at ambient and 2 at 400 F when putty is used (See Item 9B).**
7. **Busway+ -** (Not Shown) - Nom 19 in. (483 mm) wide (or smaller) by 5 in. (127 mm) deep "I" shaped aluminum enclosure containing factory-mounted copper bars rated for 600 V, 5000 A or aluminum bars rated for 600 V, 4000 A. A max two busways to be installed within the opening. The annular space between the busway and the periphery of the opening shall be a min 1/2 in. (13 mm) to a max 3-1/2 in. (89 mm). Busways spaced min 6 in. (152 mm) from all other penetrants. Busway to be rigidly supported on both sides of floor or wall assembly. The busway shall bear the UL Listing Mark and shall be installed in accordance with all provisions of the National Electrical Code, NFPA 70. **When busway is used, the T, FT and FTH Ratings are 0 hr.**
8. **Steel Duct -** (Not Shown) - Nom 18 in. (457 mm) diameter (or smaller) No. 28 GA (or heavier) steel duct installed within opening when opening contains no cable tray. A max of two steel ducts may be installed within the through-opening. Ducts to be spaced min 4 in. (102 mm) apart and min 8 in. (204 mm) from insulated penetrants and nonmetallic penetrants. The clearance between the steel duct and the periphery of the opening shall be min 0 in. (0 mm) (point contact). Steel ducts to be rigidly supported on both sides of floor or wall assembly. **When steel duct is used, the F and FH Ratings are 2 hr and the T, FT and FTH Ratings are 0 hr. The L Rating is Less than 1 CFM/sq ft at ambient and 400 F.**

9. **Firestop System -** The firestop system shall consist of the following items:
   A. **Fill, Void or Cavity Materials* - Pillows -** Nom 9 in. (227 mm) long by 4 to 6 in. (102 to 152 mm) wide by 1 to 3 in. (25 to 76 mm) thick plastic covered intumescent pillows. In floors, pillows to be installed lengthwise through opening and positioned to extend a maximum of 2-1/2 in. (64 mm) below the bottom plane of the floor. In walls, pillows to be installed lengthwise through opening and positioned to extend an equal distance from the approximate center line of the wall. Pillows tightly packed into the opening to fill the annular space between the annular space and the penetrating items.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Firestop Pillows
   B. **Fill, Void or Cavity Materials* - Sealant or Putty -** Min 1/2 in. (13 mm) depth of fill material applied at point contact locations between penetrating items and periphery of opening. Additional fill material forced into interstices of grouped cables and grouped cables within cable trays. **For L Ratings, apply nom 3/16 in. (4.8 mm) thick by 4-3/4 in. (121 mm) wide band of putty to top of cables in the cable tray.**
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series 100, 101, 102, 120, 129 or 105 Sealant, SpecSeal LCI Sealant, SpecSeal SIL300 Silicone Firestop Sealant, or SpecSeal Putty
   C. **Wire Mesh -** Nom 1 in. (25 mm) hexagonal wire mesh fabricated from min 20 ga galv steel wire cut to fit the contours of the penetrating items and the opening with a min 2 in. (51 mm) lap beyond the periphery of the opening. Wire mesh secured to both sides of floor or wall by means of 1/4 in. (6 mm) diam by 1-1/2 in. (38 mm) long steel concrete screws in conjunction with 1-1/4 in. (31 mm) diam steel fender washers spaced max 6 in. (152 mm) OC. Any joints within wire mesh shall overlap 2 in. (51 mm) and be secured together by means of No. 20 AWG steel wire spaced 6 in. (152 mm) OC. When both the length and width dimensions of the through opening are less than 36 in. (914 mm) and when the max space between penetrants or between the penetrant and the perimeter of the opening is less than 10 in. (254 mm), the wire mesh is optional. When the area of the opening exceeds 1296 sq in. (0.84 m2), the gauge of the steel wire mesh shall be increased to min 16 AWG.
   D. **Steel Straps -** (Not shown) - As an alternate to the wire mesh (Item 9C) in wall assemblies, min 1 in. (25 mm) wide by 0.015 in. (0.38 mm) thick steel banding straps sized to lap 2 in. (51 mm) beyond the periphery of the opening may be installed either horizontally or vertically between rows of penetrants with a max on center spacing of 4 in. (102 mm). Steel banding straps secured to concrete with 1/4 in. (6 mm) diam by 1-1/2 in. (38 mm) long steel concrete screws in conjunction with 1-1/4 in. (31 mm) diam steel fender washers.
   E. **Steel Plate -** (Not Shown) - As an alternate to Item 9C or 9D, min 28 GA (or heavier) steel plate sized to lap 2 in. (51 mm) beyond periphery of opening may be installed on minimum one side of floor or wall assembly on either side of assembly. Steel plate secured to concrete with 1/4 in. (6 mm) diam by 1-1/2 in. (38 mm) long steel concrete screws in conjunction with 1-1/4 in. (31 mm) diam steel fender washers. Fasteners spaced 1 in. (25 mm) from each corner and 8 in. (204 mm) center-to-center. **When steel plate is used, the T, FT and FTH Ratings are 0 hr.**

* Bearing the UL Classification Marking
#Bearing the UL Recognized Components Mark
+Bearing the UL Listing Mark
*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Classified by
Underwriters Laboratories, Inc.
to ASTM/UL1479 (ASTM E814)

System No. F-A-8036
F Rating - 3 Hr
T Rating - 1/2 Hr
L Rating At Ambient - Less Than 1 CFM/sq ft (See Items 3, 5 and 6)
L Rating At 400 F - Less Than 1 CFM/sq ft (See Items 3, 5 and 6)
W Rating - Class 1 (See Items 3, 5 and 6)



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 floor.
1A. **Alternate Floor Assembly -** (Not Shown) - The fire rated unprotected concrete and steel deck floor assembly shall be constructed of the material 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, as measured from the top plane of the steel floor units.
   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 the concrete pour or grouted into the concrete assembly in accordance with the accompanying installation instructions. The devices may be cut flush or extend above the top surface of the floor.
   SPECIFIED TECHNOLOGIES INC - SpecSeal CD200, CD201, CD202, CD200M, CD300, CD301, CD302, CD300M, CD400, CD401, CD402 or CD400M Cast In Firestop Device
2A. **Firestop Device* -** (Not Shown) - When Item 1A is used, a steel deck adapter kit consisting of steel plates and a nonmetallic extension tube is used in conjunction with Item 2. Install the deck adapter in accordance with the accompanying installation instructions.
   SPECIFIED TECHNOLOGIES INC - SpecSeal CD200DK, CD201DK, CD300DK, CD301DK, CD400DK or CD401DK Cast In Firestop Device Deck Adapter
2B. **Firestop Device* -** (Not Shown) - When the concrete thickness exceeds 8 in. (203 mm), a nonmetallic extension tube is used in conjunction with Item 2. Install the extension tube in accordance with the accompanying installation instructions.
   SPECIFIED TECHNOLOGIES INC - SpecSeal CD200X, CD300X, or CD400X Cast In Firestop Device Extension
3. **Through Penetrants -** Pipes, tubing or cable to be bundled within the device. The annular space between penetrants and the device is min 0 in. (point contact) to max 3/4 in. (19 mm). To achieve L or W Rating, the min annular space is 1/8 in. (3 mm) and the min spacing between penetrants is 1/8 in. (3 mm). Penetrants to be rigidly supported on both sides of floor assembly. The following types and sizes of penetrants may be used.

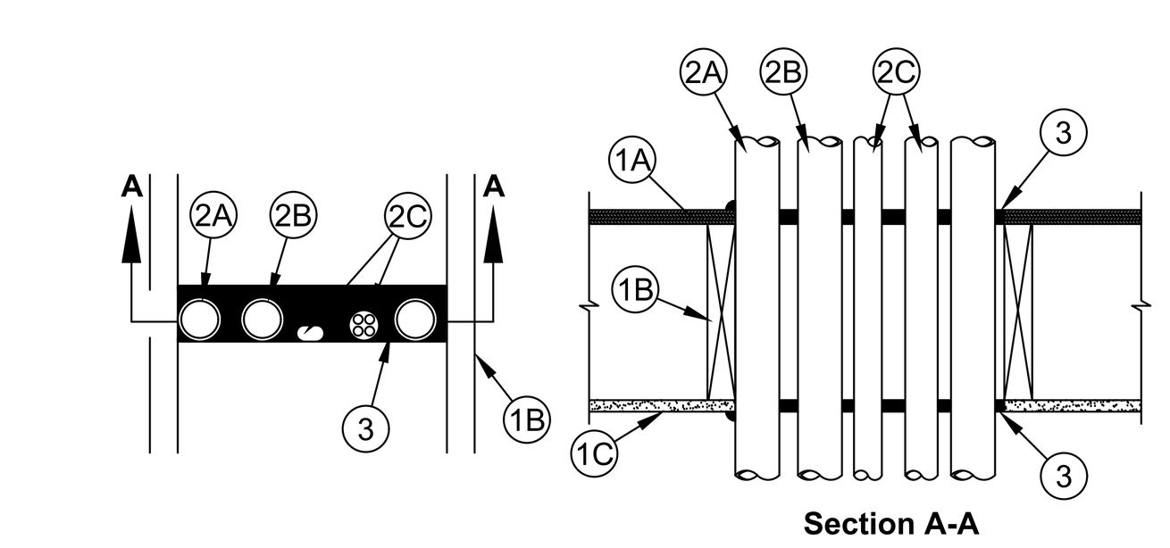
3A. **Metallic Pipes -** A max of four pipes or tube installed within the device. Of the four metallic penetrants, a max of two may have a nom diam greater than 1/2 in. (13mm). The following types and sizes of metallic pipes, conduits or tubing may be used:
   A. **Steel Pipe -** Nom 1 in. (25 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 1 in. (25 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Copper Pipe -** Nom 1 in. (25 mm) diam (or smaller) Regular (or heavier) copper pipe.
   D. **Copper Tube -** Nom 1 in. (25 mm) diam (or smaller) Type M (or heavier) copper tube.
3B. **Nonmetallic Pipes -** A max of one nonmetallic pipe or conduit may be used:
   A. **Polyvinyl Chloride (PVC) Pipe -** Nom 1-1/4 in. (32 mm) diam (or smaller) Schedule 40 solid core PVC pipe for use in vented (drain, waste or vent) or closed (process or supply) piping systems.
   B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe -** Nom 1-1/4 in. (32 mm) diam (or smaller) SDR 13.5 CPVC pipe for use in closed (process or supply) piping systems.
3C. **Cables -** A max of two 4 pair No. 18 AWG (or smaller) thermostat cables with PVC insulation and jacket.
4. **Tube Insulation - Plastics# -** Nom 3/4 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The tube insulation shall be installed on all metallic penetrants (Item 3A) having a nom diam greater than 1/2 in. (13 mm).
   See **Plastics** (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.
5. **Packing Material -** (Optional, Not Shown) - When L or W Rating is required, min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool firmly packed into the top of the device (Item 2) and recessed min 1/4 in. (6 mm) from top edge of device to accommodate for sealant (Item 6).
6. **Fill, Void, or Cavity Material* -** (Optional, Not Shown) - To achieve L or W Ratings, apply min 1/4 in. (6 mm) depth of sealant atop packing material (Item 5) flush with top edge of device.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SIL300 Sealant or SpecSeal Series SIL300SL Sealant

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

+Bearing the UL Recognized Component Mark

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. F-C-8029**

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



1. **Floor-Ceiling Assembly -** The 1 hr fire-rated wood joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Designs in the UL Fire Resistance Directory, as summarized below:
   A. **Flooring System -** Lumber or plywood subfloor with finish floor of lumber, plywood or **Floor Topping Mixture*** as specified in the individual Floor-Ceiling Design. Max area of rectangular opening cut in flooring is 43-1/2 sq in. (0.028 m2) with a max width dimension of 3 in. (76 mm) and with a max length dimension of 14-1/2 in. (368 mm). Longer dimension of rectangular opening to be perpendicular to wood joist direction.
   B. **Wood Joists -** Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or **Structural Wood Members*** with bridging as required and with ends firestopped.
   C. **Gypsum Board* -** Thickness, type, number of layers and fasteners as required in the individual Floor-Ceiling Design. Max area of rectangular opening cut in gypsum board ceiling is 43-1/2 sq in. (0.028 m2) with a max width dimension of 3 in. (76 mm) and with a max length dimension of 14-1/2 in. (368 mm).
1A. **Chase Wall -** (Optional, Not Shown) - The through penetrants (Item 2) may be routed through a 1 hr fire rated single, double or staggered wood stud/gypsum board chase wall. Depth of chase wall stud cavity to be min 1/2 in. (13 mm) greater than width of opening cut in sole and top plates to accommodate the through penetrants. The chase wall shall be constructed of the materials and in the manner specified in the individual U300 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs -** Nom 2 by 4 in. (51 by 102 mm), 2 by 6 in. (51 by 152 mm) or double nom 2 by 4 in. (51 by 102 mm) lumber studs.
   B. **Sole Plate -** Nom 2 by 4 in. (51 by 102 mm), 2 by 6 in. (51 by 152 mm) or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max area of rectangular opening cut in sole plate is 43-1/2 sq in. (0.028 m2) with a max width dimension of 3 in. (76 mm) and with a max length dimension of 14-1/2 in. (368 mm).

