3M

Fire Protection Products

Date: January 1, 2008

Subject: General Certificate of Conformance for 3M Fire Protection Products

Product Category: Through Penetration Firestop Products

Fire Barrier CS-195+ Composite Sheet
Fire Barrier FS-195+ Wrap Strip
Fire Barrier Plastic Pipe Device (PPD)
Fire Barrier Ultra Plastic Pipe Device (PPD)
Fire Barrier Ultra RC Pack
Fire Barrier Moldable Putty+ (MP+)
Interam™ E-5 Series Mats
Interam™ I-10 Series Mats
Interam™ Ultra GS Strip
Interam™ T-49 Tape
Interam™ T-65 Tape
Fire Barrier Cast-In Device & Accessories
3M Fire Barrier Pillow
3M Fire Barrier Self-Locking Pillow
Fire Barrier Expantrol™ Flexible Intumescent Strip (E-FIS)
Fire Barrier Pass-Through Device
Fire Barrier RC-1Restricting Collar
Ultra Fast Anchors
Marine Fire Wrap
Fire Barrier Sealant CP 25WB+ Caulk
Fire Barrier Sealant IC 15WB Caulk
Fire Barrier Sealant IC 15WB+ Caulk
FireDam™ 150+ Caulk
Fire Barrier Water Tight Sealant 3000 WT
Fire Barrier Water Tight Sealant 1003 SL
Fire Barrier Water Tight Sealant 1000 NS
Fire Barrier Silicone Sealant 2000 N/S
Fire Barrier Silicone Sealant 2000+
Fire Block Sealant FB 136
Interam™ FireDam™ 150 Caulk
Fire Barrier Silicone RTV Foam 2001
FireDam™ Spray 100
FireDam™ Spray 200
Fire Barrier Mortar
Fire Barrier Packing Material

These products are tested to one or more of the following standards:

- ASTM E 119 (ANSI/UL 263) Fire Tests of Building Construction and Materials Time-Temperature Curve
- ASTM E 814 (ANSI /UL 1479) Fire Tests of Through-Penetration Fire Stops (under positive furnace pressure of minimum .01 inches of water column)
- ASTM E 84 (ANSI/UL 723) Surface Burning Characteristics of Building Materials
- ASTM E 1966 (ANSI / UL 2079) Test for Fire Resistance of Building Joint Systems
- NFPA 252 Standard Methods of Fire Test and Door Assemblies
- UBC Standard 7-2(97)
- IMO Res. A.754(18)
- ASTM E 2307 Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus
- ASTM E 136 Standard Test Method for Behavior of Material in a Vertical Tube Furnace at 750° C
- ASTM C 1338 Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings

No asbestos, PCB's, or lead are used or contained in these products.

Issued by:

Quality Manager or Designee

Product Service Manager, or Designee

3M Fire Protection Products

MATRIX OF UL TESTED AND APPROVED SYSTEMS FOR FIRESTOPPING PLUMBING & MECHANICAL PENETRATIONS IN RATED GYPSUM WALLS, CONCRETE FLOOR & WALL CONSTRUCTION

Penetrating Item	Assembly Penetrated	F Rating	System Number	Products Used
Metal Pipe (Sleeved)	Framed Gypsum Walls	1 & 2 Hr.	W-L-1003	CP25WB FB3000WT
Metal pipe	Framed Gypsum Walls	1 & 2 Hr.	W-L-1146	CP25WB FB3000WT
Metal Pipe	Framed Gypsum Walls	1 & 2 Hr.	W-L-1167	FD 150+
Metal pipe (Multiple)	Framed Gypsum Walls	1 & 2 Hr.	W-L-1228	CP25WB IC15WB FB3000WT
Metal pipe (Multiple)	Framed Gypsum Walls	1 & 2 Hr.	W-L-1287	IC15WB CP25WB FB3000WT
Metal pipe	Framed Gypsum Walls	1 & 2 Hr.	W-L-1296	IC15WB CP25WB FB3000WT
Plastic pipe (Angled pipe)	Framed Gypsum Walls	1 & 2 Hr	W-L-2087	FS-195 IC15WB CP25WB FB3000WT
Plastic pipe (Caulk only)	Framed Gypsum Walls	1 & 2 Hr.	W-L-2088	IC15WB CP25WB FB3000WT
Plastic pipe	Framed Gypsum Walls	1 & 2 Hr.	W-L-2147	Ultra RC Pack Ultra GS
Plastic pipe	Framed Gypsum Walls	1, 2 & 3 Hr.	W-L-2162	Plastic Pipe Device
Plastic pipe (Multiple)	Framed Gypsum Walls	1 & 2 Hr.	W-L-2300	IC15WB CP25WB FB3000WT
Metal pipe	Concrete Floor & Walls	2, 3 & 4 Hr.	C-AJ-1044	CP25WB FB3000WT
Metal pipe (Bottom side)	Concrete Floor & Walls	2 Hr.	C-AJ-1496	IC15WB CP25WB FB3000WT

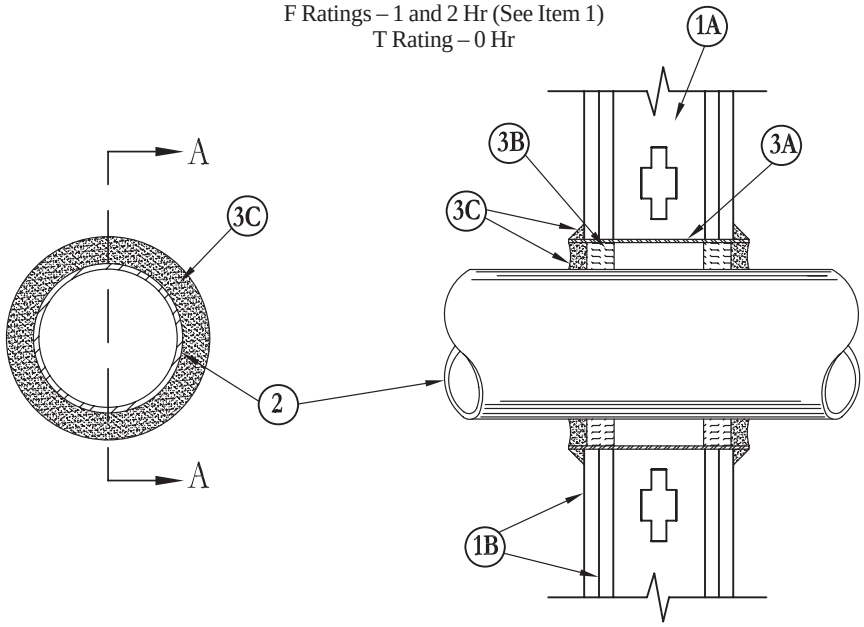
Metal pipe (1/4” caulk)	Concrete Floor & Walls	2 Hr.	C-AJ-1338	CP25WB FB3000WT
Metal Pipe	Concrete Floor & Walls	2 Hr.	C-AJ-1366	FD 150+
Metal pipe	Concrete Floor & Walls	3 Hr.	C-AJ-1427	IC15WB CP25WB FB3000WT
Metal pipe (Multiple)	Concrete Floor & Walls	2 Hr.	C-AJ-1429	IC15WB CP25WB FB3000WT
Metal pipe	Concrete Floor	2 Hr.	F-A-1041	Cast-in-Device
Metal pipe	Concrete Floor	3 Hr.	F-A-1042	Cast-in-Device
Metal pipe	Concrete Floor	2 Hr.	F-A-1046	Cast-in-Device
Metal pipe	Concrete Floor	3 Hr.	F-A-1050	Cast-in-Device
Plastic Pipe	Concrete Floor	2 Hr.	C-AJ-2001	PPD or RC-1
Plastic Pipe In-hole	Concrete Floor	2 Hr.	C-AJ-2256	Ultra GS
Plastic pipe	Concrete Floor	2 Hr.	F-A-2097	Cast-in-Device
Plastic pipe	Concrete Floor	3 Hr.	F-A-2098	Cast-in-Device
Plastic pipe	Concrete Floor	2 Hr.	F-A-2109	Cast-in-Device
Plastic pipe (Tub Box)	Concrete Floor	2 Hr.	F-A-2109	Cast-in-Device
Plastic pipe (Fluted deck)	Concrete Floor	2 Hr.	F-A-2110	Cast-in-Device
Plastic pipe (Multiple) (Fluted deck)	Concrete Floor	2 Hr.	F-A-2115	Cast-in-Device
Plastic pipe (Tub box)	Concrete Floor	3 Hr.	F-B-2015	Cast-in-Device
Plastic pipe Aerator adapter	Concrete Floor	2 Hr.	F-B-2018	Cast-in-Device
Insulated metal pipe	Framed Gypsum Walls	1 & 2 Hr.	W-L-5011	FS-195 CP25WB FB3000WT
Insulated metal pipe	Framed Gypsum Walls	1 & 2 Hr.	W-L-5045	CP25WB
Insulated metal pipe	Framed Gypsum Walls	1 & 2 Hr.	W-L-5168	IC15WB CP25WB FB3000WT
Insulated metal pipe	Framed Gypsum Walls	1 & 2 Hr.	W-L-5169	IC15WB CP25WB FB3000WT

Insulated metal pipe	Framed Gypsum Walls	2 Hr.	W-L-8010	FS-195 & IC15WB CP25WB
Insulated metal pipe (Fiberglass)	Concrete Floor & Walls	2 Hr.	C-AJ-5210	IC15WB CP25WB FB3000WT
Insulated metal pipe Armaflex)	Concrete Floor & Walls	2 Hr.	C-AJ-5211	IC15WB CP25WB FB3000WT
Insulated metal pipe	Concrete Floor & Walls	2 Hr.	C-AJ-8072	CP25WB FB3000WT

Rev. 3-04-05

System No. W-L-1003

February 14, 2008
F Ratings – 1 and 2 Hr (See Item 1)
T Rating – 0 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 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 16 in. (406 mm) OC with nom 2 by 4 in. (51 by 102 mm) lumber end plates and cross braces. Steel studs to be min 3-1/2 in. (89 mm) wide by 1-3/8 in. (35 mm) deep channels spaced max 24 in. (610 mm) OC.

   B. **Gypsum Board*** – Nom 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 15 in. (381 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** – One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. The space between pipes, conduits or tubing and the steel sleeve (Item 3A) shall be min of 0 in. (point contact) to max 2-3/8 in. (60 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 12 in. (305 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.

   B. **Iron Pipe** – Nom 12 in. (305 mm) diam (or smaller) service weight (or heavier) cast iron soil pipe, nom 12 in. (305 mm) diam (or smaller) or Class 50 (or heavier) ductile iron pressure pipe.

   C. **Conduit** – Nom 6 in. (152 mm) diam (or smaller) steel conduit or nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing.

   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. **Firestop System** – Installed symmetrically on both sides of wall assembly. The details of the firestop system shall be as follows.

   A. **Steel Sleeve** – Cylindrical sleeve fabricated from min 0.019 in. thick (0.48 mm) galv sheet steel and having a min 2 in. (51 mm) lap along the longitudinal seam. Length of steel sleeve to be equal to thickness of wall plus 1 to 4 in. (25 to 102 mm) such that, when installed, the ends of the sleeve will project approx 1/2 to 2 in. (13 to 51 mm) beyond the surface of the wall on both sides of the wall assembly.

   Sleeve installed by coiling the sheet steel to a diam smaller than the through opening, inserting the coil through the openings and releasing the coil to let it uncoil against the circular cutouts in the gypsum board layers.

   B. **Packing Material** – Min 1 in. (25 mm) thickness of mineral wool batt insulation firmly packed into steel sleeve on both sides of the wall assembly as permanent forms. Packing material to be recessed min 1/2 in. (13 mm) from end of steel sleeve (flush with or recessed into gypsum board surface) on both sides of wall assembly.

   B1. **Packing Material** – (Not shown) – As an alternate to Item B, nom 1 in. (25 mm) thick polyethylene backer rod may be used. The backer rod is to be recessed within the steel sleeve a min of 1 in. (25 mm) from each surface of wall.

