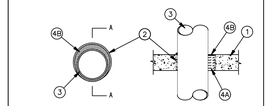
SCHEDULES OF THROUGH PENETRATION FIRESTOP SYSTEMS

CONCRETE FLOORS			CONCRETE OR BLOCK WALLS		
TYPE OF PENETRANT	F-RATING (HR)	UL-CLASSIFIED SYSTEM	TYPE OF PENETRANT	F-RATING (HR)	UL-CLASSIFIED SYSTEM
SINGLE METAL PIPES OR CONDUIT	1	C-AJ-1226	SINGLE METAL PIPES OR CONDUIT	1	C-AJ-1226
	2	C-AJ-1226		2	C-AJ-1226
	3	C-AJ-1226		3	C-AJ-1226
SINGLE INSULATED PIPES	1	C-AJ-5090, C-AJ-5091	SINGLE INSULATED PIPES	1	C-AJ-5090, C-AJ-5091
	2	C-AJ-5090, C-AJ-5091		2	C-AJ-5090, C-AJ-5091
	3	C-AJ-5090		3	C-AJ-5090
NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	C-AJ-7046	NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	C-AJ-7046
	2	C-AJ-7046		2	C-AJ-7046
	3	C-AJ-7046		3	C-AJ-7046
MIXED PENETRANTS	1	C-AJ-8041	MIXED PENETRANTS	1	C-AJ-8041
	2	C-AJ-8041		2	C-AJ-8041
	3	C-AJ-8041		3	C-AJ-8041

GYPSUM WALLBOARD ASSEMBLIES		
TYPE OF PENETRANT	F-RATING (HR)	UL-CLASSIFIED SYSTEM
METAL PIPES OR CONDUIT	1	W-L-1054, W-L-1164
	2	W-L-1054, W-L-1164
INSULATED PIPES	1	W-L-5029
	2	W-L-5029
NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	W-L-7040, W-L-7042
	2	W-L-7040, W-L-7042
MIXED PENETRANTS	1	W-L-8013
	2	W-L-8013

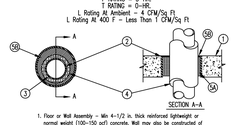
NOTES:
1. ASSURE CONDITIONS OF EACH THROUGH-PENETRATION FIRESTOP SYSTEM MUST MEET ALL DETAILS OF THE UL-CLASSIFIED SYSTEM SELECTED.
2. WHERE MORE THAN ONE APPLICABLE UL-CLASSIFIED SYSTEM IS LISTED IN THE SCHEDULES, CHOOSE THE UL SYSTEM WHICH IS MOST ECONOMICAL FOR EACH THROUGH-PENETRATION FIRESTOP SYSTEM.
3. COORDINATE WORK WITH OTHER TRADES TO ASSURE THE PENETRATION OPENING SIZES ARE APPROPRIATE FOR PENETRANT LOCATIONS, AND VICE VERSA.

System No. C-AJ-1226
F RATING = 3-HR.
T RATING = 0-HR.
L Rating At Ambient = Less than 1 CFM/Sq Ft
L Rating At 400 F = 4 CFM/Sq Ft



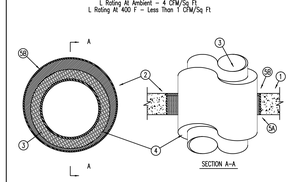
1. Floor or Wall Assembly — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified Concrete Block*. Max diam of opening is 32 in.
2. Metallic Sleeve — (Optional) Nom 32 in. diam (or smaller) Schedule 40 (or heavier) steel sleeve cast or grouted into floor or wall assembly, flush with floor or wall surfaces or extending a max of 3 in. above floor or beyond both surfaces of wall.
3. Through-Penetrant — One metallic pipe, tube or conduit to be installed either concentrically or eccentrically within the firestop system. The annular space between penetrant and perimeter of opening shall be min 0 in. (point contact) to max 1-7/8 in. Penetrant may be installed with continuous point contact. Penetrant to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic penetrants may be used:
   A. Steel Pipe — Nom 30 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. Iron Pipe — Nom 30 in. diam (or smaller) cast or ductile iron pipe.
   C. Copper Pipe — Nom 6 in. diam (or smaller) Regular (or heavier) copper pipe.
   D. Copper Tubing — Nom 6 in. diam (or smaller) Type L (or heavier) copper tubing.
   E. Conduit — Nom 6 in. diam (or smaller) steel conduit.
   F. Conduit — Nom 4 in. diam (or smaller) steel electrical metallic tubing (EMT).
4. Firestop System — The firestop system shall consist of the following:
   A. Packing Material — Min 4 in. thickness of min 4 pcf mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or sleeve or from both surfaces of wall or sleeve as required to accommodate the required thickness of fill material.
   B. Fill, Void or Cavity Material* — Sealant — Min 1/4 in. thickness of fill material applied within the annulus, flush with top surface of floor or sleeve or with both surfaces of wall or sleeve. At the point or continuous contact locations between penetrant and concrete or sleeve, a min 1/4 in. diam bead of fill material shall be applied at the concrete or sleeve/ pipe penetrant interface on the top surface of floor and on both surfaces of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI, INC — FS-ONE Sealant
*Bearing the UL Classification Mark