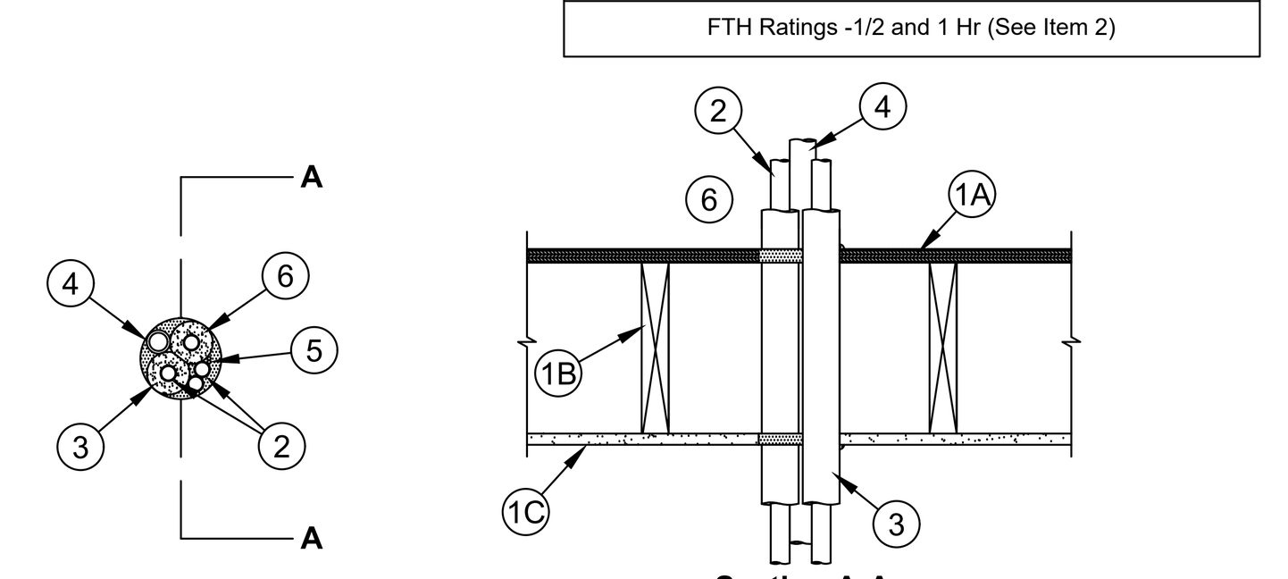
   C. **Top Plate -** The double top plate shall consist of two nom 2 by 4 in. (51 by 102 mm), two nom 2 by 6 in. (51 by 152 mm) or two sets of parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max area of rectangular opening cut in top plate is 43-1/2 sq in. (0.028 m2) with a max width dimension of 3 in. (76 mm) and with a max length dimension of 14-1/2 in. (368 mm).
   D. **Gypsum Board* -** Thickness, type, number of layers and fasteners shall be as specified in the individual Wall and Partition Design.
2. **Through Penetrants -** One or more metallic or nonmetallic pipes, conduits, tubing or cables to be installed either concentrically or eccentrically within the opening. Min separation between penetrants to be 1 in. (25 mm). Annular space between the penetrants and the periphery of the opening shall be min 0 in. (point contact) to max 1 in. (25 mm). Penetrants to be rigidly supported on both sides of floor-ceiling assembly. The following types and sizes of through penetrants may be used:
   A. **Metallic Penetrants -** The following types and sizes of metallic pipes, conduits or tubes may be used:
   A1. **Steel Pipe -** Nom 2 in. (51 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
   A2. **Iron Pipe -** Nom 2 in. (51 mm) diam (or smaller) cast or ductile iron pipe.
   A3. **Copper Pipe or Tubing - -** Nom 2 in. (51 mm) diam (or smaller) Type L (or heavier) copper tube or Regular (or heavier) copper pipe.
   A4. **Conduit -** Nom 2 in. (51 mm) diam (or smaller) rigid steel conduit, electrical metallic tubing (EMT) or flexible steel or aluminum conduit.
   B. **Nonmetallic Penetrants -** The following types and sizes of nonmetallic pipes, conduits or tubes may be used:
   B1. **Polyvinyl Chloride (PVC) Pipe -** Nom 2 in. (51 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.
   B2. **Chlorinated Polyvinyl Chloride (CPVC) Pipe -** Nom 2 in. (51 mm) diam (or smaller) SDR11 CPVC pipe for use in closed (process or supply) piping systems.
   B3. **Rigid Nonmetallic Conduit (RNC)+ -** Nom 2 in. (51 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA 70).
   B4. **Electrical Nonmetallic Tubing (ENT)+ -** Nom 2 in. (51 mm) diam (or smaller) PVC tubing installed in accordance with the National Electrical Code (NFPA 70).
   B5. **Cross Linked Polyethylene (PEX) Tubing -** Nom 1 in. (25 mm) diam (or smaller) SDR 9 PEX tubing for use in closed (process or supply) piping systems.
   C. **Cables -** The following types of cables may be used:
   C1. Max 200 pair No. 24 AWG (or smaller) copper conductor telecommunication cable with PVC insulation and jacketing.
   C2. Max 3/C No. 3/0 AWG (or smaller) aluminum or copper conductor SER cable with PVC insulation and jacketing.
   C3. Max 3/C with ground No. 8 AWG (or smaller) Type NM (Romex) nonmetallic sheathed cable with PVC insulation and jacketing.
   C4. Max 7/C No. 12 AWG (or smaller) power/control cables with PVC insulation and jacketing.
   C5. Max 4 pair No. 24 AWG (or smaller) copper conductor data cable with PVC insulation and jacketing.
   C6. Max RG/U coaxial cable with copper conductor and fluorinated ethylene insulation and jacket.
   C7. Max 4 pair No. 18 AWG (or smaller) copper conductor instrumentation cable with PVC insulation and jacketing.
   C8. Fiber optic cable with PVC insulation and jacketing.
   C9. **Through-Penetrating Products* -** Max 4/C with ground No. 2/0 AWG (or smaller) aluminum or copper conductor, aluminum or steel jacketed Metal-Clad+ or Armored-Clad+ cable.
   The T Rating is 3/4 hr unless copper pipe or tube is used. When copper pipe of tube is used, the hourly T Rating is 1/2 hr.
3. **Fill, Void or Cavity Material* - Sealant -** Min 3/4 in. (19 mm) thickness of fill material applied within the annulus, flush with the top surface of the floor or chase wall sole plate. Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with bottom surface of gypsum board ceiling or chase wall top plate. Min 1/4 in. (6 mm) diam bead of fill material applied at point contact location on the top surface of floor or chase wall sole plate and at the penetrant/ceiling or penetrant/chase wall top plate interface.
   SPECIFIED TECHNOLOGIES INC - SpecSeal LCI Sealant or Type WF300 Firestop Caulk

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

+Bearing the UL Listing Mark

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. F-C-8021**

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



1. **Floor-Ceiling Assembly -** The 1 hr fire-rated wood joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Designs in the UL Fire Resistance Directory, as summarized below:
   A. **Flooring System -** Lumber or plywood subfloor with finish floor of lumber, plywood or **Floor Topping Mixture*** as specified in the individual Floor-Ceiling Design. Max diam of opening is 4-1/2 in. (114 mm).
   B. **Wood Joists -** Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or **Structural Wood Members*** with bridging as required and with ends firestopped.
   C. **Gypsum Board* -** Thickness, type, number of layers and fasteners as required in the individual Floor-Ceiling Design. Max diam of opening is 4-1/2 in. (114 mm).
1A. **Chase Wall -** (Optional, Not Shown) - The through penetrant (Item 2) may be routed through a single, double or staggered wood stud/gypsum board chase wall. Depth of chase wall stud cavity to be min 1/2 in. (13 mm) greater than diameter of opening cut in sole and top plates to accommodate the through penetrant (Item 2). The chase wall shall include the following construction features:
   A. **Studs -** Nom 2 by 4 in. (51 by 102 mm), 2 by 6 in. (51 by 152 mm) or double nom 2 by 4 in. (51 by 102 mm) lumber studs.
   B. **Sole Plate -** Nom 2 by 4 in. (51 by 102 mm), 2 by 6 in. (51 by 152 mm) or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max diam of opening is 4-1/2 in. (114 mm).
   C. **Top Plate -** The single or double top plate shall consist of one or two nom 2 by 4 in. (51 by 102 mm) or one or two nom 2 by 6 in. (51 by 152 mm) or one or two sets of parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max diam of opening is 4-1/2 in. (114 mm).
   D. **Gypsum Board* -** Min 1/2 in. (13 mm) thick rated or nonrated gypsum board.
2. **Through Penetrant -** One or more metallic pipes, conduits or tubing to be installed either concentrically or eccentrically within the opening. Pipes, conduits or tubing to be spaced min 0 in. (0 mm) (point contact) to max 1 in. (25 mm) apart. The space between the pipes, conduits or tubing and the periphery of the opening shall be min 0 in. (0 mm) (point contact) to max 1 in. (25 mm). Penetrants to be rigidly supported on both sides of floor-ceiling assembly. The following types and sizes of metallic pipe, conduits or tubing may be used:
   A. **Steel Pipe -** Nom 3/4 in. (19 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.

   B. **Iron Pipe -** Nom 3/4 in. (19 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Conduit -** Nom 3/4 in. (19 mm) diam (or smaller) steel conduit or steel electrical metallic tubing.
   D. **Copper Pipe or Tube -** Nom 3/4 in. (19 mm) diam (or smaller) Regular (or heavier) copper pipe or Type L (or heavier) copper tube.
   When metallic pipe, conduit or tubing without insulation is used, T, FT and FTH Ratings are 1/2 hr. Otherwise, T, FT and FTH Ratings are 1 hr.
3. **Tube Insulation - Plastics# -** Nom 1 in. (25 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. Tube insulation to be installed on a max of two metallic pipes or tubes. Insulated pipe or tubing to be spaced 0 in. (0 mm) (point contact) to 1 in. (25 mm) from other through penetrants (Items 2, 4 and 5). The space between the insulated pipe or tube and the periphery of the opening shall be min 0 in. (0 mm) (point contact) to max 1 in. (25 mm).
   See **Plastics** (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.
4. **Nonmetallic Through Penetrant -** One nonmetallic pipe, conduit or tube to be installed within the firestop system. Pipe, conduit or tube to be spaced min 0 in. (0 mm) (point contact) to max 1 in. (25 mm) from the insulated through penetrants and min 1/2 in. (13 mm) to max 1 in. (25 mm) from non-insulated through penetrants. The space between the pipe, conduit or tube and the periphery of the opening shall be min 0 in. (0 mm) (point contact) to max 1 in. (25 mm). Pipe, conduit or tube to be rigidly supported on both sides of floor-ceiling assembly. One of the following types and sizes of nonmetallic through penetrants may be used:
   A. **Polyvinyl Chloride (PVC) Pipe -** Nom 1-1/4 in. (32 mm) diam (or smaller) Schedule 40 solid or cellular core PVC pipe for use in vented (drain, waste or vent) or closed (process or supply) piping system.
   B. **Chlorinated Polyvinyl (CPVC) Pipe -** Nom 1-1/4 in. (32 mm) diam (or smaller) SDR17 CPVC pipe for use in vented (drain, waste or vent) or closed (process or supply) piping system.
   C. **Rigid Nonmetallic Conduit+ -** Nom 1-1/4 in. (32 mm) diam (or smaller) PVC conduit installed in accordance with Article 347 of the National Electrical Code (NFPA 70).
   D. **Electrical Nonmetallic Tubing (ENT) -** Nom 1-1/4 in. (32 mm) diam (or smaller) PVC tubing installed in accordance with Article 331 of the National Electrical Code (NFPA 70).
   E. **Cross Linked Polyethylene (PEX) Tubing -** Nom 1 in. (25 mm) diam (or smaller) SDR9 PEX tubing for use in closed (process or supply) piping systems.
5. **Cables -** Max two 4 pair No. 18 AWG (or smaller) cables with PVC insulation and jacketing. Cables to be spaced min 0 in. (0 mm) (point contact) to max 1 in. (25 mm) from the other through penetrants. The space between the cables and the periphery of the opening shall be min 0 in. (0 mm) (point contact) to max 1 in. (25 mm). Cables to be rigidly supported on both sides of the floor-ceiling assembly.
6. **Fill, Void or Cavity Material* - Caulk or Sealant -** Min 3/4 in. (19 mm) thickness of fill material applied within the annulus, flush with the top surface of the floor or sole plate. Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with bottom surface of ceiling or top plate. Additional fill material forced into grouped penetrant interstices to max extent possible. At point contact locations, min 1/4 in. (6 mm) diam bead of fill material applied at grouped penetrant bundle/subfloor or sole plate interface and at grouped penetrant bundle/ceiling or top plate interface.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant, SpecSeal LCI Sealant or Type WF300 Caulk

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

#Bearing the UL Recognized Component Mark

GENERAL NOTES:

1. Refer to section 07 84 00 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:
   · 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. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   · UL Fire Resistance Directory; Current Edition
   · NFPA 101 Life Safety Code
   · All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:
PROJECT_NAME:

PROJECT LOCATION:
PROJECT_LOCATION:

ARCHITECT/CONSULTANT:
ARCHITECT/CONSULTANT:

TITLE:
STI FIRESTOP SYSTEMS

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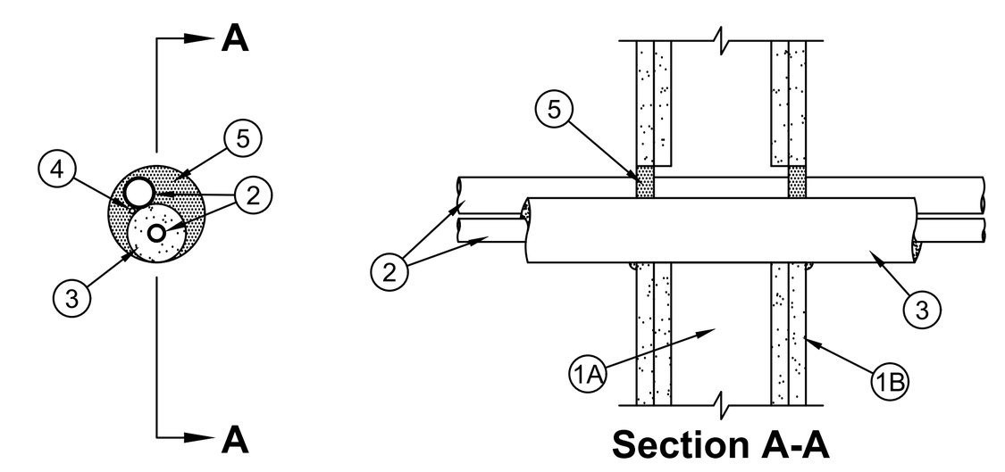
INDEX

Classified by
Underwriters Laboratories, Inc.
to ASTM/UL1479 (ASTM E814)

System No. W-L-8025
F Ratings - 1 and 2 Hr (See Item 1)
T Rating - 1/4 Hr



1. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features.
   A. **Studs -** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.
   B. **Gypsum Board* -** Thickness, type, number of layers and fasteners as specified in the individual Wall and Partition Design. Max diam of opening is 3-1/2 in. (89 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 Penetrant -** A max of two pipes or tubes to be installed within the opening. Of the two pipes or tubes, only one may have a nom diam greater than 1/2 in. (13 mm). Annular space between pipes or tubing and periphery of opening shall be min 0 in. (point contact) to max 1-1/2 in. (38 mm). Separation between uninsulated pipes or tubes shall be min 0 in. (point contact) to max 1-1/2 in. (38 mm). Pipes or tubing to be rigidly supported on both sides of the wall assembly. The following types and sizes of through penetrants may be used:
   A. **Steel Pipe -** Nom 1 in. (25 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 1 in. (25 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Copper Pipe -** Nom 1 in. (25 mm) diam (or smaller) Regular (or heavier) copper pipe.
   D. **Copper Tube -** Nom 1 in (25 mm) diam (or smaller) Type L (or heavier) copper tube.
3 **Tube Insulation - Plastics# -** Nom 3/4 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The tube insulation may be installed on a max of one pipe or tube. The annular space between the insulated penetrating item and the periphery of the opening shall be min 0 in. (point contact) to max 1/2 in. (13 mm). The space between insulated and uninsulated pipes or tubing shall be 0 in. (point contact).
   See **Plastics** (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.
4. **Cable -** One 4 pair No. 18 AWG (or smaller) thermostat cable with polyvinyl chloride (PVC) insulation and jacket materials. Cable to be spaced min 0 in. (point contact) to max 1/2 in. (13 mm) from the other penetrants. The space between the cable and the periphery of the opening shall be min 0 in. (point contact) to max 1/2 in. (13 mm). Cable to be rigidly supported on both sides of wall assembly.

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W-L-8025 PAGE 1 OF 2

5. **Fill, Void or Cavity Material*- Sealant -** Min 5/8 in (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall assembly. At point contact location, min 1/4 in. (6 mm) diam bead of fill material applied at through penetrant/gypsum board interface on both surfaces of wall. Additional fill material forced into grouped penetrant interstices to max extent possible.
   SPECIFIED TECHNOLOGIES INC - SpecSeal LCI Sealant or Type WF300 Firestop Caulk (wood stud walls only).
   * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.
   #Bearing the UL Recognized Component Marking

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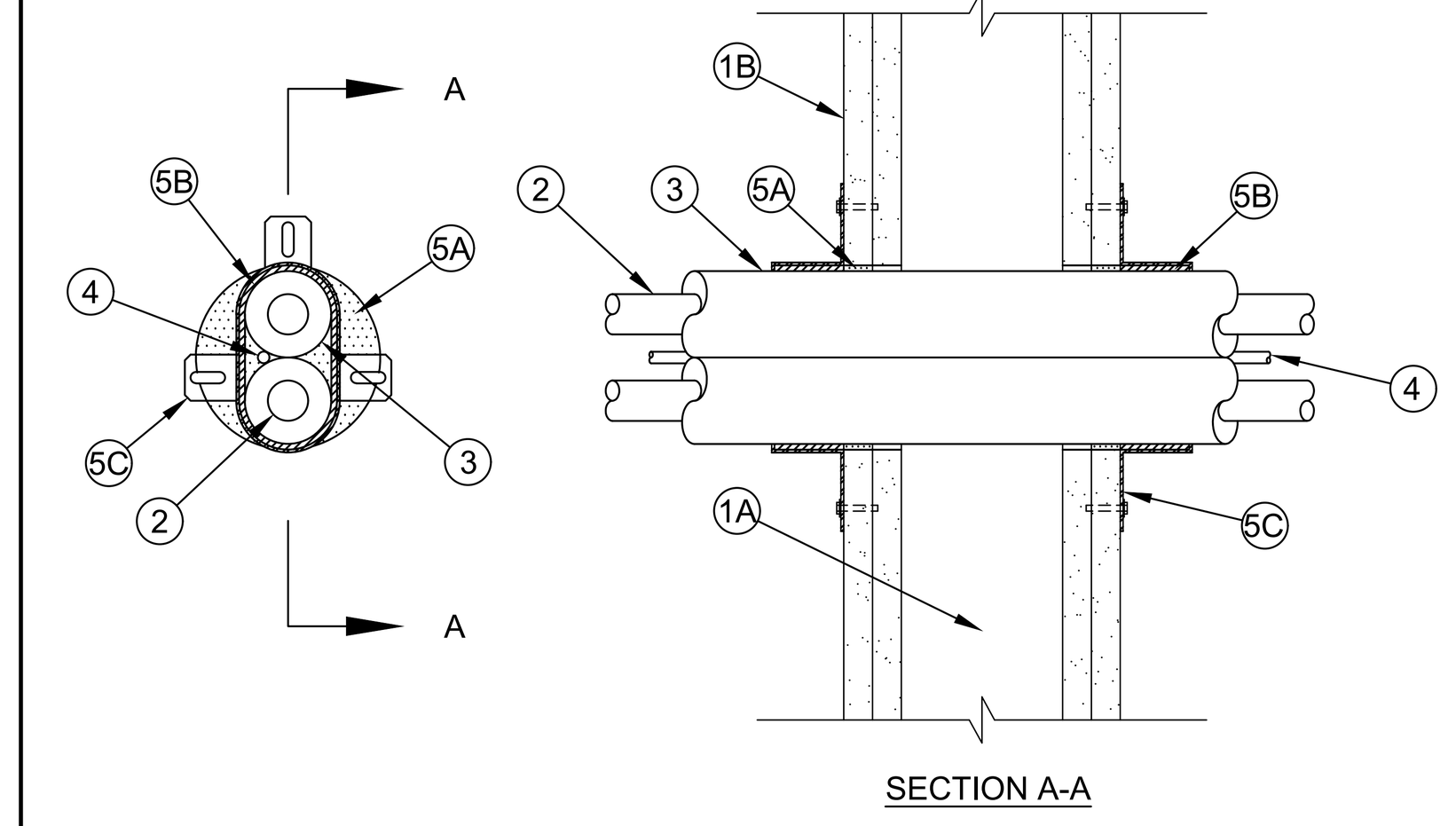
W-L-8025 PAGE 2 OF 2

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-L-8117**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Rating - 1 and 2 Hr (See Item 1)
T Rating - 0 or 3/4 Hr (See Item 1)	FT Rating - 0 or 3/4 Hr (See Item 1)
	FH Rating - 1 and 2 Hr (See Item 1)
	FTH Rating - 0 or 3/4 Hr (See Item 1)



1. **Wall Assembly -** The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, V300, U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs -** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.
   B. **Gypsum Board* -** Thickness, type, number of layers, fastener type and sheet orientation shall be as specified in the individual U300, V300, U400 , V400 or W400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 4 in. (102 mm).
   The F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall in which it is installed. When the F rating is 1 hour the T, FT and FTH Ratings are 0 HR.

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W-L-8117 PAGE 1 OF 2

2. **Through Penetrants -** A max of two pipes, conduits or tubing to be installed within the opening. The annular space between the pipes, conduits or tubing and the periphery of the opening shall be min 1/8 in. (3.2 mm) to max 2 in. (51 mm). The annular space between the pipes, conduits or tubing and other penetrants shall be a min 0 in. (point contact) to a max 1/8 in. (3.2 mm). Pipes, conduits or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
   A. **Steel Pipe -** Nom 3/4 in. diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 3/4 in. diam (or smaller) cast or ductile iron pipe.
   C. **Conduit -** Nom 3/4 in. diam (or smaller) rigid steel conduit or steel electrical metallic tubing (EMT).
   D. **Copper Pipe -** Nom 3/4 in. diam (or smaller) regular (or heavier) copper pipe.
   E. **Copper Tube -** Nom 3/4 in. diam (or smaller) Type L (or heavier) copper tube.
3. **Pipe Insulation - Foamed Plastic* -** Nom 1/2 in. (13 mm) thick polyethylene (PE) foamed plastic insulation. The insulation may be preassembled on a max of two pipes or tubes.
   See **Foamed Plastic** (BRYX) category in the Building Materials Directory for names of manufacturers. Any foamed plastic pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less may be used.
4. **Cables -** Max four pair No. 18 AWG (or smaller) copper conductor thermostat cable with PVC insulation and jacket. Cable shall be spaced 0 in. (point contact) to max 1/8 in. (3.2 mm) from insulated and bare penetrants. The annular space between the cable and the periphery of the opening shall be min 1/8 in. (3.2 mm) to max 2 in. (51 mm). Cable rigidly supported on both sides of wall assembly.
5. **Firestop System -** The firestop system shall consist of the following:
   A. **Fill, Void or Cavity Material* - Sealant -** Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with both surfaces of the wall. Additional fill material forced into grouped penetrant interstices to max extent possible.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant or SpecSeal LCI Sealant
   B. **Fill, Void or Cavity Material* - Wrap Strip -** Nom 1/8 in. (3.2 mm), 3/16 in. (4.8 mm) or 1/4 in. (6.4 mm) thick intumescent material faced on both sides with a plastic film, supplied in 1-1/2 in. (38 mm) or 2 in. (51 mm) wide strips. One layer of wrap strip encircled around penetrant bundle with ends butted and held in place with masking tape. The edge of the wrap strips shall abut the surface of the wall on each side of the wall.
   SPECIFIED TECHNOLOGIES INC - SpecSeal RED, RED2, BLU or BLU2 Wrap Strip
   C. **Steel Collar -** Collar fabricated from coils of precut 0.016 in. (0.4 mm) thick (30 MSG) galv sheet steel available from wrap strip manufacturer. Collar shall be nom 1-1/2 in. (38 mm) to 2 in. (51 mm) deep, dependent upon width of wrap strip, with min three 1 in. (25 mm) wide by 2 in. (51 mm) long anchor tabs for attachment to the wall. Retainer tabs, 3/4 in. (19 mm) wide tapering down to 1/4 in. (6 mm) wide and located opposite the anchor tabs, are folded 90 degrees toward through-penetrant surface to maintain the annular space around the through-penetrant and to retain the wrap strips. Steel collar wrapped around wrap strips and penetrant bundle with a 1 in. (25 mm) wide overlap along its perimeter joint. Steel collar tightened around wrap strips and penetrant bundle using min 1/2 in. (13 mm) wide by 0.028 in. (0.71 mm) thick stainless steel hose clamp installed at midheight of the collar or using three symmetrically located No. 8 steel sheet metal screws. Collar secured to wall surface by means of 1/8 in. (3.2 mm) diam by 1-3/4 in. (44 mm) long steel molly bolts or toggle bolts in conjunction with min 1-1/4 in. (32 mm) diam steel fender washers. Three fasteners symmetrically located, are required on each side of the wall.
   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

