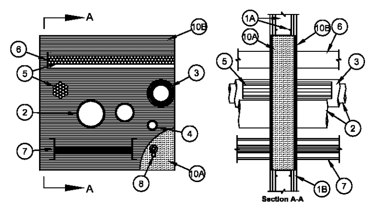
System No. W-L-8026

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.

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

2A1. **Firestop Device* -** (Optional, Not Shown) - When used in conjunction with Item 2A, 2B, or 2C, single layer of coolant wrap provided with collar to be continuously wrapped around the outer circumference of each penetrant and temporarily held in place with tape. Edge of coolant wrap to be offset from the surface of floor or both sides of the wall in order to allow for installation of restraining collar. Restraining collar to be installed such that an edge is flush with top surface of the floor or both surfaces of wall and coolant wrap is nominally centered within pocket of restraining collar. Restraining collar to overlap itself by min 1/8 in. (3 mm) and secured in place around penetrant with nom 1/2 in. (13 mm) wide stainless steel hose clamps nominally centered on both flanges. Min clearance between pipes to be 2-1/2 in. (64 mm). **When Item 2A1 is used, the maximum hourly T Rating is 2 Hr for penetrants 4 in. (102 mm) diam (or smaller).**

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 1-1/2 in. (38 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.**

   IIG MINWOOL 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.**
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 separation of 8 in. (203 mm) between trays. 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. 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 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 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 94-5VA may be used.

8C. **Cable -** One 4 pair No. 18 AWG (or smaller) thermostat cable with polyvinyl chloride (PVC) insulation and jacket material 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.

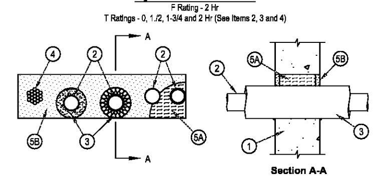
   * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

   #Bearing the UL Recognized Components Mark

   +Bearing the UL Listing Mark

System No. W-J-8012

F Rating - 2 Hr
T Ratings - 0, 1/2, 1-3/4 and 2 Hr (See Items 2, 3 and 4)



1. **Wall Assembly -** Min 6 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 144 sq in. with a 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 eccentrically or concentrically within the firestop system. The annular space between the pipes, conduits or tubing and the periphery of the opening shall be min 0 in. (point contact) to max 2 in. Separation *between uninsulated pipes, conduits or tubes shall be min 1/2 in. to max 2* in. Pipes, conduits or tubing to be rigidly supported on both sides of the wall assembly. The following types and sizes of pipes, conduits and tubes may be used:
   A. **Steel Pipe -** Nom 4 in. diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 4 in. diam (or smaller) cast or ductile iron pipe.
   C. **Conduit -** Nom 4 in. diam (or smaller) rigid steel conduit, nom 4 in. diam (or smaller) steel electrical metallic tubing (EMT) or nom 4 in. diam (or smaller) flexible aluminum or steel conduit.
   D. **Copper Pipe -** Nom 2 in. diam (or smaller) Regular (or heavier) copper pipe.
   E. **Copper Tube -** Nom 2 in. diam (or smaller) Type L (or heavier) copper tube.
   F. **Polyvinyl Chloride (PVC) Pipe -** Nom 2 in. 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 systems.
   G. **Chlorinated Polyvinyl Chloride (CPVC) Pipe -** Nom 2 in. diam (or smaller) Schedule 40 solid or cellular core CPVC pipe for use in vented (drain, waste or vent) or closed (process or supply) piping systems.
   H. **Rigid Nonmetallic Conduit+ -** Nom 2 in. diam (or smaller) PVC conduit installed in accordance with Article 347 of the National Electrical Code (NFPA 70).
   I. **Electrical Nonmetallic Tubing (ENT)+ -** Nom 2 in. diam (or smaller) ENT formed from PVC installed in accordance with Article 331 of the National Electrical Code (NFPA 70).