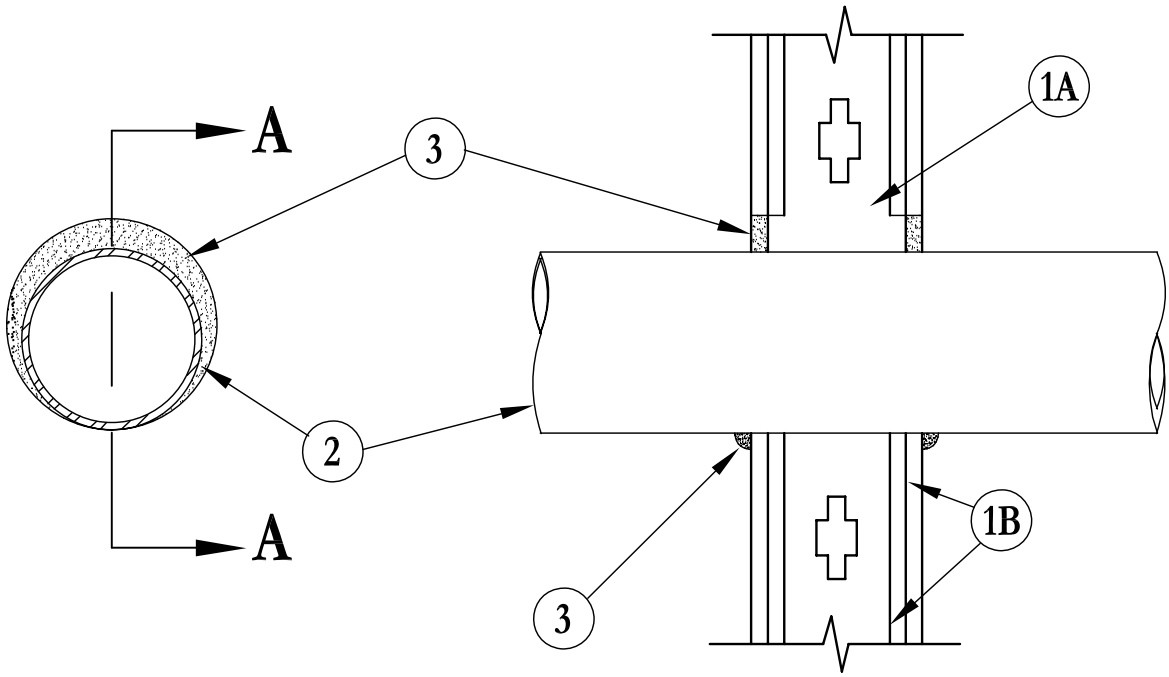
   C. **Fill, Void or Cavity Materials*** – **Caulk or Sealant** – When mineral wool batt insulation is used, caulk or sealant applied to fill the steel sleeve to a min depth of 1/2 in. (13 mm) on both sides of wall assembly. When backer rod is used, a min thickness of 1 in. (25 mm) of caulk or sealant is required flush with both sides of wall. A nom 1/4 in. (6 mm) diam continuous bead of caulk or sealant shall be applied around the circumference of the steel sleeve at its egress from the gypsum board layers on both sides of the wall assembly.

   3M COMPANY – CP 25WB+, IC 15WB+ or FB-3000 WT

*Bearing the UL Classification Mark

System No. W-L-1146

September 03, 2004
F Ratings – 1 and 2 Hr (See Item 1)
T Rating – 0 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 in. by 4 in. (51 mm 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. 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 in. to 6 in. (102 to 152 mm) wider and 4 in. to 6 in. (102 to 152 mm) higher than the diam of the penetrating item such that, when the penetrating item is centered in the opening, a 2 in. to 3 in. (51 mm to 76 mm) clearance is present between the penetrating item and the framing in 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 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 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, conduit or tubing installed either concentrically or eccentrically within the firestop system. The annular space between pipe, conduit or tubing and periphery of opening shall be min of 0 in. (point contact) to max 2 in. (0 mm to 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 24 in. (610 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.

   B. **Iron Pipe** – Nom 24 in. (610 mm) diam (or smaller) service weight (or heavier) cast iron soil pipe, nom 12 in (305 mm) diam (or smaller) or Class 50 (or heavier) ductile iron pressure pipe.

   C. **Conduit** – Nom 6 in. (152 mm) diam (or smaller) steel conduit or nom 4 in (102 mm) diam (or smaller) steel electrical metallic tubing

   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.

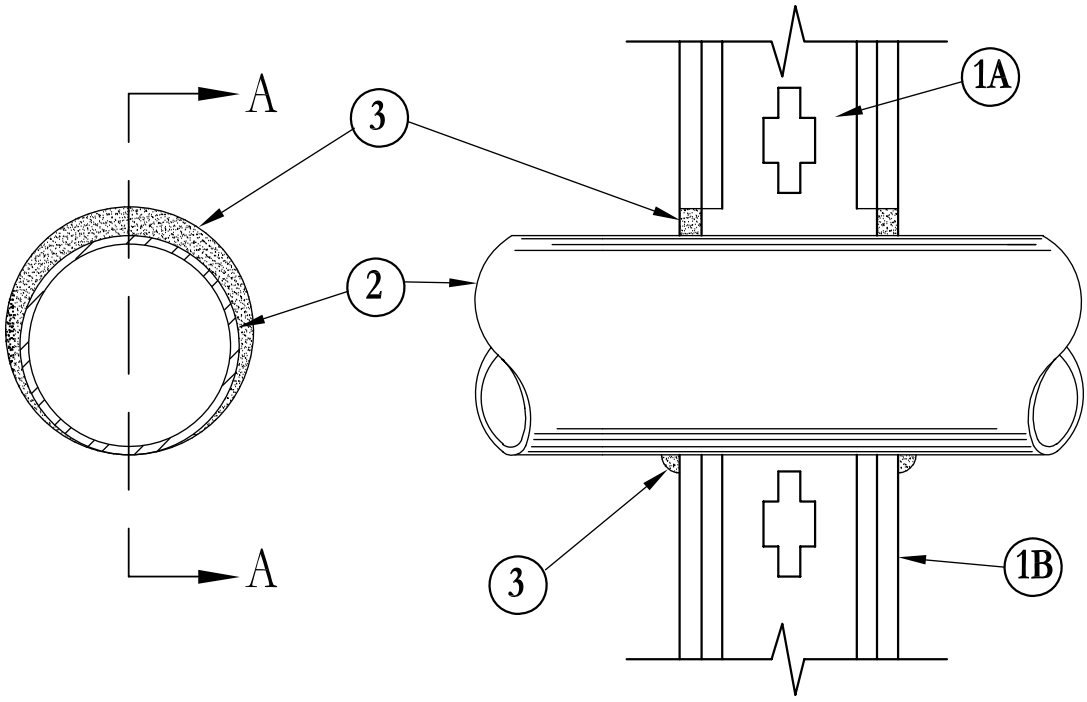
3. **Fill, Void or Cavity Materials*** – **Caulk or Sealant** – Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. Min 1/2 in. (13 mm) diam bead of caulk applied to the penetrant/wallboard interface at the point contact location on both sides of wall.

   3M COMPANY – CP 25WB+ caulk or FB-3000 WT sealant.

*Bearing the UL Classification Mark

System No. W-L-1167

August 03, 2001
F Ratings – 1 and 2 Hr (See Item 1)
T Rating – 0 Hr
L Rating At Ambient – Less Than 1 CFM/sq ft
L Rating At 400 F – 2 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. lumber spaced 16 in. OC with nom 2 by 4 in. lumber end plates and cross braces. Steel studs to be min 3-1/2 in. wide by 1-3/8 in. deep channels spaced max 24 in. OC.
   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 Design in the UL Fire Resistance Directory. Max diam of opening is 14 in.

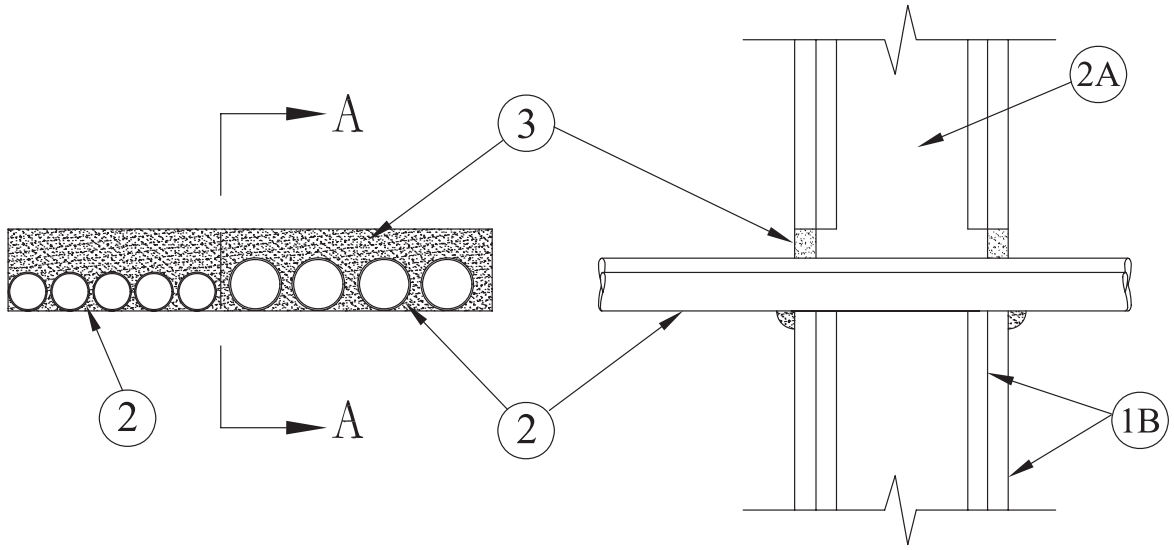
   The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.
2. **Through Penetrant** – One metallic pipe, conduit or tubing installed either concentrically or eccentrically within the firestop system. The annular space between pipe, conduit or tubing and periphery of opening shall be min of 0 in. (point contact) to max 1-3/8 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 12 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. **Iron Pipe** – Nom 12 in. diam (or smaller) service weight (or heavier) cast iron soil pipe, nom 12 in. diam (or smaller) or Class 50 (or heavier) ductile iron pressure pipe.
   C. **Conduit** – Nom 6 in. diam (or smaller) steel conduit or nom 4 in. diam (or smaller) steel electrical metallic tubing.
   D. **Copper Tubing** – Nom 4 in. diam (or smaller) Type L (or heavier) copper tubing.
   E. **Copper Pipe** – Nom 4 in. diam (or smaller) Regular (or heavier) copper pipe.
3. **Fill Void or Cavity Materials*** – **Caulk** – Min 5/8 in. thickness of fill material applied within the annulus, flush with both surfaces of wall. Min 1/2 in. diam bead of caulk applied to the penetrant/wallboard interface at the point contact location on both sides of wall.

   3M COMPANY – FireDam 150+

*Bearing the UL Classification Mark

System No. W-L-1228

May 19, 2005
F Rating – 1 and 2 Hr (See Item 1)
T Rating – 0, 1/2 and 1 Hr (See Item 3)
L Rating At Ambient – Less Than 1 CFM/sq ft
L Rating At 400 F – 2 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 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 shall consist of min 3-5/8 in. (92 mm) wide steel channel studs spaced max 24 in. (610 mm) OC.

   B. **Gypsum Board*** – Thickness, type, number of layers and fasteners shall be as specified in the individual U400 series Wall and Partition Design in the UL Fire Resistance Directory. Max area of opening is 67-1/2 sq. in. (435 sq cm) with max dimension of 22-1/2 in. (572 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** – One or more nom 2 in. (51 mm) diam (or smaller) rigid steel conduit or electrical metallic tubing (EMT) installed either concentrically or eccentrically within the firestop system. The annular space between conduits or tubing and periphery of opening shall be min 0 in. (point contact) to max 1-1/4 in. (0 mm to max 32 mm). The space between conduits or tubing shall be min 1/4 in. to max 1 in. (6 mm to max 25 mm). Conduit or tubing to be rigidly supported on both sides of wall assembly.

3. **Fill, Void or Cavity Material* – Caulk or Sealant** – Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. Min 1/2 in. (13 mm) diam bead of caulk applied to the penetrant/gypsum board interface at the point contact location on both sides of wall.