System No. C-AJ-5090
F RATING = 3-HR.
T RATING = 0-HR.
L Rating At Ambient = 4 CFM/Sq Ft
L Rating At 400 F = Less Than 1 CFM/Sq Ft



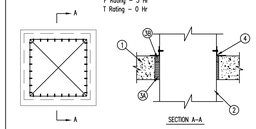
1. Floor or Wall Assembly — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified Concrete Block*. Max diam of opening is 8 in.
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Metallic Sleeve (Optional) — Nom 8 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
3. 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. The following types and sizes of metallic pipes or tubing may be used:
   A. Steel Pipe — Nom 4 in. diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. Copper Pipe — Nom 4 in. diam (or smaller) Regular (or heavier) copper pipe.
   C. Copper Tubing — Nom 4 in. diam (or smaller) Type L (or heavier) copper tubing
4. Tube Insulation—Plastisol — Nom 3/4 in., thick acrylonitrile butadiene/ polyvinyl chloride (NB/PVC) flexible foam furnished in the form of tubing. Annular space shall be min 1/2 in. to max of 1-1/2 in.
   See Plastisol (QMFZ) 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-HBF may be used.
5. Firestop System — The firestop system shall consist of the following:
   A. Packing Material — Min 4 in. thickness of min 4 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* — Sealant — Min 1/4 in. thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI, INC — FS-ONE Sealant
*Bearing the UL Classification Marking

System No. C-AJ-5091
F RATING = 2-HR.
T RATING = 0-HR.
L Rating At Ambient = 4 CFM/Sq Ft
L Rating At 400 F = Less Than 1 CFM/Sq Ft



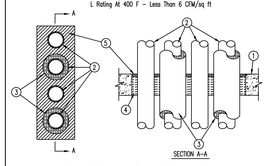
1. Floor or Wall Assembly — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified Concrete Block*. Max diam of opening is 20 in.
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Metallic Sleeve (Optional) — Nom 20 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
3. 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 floor or wall assembly. The following types and sizes of metallic pipes or tubing may be used:
   A. Steel Pipe — Nom 12 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. Copper Pipe — Nom 6 in. diam (or smaller) Regular (or heavier) copper pipe.
   C. Copper Tubing — Nom 6 in. diam (or smaller) Type L (or heavier) copper tubing.
4. Pipe Covering — Nom 2 in. thick fiberglass 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 strip tape supplied with the product. The annular space between the insulated pipe and the edge of the perimeter of the opening shall be min 1/2 in. to a max 2-1/4 in.
   See Pipe Equipment Covering — Materials (QRGU) 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.
5. Firestop System — The firestop system shall consist of the following:
   A. Packing Material — Min 4 in. thickness of min 4 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* — Sealant — Min 1/2 in. thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI, INC — FS-ONE Sealant
*Bearing the UL Classification Marking