   When Item 2A, 2B, 2C, 2D or 2E is used, the T Rating is 0 hr. When Item 2F, 2G, 2H or 2I is used, the T Rating is 1-3/4 hr.
3. **Pipe Coverings -** One or more of the metallic pipes or tubing may be insulated with one or more of the following types of pipe coverings:
   A. **Pipe and Equipment Covering Materials* -** Nom 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 butt tape supplied with the product. Annular space between the insulated through penetrant and preiphery of opening shall be min 0 in. (point contact) to max 2 in. Separation between insulated or uninsulated pipes, conduits or tubing shall be min 1/2 in. to max 2 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 2 in. thick unfaced mineral fiber pipe insulation sized to the outside diam of pipe or tube. Pipe insulation secured with min No. 8 AWG steel wire spaced max 12 in. OC. Annular space between the insulated through penetrant and preiphery of opening shall be min 0 in. (point contact) to max 2 in. Separation between uninsulated pipes, conduits or tubes shall be min 1/2 in. to max 2 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* -** 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 0 in. (point contact) to max 2 in.

   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. thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. Annular space between the insulated through penetrant and preiphery of opening shall be min 0 in. (point contact) to max 2 in. Separation between insulated or uninsulated pipes, conduits or tubes shall be min 1/2 in. to max 2 in.

   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 Items 3A, 3B or 3C are used, the T Rating is 2 hr. When Item 3D is used, the T Rating is 1 hr.
4. **Cables -** Nom 2 in. diam (or smaller) tight bundle of cables consisting of one or more cables. Cable bundle spaced min 2 in. from other penetrants. Annular space between cable bundle and periphery of opening to be min 0 in. (point contact) to max 2 in. Cable bundle to be rigidly supported on both sides of wall assembly. Any combination of the following types and sizes of cables may be used:
   A. Max 200 pair No. 24 AWG (or smaller) copper conductor with polyvinyl chloride (PVC) insulation and jacketing material.
   B. Max 1/C No. 350 kcmil (or smaller) copper conductor cable with cross-linked polyethylene (XLPE) jacket.
   C. Max 7/C No. 12 AWG (or smaller) copper conductor power and control cables with XLPE or PVC insulation with XLPE or PVC jacket.
   D. Max 3/C No. 2/0 AWG (or smaller) copper or aluminum conductor SER cables with PVC insulation and jacket.
   E. Max 3/C No. 2/0 AWG (or smaller) copper conductor PVC jacketed aluminum clad or steel clad TEK cable.
   F. Max 110/125 fiber optic (F.O.) cable with PVC insulation and jacket.
   G. Max 3/C with ground No. 8 AWG (or smaller) copper conductor NM cable (Romex) with PVC insulation and jacket.
   H. Max RG/U coaxial cable with fluorinated ethylene insulation and jacket.
   I. Max 4 pair No. 24 AWG (or smaller) copper conductor data cable with Hylar jacket and insulation.

   When cables are used, the T Rating is 1/2 hr.

4A. **Through Penetrating Product* -** Nom 2 in. tight bundle of max 4/C No. 2/0 AWG (or smaller) aluminum or steel **Armored Cable+** or **Metal Clad Cable+** installed within the opening. Annular space between through-penetrating product and periphery of opening to be min 0 in. (point contact) to max 2 in. Through penetrating product rigidly supported on both sides of wall assembly.

   AFC CABLE SYSTEMS INC

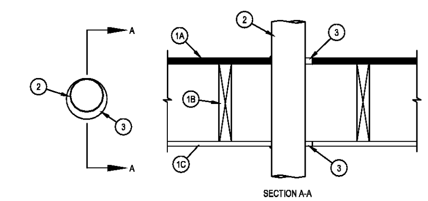
   When Armored Cables or Metal Clad Cables are used, the T Rating is 1/2 hr.

5. **Firestop Material -** The firestop system shall consist of the following items:
   A. **Packing Material -** Min 4 pcf mineral wool batt insulation compressed and firmly packed to min 3-1/2 in. and 4-3/4 in. depth for 1 and 2 hr wall assemblies, respectively. Packing material recessed from each surface of the wall as required to accommodate fill material (Item 5B).
   B. **Fill, Void or Cavity Material* - Sealant -** Min 5/8 in. thickness of fill material applied within annulus, flush with both surfaces of wall assembly. At point contact locations, min 1/4 in. diam bead of fill material applied at through penetrant/concrete interface on both surfaces of wall.

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

System No. F-C-1074

F Ratings - 1 Hr and 2 Hr (See Item 1)
T Ratings - 1/4, 1/2 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 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 pipe. As an alternate, the opening may be square-cut with a max dimension 1 in. 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 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 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. 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 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. (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* - Thickness, type, number of layers and fasteners shall be as specified in the individual Wall and Partition Design.