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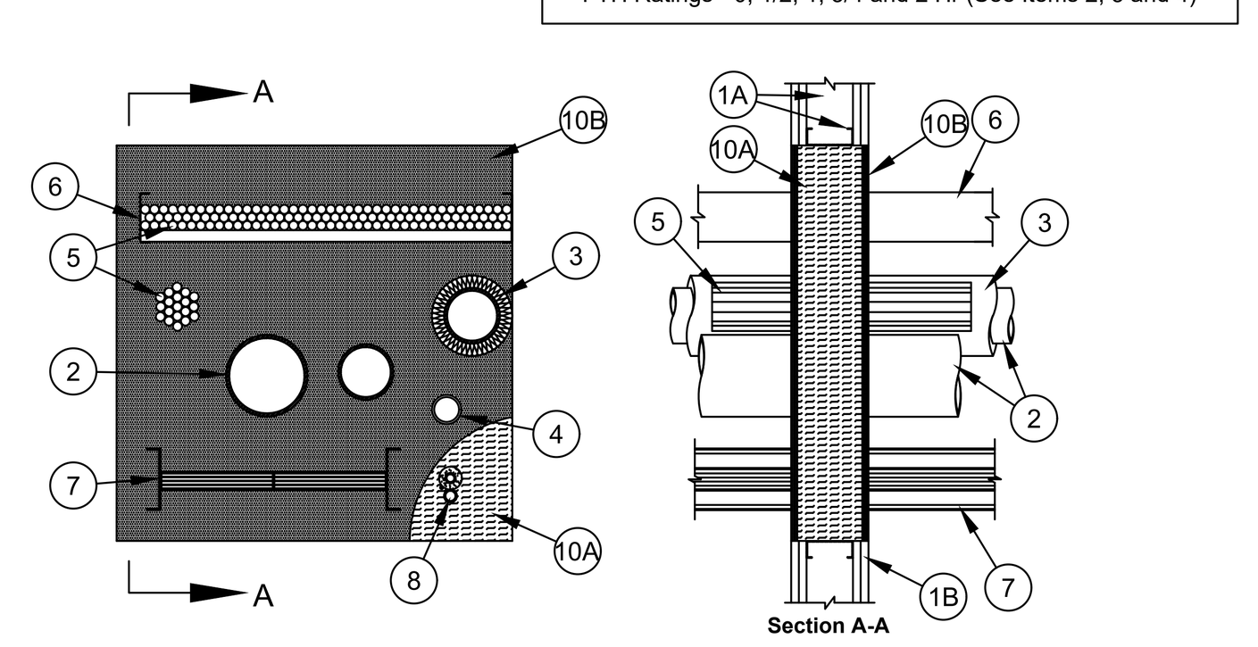
W-L-8117 PAGE 2 OF 2

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-L-8026**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr	F Ratings - 1 and 2 Hr
T Ratings - 0, 1/2, 1, 3/4 and 2 Hr (See Items 2, 3 and 4)	FT Ratings - 0, 1/2, 1, 3/4 and 2 Hr (See Items 2, 3 and 4)
	FH Ratings - 1 and 2 Hr
	FTH Ratings - 0, 1/2, 1, 3/4 and 2 Hr (See Items 2, 3 and 4)



1. **Wall Assembly -** The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs -** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm). OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC. Additional studs to be installed horizontally to form a rectangular box around the opening.
   B. **Gypsum Board* -** Thickness, type, number of layers and fasteners as specified in the individual Wall and Partition Design. When wood studs are used, interior of through opening to be lined with sheets of gypsum board around entire periphery to a total thickness of 5/8 in. (16 mm) or 1-1/4 in. (32 mm) for 1 or 2 hr wall assemblies, respectively. Max area of opening is 7 ft2 (0.66 m2)with a max height dimension of 32 in. (813 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. **Metallic Penetrants -** One or more metallic pipes, conduits or tubes to be installed within the opening. Annulus between penetrants is min 0 in. (point contact) to max 24 in. (609 mm). Annulus between penetrants and periphery of opening is 0 in. (point contact) to max 24 in. (609 mm). Penetrants rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
   A **Steel Pipe -** Nom 12 in. (305 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 12 in. (305 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Conduit -** Nom 6 in. (152 mm) diam (or smaller) rigid steel conduit, nom 4 in. (102 mm) diam (or smaller) electrical metallic tubing (EMT), or nom 4 in. (102 mm) diam (or smaller) steel Flexible Metal Conduit#.
   D **Copper Pipe or Tube -** Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe or Type M (or heavier) copper tube.

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W-L-8026 PAGE 1 OF 4

Type of Metallic Penetrant	Max Diam of Through Penetrant, in. (mm)	T Rating Hr
Steel or Iron Pipe, Conduit	12 (305)	0
Copper Pipe or Tube	6 (152)	0
Steel or Iron Pipe, Conduit or EMT	4 (102)	1/4
Steel or Iron Pipe, Conduit or EMT	2 (51)	1/2
Steel or Iron Pipe, Conduit or EMT	1 (25)	3/4

3. **Pipe Insulation -** (Optional) - One or more max 4 in. (102 mm) metallic pipes or tubes may be insulated. Annulus between penetrants is min 0 in. (point contact) to max 26 in. (660 mm). Annulus between penetrants and periphery of opening is 0 in. (point contact) to max 24 in. (609 mm). The annular space between metallic pipes, conduit and tubes and insulated pipes and tubes shall be a min 1/2 in. (13 mm) to max 24 in. (609 mm). Penetrants rigidly supported on both sides of floor or wall assembly. The following types of pipe insulation may be used
   A. **Pipe and Equipment Covering Materials* -** Nom 1 in. (25 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 self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. **When Item 3A is used, T Rating is 3/4 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.
   B. **Pipe Covering Materials* -** Nom 2 in. (51 mm) thick unfaced mineral fiber pipe insulation having a nom density of 3.5 pcf (56 kg/m3) (or heavier) and sized to the outside diam of the pipe or tube. Pipe insulation secured with min 8 AWG steel wire spaced max 12 in. (305 mm) OC. **When Item 3B is used, T Rating is 2 Hr.**
   INDUSTRIAL INSULATION GROUP L L C - High Temperature Pipe Insulation 1200, High Temperature Pipe Insulation BWT and High Temperature Pipe Insulation Thermaloc
   C. **Sheathing Material* -** Use in conjunction with Item 3B. Foil-scrim-kraft or all service jacket material shall be wrapped around the outer circumference of the pipe insulation (Item 3B) with the kraft side exposed. Longitudinal and transverse joints sealed with metal fasteners or butt tape.
   See **Sheathing Materials** (BVDV) category in the Building Materials Directory for names of manufacturers. Any sheathing 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.
   D **Tube Insulation - Plastics# -** Nom 3/4 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. **When Item 3D is used, T Rating is 1/2 Hr.**
   See **Plastics** (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.
   E **Pipe Covering Materials* - Cellular Glass Insulation -** Nom 2 to 3 in. (51 to 76 mm) thick cellular glass units sized to the outside diam of the pipe or tube and supplied in nom 24 in. (610 mm) long half sections or nom 18 in.(457 mm) long segments. Pipe insulation installed on pipe in accordance with the manufacturer's instructions. **When Item 3E is used, T Rating is 2 Hr.**
   PITTSBURGH CORNING CORP - FOAMGLAS
   F **Metal Jacket -** Used in conjunction with Item 3E. Min 12 in. (305 mm) long jacket formed from min 0.010 in. (0.25 mm) thick aluminum sheet cut to wrap tightly around the pipe insulation with a min 2 in. (51 mm) lap and secured using bands and seals of a similar material or min No. 18 AWG steel tie wire. Bands or steel tie wire to be located within 2 in. (51 mm) of each end of the jacket and spaced max 10 in. (254 mm) OC. Jacket installed with edge abutting surface of fill material (Item 9A) on both surfaces of wall. Metal jacket to be used in addition to any other jacketing material which may be required on the pipe covering.
   G. **Pipe and Equipment Covering Materials* -** Nom 2 to 3 in. (51 to 76 mm) thick hollow cylindrical calcium silicate (min 14 pcf or 224 kg/m3) units sized to the outside diam of the pipe or tube. Pipe insulation secured with stainless steel bands or min 8 AWG stainless steel wire spaced max 12 in. (305 mm) OC. **When Item 3G is used, T Rating is 2 Hr.**

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W-L-8026 PAGE 2 OF 4

4. **Nonmetallic Penetrants -** One or more nonmetallic pipes, conduits or tubes to be installed within the opening. Annulus between penetrants and periphery of opening is min 1 in. (25 mm) to max 24 in. (609 mm). Separation between metallic and nonmetallic penetrants is min 6 in. (152 mm). Penetrants rigidly supported on both sides of wall assembly. The following types and sizes of nonmetallic pipes, conduits or tubing may be used:
   A. **Polyvinyl Chloride (PVC) Pipe -** Nom 2 in. (51 mm) diam (or smaller) solid or cellular core Schedule 40 PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe -** Nom 2 in. (51 mm) diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.
   C. **Rigid Nonmetallic Conduit+ -** Nom 2 in. (51 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA 70).
   D. **Electrical Nonmetallic Tubing (ENT)+ -** Nom 2 in. (51 mm) diam (or smaller) corrugated wall ENT formed of polyvinyl chloride (PVC) installed in accordance with the National Electrical Code (NFPA 70).
   E. **Optical Fiber Raceway+ -** Nom 2 in. (51 mm) diam (or smaller) optical fiber raceway (innerduct). Optical fiber raceway installed in accordance with the National Electrical Code (NFPA 70).
   When Item 4 is used, the T Rating of the firestop system is 2 hr.
5. **Cables -** Nom 4 in. (102 mm) diam (or smaller) tight bundle of cables. Annulus between cable bundle and periphery of opening is min 0 in. (point contact) to max 24 in. (609 mm). Separation between cable bundle and metallic or nonmetallic penetrants shall be min 6 in. (152 mm). Cable bundle rigidly supported on both sides of wall assembly. The following types and sizes of cables may be used:
   A. Max 1/C - 1000 kcmil cable with plenum rated, polyvinyl chloride (PVC) or cross-linked polyethylene (XLPE) insulation and jacket.
   B. Max 7/C - No. 12 AWG cable with PVC-nylon insulation and PVC jacket.
   C. Max 400 pair - No. 24 AWG copper conductor telephone cable with plenum rated or PVC insulation and jacket.
   D. Max RG/U coaxial cables with plenum rated or fluorinated ethylene jacket and insulation.
   E. Multiple fiber optic cables with plenum rated or PVC insulation.
   F. **Through Penetrating Product* -** Any cables, Armored Cable+ or Metal Clad Cable+ currently Classified under the **Through Penetrating Product category.**
   See **Through Penetrating Product** (XHLY) category in the Fire Resistance Directory for names of manufacturer.
   When cables are used, T Rating is 1/2 hr.
6. **Cable Tray -** Max 30 in. (762 mm) wide by max 6 in. (152 mm) deep open ladder cable tray with channel-shaped side rails formed from min 0.060 in. (1.5 mm) thick (No. 16 MSG) galv steel or min 0.060 in. (1.5 mm) thick aluminum with rungs spaced max 9 in. (229 mm) OC. A max of two cable trays may be installed within the opening with a min vertical separation of 4 in. (102 mm) and a min horizontal separation of 1/4 in. (6 mm) between trays. Max vertical or horizontal separation is 24 in. (609 mm). Annulus between the cable tray and the periphery of the opening is min 0 in. (point contact) to max 24 in. (609 mm). Separation between cable tray and metallic or nonmetallic penetrants is min 6 in. (152 mm). Cable trays to be rigidly supported on both sides of the wall assembly. Aggregate cross-sectional area of cables in cable tray not to exceed 40 percent of the cross-sectional area of the cable tray based on a max 3 in. (76 mm) cable loading depth within tray. Any combination of the cable types specified in Item 5 may be used. **When cable tray is used, T Rating is 1/2 hr.**
7. **Busway+ -** Nom 19 in. (483 mm) wide (or smaller) by 6 in. (152 mm) deep "I" shaped aluminum enclosure containing factory-mounted copper bars rated for 600 V, 5000 A or max 26 in. (660 mm) wide by max 6 in. (152 mm) deep "I" shaped aluminum enclosure containing factory-mounted aluminum bars rated for 600 V, 4000 A. . A max of two busways may be installed within the opening with a min separation of 1 in. (25 mm) to max 24 in. (609 mm). The annular space between the busway and the periphery of the opening shall be a min 0 in. (point contact) to a max 24 in. (609 mm). Busways spaced min 6 in. (152 mm) from all other penetrants. Busway to be rigidly supported on both sides of wall assembly. The busway shall bear the UL Listing Mark and shall be installed in accordance with all provisions of the National Electrical Code, NFPA 70. **When busway is used, the T Rating is 1/4 hr.**
8. **Air Conditioning (AC) Line Set -** One or more AC line sets installed within opening. Each AC line set consists of two pipes or tubes (Item 8A), tubing insulation (Item 8B) and a thermostat cable (Item 8C). The space between the AC line sets shall be min 2 in. (51 mm). The space between the AC line sets and the periphery of the opening shall be min 0 in. (point contact) to max 24 in. (609 mm). The AC line sets shall be spaced min 6 in. from uninsulated metallic penetrants and shall be rigidly supported on both sides of the wall assembly.