System No. C-AJ-7046
F Rating – 3 Hr
T Rating – 0 Hr



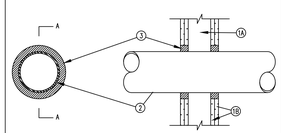
1. Floor or Wall Assembly — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete floor or min 5-1/2 in. thick lightweight or normal weight concrete wall. Wall may also be constructed of any UL Classified Concrete Block*. Max area of opening is 1139 in. sq with a max dimension of 33-3/4 in.
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Steel Duct — Nom 32 by 32 by No. 24 gauge (or heavier) galv steel duct. One steel duct to be positioned within the firestop system. The annular space shall be min 1/4 in. to max 1-1/2 in. Duct to be rigidly supported on both sides of floor or wall assembly.
3. Firestop System — The firestop system shall consist of the following:
   A. Packing Materials — Min 3-1/2 in. thickness of min 4 pcf mineral wool batt insulation firmly packed into opening as a permanent form and to a depth of 4 in. as measured from the top of the opening. 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* — Sealant — Min 1 in. thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI INC — CP 601S Elastomeric Firestop Sealant
4. Steel Retaining Angle — Nom 2 in. by 2 in. by No. 16 gauge (or heavier) steel angles attached to all four sides of the steel duct on the top surface or both surfaces of the wall. The angles shall be attached with No. 8 (or larger) steel sheet metal screws spaced max of 1 in. from corner of duct and at 3 in. OC.
*Bearing the UL Classification Marking

System No. C-AJ-8041
F RATING = 3-HR.
T RATING = 0 and 1 HR.
L Rating At Ambient = 10 CFM/Sq ft
L Rating At 400 F = Less Than 6 CFM/sq ft



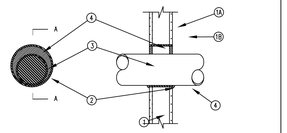
1. Floor or Wall Assembly — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete floor or min 5 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete wall. Wall may also be constructed of any UL Classified Concrete Block*. Max area of opening is 192 sq in. with max dimension of 24 in.
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Through-Penetrants — One or more pipes, conduits or tubing to be installed within the opening. The space between pipes, conduits or tubing shall be 1-1/2 in. The space between pipes, conduits or tubing and periphery of opening shall be min 1-5/8 in. to max 2-1/2 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 3 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. Copper Tubing – Nom 3 in. diam (or smaller) Type L (or heavier) copper tubing.
   C. Copper Pipe – Nom 3 in. diam (or smaller) Regular (or heavier) copper pipe.
   D. Conduit – Nom 3 in. diam (or smaller) electrical metallic tubing or steel conduit.
3. Pipe Covering* – (Optional) – Max 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 strip tape supplied with the product. A nom annular space of 1-1/2 in. is required within the firestop system. The T Rating of the firestop system is dependent on the type of pipe covering. If Rating is 0 hr, any pipe covering thickness may be used.
   See Pipe and Equipment Covering – Materials (QRGU) 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.
4. Packing Material – Min 4 in. thickness of min 4.0 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.
5. Fill, Void or Cavity Material* – Sealant – Min 1/2 in. thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI, INC – FS-ONE Sealant
*Bearing the UL Classification Marking

System No. W-L-1054
F Ratings – 1 and 2 Hr (See Items 1 and 3)
T Rating – 0 Hr
L Rating At Ambient = Less Than 1 CFM/Sq Ft
L Rating At 400 F = 4 CFM/Sq Ft



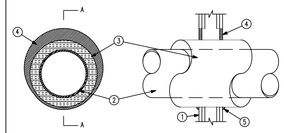
1. Wall Assembly — The 1 or 2 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   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. OC. Steel studs to be min 2-1/2 in. wide and spaced max 24 in. 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. wider and 4 to 6 in. higher than the diam of the penetrating item such that, when the penetrating item is installed in the opening, a 2 to 3 in. clearance is present between the penetrating item and the framing on all four sides.
   B. Gypsum Board — Nom 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 Designs in the UL Fire Resistance Directory. Max diam of opening is 32-1/4 in. for steel stud walls. Max diam of opening is 14-1/2 in. for wood stud walls.
   The T Rating of the Firestop System is equal to the hourly fire rating of the wall assembly.
2. Through-Penetrants — One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. The annular space shall be min 0 in. to max 2-1/4 in. Pipe may be installed with continuous point contact. Pipe, conduit or tubing may be installed at an angle not greater than 45 degrees from perpendicular. 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 30 in. diam (or smaller) Schedule 10 (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) steel electrical metallic tubing or 6 in. diam steel conduit.
   D. Copper Tubing — Nom 6 in. diam (or smaller) Type L (or heavier) copper tubing.
   E. Copper Pipe — Nom 6 in. diam (or smaller) regular (or heavier) copper pipe.
3. Fill, Void or Cavity Material* — Sealant — Min 5/8 in. thickness of fill material applied within the annulus, flush with both surfaces of wall. At the point or continuous contact locations between pipe and concrete, a min 1/4 in. diam bead of fill material shall be applied at the pipe wall interface on both surfaces of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI INC — FS-ONE Sealant
*Bearing the UL Classification Marking