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 Rating is 1/4 hr when copper pipe or tube is used in 1 hr fire-rated assemblies. The T Rating is 1/2 hr when copper pipe of 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 Rating is 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.

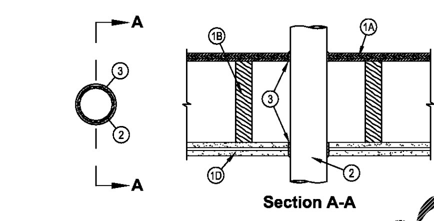
   OMEGA FLEX INC
   GASTITE, DIV OF TITEFLEX
   WARD MFG LLC

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
*Bearing the UL Classification Mark

System No. F-C-1010

F Ratings - 1 and 2 Hr (See Item 1)
T Ratings - 1/2, 3/4, 1 and 1-1/2 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 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 Rating of the firestop system is equal to the hourly fire 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. Max diam of floor opening is 5 in.
   B. Wood Joists* - For 1 hr fire-rated floor-ceiling assemblies, nom 10 in. deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or Structural Wood Members* with bridging as required and with ends firestopped. For 2 hr fire-rated floor-ceiling assemblies, nom 2 by 10 in. lumber joists spaced 16 in. OC with nom 1 by 3 in. lumber bridging and with ends firestopped.
   C. Furring Channels - (Not Shown) - In 2 hr fire-rated assemblies, resilient galv steel furring installed perpendicular to wood joists between first and second layers of gypsum board (Item 1D). Furring channels spaced max 24 in. OC. In 1 hr fire-rated assemblies, resilient galv steel furring installed perpendicular to wood joists between gypsum board and wood joists as specified in the individual Floor-Ceiling Design. Furring channels spaced max 24 in. OC.
   D. Gypsum Board* - Nom 4 ft wide by 5/8 in. thick as specified in the individual Floor-Ceiling Design. First layer of gypsum board secured to wood joists or furring channels as specified in the individual Floor-Ceiling Design. Second layer of gypsum board (2 hr fire-rated assembly) screw-attached to furring channels as specified in the individual Floor-Ceiling Design. Max diam of ceiling opening is 5 in.
2. Through Penetrants - One metallic pipe, conduit or tube installed approximately midway between wood joists. Diam of openings hole-sawed through flooring system and through gypsum board ceiling to be nom 1/2 in. greater than the outside diam of through-penetrant. For 1 hr rated floor assemblies, through penetrant to be installed either concentrically or eccentrically within the opening with an annular space of 0 in. (point contact) to 1/2 in. For 2 hr rated floor assemblies, through penetrant to be centered in the opening. Pipe, conduit or tube to be rigidly supported on both sides of floor-ceiling assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
   A. Steel Pipe - Nom 4 in. diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. Iron Pipe - Nom 4 in. diam (or smaller) cast or ductile iron pipe.
   C. Conduit - Nom 4 in. diam (or smaller) steel electrical metallic tubing or steel conduit.
   D. Copper Pipe - Nom 4 in. diam (or smaller) Regular (or heavier) copper pipe.
   E. Copper Tubing - Nom 4 in. diam (or smaller) Type L (or heavier) copper tubing.

   The T Rating of the firestop system is dependent upon the hourly rating of the floor-ceiling assembly and type of through-penetrant used as shown in the table below:

Floor Ceiling Rating Hr	Type of Penetrant	T Rating Hr
1	Steel or Iron Pipe	1
1	Steel Conduit	1
1	Copper Tube or Pipe	3/4
2	Steel or Iron Pipe	1-1/2
2	Steel Conduit	1-1/2
2	Copper Tube or Pipe	1/2

3. Fill, Void or Cavity Material* - Sealant - Fill material forced into annulus to fill space to max extent possible on top surface of floor and bottom surface of ceiling. Min 3/8 in. diam bead of fill material applied at point contact location on top surface of floor and on bottom surface of gypsum board ceiling.
   SPECIFIED TECHNOLOGIES INC - SpecSeal 100, 101, 102, 105, 120 or 129 Sealant

*Bearing the UL Classification Mark

March Adams & Associates

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ASHLAND CITY, TENNESSEE

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FIRESTOPPING DETAILS E003