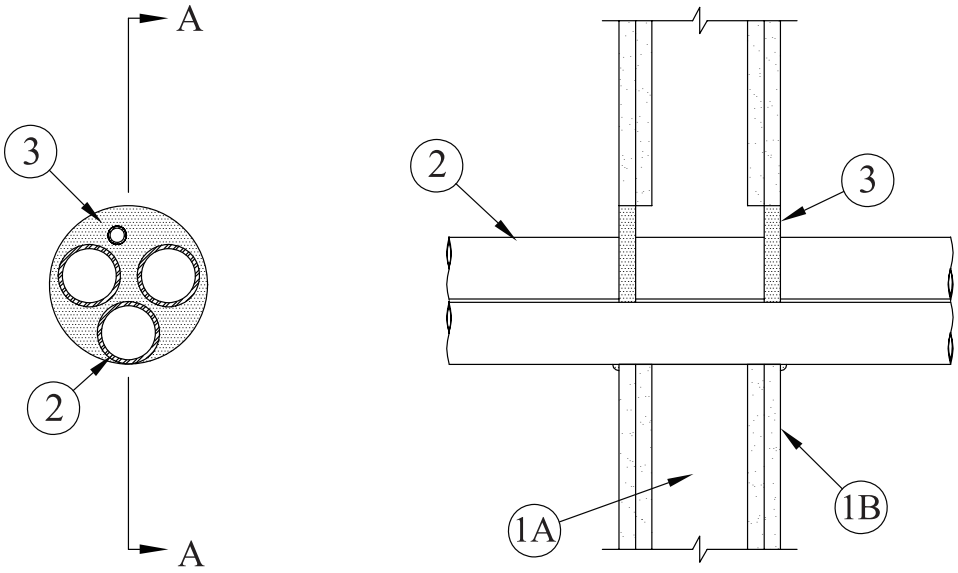
   The hourly T Rating of the firestop system is 0 Hr when used in 1 Hr rated assemblies. The T Rating for 2 Hr rated assemblies is 1/2 and 1 Hr for FireDam 150+ and CP 25WB+, respectively.

   3M COMPANY – IC 15WB+, CP 25WB+, FireDam 150+ caulk or FB-3000 WT sealant.

*Bearing the UL Classification Mark

System No. W-L-1287

May 19, 2005
F Ratings – 1 & 2 Hr (See Item 1)
T Ratings – 0 & 1/4 Hr (See Item 1)



SECTIONA-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 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 in. by 4 in. (51 mm by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide spaced max 24 in. (610 mm) OC.

   B. **Gypsum Board*** – 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 8 in. (203 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. The hourly T Rating is 0 and 1/4 Hr for 1 and 2 Hr rated assemblies, respectively.

2. **Through Penetrants** – One or more metallic pipes, conduits, tubes or flexible metal pipes installed concentrically or eccentrically within opening. Annular space between penetrants and periphery of opening to be min 0 in. (point contact) to max 2 in. (0 mm to max 51 mm). Space between penetrants to be min 1/4 in. to max 2 in. (6 mm to max 51 mm). Penetrants to be rigidly supported on both sides of wall. The following types and sizes of penetrants may be used:

   A. **Steel Pipe** – Nom 3 in. (76 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.

   B. **Iron Pipe** – Nom 3 in. (76 mm) diam (or smaller) cast or ductile iron pipe.

   C. **Conduit** – Nom 3 in. (76 mm) diam (or smaller) steel conduit or steel electrical metallic tubing.

   D. **Copper Tubing** – Nom 2 in. (51 mm) diam (or smaller) Type L (or heavier) copper tubing.

   E. **Copper Pipe** – Nom 2 in. (51 mm) diam (or smaller) Regular (or heavier) copper pipe.

   F. **Through Penetrating Product* – Flexible Metal Piping** – The following types of steel flexible metal gas piping may be used:

      1. Nom 2 in. (51 mm) diam (or smaller) steel flexible metal gas piping. Plastic covering on piping may or may not be removed on both sides of floor or wall assembly.

         OMEGA FLEX INC.

      2. Nom 1 in. (25 mm) diam (or smaller) steel flexible metal gas piping. Plastic covering on piping may or may not be removed on both sides of floor or wall assembly.

         TITEFLEX CORP, A BUNDY CO

      3. Nom 1 in. (25 mm) diam (or smaller) steel flexible metal gas piping. Plastic covering on piping may or may not be removed on both sides of floor or wall assembly.

         WARD MFG INC.

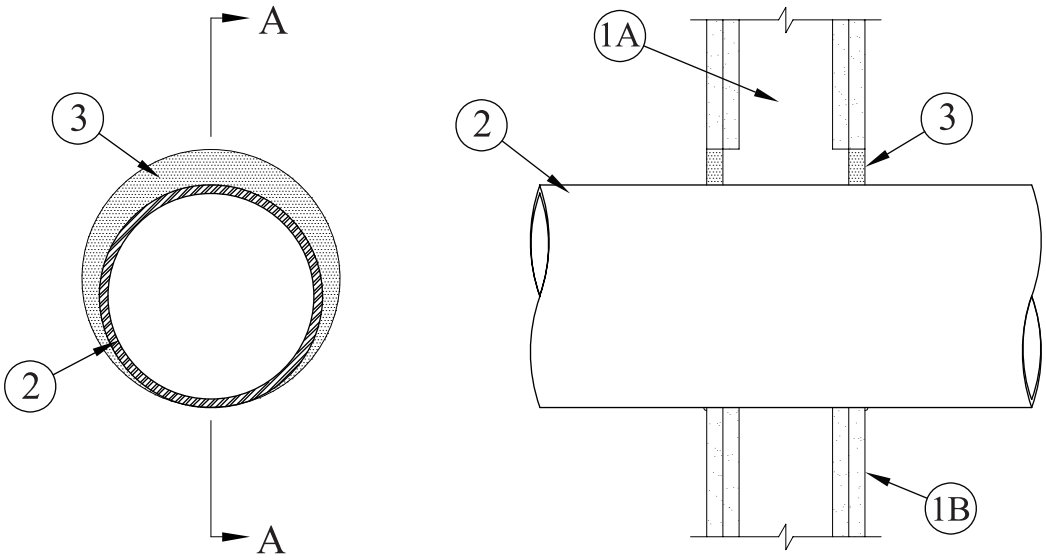
3. **Fill, Void or Cavity Material* – Caulk or Sealant** – Min 5/8 in. (16 mm) thickness of caulk applied within annulus, flush with both surfaces of wall. Min 1/4 in. (6 mm) diam bead of caulk applied to gypsum board/penetrant interface at point contact location on both sides of wall.

   3M COMPANY – IC 15WB+, CP 25WB+ caulk or FB-3000 WT sealant.

*Bearing the UL Classification Marking

System No. W-L-1296

February 14, 2008
F Ratings – 1 and 2 Hr (See Item 1)
T Ratings – 0 and 1/4 Hr (See Item 1)



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 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide spaced max 24 in. (610 mm) OC.
   B. **Gypsum Board*** – 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 10-5/8 in. (270 mm).
   C. **Steel Sleeve** – (Optional, Not Shown) - Cylindrical sleeve fabricated from min 0.019 in. thick (0.48 mm) galv sheet steel and having a min 2 in. (51 mm) lap along the longitudinal seam. Length of steel sleeve to be equal to thickness of wall. Sleeve installed by coiling the sheet steel to a diam smaller than the through opening, inserting the coil through the openings and releasing the coil to let it uncoil against the circular cutouts in the gypsum wallboard layers.

   The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed. The hourly T Rating is 0 and 1/4 Hr for 1 and 2 Hr rated assemblies, respectively.
2. **Through Penetrants** – One metallic pipe, conduit, tubing or flexible metal pipe installed concentrically or eccentrically within opening. Annular space between penetrant and periphery of opening to be min 0 in. (0 mm point contact) to max 2 in. (51 mm). Penetrant to be rigidly supported on both sides of wall. The following types and sizes of penetrants 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) steel electrical metallic tubing (EMT) or nom 6 in. (152 mm) rigid steel conduit.
   D. **Copper Tubing** – Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tubing.
   E. **Copper Pipe** – Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
   F. **Through Penetrating Product*** – **Flexible Metal Piping** – The following types of steel flexible metal gas piping may be used:
      1. Nom 2 in. (51 mm) diam (or smaller) steel flexible metal gas piping. Plastic covering on piping may or may not be removed on both sides of floor or wall assembly.

         OMEGA FLEX INC
      2. Nom 1 in. (25 mm) diam (or smaller) steel flexible metal gas piping. Plastic covering on piping may or may not be removed on both sides of floor or wall assembly.

         GASTITE, DIV OF TITEFLEX
      3. Nom 1 in. (25 mm) diam (or smaller) steel flexible metal gas piping. Plastic covering on piping may or may not be removed on both sides of floor or wall assembly.

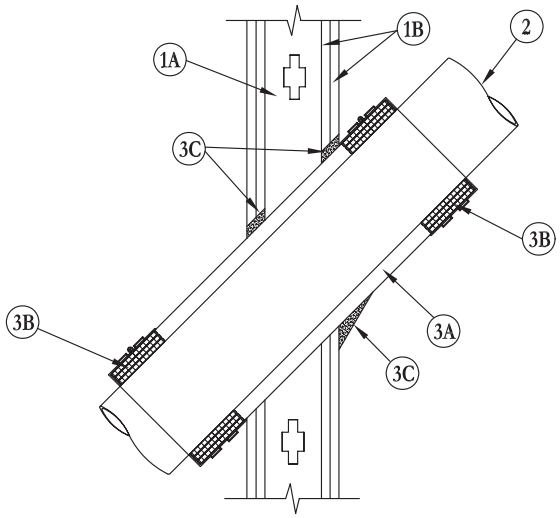
         WARD MFG INC
3. **Fill, Void or Cavity Material* – Caulk or Sealant** – Min 5/8 in. (16 mm) thickness of caulk applied within annulus, flush with both surfaces of wall. Min 1/4 in. (6 mm) diam bead of caulk applied to gypsum board/penetrant interface at point contact location on both sides of wall.

   3M COMPANY – IC 15WB+, CP 25WB+ caulk or FB-3000 WT sealant

*Bearing the UL Classification Mark

System No. W-L-2087

May 23, 2005
F Ratings – 1 and 2 Hr (See Item 1)
T Ratings – 0 and 3/4 Hr (See Item 1)



1. **Wall Assembly** – The 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 in. by 4 in. (51 mm 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 required in the individual Wall and Partition Design. Diam of opening is max 1/2 in. (13 mm) larger than the outside diam of steel sleeve (Item 3A).

   The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed. The T Ratings are 0 and 1/2 hr when installed in 1 hr and 2 hr rated walls, respectively.

2. **Through Penetrants** – One nonmetallic pipe or conduit to be centered within the firestop system. Pipe or conduit to be rigidly supported on both sides of floor or wall assembly. The pipe or conduit may be installed at an angle not greater than 45 degrees from perpendicular. The following types and sizes of nonmetallic pipes or conduits may be used:

   A. Nom 4 in. (102 mm) diam (or smaller) Schedule 40 solid core or cellular core polyvinyl chloride(PVC) pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

   B. Nom 4 in. (102 mm) diam (or smaller) SDR13.5 chlorinated polyvinyl chloride (CPVC) pipe for use in closed (process or supply) piping systems.

   C. Nom 4 in. (102 mm) diam (or smaller) Schedule 40 (or heavier) solid core or cellular core acrylonitrile butadiene styrene (ABS) pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

3. **Firestop System** – The firestop system shall consist of the following:

   A. **Metallic Sleeve** – Cylindrical sleeve fabricated from min 0.019 in. (0.48 mm) thick (26 gauge) galv sheet steel and having a min 1 in. (25 mm) lap along the longitudinal seam. Sleeve to extend a min of 2 in. (51 mm) beyond both sides of the wall. The inside diam of the sleeve shall be larger than outside diam of nonmetallic pipe or conduit such that an annular space will be present between the steel sleeve and the pipe around the entire circumference of the pipe to accommodate the layer(s) of wrap strips (Item 3B). The annular space between the outside of the wrap strip layer(s) and the inside of the sleeve shall be min 0 in. to max 1/4 in. (0 mm to max 6 mm). The annular space between the outside of the sleeve and the periphery of the opening shall be min 0 in. to max 1/2 in. (0 mm to max 13 mm).

   B. **Fill, Void or Cavity Materials*** – **Wrap Strip** – Nom 1/4 in. (6 mm) thick intumescent elastomeric material faced on one side with aluminum foil, supplied in 2 in (51 mm) wide strips. Nom 2 in. (51 mm) wide strips tightly wrapped around nonmetallic pipe (foil side exposed) and slid into sleeve on both sides of wall such that the outer edges of wrap strips are flush with the outer edges of the sleeve. For nom 1/2 in. to nom 1-1/2 in. (13 mm to nom 38 mm) diam pipes, a min of one layer of wrap strip is required. For nom 2 in., 2-1/2 in. and 3 in. (51 mm, 64 mm and 76 mm) diam pipes, a min of two layers of wrap strip is required. For nom 3-1/2 in. and 4 in. (89 mm to 102 mm) diam pipes, a min of three layers of wrap strip is required. Each layer of wrap strip to be installed with butted seam with butted seams in successive layers staggered. Wrap strip layers held in position using aluminum foil tape, steel wire tie, or equivalent. A min 1/2 in. (13 mm) wide stainless steel hose clamp shall be secured around the outside of the sleeve over the center of the wrap strips on both ends of the sleeve.