System No. W-L-1164
F Ratings – 1 and 2 Hr (See Items 1 and 4)
T Rating – 0 Hr



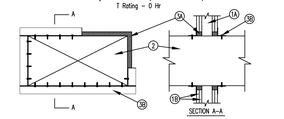
1. Wall Assembly The 1 or 2 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs 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. OC. Steel studs to be min 2-1/2 in. wide and spaced max 24 in. 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. wider and 4 to 6 in. higher than the diam of the penetrating item such that, when the penetrating item is installed in the opening, a 2 to 3 in. clearance is present between the penetrating item and the framing on all four sides.
   B. Gypsum Board* The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Designs in the UL Fire Resistance Directory. Max diam of opening in steel stud walls is 32in.. Max diam of openings in wood stud walls is 14-1/2 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. Steel Sleeve – Nom 32 in. diam (or smaller) Schedule 40 (or heavier) steel pipe sleeve friction fit in nom 32 in. diam circular opening cut through gypsum wallboard layers. Length of steel sleeve to be equal to thickness of wall.
3. Through-Penetrant – One metallic pipe, conduit or tubing installed either concentrically or eccentrically within the firestop system. The annular space between pipe, conduit or tubing and the steel sleeve shall be min of 0 in. (point contact) to max 1-7/8 in. 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 30 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. Iron Pipe – Nom 30 in. diam (or smaller) service weight (or heavier) cast iron soil pipe or Class 50 (or heavier) ductile iron pressure pipe.
   C. Conduit – Nom 4 in. diam (or smaller) steel electrical metallic tubing.
   D. Copper Tubing – Nom 6 in. diam (or smaller) Type L (or heavier) copper tubing.
   E. Copper Pipe – Nom 6 in. diam (or smaller) Regular (or heavier) copper pipe.
4. Fill, Void or Cavity Material*–Sealant – Min 5/8 in. and 1-14 in. thickness of fill material applied within annulus, flush with both surfaces of wall assembly for 1 or 2 hr rated walls, respectively. Min 1/2 in. diam bead of caulk applied to the penetrant/wallboard interface at the point contact location on both sides of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI INC — FS-ONE Sealant
*Bearing the UL Classification Marking

System No. W-L-5029
F Ratings – 1 and 2 Hr (See Item 1)
T Ratings – 1/2, 3/4, 1 and 1-3/4 Hr (See Item 3)
L Rating At Ambient = 4 CFM/Sq Ft
L Rating At 400 F = Less Than 1 CFM/Sq Ft



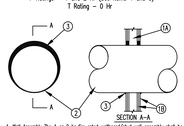
1. Wall Assembly – The 1 or 2 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   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. OC. Steel studs to be min 2-1/2 in. wide and spaced max 24 in. OC.
   B. Wallboard, Gypsum* – Nom 5/8 in. thick with square or tapered edges. The gypsum wallboard type, number of layers and sheet orientation shall be as specified in the individual Wall and Partition Design Number. Max area of opening is 1244 in. with the dimension of 49-1/4 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. Steel Duct – Nom 24 in. by 48 in. (or smaller) No. 24 gauge (or heavier) galv steel duct to be installed within the firestop system. The annular space shall be min 1/4 in. to a max 1 in. Duct to be rigidly supported on both sides of wall assembly.
3. Firestop System – The firestop system shall consist of the following:
   A. Fill, Void or Cavity Material* – Sealant – In 1 hr assemblies, min 5/8 in. thickness of fill material applied within annulus flush with both surfaces of wall. In 2 hr assemblies, min 1-1/4 in. thickness of sealant applied within annulus flush with both surfaces of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI, Inc. – FS-ONE Sealant or CP606 Elastomeric Firestop Sealant or CP606 Flexible Sealant
   B. Bead Retaining Angle – Min 1-1/2 in. by 1-1/2 in. No. 16 MSG (0.060 in.) galv steel angles cut to fit contour of duct with a 1-1/2 in. overlap on both surfaces of wall. Vertical leg of angle secured to duct with min No. 8 by 3/4 in. long sheet metal screws per side, spaced a max of 3 in. OC.
*Bearing the UL Classification Marking