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W-L-8026 PAGE 3 OF 4

8A. **Through Penetrant -** A max of two pipes or tubes to be installed in each AC line set. Of the two pipes or tubes, only one may have a nom diam greater than 1/2 in. (13 mm). The following types and sizes of through penetrants may be used:
   A. **Steel Pipe -** Nom 1 in. (25 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 1 in. (25 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Copper Pipe -** Nom 1 in. (25 mm) diam (or smaller) Regular (or heavier) copper pipe.
   D. **Copper Tube -** Nom 1 in. (25 mm) diam (or smaller) Type L (or heavier) copper tube.
8B. **Tube Insulation - Plastics# -** Nom 3/4 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The tube insulation may be installed on one max 3/4 in. (19 mm) diam pipe or tube in each AC line set. The space between the insulated and non-insulated pipes or tubes within each AC line set shall be 0 in. (point contact).
   See **Plastics** (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation meeting the above specifications and having a UL 94 Flammability Classification of 945VA may be used.
8C. **Cable -** One 4 pair No. 18 AWG (or smaller) thermostat cable with polyvinyl chloride (PVC) insulation and jacket materials may be installed with each AC line set.
   When Item 8 is used, the T Rating of the firestop system is 1/4 hr.
9. **Steel Duct -** (Not Shown) - Nom 12 in. (305 mm) diameter (or smaller) No. 30 GA (or heavier) steel duct installed within opening when opening contains no cables or cable tray. A max of two steel ducts may be installed within the through-opening. Ducts to be spaced min 4 in. (102 mm) apart and min 8 in. (203 mm) from insulated penetrants and nonmetallic penetrants. Annulus between the steel duct and the periphery of the opening shall be min 0 in. (point contact) to max 24 in. (0 to 609 mm). Steel ducts to be rigidly supported on both sides of wall assembly. **When steel duct is used, the T Rating is 0 hr.**
10. **Firestop System -** The firestop system shall consist of the following items:
   A. **Packing Material -** Min 4 pcf (64 kg/m3) mineral wool batt insulation tightly packed into opening to full depth of the wall. Packing material recessed from both surfaces of wall to accommodate the required thickness of fill material.
   B. **Fill, Void or Cavity Materials*-Sealant -** Min 1/2 in. (13 mm) depth of fill material applied within the annulus, flush with both surfaces of the wall assembly. Additional fill material forced into interstices of grouped cables and grouped cables within cable trays. At point contact location between through penetrant and gypsum wallboard, a min 3/8 in. (10 mm) diam bead of fill material shall be applied at through penetrant/gypsum board interface on both surfaces of the wall.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant or SpecSeal LCI Sealant
   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**
   #Bearing the UL Recognized Components Mark
   +Bearing the UL Listing Mark

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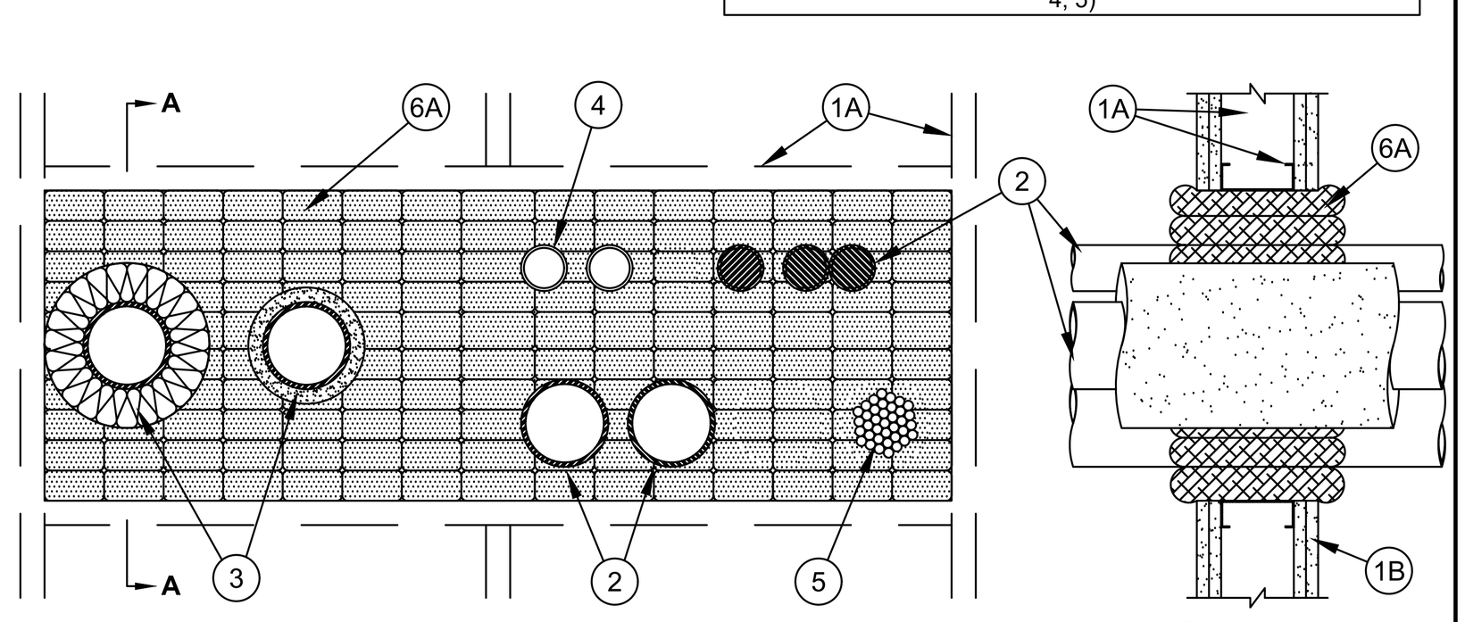
W-L-8026 PAGE 4 OF 4

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-L-8050**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings - 1 and 2 Hr (See Item 1)
T Ratings - 1/4, 1, 1-1/4 and 2Hr (See Item 2, 3, 4 and 5)	FT Ratings - 1/4, 1, 1-1/4 and 2Hr (See Item 2, 3, 4 and 5)
L Rating At Ambient - Less than 1 and 1.6 CFM/sq ft (See Items 2, 4, 5)	FH Ratings - 1 and 2 Hr (See Item 1)
L Rating at 400 F - Less than 1 and 1.6 CFM/sq ft (See Items 2, 4, 5)	FTH Ratings - 1/4, 1 and 1-3/4 Hr (See Item 2 and 3) Hr
	L Rating At Ambient - Less than 1 and 1.6 CFM/sq ft (See Items 2, 4, 5)
	L Rating at 400 F - Less than 1 and 1.6 CFM/sq ft (See Items 2, 4, 5)



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.
1. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum board/steel stud wall assembly shall be constructed of the materials and in the manner specified in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs -** Steel studs to be min 3-1/2 in. (89 mm) wide and spaced 24 in. (610 mm) OC. Additional studs installed horizontally to form a rectangular box around the through-penetrants.
   B. **Gypsum Board* -** Thickness, type, number of layers, orientation and fasteners shall be as specified in the individual Wall and Partition Design. Max area of opening is 5.2 ft2 (0.48 m2) with a max dim of 46-3/4 in. (1.19 m).
   The F and FH Ratings are equal to the rating of the wall assembly in which it is installed.
2. **Metallic Penetrants -** One or more metal pipes, conduits or tubing installed within the through opening. The space between pipes, conduits or tubing shall be min 0 in. (point contact) to max 6 in. (152 mm). The space between pipes, conduits or tubing and periphery of opening shall be min 0 in. (point contact) to max 8 in. (203 mm). Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
   A. **Steel Pipe -** Nom 8 in. (203 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 8 in. (203 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Conduit -** Nom 6 in. (152 mm) diam (or smaller) rigid steel conduit, nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing (EMT) or nom 1 in. (25 mm) diam (or smaller) flexible steel conduit.

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W-L-8050 PAGE 1 OF 3

   D. **Copper Pipe or Tube -** Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe or Type L (or heavier) copper tube.
   The hourly T, FT and FTH Ratings are 1/4 hr when bare (non-insulated) metallic penetrant is used. The L Rating is Less than 1 CFM/sq ft at ambient and 400 F.
3. **Pipe Insulation -** (Optional) - Pipe insulation may be installed on one or more of the metallic pipes or tubes. When pipe insulation is used, min space between insulated metallic pipes and tubes and bare metallic pipes, conduits and tubing shall be min 2 in. (51 mm). The following types of pipe insulations may be used:
   A. **Pipe and Equipment Covering Materials* -** Nom 2 in. (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 self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. **When Item 3A is used, T, FT and FTH Ratings are 1 hr and 1-1/4 hr for 1 hr and 2 hr fire rated walls, respectively.**
   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.
   B. **Pipe Covering Materials* -** Nom 2 in. (51 mm) thick unfaced mineral fiber pipe insulation having a min density of 3.5 pcf (56 kg/m3) and sized to the outside diam of the pipe or tube. Pipe insulation secured with min 18 SWG steel wire spaced max 12 in. (305 mm) OC. **When Item 3B is used, T, FT and FTH Ratings are 1 hr and 2 hr for 1 hr and 2 hr fire rated walls, respectively.**
   INDUSTRIAL INSULATION GROUP L L C - High Temperature Pipe Insulation 1200, High Temperature Pipe Insulation BWT and High Temperature Pipe Insulation Thermaloc
   C. **Sheathing Material* -** Use in conjunction with Item 3B. Foil-scrim-kraft or all service jacket material shall be wrapped around the outer circumference of the pipe insulation (Item 3B) with the kraft side exposed. Longitudinal and transverse joints sealed with metal fasteners or butt tape.
   See **Sheathing Materials** (BVDV) category in the Building Materials Directory for names of manufacturers. Any sheathing 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.
   D. **Tube Insulation - Plastics## -** Nom 3/4 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The max diam of the pipe shall be 4 in. (102 mm) when Item 3D is used. **When Item 3D is used, T, FT and FTH Ratings are 3/4 Hr.**
   See **Plastics** (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.
   E. **Pipe Covering Materials* - Cellular Glass Insulation -** Nom 2 to 3 in. (51 to 76 mm) thick cellular glass units sized to the outside diam of the pipe or tube and supplied in nom 24 in. (610 mm) long half sections or nom 18 in. (457 mm) long segments. Pipe insulation installed on pipe in accordance with the manufacturer's instructions. **When Item 3E is used, T, FT and FTH Ratings are 1 hr and 2 hr for 1 hr and 2 hr fire rated walls, respectively.**
   F. **Metal Jacket -** Used in conjunction with Item 3E. Min 12 in. (305 mm) long jacket formed from min 0.010 in. (0.25 mm) thick aluminum sheet cut to wrap tightly around the pipe insulation with a min 2 in. (51 mm) lap and secured using bands and seals of a similar material or min No. 18 SWG steel tie wire. Bands or steel tie wire to be located within 2 in. (51 mm) of each end of the jacket and spaced max 10 in. (254 mm) OC. Jacket installed on each side of wall with edge flush with wall surface. Metal jacket to be used in addition to any other jacketing material which may be required on the pipe covering.
   G. **Pipe and Equipment Covering Materials* -** Nom 2 to 3 in. (51 to 76 mm) thick hollow cylindrical calcium silicate (min 14 pcf or 224 kg/m3) units sized to the outside diam of the pipe or tube. Pipe insulation secured with stainless steel bands or with min No. 18 SWG stainless steel wire spaced max 12 in. (305 mm) OC. **When Item 3G is used, T, FT and FTH Ratings are 1 hr and 2 hr for 1 hr and 2 hr fire rated walls, respectively.**
4. **Nonmetallic Penetrants -** One or more nonmetallic pipes, conduits or tubes to be installed within the opening. Min clearance between nonmetallic penetrants to be 2 in. (51 mm). Min clearance between nonmetallic penetrants and cables or metallic penetrants to be 4 in. (102 mm). Min clearance between penetrants and periphery of opening is 2 in. (51 mm). Penetrants rigidly supported on both sides of wall assembly. The following types and sizes of nonmetallic pipes, conduits or tubing may be used:

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W-L-8050 PAGE 2 OF 3

   A. **Polyvinyl Chloride (PVC) Pipe -** Nom 2 in. (51 mm) diam (or smaller) solid or cellular core Schedule 40 PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe -** Nom 2 in. (51 mm) diam (or smaller) SDR17 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   C. **Rigid Nonmetallic Conduit+ -** Nom 2 in. (51 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA 70).
   D. **Electrical Nonmetallic Tubing (ENT)+ -** Nom 2 in. (51 mm) diam (or smaller) corrugated wall ENT formed of polyvinyl chloride (PVC) installed in accordance with the National Electrical Code (NFPA 70).
   E. **Optical Fiber Raceway (OFR)+ -** Nom 2 in. (51 mm) diam (or smaller) OFR formed of either polyvinyl chloride (PVC) or polyvinylidene fluoride (PVDF) installed in accordance with the National Electrical Code (NFPA 70).
   When Item 4 is used, the T, FT and FTH Ratings are equal to the 1 or 2 hr fire rating of the wall assembly. The L Rating is Less than 1 CFM/sq ft at ambient and at 400 F.
5. **Cables -** One or more individual or max 4 in. (102 mm) diam tight bundles of cables to be installed within opening. Cables shall be spaced min 4 in. (102 mm) from all other penetrants. Min clearance between cable and periphery of opening is 2 in. (51 mm). Cables rigidly supported on both sides of wall assembly. The following types and sizes of cables may be used:
   A. Max 1/C - 350 kcmil cable with polyvinyl chloride (PVC), cross-linked polyethylene (XLPE) or plenum rated insulation and jacket.
   B. Max 7/C - No. 12 AWG cable with PVC-nylon insulation and PVC or plenum rated jacket.
   C. Max 200 pair - No. 24 AWG copper conductor telephone cable with plenum rated or PVC insulation and jacket.
   D. Max RG/U coaxial cables with plenum rated or fluorinated ethylene jacket and insulation.
   E. Multiple fiber optic cables with plenum rated or PVC insulation.
   F. Max four pair No. 22 AWG (or smaller) copper conductor data cable with PVC or plenum rated jacketing and insulation.
   G. **Through Penetrating Product*** - Any cables, **Armored Cable+** or **Metal Clad Cable+** currently Classified under the **Through Penetrating Product** category.
   See **Through Penetrating Product** (XHLY) category in the Fire Resistance Directory for names of manufacturers
   When Item 5A or 5F is used, the T, FT and FTH Ratings are 1/2 hr. When other cables are used, T, FT and FTH Ratings are 3/4 hr. The L Rating is 1.6 CFM/sq ft at ambient and at 400 F.
6. **Firestop System -** The firestop system consists of the following items:
   A. **Fill, Void or Cavity Material* - Pillows -** Max 3 in. (76 mm) thick by 6 in. (152 mm) wide by 9 in. (229 mm) long intumescent pillows covered with a plastic jacket installed lengthwise through opening such that ends project an equal distance from the approximate centerline of the wall assembly. Pillows tightly-packed into opening between pipes and between pipes and periphery of opening.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Firestop Pillows
   B. **Fill, Void or Cavity Material* - Sealant or Putty (Not Shown) -** At locations of point contact, apply min 1/2 in. (13 mm) diam bead of sealant or putty at penetrant/gypsum board interface on both surfaces of wall.
   SPECIFIED TECHNOLOGIES INC - SpecSeal LCI Sealant, SpecSeal Series SSS Sealant, SpecSeal Putty
   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

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W-L-8050 PAGE 3 OF 3

GENERAL NOTES:

1. Refer to section 07 84 00 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:
   · 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. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   · UL Fire Resistance Directory; Current Edition
   · NFPA 101 Life Safety Code
   · All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:
PROJECT_NAME:

PROJECT LOCATION:
PROJECT_LOCATION:

ARCHITECT/CONSULTANT:
ARCHITECT/CONSULTANT:

TITLE:
STI FIRESTOP SYSTEMS

Specified Technologies Inc.
210 Evans Way Somerville, NJ 08876
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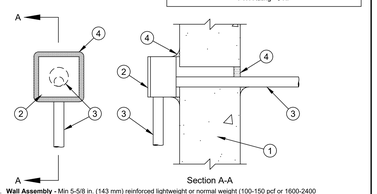
INDEX

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-J-1217**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating - 2 Hr	F Rating - 2 Hr
T Rating - 0 Hr	FT Rating - 0 Hr
	FH Rating - 2 Hr
	FTH Rating - 0 Hr



1. **Wall Assembly -** Min 5-5/8 in. (143 mm) 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***. Diam of opening to be 1/2 in. (13 mm) to 1 in. (25 mm) larger than outside diam of through penetrant. Max diam of opening is 2-1/4 in. (57 mm).
   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Pull or Junction Box* -** Min 16 ga steel pull or junction box mounted flush with or max 1/4 in. (6 mm) from surface of wall.
   See **Junction and Pull Boxes** (BGUZ) category in the Electrical Construction Material Directory for names of manufacturers.
3. **Conduit -** One nom 1 in. (25 mm) diam (or smaller) steel conduit or steel electrical metallic tubing to be installed either concentrically or eccentrically within the firestop system. The annular space shall be min 0 in. (point contact) to max 1 in. (25 mm). Conduit or EMT to be secured to back surface of pull or junction box with steel connector and rigidly supported on both sides of wall assembly.
4. **Fill, Void or Cavity Material* - Sealant -** Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with surface of wall opposite the pull or junction box. A min 1/2 in. (13 mm) diam bead of fill material shall be applied to the joint contact location between the conduit and wall. A min 1/2 in. (13 mm) diam bead of fill material shall be applied around the entire perimeter of the pull or junction box at its interface with the wall surface. The fill material shall lap min 1/2 in. (13 mm) onto both the wall and the sides of the pull or junction box.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant, SpecSeal LCI Sealant, SpecSeal LC150 Sealant, or SpecSeal LE600 Sealant
   •Bearing the UL Listing Mark
   * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814)
and ANSI/ULC263 (ASTM E119)

CLIV.R14288
Wall-opening Protective Materials

SpecSeal Power Shield Box Inserts, for use with flush device UL Listed Metallic Outlet Boxes without internal clamps installed with steel mud rings in framed wall assemblies. When protective material is used in outlet boxes on both sides of the wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. (610 mm) provided that the boxes are not installed back-to-back. Installation shall comply with the National Electrical Code (NFPA 70). The max outlet box dimensions, hourly rating, type of stud, use of stud cavity insulation and type of faceplate are tabulated below. Additional general construction features shall comply as follows:

A. **Studs -** Unless otherwise specified, the minimum stud width is 3-1/2 in. (89 mm).

B. **Stud Cavity Insulation -** Where indicated in the table below, stud cavity insulation to consist of min 3-1/2 in. (89 mm) thick fiberglass (min 0.5 pcf or 8 kg/m3) or mineral fiber (min 4 pcf or 64 kg/m3). Unless indicated as required, stud cavity insulation is optional.

C. **Wall Design -** Stud composition is indicated in the table below. Wall construction shall comply with the individual U300, U400 or V400 Series Wall and Partition Design in the Fire Resistance Directory.

D. **Pad Dimensions -** The minimum dimensions of the insert pad are shown in the table below. Pads may be cut to achieve dimensions shown in table and partial insert pads may be utilized.

Product	Max Outlet Box Size, in. (mm)	Outlet Box Type	Outlet Box Mfr	Pad Size, in. (mm)	Rating, hr	Stud	Cavity Insulation	Face Plate Type	Putty Ball
EP 23	4 x 4 x 2-1/8 (102 x 102 x 54) deep	-	-	1-7/8 x 3-3/4 (48 x 70)	2	Steel	No	Steel	-
EP 23	2 x 3 x 2-1/4 (51 x 76 x 57) deep	-	-	1-7/8 x 2-3/4 (48 x 70)	2	Steel	Yes	Plastic	-
EP 23	2 x 3 x 2-1/4 (51 x 76 x 57) deep	-	-	1-7/8 x 2-3/4 (48 x 70)	1	Steel or Wood	Yes	Plastic or Steel	-
EP 24	2-1/8 x 4 x 2-1/8 (54 x 102 x 54) deep	-	-	1-7/8 x 3-3/4 (48 x 95)	2	Steel	No	Steel	-
EP 24	2-1/8 x 4 x 2-1/8 (54 x 102 x 54) deep	-	-	1-7/8 x 3-3/4 (48 x 95)	2	Steel	Yes	Plastic	-
EP 24	2-1/8 x 4 x 2-1/8 (54 x 102 x 54) deep	-	-	1-7/8 x 3-3/4 (48 x 95)	1	Steel or Wood	Yes	Plastic or Steel	-
EP 44	4 x 4 x 2-1/8 (102 x 102 x 54) deep	-	-	3-3/4 x 3-3/4 (95 x 95)	2	Steel	No	Steel	-
EP 44	4 x 4 x 2-1/8 (102 x 102 x 54) deep	-	-	3-3/4 x 3-3/4 (95 x 95)	2	Steel	Yes	Plastic	-
EP 44	4 x 4 x 2-1/8 (102 x 102 x 54) deep	-	-	3-3/4 x 3-3/4 (95 x 95)	1	Steel or Wood	Yes	Plastic or Steel	-
EP 45	4-1/16 x 4-1/16 x 2-1/8 (119 x 119 x 54) deep	-	-	4-1/2 x 4-1/2 (114 x 114)	1 or 2	Steel or Wood	Yes	Plastic or Steel	-
EP 45	4-1/2 x 9 x 2-3/8 (114 x 127 x 60) deep	-	-	4-1/2 x 4-1/2 (114 x 114)	1 or 2	Steel or Wood	Yes	Plastic or Steel	-
EP 45	4-1/2 x 14 x 2-1/2 (114 x 356 x 64) deep	-	-	4-1/2 x 13-3/4 (114 x 349)	1 or 2	Steel or Wood	Yes	Plastic or Steel	-

SpecSeal Putty Pads, for use with flush device UL Listed Metallic Outlet Boxes installed with steel mud rings or UL Listed Nonmetallic Outlet Boxes in framed wall assemblies. When protective material is used on outlet boxes on both sides of the wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. (610 mm) provided that the boxes are not installed back-to-back. Installation shall comply with the National Electrical Code (NFPA 70). Min 3/16 in. (5 mm) thick moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud) and to completely seal against the stud within the stud cavity. Adjoining pieces of moldable putty pads to be overlapped approx 1/2 in. (13 mm) at the seam. An additional 3/16 in. (5 mm) thickness of putty to be formed around the connector securing the end of each Type MC cable, electrical metallic tube (EMT) or conduit to the box. When nonmetallic box is used with Type NM cable, a 3/16 in. (5 mm) thickness of putty shall be formed around the cable at its connection to the box and extending a min of 1 in. (25 mm). The box composition, max device dimensions, hourly rating, type of stud and type of faceplate are tabulated below. Additional general construction features shall comply as follows:

A. **Studs -** Unless otherwise specified, the minimum stud width is 3-1/2 in. (89 mm).

B. **Stud Cavity Insulation -** Unless indicated as required, stud cavity insulation is optional and may consist of min 3-1/2 in. (89 mm) thick fiberglass (min 0.5 pcf or 8 kg/m3) or mineral fiber (min 4 pcf or 64 kg/m3).

C. **Wall Design -** Stud composition is indicated in the table below. Wall construction shall comply with the individual U300, U400 or V400 Series Wall and Partition Design in the Fire Resistance Directory.

D. **Metallic Outlet Boxes -** Except as indicated in the table below, when steel outlet boxes are used and the boxes are interconnected by means of electrical metallic tube or conduit, a ball of putty is to be installed to plug the open end of each electrical metallic tube (EMT) or conduit within the outlet box. When MC cable is used and/or when the outlet boxes are not interconnected, the ball of putty is not required.

E. **Nonmetallic Outlet Boxes -** The box manufacturer is indicated in the table below. Boxes shall bear a 2 hr rating under the "Outlet Boxes and Fittings Classified for Fire Resistance" category in the Fire Resistance Directory.

Model	Max Outlet Box in. (mm)	Outlet Box Type	Outlet Box Mfr	Pad Size in. (mm)	Rating, hr	Stud	Cavity Insulation	Face Plate Type	Putty Ball
-	4 x 4 x 2-1/8 (102 x 102 x 54) deep	Steel	N.A.	-	1	Steel or Wood	-	Steel	No
-	4 x 4 x 2-1/8 (102 x 102 x 54) deep	Steel	N.A.	-	1	Steel or Wood	-	Plastic	Yes
-	4-1/16 x 4-1/16 x 2-1/8 (119 x 119 x 54) deep	Steel	N.A.	-	1 or 2	Steel or Wood	-	Steel	Yes
-	4-1/2 x 9 x 2-3/8 (114 x 127 x 60) deep	Steel	N.A.	-	1 or 2	Steel or Wood	-	Steel	Yes
-	4-1/2 x 14 x 2-1/2 (114 x 127 x 60) deep	Steel	N.A.	-	1 or 2	Steel or Wood	-	Steel	Yes
-	4 x 4 x 3 (95 x 102 x 76) deep	Polyvinyl Chloride	Lamson & Sessions or Carlon	-	1 or 2	Wood	-	Plastic or Steel	N.A.
-	4 x 4 x 3 (95 x 102 x 76) deep	Phenolic	Allied Moulded Prods.	-	1 or 2	Wood	-	Plastic or Steel	N.A.
-	4 x 4 x 3 (95 x 102 x 76) deep	Polycarbonate	Thomas & Betts	-	1 or 2	Wood	-	Plastic or Steel	N.A.
-	4 x 4 x 3 (95 x 102 x 76) deep	Phenolic	Thomas & Betts	-	1 or 2	Wood	-	Plastic or Steel	N.A.
-	2-1/4 x 3-3/4 x 2-3/4 (57 x 95 x 70) deep	Polyvinyl Chloride	Pass & Seymour	-	1 or 2	Wood	-	Plastic or Steel	N.A.