      3M COMPANY – FS-195+

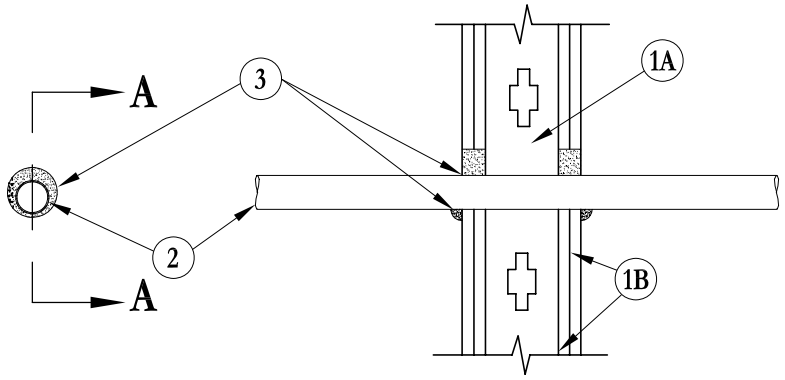
   C. **Fill, Void or Cavity Materials*** – **Caulk or Sealant** – Min thickness of 5/8 in. and 1-1/4 in. (16 mm and 32 mm) for 1 and 2 hr rated wall assemblies, respectively, applied within annulus between metallic sleeve and periphery of the opening, flush with both surfaces of wall assembly. At the point contact location between sleeve and gypsum board, a min 1/2 in (13 mm) diam bead of caulk shall be applied at the sleeve/wallboard interface on both surfaces of wall assembly. A min 1/4 in. (6 mm) bead of caulk shall also be applied over the outer edges of the wrap strips and within the annular space between the wrap strip and sleeve on both sides of wall.

      3M COMPANY – CP 25WB+, IC 15WB+, FireDam 150+ caulk or FB-3000 WT sealant
      (Note: CP 25WB+ not suitable for use with CPVC pipes.)

*Bearing the UL Classification Marking

System No. W-L-2088

May 23, 2005
F Ratings – 1 and 2 Hr (See Item 1)
T Ratings – 0, 1 and 2 Hr (See Item 2)



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 in. by 4 in. (51 mm 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 required in the individual Wall and Partition Design. Diam of opening shall be 7/8 in. (22 mm) larger than the outside diam of nonmetallic pipe or conduit (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 Penetrants** – One nonmetallic pipe or conduit to be installed either concentrically or eccentrically within the firestop system. The annular space for max 1-1/4 in. (32 mm) diam pipe or conduit shall be min 0 in. (point contact) to max 7/8 in. (0 mm to max 22 mm). The annular space for pipe or conduit larger than nom 1-1/4 in. (32 mm). diam shall be min 1/2 in. to max 1 in. (13 mm to max 25 mm). Pipe or conduit to be rigidly supported on both sides of wall assembly. The following types and sizes of nonmetallic pipes or conduits 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. **Polyvinyl Chloride (PVC) Pipe** – Nom 3 in. (76 mm) diam (or smaller) Schedule 40 solid core PVC pipe for use in closed (process or supply) piping system.
   C. **Chlorinated Polyvinyl Chloride (CPVC) Pipe** – Nom 3 in. (76 mm) diam (or smaller) SDR 11 CPVC pipe for use in closed (process or supply) piping systems.
   D. **Rigid Nonmetallic Conduit**++ – Nom 3 in. (76 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with Article 347 of the National Electrical Code (NFPA No 70).
   E. **Electrical Nonmetallic Tubing (ENT)**++ – Nom 1 in. (25 mm) diam (or smaller) ENT formed of PVC, installed in accordance with Article 331 of the National Electrical Code (NFPA No. 70).

   See **Rigid Nonmetallic Conduit** (DZKT) and **Electrical Nonmetallic Tubing** (FKHU) categories in the UL Electrical Construction Equipment Directory for names of manufacturers.

   F. **Acrylonitrile Butadiene Styrene (ABS) Pipe** – Nom. 2 in. (51 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.

   The hourly T Rating is dependent on the hourly rating of the wall assembly, the pipe or conduit size and whether the pipe is intended for use as a closed or vented system, as shown in the following table.

Nom Pipe Diam In. (mm)	Wall Assembly Rating Hr	Closed (c) or Vented (v)	T Rating Hr
1/2 to 3 (13 to 76)	1	c	1
1/2 to 1-1/4 (13 to 32)	1	v	1
1/2 to 1-1/4 (13 to 32)	2	c	2
1/2 to 1-1/4 (13 to 32)	2	v	1
2 (51)	1	v	0
2 (51)	2	v	0

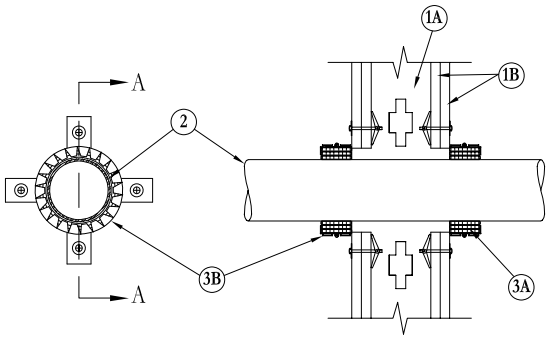
3. **Fill, Void or Cavity Materials*** – **Caulk, Sealant or Putty** – Min thickness of 5/8 in. and 1-1/4 in. (16 mm and 32 mm) of caulk or putty for 1 and 2 hr rated wall assemblies, respectively, applied within annulus between pipe or conduit and periphery of the opening, flush with both surfaces of wall assembly. At the point contact location between pipe or conduit and gypsum board, a min 1/2 in. (13 mm) diam bead of caulk or putty shall be applied at the pipe or conduit/wallboard interface on both surfaces of wall assembly.

   3M COMPANY – CP 25WB+, IC 15WB+ caulk, FB-3000 WT sealant or MP+ Stix putty
   (Note: CP 25WB+ not suitable for use with CPVC pipes.)

+++Bearing the UL Listing Mark.
*Bearing the UL Classification Marking

System No. W-L-2147

May 23, 2005
F Rating – 1 And 2 Hr (See Item 1)
T Rating – 1 And 2 Hr (See Item 1)



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. (89 mm) wide and spaced max 24 in. (610 mm) OC.
   B. **Gypsum Board*** – Thickness, type, number of layers and fasteners as required in the individual Wall and Partition Design. Max diam of opening is 5 in. (127 mm).

   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 nom 1/4 in. (6 mm) annular space between pipe or conduit and periphery of opening. Pipe or conduit to be rigidly supported on both sides of the wall 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) 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. **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 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 core or cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   E. **Fire 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 system.
3. **Firestop System** – The details of the firestop system shall be as follows:
   A. **Fill, Void or Cavity Materials* – Wrap Strip** – Nom 1/8 in. (3.2 mm) thick intumescent material supplied in 2 in. (51 mm) wide strips. Wrap strip tightly wrapped around nonmetallic pipe with continuous layers and butted tightly against both surfaces of the wall. The min number of layers required is dependent upon the nom diam of the pipe. For nom 2 in. (51 mm) diam (and smaller) pipes, one layer is required. For nom 2-1/2 in. and 3 in. (62 and 76 mm) diam pipes, two layers are required. For nom 3-1/2 in. and 4 in. (89 and 102 mm) diam pipes, three layers are required. Wrap strip layers temporarily held in position using aluminum foil tape, steel wire tie, or equivalent.

      3M COMPANY – Ultra GS
   B. **Steel Collar** – Nom 2 in. (51 mm) deep collar with 1-1/4 in. (32 mm) wide by 2 in. (51 mm) long anchor tabs and min 1/2 in. (13 mm) long tabs to retain wrap strip layers. Coils of precut 0.016 in. (0.41 mm) thick (28 gauge) galv sheet steel available from wrap strip manufacturer. As an alternate, collar may be field-fabricated from min 0.016 in. (0.41 mm) thick (28 gauge) galv sheet steel in accordance with instruction sheet supplied by wrap strip manufacturer. Steel collar, with anchor tabs bent outward 90 deg, wrapped tightly around wrap strip layers with min 1 in. (25 mm) overlap at seam. Anchor tabs to be pressed tightly against wall surfaces, and collar to be compressed around wrap strip layers using a min 1/2 in. (13 mm) wide by 0.028 in. (0.71 mm) thick stainless steel band clamp at the middle of collar. As an alternate to the band clamp, collar for systems with three or more layers of wrap strip may be fastened together along the overlapping seam with three No. 6 by 3/8 in. (10 mm) long self-tapping steel screws. Collar to be secured to wall surfaces with 3/16 in. (5 mm) diam steel toggle bolts, or equivalent, in conjunction with min 1-1/4 in. (32 mm) diam steel fender washers. Min of two, three or four anchor bolts, symmetrically located, for nom 2 in. (51 mm) diam (and smaller), nom 3 in. (76 mm) diam (and smaller) and nom 4 in. (102 mm) diam (and smaller), pipes, respectively.
   C. **Fill, Void or Cavity Materials*** – **Caulk, Sealant or Putty** (Not Shown) – Min 1/2 in. (13 mm) diam bead of caulk or putty shall be applied to outer perimeter of collar at its interface with wall surface(s).

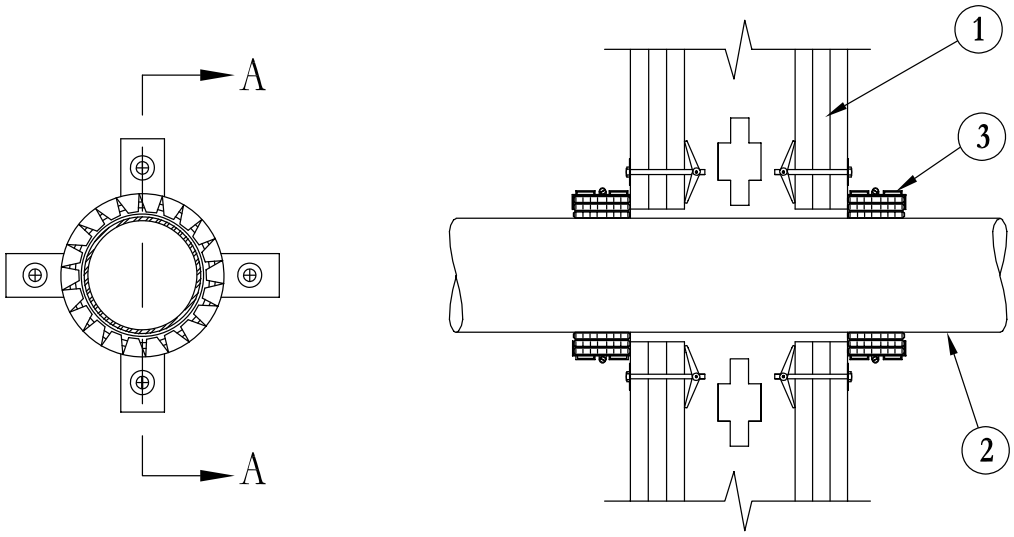
      3M COMPANY – CP 25WB+, IC 15WB+, FireDam 150+ caulk, FB-3000 WT sealant or MP+ putty
      (Note: CP 25WB+ not suitable for use with CPVC pipes. CP 25WB+ not suitable for use with CPVC pipes.)
   D. **Firestop Device*** – As an alternate to Items 3A and 3B, firestop device to be installed in accordance with the accompanying installation instructions. Firestop device to be installed and latched around pipe and secured to both sides of wall with Ultra Fast Anchors Straps or with 1/4 in. (6 mm) diam by min 1-1/2 in. (38 mm) long steel toggle bolts in conjunction with min 1-1/4 in. (32 mm) diam steel fender washers. Min of two, three or four anchor straps or anchor bolts symmetrically located, for nom 2 in., 3 in. and 4 in. (51 mm, 76 mm and 102 mm) diam pipe respectively.

      3M COMPANY – Ultra RC Pack 2.0, 3.0, 4.0

++Bearing the UL Listing Mark
*Bearing the UL Classification Mark

System No. W-L-2162

May 19, 2005
F Ratings – 1, 2 And 3 Hr (See Item 1)
T Ratings – 1, 2 And 3 Hr (See Item 1)



SECTION A-A

1. **Wall Assembly** – The 1, 2 or 3 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 in. by 4 in. (51 mm by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide spaced max 24 in. (610 mm) OC. When wood studs are used, the assembly is limited to 1 and 2 hr. ratings.