System No. W-L-7040
F Ratings – 1 and 2 Hr (See Items 1 and 3)
T Rating – 0 Hr



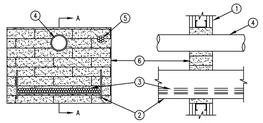
1. Wall Assembly – The fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs – 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. OC. Steel studs to be min 2-1/2 in. wide and spaced max 24 in. OC.
   B. Wallboard, Gypsum* – Nom 5/8 in. thick with square or tapered edges. The gypsum wallboard type, number of layers and sheet orientation shall be as specified in the individual Wall and Partition Design Number. Max area of opening is 1244 in. with the dimension of 49-1/4 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. Steel Duct – Nom 24 in. by 48 in. (or smaller) No. 24 gauge (or heavier) galv steel duct to be installed within the firestop system. The annular space shall be min 1/4 in. to a max 1 in. Duct to be rigidly supported on both sides of wall assembly.
3. Firestop System – The firestop system shall consist of the following:
   A. Fill, Void or Cavity Material* – Sealant – In 1 hr assemblies, min 5/8 in. thickness of fill material applied within annulus flush with both surfaces of wall. In 2 hr assemblies, min 1-1/4 in. thickness of sealant applied within annulus flush with both surfaces of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI, Inc. – FS-ONE Sealant or CP606 Flexible Sealant
*Bearing the UL Classification Marking

System No. W-L-7042
F Ratings – 1 and 2 Hr (See Items 1 and 3)
T Rating – 0 Hr

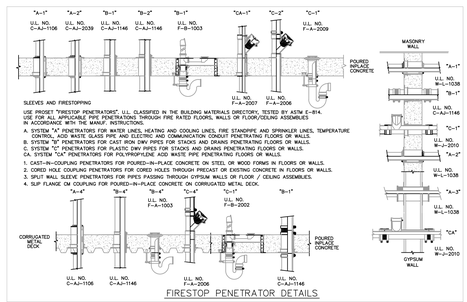


1. Wall Assembly The 1 or 2 hr fire rated wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs 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. OC. Steel studs to be min 2-1/2 in. wide and spaced max 24 in. OC.
   B. Gypsum Board* For 1 hr assembly, one layer of min 5/8 in. thick wallboard as required in the individual Wall and Partition Design. For 2 hr assembly, two layers of min 5/8 in. thick wallboard as required in the individual Wall and Partition Design. Max diam of opening is 14-1/2 in. for wood stud walls and 21-3/4 for steel stud walls.
   The hourly F and T Ratings of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.
2. Through Penetrant Gas steel duct to be installed concentrically or eccentrically within the firestop system. The annular space between the duct and perimeter of opening shall be 0 in. (point contact) and max 1-1/2 in. Duct to be rigidly supported on both sides of wall assembly.
   A. Spiral Wound HVAC Duct Nom 20 in. diam (or smaller) No. 24 MSG (or heavier) galv steel spiral wound duct.
   B. Sheet Metal Duct Nom 12 in. diam (or smaller) No. 28 MSG (or heavier) galv sheet steel duct.
3. Fill, Void or Cavity Material*—Sealant Min 5/8 in. and 1-1/4 in. thickness of fill material applied within annulus, flush with both surfaces of wall assembly for 1 or 2 hr rated walls, respectively. At the point contact location between duct and wallboard, a min 1/2 in. diam bead of sealant shall be applied at the wallboard/ duct interface on both surfaces of wall assembly.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI INC – CP601S Elastomeric Firestop Sealant, FS-ONE Sealant or CP606 Flexible Firestop Sealant
*Bearing the UL Classification Mark

System No. W-L-8013
F Ratings – 1 and 2 Hr (See Item 1)
T Rating – 0 Hr
L Rating At Ambient = 5 CFM/Sq Ft
L Rating At 400 F – 2 CFM/Sq Ft