SpecSeal Putty Pads , for use with maximum 4 by 4 by 2-1/8 in. (102 by 102 by 54 mm) deep flush device UL Listed Metallic Outlet Boxes installed with steel mud rings and with steel faceplates in 1 hr or 2 hr fire rated gypsum board wall assemblies constructed with min 5-1/2 in. (140 mm) wide wood or steel studs and with stud cavities filled with fiberglass (nom 0.5 pcf or 8 kg/m3) or mineral fiber (nom 4 pcf or 64 kg/m3) insulation. When protective material is used on outlet boxes on both sides of the wall as directed, the boxes may be installed back-to-back provided that the boxes on opposite sides of the wall are not interconnected with conduit or, when interconnected, the open end of the conduit within the outlet box is filled with a ball of putty. Installation shall comply with the National Electrical Code (NFPA 70). Min 3/16 in. (5 mm) thick moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud) and to completely seal against the stud within the stud cavity. Adjoining pieces of moldable putty pads to be overlapped approx 1/2 in. (13 mm) at the seam. An additional 3/16 in. (5 mm) thickness of putty to be formed around the connector securing the end of each Type MC cable, electrical metallic tube (EMT) or conduit to the box.

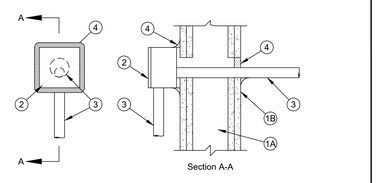
SpecSeal EP23, EP24 and EP44 Power Shield Box Inserts and SpecSeal Putty Pads, for use with maximum 4 by 4 by 1-1/2 or 2-1/8 in. (102 by 102 by 39 or 54 mm) deep flush device UL Listed **Metallic Outlet Boxes** installed with steel mud rings and with steel or plastic faceplates in 1 hr or 2 hr fire rated gypsum board wall assemblies constructed with min 3-1/2 in. (89 mm) wide wood or steel studs. When both protective materials are used with outlet boxes on both sides of the wall as directed, the boxes may be installed back-to-back provided that the backs of the boxes are minimum 1/2 in. (13 mm) apart and provided that the boxes are not interconnected. Installation shall comply with the National Electrical Code (NFPA 70). Min 3/16 in. (5 mm) thick moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud) and to completely seal against the stud within the stud cavity. Adjoining pieces of moldable putty pads to be overlapped approx 1/2 in. (13 mm) at the seam. An additional 3/16 in. (5 mm) thickness of putty to be formed around the connector securing the end of each Type MC cable, electrical metallic tube (EMT) or conduit to the box. An insert pad shall be installed to completely cover the back inside surface of each outlet box.

SpecSeal Putty Pads, for use with max 5 by 5 by 2 7/8 in. (127 by 127 by 73 mm) deep flush device UL Listed Metallic Outlet Boxes or UL Listed Communications-Circuit Accessories manufactured by Randl Industries Inc for use in 1 hr or 2 hr fire rated gypsum board wall assemblies framed with min 3-5/8 in. (92 mm) wide wood or steel studs and constructed as specified in the individual U300, U400, or V400 or W400 Series Wall and Partition Designs in the Fire Resistance Directory. Metallic outlet boxes to be provided with UL Listed Signal Appliance with steel cover plate manufactured by Cooper Wheelock Inc. Moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud unless otherwise noted) including nailing tabs and to completely seal against the stud within the stud cavity. Multiple moldable putty pads may be installed on an outlet box to attain the required minimum thickness of putty material. Additional putty material used to seal around each conduit and/or cable fitting on the exterior of each box. A min 3/16 in. (4.8 mm) thickness of putty material is required on the exterior surfaces of flush device boxes in 1 and 2 hr fire rated Wall and Partition Designs. When the moldable putty pad outlet box protective material is used on boxes on both sides of wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. (610 mm) provided that the outlet boxes are not installed back to back, except as noted.

SpecSeal EP55 Power Shield Box Inserts, for use with max 5 by 5 by 2 7/8 in. (127 by 127 by 73 mm) deep flush device UL Listed Metallic Outlet Boxes or UL Listed Communications-Circuit Accessories manufactured by Randl Industries Inc for use in 1 hr or 2 hr fire rated gypsum board wall assemblies framed with min 3-5/8 in. (92 mm) wide wood or steel studs and constructed as specified in the individual U300, U400, or V400 or W400 Series Wall and Partition Designs in the Fire Resistance Directory. Metallic outlet boxes to be provided with UL Listed Signal Appliance with steel cover plate manufactured by Cooper Wheelock Inc. Power Shield Box Insert is to be applied to the back surface of the box and may be slit to accommodate communications-circuit accessories. When the Power Shield Box Insert is used on boxes on both sides of wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. (610 mm) provided that the outlet boxes are not installed back to back, except as noted.

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-L-1448**

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

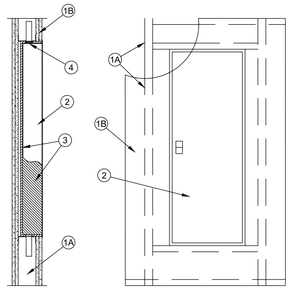


1. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs -** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3 1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.
   B. **Gypsum Board* -** 5/8 in. (16 mm) thick, 4 ft (1.2 m) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Diam of opening to be 1/2 in. (13 mm) to 1 in. (25 mm) larger than outside diam of through penetrant. Max diam of opening is 2-1/4 in. (57 mm).
   The F Rating of the firestop system is equal to the fire rating of the wall assembly.
2. **Pull or Junction Box* -** Min 16 ga steel pull or junction box mounted flush with or max 1/4 in. (6 mm) from surface of wall.
   See **Junction and Pull Boxes** (BGUZ) category in the Electrical Construction Material Directory for names of manufacturers.
3. **Conduit -** One nom 1 in. (25 mm) diam (or smaller) steel conduit or steel electrical metallic tubing to be installed either concentrically or eccentrically within the firestop system. The annular space shall be min 0 in. (point contact) to max 1 in. (25 mm). Conduit or EMT to be secured to back surface of pull or junction box with steel connector and rigidly supported on both sides of wall assembly.

4. **Fill, Void or Cavity Material* - Sealant -** Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with surface of wall opposite the pull or junction box. A min 1/2 in. (13 mm) diam bead of fill material shall be applied at the point contact location between the conduit and wall. A min 1/2 in. (13 mm) diam bead of fill material shall be applied around the entire perimeter of the pull or junction box at its interface with the wall surface. The fill material shall lap min 1/2 in. (13 mm) onto both the wall and the sides of the pull or junction box.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant, SpecSeal LCI Sealant, SpecSeal LC150 Sealant, or SpecSeal LE600 Sealant
   •Bearing the UL Listing Mark
   * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

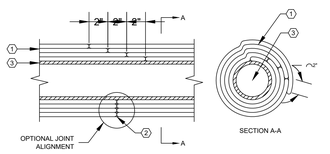
Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-L-7307**

AN SI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings - 1 and 2 Hr (See Item 1)
T Ratings - 1 and 2 Hr (See Item 1)	FT Ratings - 1 and 2 Hr (See Item 1)
	FH Ratings - 1 and 2 Hr (See Item 1)
	FTH Ratings - 1 and 2 Hr (See Item 1)



1. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs -** Wall framing may consist of steel channel studs. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC. Additional studs installed horizontally at the top and bottom of the steel box. Additional studs installed vertically as required for steel box attachment.
   B. **Gypsum Board* -** Gypsum board type, thickness, number of layers, and orientation shall be as specified in the individual Wall and Partition Design. Size of cutout made to accommodate steel box (Item 2) and wrap material (Item 3).
   The hourly Ratings of the firestop system are equal to the hourly fire rating of the wall assembly in which it is installed.
2. **Steel Box -** Max 14-1/8 in. (359 mm) wide by 39-3/8 in. (1000 mm) by max 3-7/8 (98 mm) steel electrical panel box, steel utility box, or steel med-gas valve box with hinged steel door and mounting flange. Steel box attached to wall framing using steel screws after application of wrap material (Item 3). Sides of steel box may be penetrated by min two min 1/2" (13 mm) diam steel pipe, iron pipe, copper pipe or tube, steel conduit or EMT. Steel conduit connectors may be used at interface with steel box. Open ends of pipes, tubes or conduits which terminate inside the box to be plugged with sealant or putty (Item 4).
3. **E-Wrap Endothermic Wrap* -** Wrap - Nom 0.5 in. (13 mm) thick flexible sheet material. One layer sized to cover back and four sides of steel box. At corners of steel box, wrap cut horizontally or vertically, extending from corner of steel box to edge of wrap material. Circular openings made in wrap material to accommodate pipes, tubes or conduits sized max 1/2 in. (13 mm) larger than the outside diameter of the pipe, tube, or conduit. Wrap material folded to maintain contact with back and four sides of steel box. At the corners of the box, trim the overhanging material on the top and bottom sides so that it is flush with the wrap on the sides. Seal the corners with aluminum foil tape. As an option, the overhanging material can be folded onto the sides and secured with aluminum foil tape. Prior to application of wrap material, a bead of construction adhesive to be applied to the back and side of steel box at edge.
   SPECIFIED TECHNOLOGIES INC - E-Wrap Endothermic Wrap.
4. **Fill, Void or Cavity Materials* - Putty or Sealant -** Min 1/2 in. (13 mm) thickness of sealant or putty applied into ends of pipes, tubes or conduits that terminate inside box. Additional putty or sealant to fill circular cutouts made to accommodate pipes, tubes or conduits. A min 1/4 in. (6 mm) diam bead or sealant applied to exposed edge of wrap material.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Putty, SpecSeal SSS Sealant or SpecSeal LCI Sealant.
   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Specified Technologies, Inc.
Design No. STI/AF 120-01
Applied Fireproofing
STI E-Wrap
ASTM E1725
Ratings:
Min. 1 in. Tubing, 3 Layers of STI E-Wrap: 1 Hour
Min. 1 in. Tubing, 4 Layers of STI E-Wrap: 1-3/4 Hour
Min. 1 in. Tubing, 5 Layers of STI E-Wrap: 2 Hour
Min. 4 in. Tubing, 4 Layers of STI E-Wrap: 2 Hour



1. **CERTIFIED MANUFACTURER:** Specified Technologies, Inc.
   CERTIFIED PRODUCT: Applied Fireproofing
   CERTIFIED MODEL: STI E-Wrap Endothermic Wrap

   Install STI E-Wrap layers to achieve the desired fire resistance rating.
   LAYER 1 - Wrap STI E-Wrap onto the tubing (Item 3) by attaching the edge to the tubing using 1/2 in. wide filament tape or 2 in. wide aluminum foil tape, and wrapping tightly around the tubing and overlapping 2 in. at the longitudinal seam. 3 in. wide aluminum foil tape is applied centered on, and parallel with the longitudinal seam for the full length of the seam. Additional wrap sections are added to insulate all straight runs of tubing. The radial seams are butted end-to-end without overlap. 3 in. wide aluminum foil tape is applied over the seam and overlaps 2 in. back onto itself.

   The elbows are each fitted with a gore segment cut to accommodate the elbow radius that occurs as the STI E-Wrap is wrapped radially around the elbow. The gore segment is wrapped onto the tubing (Item 3) by attaching the edge to the tubing using 1/2 in. wide filament tape or 2 in. wide aluminum foil tape,and wrapping tightly around the tubing and overlapping 2 in. at the longitudinal seam. The longitudinal seam is located at the long radius of the elbow. 2 in. wide aluminum foil tape is applied centered on, and parallel with the longitudinal seam for the full length of the seam. The radial seam butted between the gore end segment and adjoining straight section is filled with STI LCI Intumescent Firestop Sealant (Item 2). 3 in. wide aluminum foil tape is applied over the seams and overlaps 2 in. back onto itself.

LAYER 2 - Wrap a second layer of STI E-Wrap in the same manner as Layer 1. The start of Layer 2 begins at the longitudinal seam of Layer 1, secured with 2 in. wide aluminum foil tape covering the full length of the seam. Offset the Layer 2 radial seam 2 in. from the radial seam of Layer 1. Tightly wrap Layer 2 over Layer 1 and overlap the longitudinal seam by 2 in. Cover the full length of the longitudinal and radial seam with 3 in. wide aluminum foil tape. Alternatively, Layer 2 and subsequent layers can be aligned such that the radial seams are not offset or have an offset less than 2 in. When this is done, apply a 1/8 in. thickness of STI LCI Intumescent Sealant (Item 2) over the entire edge of the STI E-Wrap prior to installing the adjacent section.

The elbows are each fitted with a gore segment cut to accommodate the elbow radius that occurs as the STI E-Wrap is wrapped radially around the elbow in the same manner as Layer 1. The gore segment is attached to Layer 1 with 2 in. wide aluminum foil tape and wrapped tightly around Layer 1, overlapping 2 in. at the longitudinal seam. The longitudinal seam of Layer 2 is located at the short radius of the elbow. 2 in. wide aluminum foil tape is applied centered on, and parallel with the longitudinal seam for the full length of the seam. The radial seam butted between the gore end segment and adjoining straight Layer 2 section is filled with STI LCI Intumescent Sealant. The elbow and straight section butt joints of Layer 1 and Layer 2 are in alignment and not offset. 3 in. wide aluminum foil tape is applied over the seams and overlaps 2 in. back onto itself.