   B. **Gypsum Board*** – Thickness, type, number of layers and fasteners as required in the individual Wall and Partition Design. Max diam of opening is 5 in. (127 mm).

   The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.

2. **Through Penetrants** – One nonmetallic pipe or conduit to be centered within opening with a nom 1/4 in. (6 mm) annular space between pipe or conduit and periphery of opening. Pipe or conduit to be rigidly supported on both sides of the wall 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) 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. **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 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 core or cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

   E. **Fire 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 system.

   F. **Polyvinylidene Flouride (PVDP) Pipe** – Nom 4 in. (102 mm) diam (or smaller) Schedule 40 PVDF pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

   The T Ratings are 1, 2 and 3 Hr for pipes A, B and C in 1, 2 and 3 Hr rated wall assemblies, respectively. The T Ratings for pipe D, E and F are 1 Hr in 1 and 2 Hr rated wall assemblies and 2 Hr in 3 Hr rated wall assemblies in which it is installed.

3. **Firestop Device – Collar** – Collar to be installed in accordance with the accompanying installation instructions. Collar to be installed and latched around pipe and secured to both sides of wall with 3M Ultra Fast Anchor Straps or with 1/4 in. (6 mm) diam by min 1-1/2 in. (38 mm) long steel toggle bolts in conjunction with min 1-1/4 in. (32 mm) diam steel fender washers. Min of two, three or four anchor straps or anchor bolts, symmetrically located, for nom 2 in. (51 mm) diam (and smaller), nom 3 in. (76 mm) diam and nom 4 in. (102 mm) diam pipes, respectively.

   3M COMPANY – Ultra PPD 1.5, 2.0, 3.0 and 4.0

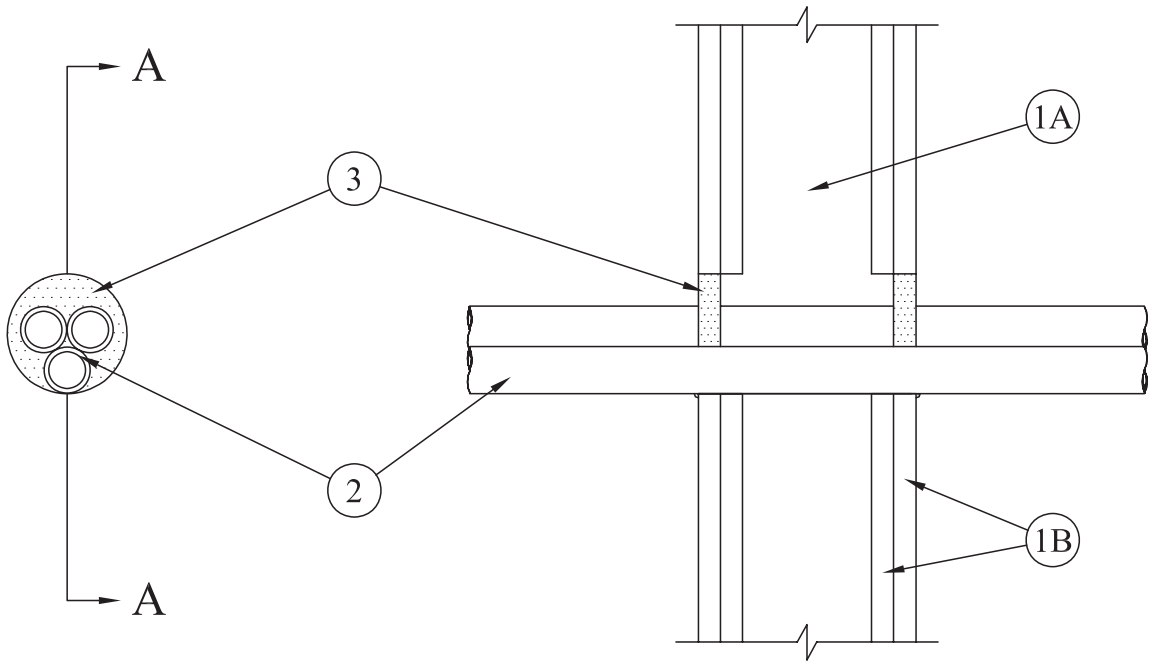
4. **Fill, Void or Cavity Materials*** – **Caulk, Sealant or Putty** (Optional, Not Shown) – Generous bead of caulk or putty may be applied to outer perimeter of collar at its interface with wall surfaces.

   3M COMPANY – CP 25WB+, IC 15WB+, FireDam 150+ caulk, FB-3000 WT sealant or MP+ Stix putty
   (Note: CP 25WB+ not suitable for use with CPVC pipes.)

*Bearing the UL Classification Marking
++Bearing the UL Listing Mark

System No. W-L-2300

May 19, 2005
F Ratings – 1 & 2 Hr (See Item 1)
T Ratings – 0 & 1/2 Hr (See Item 1)



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 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 in. by 4 in. (51 mm by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide spaced max 24 in. (610 mm) OC.
   B. **Gypsum Board*** – 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 4 in. (102 mm).

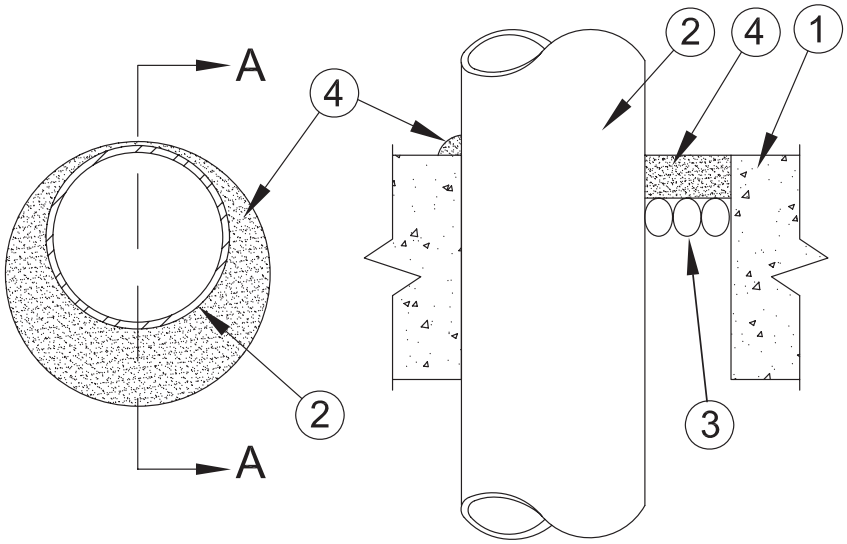
   The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed. The hourly T Rating is 0 and 1/2 Hr for 1 and 2 Hr rated assemblies, respectively.
2. **Through Penetrants** – One or more nonmetallic pipes, conduits or tubes installed concentrically or eccentrically within opening. Annular space between penetrants and periphery of opening to be min 0 in. (point contact) to max 1 in. (0 mm to max 25 mm). Space between penetrants shall be min 0 in. (point contact) to max 1 in. (0 mm to max 25 mm). Penetrants to be rigidly supported on both sides of wall. The following types and sizes of penetrants may be used:
   A. **Polyvinyl Chloride (PVC) Pipe** – Nom 1-1/2 in. (38 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 1-1/2 in. (38 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with Article 347 of the National Electrical Code (NFPA No. 70).
   C. **Chlorinated Polyvinyl Chloride (CPVC) Pipe** – Nom 1-1/2 in. (38 mm) diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.
   D. **Crosslinked Polyethylene (PEX) Tubing** – Nom 1 in. (25 mm) diam (or smaller) SDR 9 PEX tubing for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
3. **Fill, Void or Cavity Material*** – **Caulk or Sealant** – Min 5/8 in. (16 mm) thickness of caulk applied within annulus, flush with both surfaces of wall. Min 1/4 in. (6 mm) diam bead of caulk applied to gypsum board/penetrant interface at point contact location on both sides of wall.

   3M COMPANY – IC 15WB+, CP 25WB+ caulk or FB-3000 WT sealant
   (Note: CP 25WB+ not suitable for use with CPVC pipes.)

*Bearing the UL Classification Marking

System No. C-AJ-1044

March 15, 2007
F Ratings – 2, 3, and 4 Hr (See Items 2A and 4)
T Rating – 0 Hr
L Rating At Ambient – 2 CFM/sq ft
L Rating At 400 F – less than 1 CFM/sq ft
W Rating – Class 1 (See Item 4)



SECTION A-A

1. **Floor or Wall Assembly** – Lightweight or normal weight (100-150 pcf or 1600-2400 kg/m^3) concrete. Except as noted in table under Item 4, min thickness of solid 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 UL Classified hollow core **Precast Concrete Units***. When floor is constructed of hollow core precast concrete units, packing material (Item 3) and caulk fill material (Item 4) to be installed symmetrically on both sides of floor, flush with floor surface. Wall assembly may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening in solid lightweight or normal weight concrete floor is 32 in. (813 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.

1A. **Steel Sleeve** – (Optional, Not Shown) - Nom 16 in. (406 mm) diam (or smaller) Schedule 10 (or heavier) steel sleeve cast or grouted into floor or wall assembly. Sleeve may extend a max of 2 in. (51 mm) above top of floor or beyond either surface of wall. As an alternate, nom 16 in. (406 mm) diam (or smaller) min 0.028 (0.71 mm) thick galvanized sheet steel sleeve cast or grouted into floor or wall assembly flush with floor or wall surfaces.

2. **Through Penetrants** – One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. Max annular space between pipe, conduit or tubing and edge of through opening or sleeve is dependent on the parameters shown in Item 4. Min annular space between pipe or conduit and edge of through opening is 0 in. (point contact). Max annular space to be as shown in the table in Item 4. 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. (762 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.

   B. **Iron Pipe** – Nom 30 in. (762 mm) diam (or smaller) cast or ductile iron pipe.

   C. **Conduit** – Nom 6 in. (152 mm) diam (or smaller) rigid steel conduit.

   D. **Conduit** – Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing.

   E. **Copper Tubing** – Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tube.

   F. **Copper Pipe** – Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe.

3. **Packing Material** – Polyethylene backer rod or nom 1 in. (25 mm) thickness of tightly-packed mineral wool batt or glass fiber 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 caulk fill material (Item 4).

3A. **Forming Material*** – As an alternate to the packing material in Item 3, nom 4 in. (102 mm) wide strips of min 1/2 in (13 mm) thick compressible mat to be stacked to a thickness greater than the width of the annular space and compression-fitted, edge-first, to fill the annular space to a min 4 in. (102 mm) depth. As an option, the strips of min 1/2 in. (13mm) thick compressible mat may be folded in half, lengthwise, and stacked to a thickness greater than the width of the annular space and compression-fitted, edge-first, to fill the annular space to a min 2 in. (51 mm) depth. Top of forming material to be recessed from top surface of floor or from both surfaces of wall as necessary to accommodate the required thickness of caulk fill material.