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. lumber spaced 16 in. OC. Steel studs to be min 2-1/2 in. wide and spaced max 24 in. OC.
   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 Wall and Partition Design. Max area of opening is 192 sq in. with max dimension of 24 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. Cable Tray* Min 18 in. wide by max 6 in. deep open-ladder or solid-back cable tray with channel-shaped side rails formed of 0.060 in. thick aluminum or 0.060 in. thick steel and with 1-1/2 in. wide by 1 in. channel shape rungs spaced 9 in. OC or a 0.028 in. thick steel solid back, respectively. One cable tray to be installed in the opening. The max annular space between the cable tray and the perimeter of the opening shall be min 1 in. to max 7 in. Cable tray to be rigidly supported on both sides of floor or wall assembly.
3. Cables Aggregate cross-sectional area of cables in cable tray to be max 30 percent of the cross-sectional area of the cable tray. Any combination of the following types and sizes of copper conductor cables may be used:
   A. 7/C No. 12 AWG with polyvinyl chloride (PVC) insulation and PVC jacket.
   B. 100 pair – No. 24 AWG cable with PVC insulation and jacket.
   C. 1/C, 750 kcmil (or smaller) with PVC insulation and jacket.
4. Through-Penetrants One or more pipe or tube to be installed within the opening. The total number of through-penetrants is dependent on the size of the opening and types and sizes of the penetrants. Any combination of the penetrants described below may be used provided that the following parameters relative to the annular spaces and the spacings between the pipes are maintained. The space between the pipe or tube and the periphery of the opening shall be min 1-1/2 in. to max 9-1/4 in. Pipe or tube to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of non-metallic or metallic pipes, or tubes may be used:
   A. Polyvinyl Chloride (PVC) Pipe Max 3 in. diam Schedule 40 solid core PVC pipe (or smaller) for use in closed (process or supply) or vented (drain, waste or vent) piping system.
   B. Steel Pipe Nom 6 in. diam (or smaller) Schedule 40 (or heavier) steel pipe.
   C. Conduit Nom 4 in. diam (or smaller) steel electrical metallic tubing or 6 in. diam steel conduit.
   D. Copper Pipe Nom 4 in. diam (or smaller) Regular (or heavier) copper pipe.
   E. Copper Tube Nom 4 in. diam (or smaller) Type L (or heavier) copper tube.
4A. Pipe Covering (Not Shown)Nom 1-1/2 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 strip tape supplied with the product. A nom annular space of 1-1/2 in. is required within the firestop system. The T Rating of the firestop system is dependent on the type of pipe covering. If Rating is 0 hr, any pipe covering thickness may be used.
   See Pipe and Equipment Covering – Materials (QRGU) 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 may be used.
5. Cables Max 1-1/2 in. diam tight bundle of cables installed within the opening and rigidly supported on both surfaces of wall. The space between the cables and periphery of the opening shall range from 1-3/16 in. min to a max of 1-1/2 in. Any combination of the following types and sizes of cables may be used:
   A. 7/C No. 12 AWG with polyvinyl chloride (PVC) insulation and jacket.
   B. 25 pair – No. 24 AWG cable with PVC insulation and jacket.
   C. Type R QJ/59 coaxial cable with PVC outer jacket.
   D. 24 fiber optic cable with PVC sub unit and outer jacket.
6. Firestop System The firestop system shall consist of the following:
   A. Fill, Void or Cavity Material* Fill, Void or Cavity Material*–Fire Blocks For walls incorporating max 3-5/8 in. steel studs or max 2 by 4 in. wood studs, fire block installed with 5 in. dimension projecting through and centered in opening. For walls constructed of larger steel or wood studs, fire block installed with long dimension
   passing through and centered in opening. Blocks may or may not be cut flush with both surfaces of wall. When multiple layers of gypsum board are used, blocks may be recessed 1/2 in. from surface of wall .
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI INC — FS 657 Fire Block
   B. Fill, Void or Cavity Material* Sealant or Putty – Fill material to be forced into interstices of cables, between cables and cable trays, around each penetrant and where obvious voids are observed to max extent possible on both surfaces of the penetration.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI INC — FS-One Sealant, CP 618 Putty Sticker CP620 Fire Foam
*Bearing the UL Classification Mark



FIRESTOP PENETRATOR DETAILS

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