LAYER 3 AND LAYER 4 - Wrap a third and fourth layer of STI E-Wrap in the same manner as Layer 2.
The elbow longitudinal seam for Layer 3 is located at the middle radius of the elbow, rotated 90 degrees from the longitudinal seam of Layer 2. The elbow longitudinal seam for Layer 4 is located at the middle radius of the elbow, rotated 180 degrees from the longitudinal seam of Layer 3.

GENERAL - For each layer, all aluminum foil tape is pressed with a squeegee.
The outer layer is further secured with steel tie wire or 1/2 in. wide stainless steel banding located 1 in. from each radial seam. Space the steel tie wire 6 in. on center (oc) between the seams or the 1/2 in. wide stainless steel banding 12 in. oc. At the elbows, space the steel wire 2 in. oc or the stainless steel banding 12 in. oc, both at the short interior radius.

2. **CERTIFIED MANUFACTURER:** Specified Technologies, Inc.
   CERTIFIED PRODUCT: Caulk or Sealant
   CERTIFIED MODEL: STI LCI Intumescent Firestop Sealant

   Install STI LCI Intumescent Firestop Sealant at seams of elbow gore segments and for any gap greater than 1/8 in. at a butted seam. Use only STI LCI Intumescent Firestop Sealant bearing an Intertek Certified Label.

3. **TUBING:** Use min. 1 in. diameter electrical metal tubing (EMT), intermediate metal conduit (IMC), or rigid metal conduit (RMC).

GENERAL NOTES:

1. Refer to section 07 84 00 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:
   · 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. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   · UL Fire Resistance Directory; Current Edition
   · NFPA 101 Life Safety Code
   · All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:
PROJECT_NAME:

PROJECT LOCATION:
PROJECT_LOCATION:

ARCHITECT/CONSULTANT:
ARCHITECT/CONSULTANT:

TITLE:
STI FIRESTOP SYSTEMS

Specified Technologies Inc.
210 Evans Way Somerville, NJ 08876
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Phone: (908)526-8000
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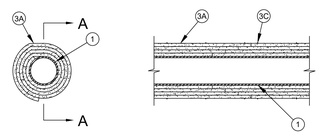
INDEX

Classified by
Underwriters Laboratories, Inc.
to UL 1489

System No. FP-3
*Fire Resistance Rating - 2 Hr



Section A-A

1. **Fuel Pipe Assembly -** Nom 1 in. (25 mm) Max 4 in. (102 mm) diam Schedule 40 (or heavier) steel pipe. All fittings shall be welded.
2. **Pipe Supports -** (Not Shown) - Pipe shall be supported by steel pipe hangers in conjunction with min 3/8 in. (10 mm) diameter threaded steel rod. Refer to the manufacturer's installation instructions for additional details.
3. **Fire-resistant Pipe-protection System* -** The fire-resistant pipe-protection system consists of a wrap, foil tape, steel tie wire and caulk. The system shall be installed in accordance with the detailed installation instruction manual supplied by the manufacturer of the **Fire-resistant Pipe-protection Materials***. The details of the fire-resistant pipe-protection system are summarized below:
   A. **Fire-resistant Pipe-protection Materials* - Mat -** Nom 0.5 in. (12.7 mm) flexible sheet material. A min of five layers of wrap are required for pipe smaller than 4 in (102 mm). For 4 in (102 mm) pipe, 4 layers are required. A minimum of two layers of wrap are required for the pipe support system per manufactures instructions. There are three wrapping methods for pipe as follows:

   Config A: -

   Install wrap by cutting to size and wrapping around the fuel pipe assembly (Item 1) and itself such that a min 2 in. (51 mm) overlap is present along the longitudinal seam. Adjacent lengths of wrap in each layer to be installed with tightly butted end seams. Successive layers of wrap installed in same manner with butted end seams offset min 2 in. (51 mm) from butted end seams of preceding layer. All seams in each layer of wrap to be sealed with foil tape (Item 3B).

   Config B: -

   Install wrap by cutting to size and wrapping around the fuel pipe assembly (Item 1) and itself such that a min 2 in. (51 mm) overlap is present along the longitudinal seam. Adjacent lengths of wrap in each layer to be installed with tightly butted end seams. Successive layers of wrap installed in same manner with butted end seams offset from 0 in (0 mm) to 2 in. (51 mm) from butted end seams of preceding layer. Install a 1/8 depth of caulk (Item 3E) at the butted seam. All seams in each layer of wrap to be sealed with foil tape (Item 3B).

Config C: -

Install wrap by cutting to size and wrapping around the fuel pipe assembly (Item 1) and itself such that a single piece of wrap completes all required layers and overlaps past the initial edge 2 in. (51 mm) for each layer that is required by the system. Adjacent lengths of wrap in each layer to be installed with tightly butted end seams. Install a 1/8 depth of caulk (Item 3E) at the butted seam. Install foil tape (Item 3B) along the final longitudinal edge of the overlap and over each seam of the outer layer between adjacent sections of wrap.

SPECIFIED TECHNOLOGIES INC - E-Wrap Endothermic Wrap

B. **Foil Tape -** (Not Shown) - Nom 3 in. (76 mm) wide min 3 mil (0.08 mm) thick pressure-sensitive aluminum foil tape, supplied in rolls. Used to secure seams of wrap (Item 3A).

C. **Steel Tie-Wire -** Nominal 16 ga., or heavier, steel wire ties installed over the outermost layer of wrap 1 in. (25 mm) from each seam between adjacent sections of wrap and 6 in. (152 mm) OC between seams.

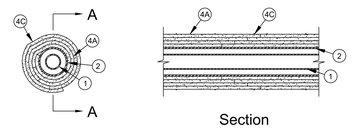
D. **Fill, Void or Cavity Materials* - Caulk -** Any joint between the adjacent layers of wrap that exceed 1/8 in. (3.2 mm) in width shall be filled with caulk to the full depth of the joint. For configurations 2 and 3 of Item 3A, Install a 1/8 in (3.2 mm) depth of caulk between the abutting edges of each layer between adjacent sections of wrap.

SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant or SpecSeal Series LCI Sealant

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

Classified by
Underwriters Laboratories, Inc.
to UL 1489

System No. FP-4
Fire Resistance Rating - 2 Hr



Section A-A

1. **Fuel Pipe Assembly -** One or more nom 1 in. (25 mm) diam Max 2 in. (51 mm) Schedule 40 (or heavier) steel pipe with continuously welded fittings installed symmetrically within the outer containment pipe (Item 2) utilizing steel pipe spacers.
2. **Outer Containment Pipe -** Nom 3 in. (76 mm) Max 4 in. (102 mm) diam Schedule 40 (or heavier) steel pipe with continuously welded fittings. Outer containment pipe is sized a minimum 2 sizes larger than the fuel pipe assembly (Item 1).
3. **Pipe Supports -** (Not Shown) - Outer containment pipe shall be supported by steel pipe hangers in conjunction with min 3/8 in. (10 mm) diameter threaded steel rod. A minimum of two layers of wrap are required for the pipe support system per manufactures instructions. Refer to the manufacturer's installation instructions for additional details.
4. **Fire-resistant Pipe-protection System* -** The fire-resistant pipe-protection system consists of a wrap, foil tape, steel tie-wire and caulk. The system shall be installed in accordance with the detailed installation instruction manual supplied by the manufacturer of the Fire-resistant Pipe-protection Materials*. The details of the fire-resistant pipe-protection system are summarized below:
   A. **Fire-resistant Pipe-protection Materials* - Mat -** Nom 0.5 in. (12.7 mm) flexible sheet material. For outer containment pipe less than nom 4 in diam, min of five layers of wrap are required. For outer containment pipe of 4 in diam, min of four layers of wrap are required. A minimum of two layers of wrap are required for the pipe support system per manufactures instructions. There are three wrapping methods for pipe as follows:

   Config A:

   Install wrap by cutting to size and wrapping around the containment pipe (Item 2) and itself such that a min 2 in. (51 mm) overlap is present along the longitudinal seam. Adjacent lengths of wrap in each layer to be installed with tightly butted end seams. Successive layers of wrap installed in same manner with butted end seams offset min 2 in. (51 mm) from butted end seams of preceding layer. All seams in each layer of wrap to be sealed with foil tape (Item 4B).

   Config B:

   Install wrap by cutting to size and wrapping around the containment pipe (Item 2) and itself such that a min 2 in. (51 mm) overlap is present along the longitudinal seam. Adjacent lengths of wrap in each layer to be installed with tightly butted end seams. Successive layers of wrap installed in same manner with butted end seams offset from 0 in (0 mm) to 2 in. (51 mm) from butted end seams of preceding layer. Install a 1/8 depth of caulk (Item 4E) at the butted seam. All seams in each layer of wrap to be sealed with foil tape (Item 4B).

Config C:

Install wrap by cutting to size and wrapping around the containment pipe (Item 2) and itself such that a single piece of wrap completes all required layers and overlaps past the initial edge 2 in. (51 mm) for each layer that is required by the system. Adjacent lengths of wrap in each layer to be installed with tightly butted end seams. Install a 1/8 depth of caulk (Item 4E) at the butted seam. Install foil tape (Item 4B) along the final longitudinal edge of the overlap and over each seam of the outer layer between adjacent sections of wrap.

SPECIFIED TECHNOLOGIES INC - E-Wrap Endothermic Wrap

B. **Foil Tape -** (Not Shown) - Nom 3 in. (76 mm) wide min 3 mil (0.08 mm) thick pressure-sensitive aluminum foil tape, supplied in rolls. Used to secure seams of wrap (Item 4A).

C. **Steel Tie-Wire -** Nominal 16 ga., or heavier, steel wire ties installed over the outermost layer of wrap 1 in. (25 mm) from each seam between adjacent sections of wrap and 6 in. (152 mm) OC between seams.

D. **Fill, Void or Cavity Materials* -** Caulk - Any joint between the adjacent layers of wrap that exceed 1/8 in. (3.2 mm) in width shall be filled with caulk to the full depth of the joint. For Methods 2 and 3 of Item 4A, Install a 1/8 in (3.2 mm) depth of caulk between the abutting edges of each layer between adjacent sections of wrap.

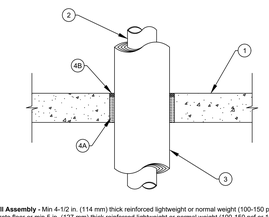
SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant or SpecSeal Series LCI Sealant

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

Classified by
Underwriters Laboratories, Inc.
to UL 1724

System No. C-AJ-5437

ANSI/UL1479 (ASTM E814)	ANSI/UL1479 (ASTM E814)
F Rating - 2 Hr	F Rating - 2 Hr
T Rating - 2 Hr	FT Rating - 2 Hr
	FH Rating - 2 Hr
	FTH Rating - 2 Hr



1. **Floor or Wall Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete floor or min 5 in. (127 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete wall. Floor may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units***. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening is 10 in. (254 mm). Max diam of opening in floor constructed of hollow-core precast concrete units is 7 in. (178 mm).

   See **Concrete Blocks** (CAZT) and **Precast Concrete Units** (CFTV) categories in the Fire Resistance Directory for names of manufacturers.
2. **Through Penetrants -** One metallic pipe to be installed either concentrically or eccentrically within the firestop system. Pipe to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes may be used:

   A. **Steel Pipe -** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe.

   B. **Iron Pipe -** Nom 4 in. (102 mm) diam (or smaller) cast or ductile iron pipe.

2A. **Through Penetrants -** (Not Shown) As an option to 2, a pipe system may consist of an inner pipe and an outer containment pipe of the same material acceptable in Item 2, as long as the outer containment pipe meets the criteria of Item 2.
3. **Pipe Coverings - Fire-resistant Pipe-protection Materials* - Wrap -** Nom 0.5 in. (12.7 mm) flexible sheet material. A min of four layers of wrap are required. All seams in each layer of wrap to be sealed with foil tape. Wrap layers secured in place with 16 ga. steel tie wire on outermost layer.

   SPECIFIED TECHNOLOGIES INC - E-Wrap Endothermic Wrap

4. **Firestop System -** The firestop system shall consist of the following:
   A. **Packing Material -** Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool batt insulation compressed and firmly packed within annular space. Packing material to be recessed from top surface of floor or from both surfaces of wall to accommodate the required thickness of fill material (Item 4B).
   B. **Fill, Void or Cavity Material* - Sealant -** Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall. When min annular space is less than 1/2 in. (13 mm), fill material to be installed to min 1 in. (25 mm) thickness.
   SPECIFIED TECHNOLOGIES INC - SpecSeal MP Putty, SpecSeal Series SSS Sealant, or SpecSeal LCI Sealant

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

GENERAL NOTES:

1. Refer to section 07 84 00 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:
   - 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. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   - UL Fire Resistance Directory; Current Edition
   - NFPA 101 Life Safety Code
   - All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:
PROJECT_NAME:

PROJECT LOCATION:
PROJECT_LOCATION:

ARCHITECT/CONSULTANT:
ARCHITECT/CONSULTANT:

TITLE:
STI FIRESTOP SYSTEMS

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