3M COMPANY – Fire Barrier Packing Material

System No. C-AJ-1044 *continued*

4. **Fill, Void or Cavity Material*** – **Caulk, Sealant** – Applied to fill the annular space flush with top surface of floor. In wall assemblies, required caulk thickness to be installed symmetrically on both sides of wall, flush with wall surface. At point contact location between penetrant and sleeve or between penetrant and concrete, a min 1/4 in. (6 mm) diam bead of caulk shall be applied at top surface of floor and at both surfaces of wall. The hourly F Ratings and the min required caulk thicknesses are dependent upon a number of parameters, as shown in the following table::

Min Floor or Wall Thkns In. (mm)	Nom Pipe Tube or Conduit Diam In. (mm)	Max Annular Space In. (mm)	Min Caulk Thkns In. (mm)	F Rating Hr
2-1/2 (64)	1/2-12 (13-305)	1-3/8 (35)	1/2 (13)	2
2-1/2 (64)	1/2-12 (13-305)	3-1/4 (83)	1 (25)	2
4-1/2 (114)	1/2-6 (13-152)	1-3/8 (35)	1/4(6)(a)	2
4-1/2 (114)	1/2-12 (13-305)	1-1/4 (32)	1/2 (13)	3
4-1/2 (114)	1/2-20 (13-508)	2 (51)	1 (25)	3
4-1/2 (114)	1/2-20 (13-508)	2 (51)	1 (25)	3
4-1/2 (114)	1/2-12 (13-305)	3-1/4 (83)	1 (25)	3
4-1/2 (114)	22-30 (558-762)	2 (51)	2 (51)	3
5-1/2 (140)	1/2-6 (13-152)	1-3/8 (35)	1 (25)(b)	4

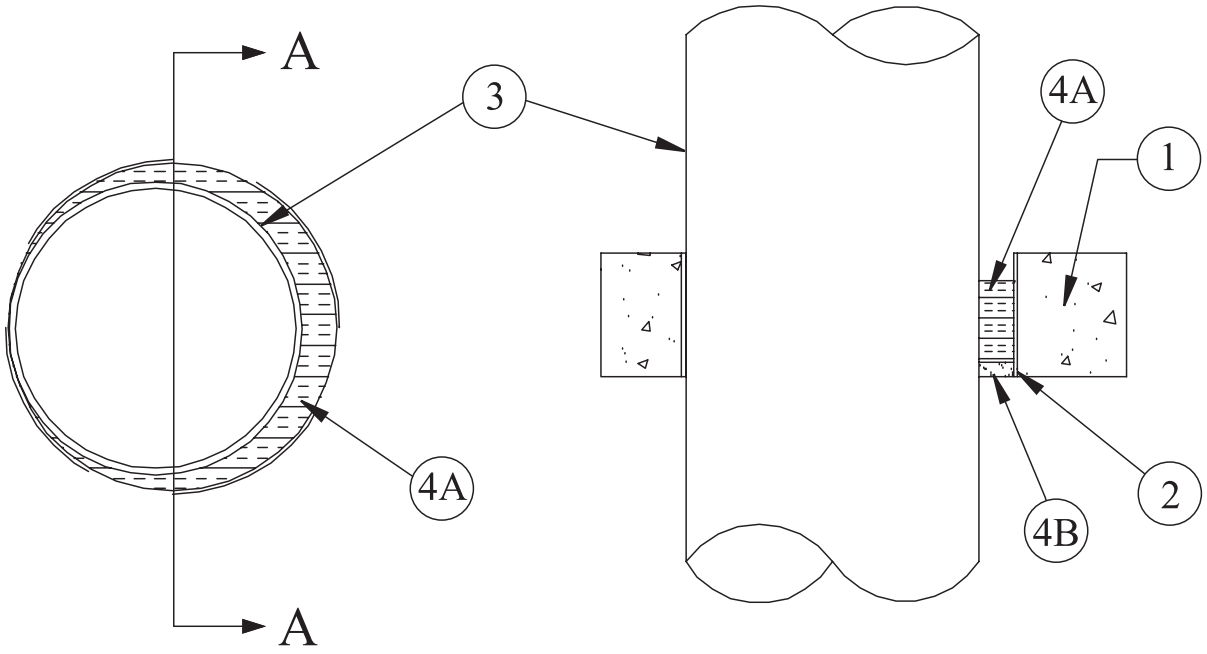
(a) Min 2 in. (51 mm) thickness of mineral wool batt insulation or forming material (Item 3A) required in annular space.
(b) Min 1 in. (25 mm) thickness of mineral wool batt insulation required in annular space on both sides of floor or wall assembly. Min 1 in. (25 mm) thickness of caulk to be installed flush with each surface of floor or wall assembly.

3M COMPANY – CP 25WB+ or FB-3000 WT.
(Note: W Rating applies only when FB-3000 WT is used.)

*Bearing the UL Classification Marking

System No. C-AJ-1496

May 18, 2005
F Rating – 3 Hr
T Rating – 0 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/m^3) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Max diam of opening 13-3/4 in. (349 mm).

   See **Concrete Blocks** (CAZT) category in Fire Resistance Directory for names of manufacturers.

2. **Steel Sleeve** – (optional) – Schedule 10 (or heavier) steel sleeve cast or grouted into slab, flush with bottom of floor. Sleeve may extend a max of 2 in. (51 mm) above top surface of floor or both surfaces of wall.

3. **Through Penetrant** – One metallic pipe or tubing installed concentrically or eccentrically within opening. Annular space between penetrant and sleeve or periphery of opening shall be min of 0 in. (0 mm) (point contact) to max 3 in. (76 mm). Penetrant to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of penetrants may be used:

   A. **Steel Pipe** – Nom 10 in. (254 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.

   B. **Iron Pipe** – Nom 10 in. (254 mm) diam (or smaller) cast or ductile iron pipe.

   C. **Conduit** – Nom 6 in. diam (or smaller) steel conduit or nom 4 in. diam (or smaller) steel electrical metallic tubing.

   D. **Copper Tubing** – Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tubing.

   E. **Copper Pipe** – Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.

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/m^3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from bottom surface of floor or from both surfaces of wall to accommodate the required thickness of fill material.

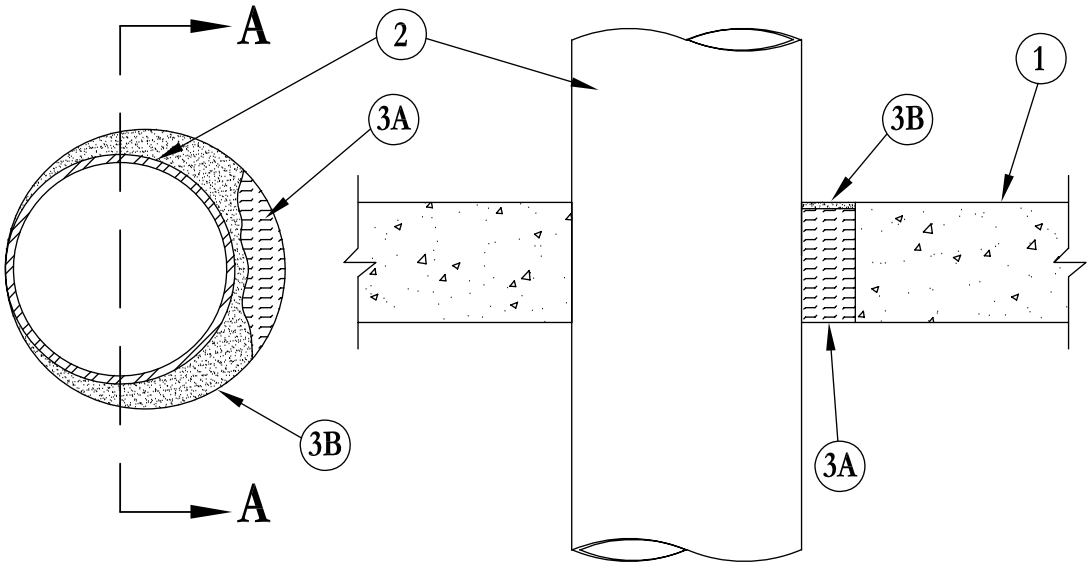
   B. **Fill, Void or Cavity Materials* – Caulk or Sealant** – Min 1/2 in. (13 mm) thickness of caulk applied within the annulus, flush with bottom surface of floor or with both surfaces of wall.

      3M COMPANY – CP 25WB+, IC 15WB+ caulk or FB-3000 WT sealant.

*-Bearing the UL Classification Mark

System No. C-AJ-1338

August 23, 2004
F Rating – 2 Hr
T Rating – 0 Hr
W Rating – Class I (See Item 3)



SECTION A-A

1. **Floor or Wall Assembly** – Min 2-1/2 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 25-7/8 in.

   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Through Penetrants** – One metallic pipe or tubing to be installed either concentrically or eccentrically within the firestop system. The annular space between tube and periphery of opening shall be min 0 in. to max 1-7/8 in. Penetrants 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 24 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.

   B. **Iron Pipe** – Nom 24 in. diam (or smaller) cast or ductile iron pipe.

   C. **Conduit** – Nom 6 in. diam (or smaller) steel conduit, or nom 4 in. (or smaller) steel electrical metallic tubing.

   D. **Copper Tubing** – Nom 6 in. diam (or smaller) Type M (or heavier) copper tube.

   E. **Copper Pipe** – Nom 6 in. diam (or smaller) Regular (or heavier) copper pipe.

3. **Firestop System** – The details of the firestop system shall be as follows:

   A. **Packing Material** – Min 2-1/4 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.

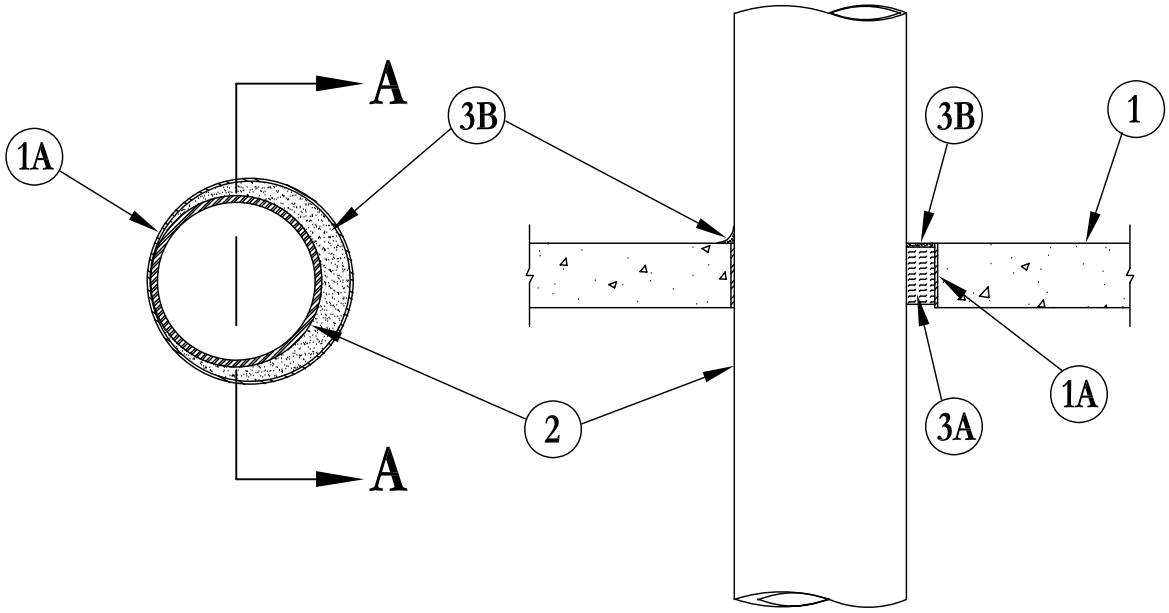
   B. **Fill, Void or Cavity Materials*** – **Caulk or Sealant** – Min 1/4 in. thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall. Min 1/2 in. diam bead of caulk applied to the penetrant/concrete interface at the point contact location on the top surface of floor or both surfaces of wall.

      3M COMPANY – CP 25WB+ caulk or FB-3000 WT sealant. (Note: W Rating applies only when FB-3000 WT is used.)

*Bearing the UL Classification Mark

System No. C-AJ-1366

December 26, 2001
F Rating – 2 Hr
T Rating – 0 Hr
L Rating At Ambient – Less Than 1 CFM/sq ft
L Rating At 400 F – 2 CFM/sq ft



SECTION A-A

1. **Floor or Wall Assembly** – Min 2-1/2 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 11-5/8 in.

   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

1A. **Steel Sleeve** (Optional) – Min 10 in. diam (or smaller) Schedule 10 (or heavier) steel pipe sleeve cast into concrete floor or wall. Sleeve to be flush with top and bottom surfaces of floor or both surfaces of wall. The inside of the sleeve shall be such that the annular space shall not exceed 7/8 in. from the OD of the penetrant to the ID of the steel sleeve.

2. **Through Penetrants** – One metallic pipe, tubing or conduit to be installed either concentrically or eccentrically within the firestop system. The annular space between tube and periphery of opening shall be min 0 in. to max 7/8 in. Penetrants to be rigidly supported on both sides of floor assembly. The following types and sizes of metallic pipes, tubing or conduit may be used:

   A. **Steel Pipe** – Nom 8 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.

   B. **Iron Pipe** – Nom 8 in. diam (or smaller) cast or ductile iron pipe.

   C. **Conduit** – Nom 6 in. diam (or smaller) rigid steel conduit.

   D. **Conduit** – Nom 4 in. (or smaller) electrical metallic tubing.

   E. **Copper Tubing** – Nom 4 in. diam (or smaller) Type L (or heavier) copper tube.

   F. **Copper Pipe** – Nom 4 in. diam (or smaller) Regular (or heavier) copper pipe.

3. **Firestop System** – The details of the firestop system shall be as follows:

   A. **Packing Material** – Min 2 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 to accommodate the required thickness of fill material.

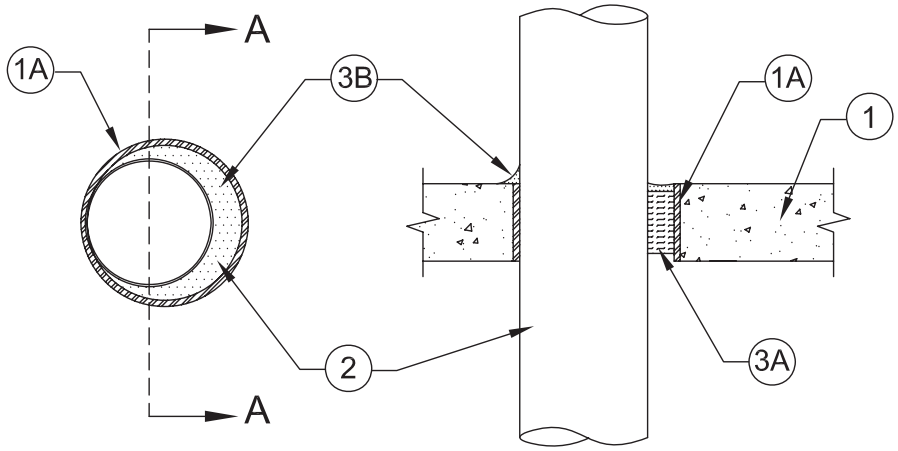
   B. **Fill, Void or Cavity Materials*** – **Caulk** – Min 1/2 in. thickness of caulk applied within the annulus, flush with top surface of floor. Min 1/2 in. diam bead of caulk applied to the penetrant/concrete interface at the point contact location on the top surface of floor.

      3M COMPANY – FD 150+

*Bearing the UL Classification Mark

System No. C-AJ-1427

March 05, 2007
F Rating – 3 Hr
T Rating – 0 Hr
W Rating – Class 1 (See Item 3)



SECTION A-A

1. **Floor or Wall Assembly** – Min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m^3) concrete floors or min 3 in. (76 mm) thick reinforced lightweight or normal weight concrete walls. Floor assembly 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 12-3/4 in. (324 mm). Max diam of opening in floors constructed of hollow-core concrete is 7 in. (78 mm).

   See **Concrete Blocks** (CAZT) and **Precast Concrete Units** (CFTV) categories in Fire Resistance Directory for names of manufacturers.

1A. **Steel Sleeve** – (Optional) - Nom 12 in. (305 mm) diam (or smaller) Schedule 10 (or heavier) steel sleeve cast or grouted into floor or wall assembly. Steel sleeve may be installed flush or may project max 2 in. (51 mm) beyond the floor or wall surfaces. As an alternate, nom 12 in. (305 mm) diam (or smaller) sleeve fabricated from nom 0.019 in. (0.48 mm) thick galv steel cast or grouted into floor or wall assembly flush with floor or wall surfaces.

2. **Through Penetrant** – One metallic pipe, conduit, tubing or flexible metal piping installed concentrically or eccentrically within opening. Annular space between penetrant and periphery of opening or sleeve shall be min of 0 in. (0 mm) (point contact) to max 2 in. (51 mm). Penetrant to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of penetrants may be used:

   A. **Steel Pipe** – Nom 10 in. (254 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. **Iron Pipe** – Nom 10 in. (254 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Conduit** – Nom 6 in. (152 mm) diam (or smaller) steel conduit or nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing.
   D. **Copper Tubing** – Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tubing.
   E. **Copper Pipe** – Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
   F. **Through Penetrating Product*** – **Flexible Metal Piping** – The following types of steel flexible metal gas piping may be used:

      1.) Nom 2 in. (51 mm) diam (or smaller) steel flexible metal gas piping. Plastic covering on piping may or may not be removed on both sides of floor or wall assembly.
      OMEGA FLEX INC

      2.) Nom 1 in. (25 mm) diam (or smaller) steel flexible metal gas piping. Plastic covering on piping may or may not be removed on both sides of floor or wall assembly.
      GASTITE, DIV OF TITEFLEX

      3.) Nom 1 in. (25 mm) diam (or smaller) steel flexible metal gas piping. Plastic covering on piping may or may not be removed on both sides of floor or wall assembly.
      WARD MFG INC

3. **Firestop System** – The details of the firestop system shall be as follows:

   A. **Packing Material** – Min 2 in. (51 mm) thickness of min 4 pcf (64 kg/m^3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or top edge of sleeve or from both surfaces of wall or both ends of sleeve as required to accommodate the required thickness of fill material. In floors constructed of hollow-core concrete, packing material to be recessed from top and bottom surfaces of floor or sleeve as required to accommodate the required thickness of fill material.

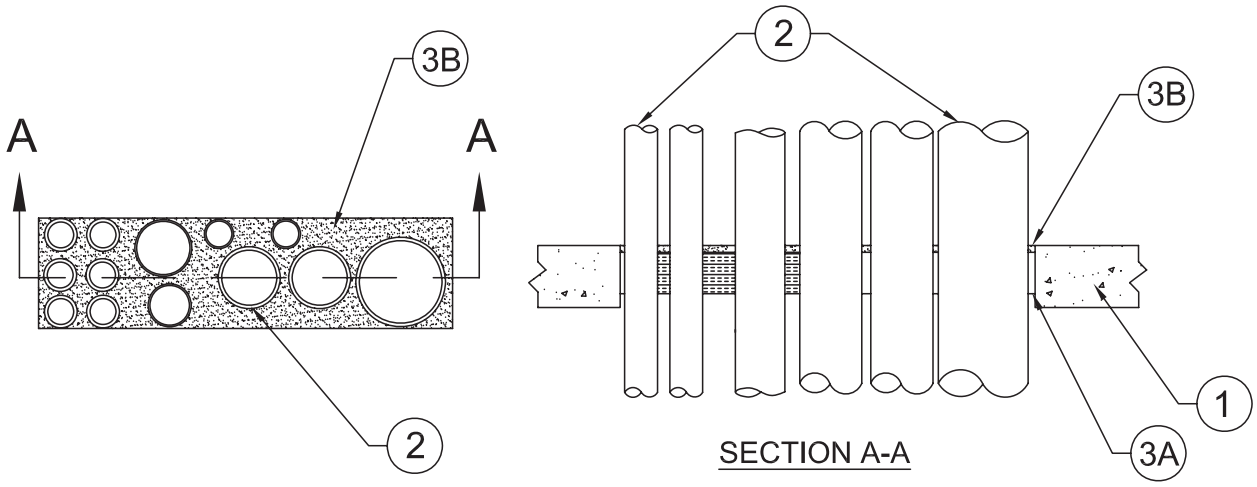
   B. **Fill, Void or Cavity Materials*** – **Caulk or Sealant** – Min 1/2 in. (13 mm) thickness of caulk applied within the annulus, flush with top surface of floor or top edge of sleeve or with both surfaces of wall or both ends of sleeves. In floors constructed of hollow-core concrete, min 1/2 in. (13 mm) thickness of caulk applied within the annulus, flush with top and bottom surfaces of floor or sleeve. Min 1/4 in. (6 mm) diam bead of caulk applied to the penetrant/concrete or penetrant/sleeve interface at the point contact location on the top surface of floor or both surfaces of wall or hollow-core.

      3M COMPANY – IC 15WB+, CP 25WB+ caulk or FB-3000 WT sealant
      (Note: W Rating applies only when FB-3000 WT is used.)

*Bearing the UL Classification Mark

System No. C-AJ-1429

March 05, 2007
F Rating – 2 Hr
T Rating – 0 Hr
W Rating – Class 1 (See Item 3)



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/m^3) concrete. Floor assembly 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 area of opening 240 sq in. (1548 sq cm) with a max dimension of 30 in. (762 mm). Max area of opening in floors constructed of hollow-core concrete is 49 sq in. (316 sq cm) with a max dimension of 7 in. (178 mm).

   See **Concrete Blocks** (CAZT) and **Precast Concrete Units** (CFTV) categories in Fire Resistance Directory for names of manufacturers.

1A. **Steel Sleeve** – (Optional, Not Shown) – Nom 16 in. (406 mm) diam (or smaller) circular sleeve fabricated from nom 0.028 in. (0.71 mm) thick galv steel cast or grouted into floor or wall assembly flush with floor or wall surfaces.

2. **Through Penetrant** – One or more metallic pipes, conduits, tubes or flexible metal pipes installed concentrically or eccentrically within opening. Annular space between penetrants and periphery of opening shall be min of 0 in. (0 mm) (point contact) to max 2 in. (51 mm) Space between penetrants shall be min of 1/4 in. (6 mm) to max 2 in. (51 mm). Penetrants to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of penetrants 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) diam (or smaller) steel conduit or nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing.
   D. **Copper Tubing** – Nom 3 in. (76 mm) diam (or smaller) Type L (or heavier) copper tubing.
   E. **Copper Pipe** – Nom 3 in. (76 mm) diam (or smaller) Regular (or heavier) copper pipe.
   F. **Through Penetrating Product*** – **Flexible Metal Piping** – The following types of steel flexible metal gas piping may be used:

      1. Nom 2 in. (51 mm) diam (or smaller) steel flexible metal gas piping. Plastic covering on piping may or may not be removed on both sides of floor or wall assembly.

         OMEGA FLEX INC.

      2. Nom 1 in. (25 mm) diam (or smaller) steel flexible metal gas piping. Plastic covering on piping may or may not be removed on both sides of floor or wall assembly.

         GASTITE, DIV OF TITEFLEX

      3. Nom 1 in. (25 mm) diam (or smaller) steel flexible metal gas piping. Plastic covering on piping may or may not be removed on both sides of floor or wall assembly.

         WARD MFG INC.

3. **Firestop System** – The details of the firestop system shall be as follows:

   A. **Packing Materia**l – Min 3 in. (76 mm) thickness of min 4 pcf (64 kg/m^3) 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. In floors constructed of hollow-core concrete, packing material to be recessed from top and bottom surfaces of floor as required to accommodate the required thickness of fill material.

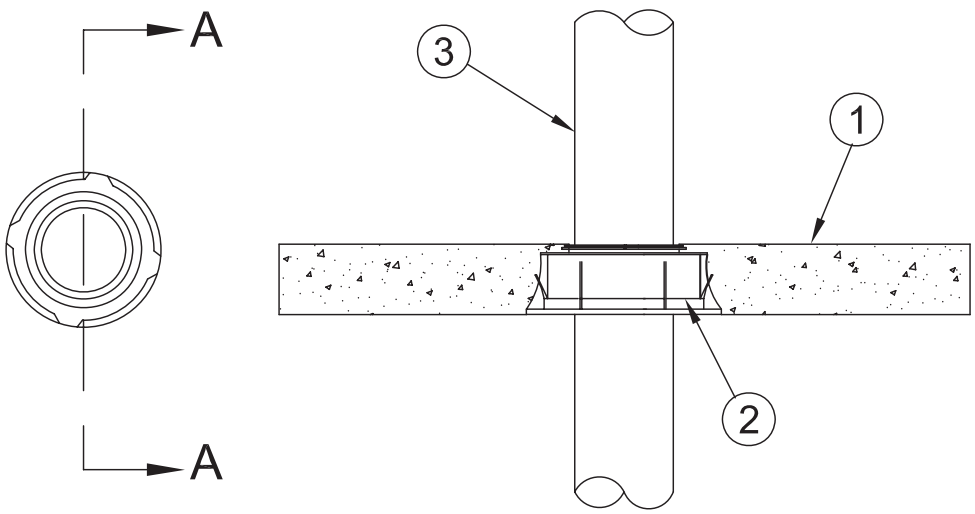
   B. **Fill, Void or Cavity Materials*** – **Caulk or Sealant** – Min 1/2 in. (13 mm) thickness of caulk applied within the annulus, flush with top surface of floor or with both surfaces of wall. In floors constructed of hollow-core concrete, min 1/2 in. (13 mm) thickness of caulk applied within the annulus, flush with top and bottom surfaces of floor. Min 1/4 in. (6 mm) diam bead of caulk applied to the penetrant/concrete interface at the point contact location on the top surface of floor or both surfaces of wall or hollow-core concrete.

      3M COMPANY – IC 15WB+, CP 25WB+ caulk or FB-3000 WT sealant.
      (Note: W Rating applies only when FB-3000 WT is used.)

* Bearing the UL Classification Marking

System No. F-A-1041

January 09, 2007
F Rating – 2 Hr
T Rating – 0 and 1-1/4 Hr (See Item 3)
L Rating at Ambient – Less Than 1 CFM/sq ft (See Item 6)
L Rating at 400° F – Less Than 1 CFM/sq ft (See Item 6)
W Rating – Class 1 (See Item 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/m^3) concrete.
2. **Firestop Device*** – Cast in place firestop device permanently embedded during concrete placement or grouted in concrete assembly in accordance with accompanying installation instructions. The device may project up to a max of 5-1/2 in. (140 mm) above top surface of floor for nom 2 in. (51 mm) diam (and smaller) penetrants.

   3M COMPANY – 3M Fire Barrier Cast-In Device 2MCID, 3MCID, 4MCID.
3. **Through Penetrants** – One metallic pipe, tubing or conduit installed within the firestop system. Pipe or conduit to be rigidly supported on both sides of floor assembly. The nom pipe or conduit size shall match the nom size of the firestop device with the exception that both nom 1-1/2 and 2 in. (38 and 51 mm) pipes or conduits are suitable for use with the nom 2 in. (51 mm) device. The following types of metallic pipes or conduits may be used:
   A. **Steel Pipe** – Schedule 5 (or heavier) steel pipe.
   B. **Iron Pipe** – Cast or ductile iron pipe.
   C. **Conduit** – Steel conduit or steel electrical metallic tubing.
   D. **Copper Tubing** – Type L (or heavier) copper tubing.
   E. **Copper Pipe** – Regular (or heavier) copper pipe.

   The hourly T Rating is 1-1/4 Hr for nom 1-1/2 in. (38 mm) diam steel and iron pipes and conduit when the firestop device extends a min of 2 in. (51 mm) above top surface of floor. The T Rating is 0 hr for all other penetrants.
4. **Packing Material** – (Not Shown) – Min 1/2 in. (13 mm) thick of min 4 pcf (64 kg/m^3) mineral wool batt insulation shall be tightly packed within the firestop device around the penetrant, flush with the top surface of floor for all nom 3 in. and 4 in. (76 and 102 mm) penetrants. Packing material is optional with all nom 1-1/2 in. and 2 in. (38 and 51 mm) diam penetrants and may be flush with top surface of floor or top of device.
5. **Fill, Void or Cavity Materials – Putty** – (Not Shown) – As an alternate to the packing material (Item 4), a min 1/2 in. (13 mm) thickness of putty may be installed within the firestop device around the penetrant, flush with the top surface of floor for all nom 3 in. and 4 in. (76 and 102 mm) diam penetrants.

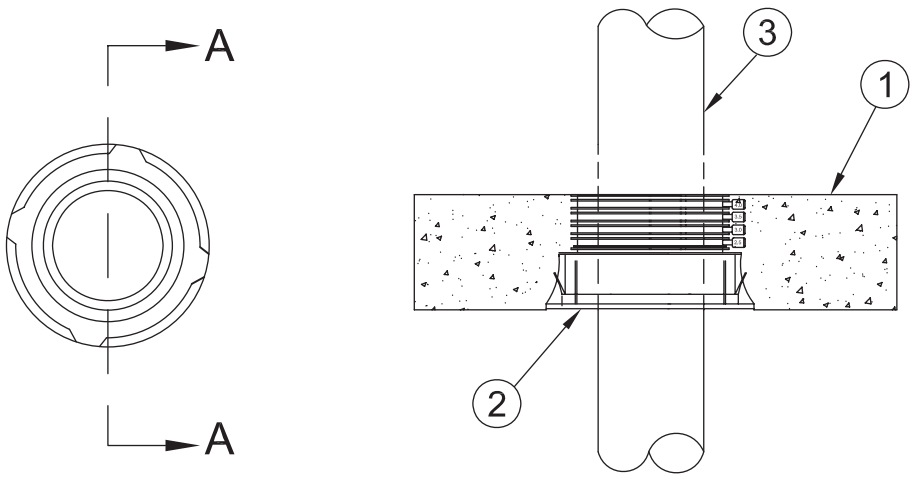
   3M COMPANY – MP+ Stix putty
6. **Fill, Void or Cavity Materials – Sealant** – (Optional, Not Shown) – For W Rating, a min 1/4 in. (6 mm) bead of sealant is required at the device/concrete interface on the top surface of the floor. When nom 1-1/2 in. (38 mm) diam pipe is installed in nom 2 in. (51 mm) diam device, a min 1/2 in. (13 mm) depth of sealant is required in the annular space between the pipe and the inside of the device to attain the W and L Ratings.

   3M COMPANY – FB-1000 NS Sealant, FB-1003 SL Sealant or FB-3000 WT Sealant

*Bearing the UL Classification Mark

System No. F-A-1042

January 09, 2007
F Rating – 3 Hr
T Rating – 0, 1/4, 1/2, 1, 2-1/4 and 3 Hr (See Item 3)
L Rating at Ambient – Less Than 1 CFM/sq ft (See Item 6)
L Rating at 400° F – Less Than 1 CFM/sq ft (See Item 6)
W Rating – Class 1 (See Item 6)



SECTION A-A

1. **Floor Assembly** – Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m^3) concrete.
2. **Firestop Device*** – Cast in place firestop device permanently embedded during concrete placement or grouted in concrete assembly in accordance with accompanying installation instructions. The device may project up to a max 3-1/2 in. (89 mm) above top surface of floor or must be trimmed flush with top surface of floor, dependent on the type and size of penetrant, as shown in Item 3.

   3M COMPANY – 3M Fire Barrier Cast-In Device 2MCID, 3MCID, 4MCID.

2A. **Firestop Device** – **Height Adapter*** – (Not Shown) - For use in floors greater than 8 in. (203 mm) thick. Adapter snaps onto top of firestop device (Item 2).

   3M COMPANY – 3M Fire Barrier Cast-In Device Height Adapter, 2HA, 3HA, 4HA.

3. **Through Penetrants** – One metallic pipe, tubing or conduit installed within the firestop system. Pipe or conduit to be rigidly supported on both sides of floor assembly. The nom pipe or conduit size shall match the nom size of the firestop device with the exception that both nom 1-1/2 and 2 in. (38 and 51 mm) pipes or conduits are suitable for use with the nom 2 in. (51 mm) device. The following types of metallic pipes or conduits may be used:
   A. **Steel Pipe** – Schedule 10 (or heavier) steel pipe.
   B. **Iron Pipe** – Cast or ductile iron pipe.
   C. **Conduit** – Steel conduit or steel electrical metallic tubing.
   D. **Copper Tubing** – Type L (or heavier) copper tubing.
   E. **Copper Pipe** – Regular (or heavier) copper pipe.

The Hourly T Rating is dependent on the type and size of penetrant, the use of flush or extended device and the use or non-use of packing material or putty, as shown below. The ratings for the extended devices are dependent on the device extending a min of 2 in. (51 mm) above surface of floor. If the device extends less than 2 in. (51 mm) above floor, the ratings shown for the flush devices apply.

Nom Penetrant Size, In. (mm)	Penetrant Type	Flush Device	Extended Device	Packing Material or Putty	F Rating Hr	T Rating Hr
1-1/2, 2 (38, 51)	A, B, C	No	Yes	Yes	3	3
1-1/2, 2 (38, 51)	A, B, C	Yes	Yes	No	3	1/2
1-1/2, 2 (38, 51)	D, E	No	Yes	Yes	3	1/4
1-1/2, 2 (38, 51)	D, E	Yes	No	Yes	3	0
3 (76)	A, B, C	No	Yes	Yes	3	2-1/4
3 (76)	A, B, C	Yes	No	No	3	1/2
3, 4 (76, 102)	B	No	Yes	No	3	1
3, 4 (76, 102)	D, E	Yes	No	Yes	3	0
4 (102)	A, B	Yes	No	No	3	1/2
4 (102)	C	Yes	No	Yes	3	1/4

4. **Packing Material** (Not Shown) – Min 2 in. (51 mm) thick of min 4 pcf (64 kg/m^3) mineral wool batt insulation shall be tightly packed within the firestop device around the penetrant, flush with the top surface of floor, where indicated in above table.

5. **Fill, Void or Cavity Materials – Putty** – (Not Shown) – As an alternate to the packing material (Item 4), a min 1 in. (25 mm) thickness of putty may be installed within the firestop device around the penetrant, flush with the top surface of floor for all nom 3 in. and 4 in. (76 and 102 mm) diam penetrants.

   3M COMPANY – MP+ Stix putty

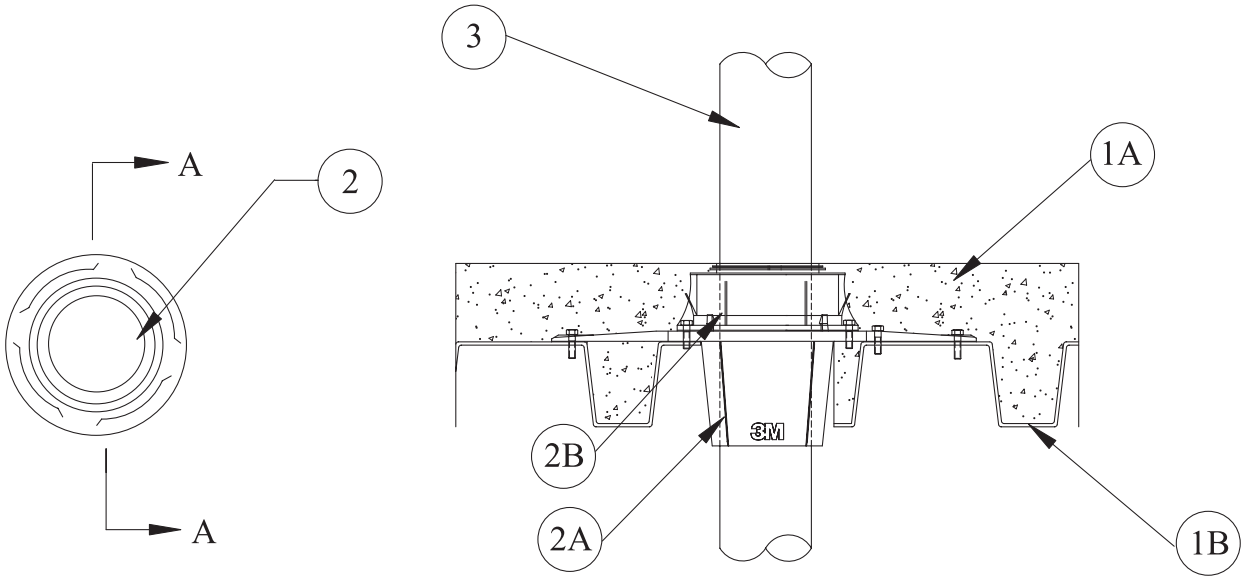
6. **Fill, Void or Cavity Materials – Sealant** – (Optional, Not Shown) – For W Rating, a min 1/4 in. (6 mm) bead of sealant is required at the device/concrete interface on the top surface of the floor. When nom 1-1/2 in. (38 mm) diam pipe is installed in nom 2 in. (51 mm) diam device, a min 1/4 in. (6 mm) depth of sealant atop a nom 2 in. (51 mm) depth of packing material is required in the annular space between the pipe and the inside of the device to attain the W and L Ratings.

   3M COMPANY – FB-1000 NS Sealant, FB-1003 SL Sealant or FB-3000 WT Sealant

*Bearing the UL Classification Mark

System No. F-A-1046

June 15, 2005
F Rating – 2 Hr
T Rating – 0 Hr



Section A-A

1. **Floor Assembly** – The fire-rated unprotected 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/m^3) concrete.
   B. **Steel Floor and Form Units*** – Composite or noncomposite max 3 in. (76 mm) deep fluted galv units as specified in the individual Floor-Ceiling design.
2. **Firestop Devices*** – The firestop devices are cast in place and permanently embedded during concrete placement or grouted in concrete assembly in accordance with accompanying installation instructions.
   A. **Firestop Device – Metal Deck Adapter*** – Nom adapter size to correspond with nom penetrant size (Item 3), except that 2 in. (51 mm) adapter is suitable for both nom 1-1/2 in. and 2 in. (38 mm and 51 mm) penetrants. Adapter to be installed through opening in deck and secured with four sheet metal screws to deck in accordance with installation instructions.

      3M COMPANY – 3M Fire Barrier Cast-In Device Metal Deck Adapter, 2MDA, 3MDA, 4MDA
   B. **Firestop Device** – Snapped into top of metal deck adapter in accordance with accompanying installation instructions. The device may be trimmed flush with top surface of floor or may project up to a max 5-1/2 in. (140 mm) above top surface of floor for nom 2 in. (51 mm) diam (and smaller) penetrants. The device must be trimmed flush with top surface of floor for all nom 3 in. and 4 in. (76 mm and 102 mm) penetrants.

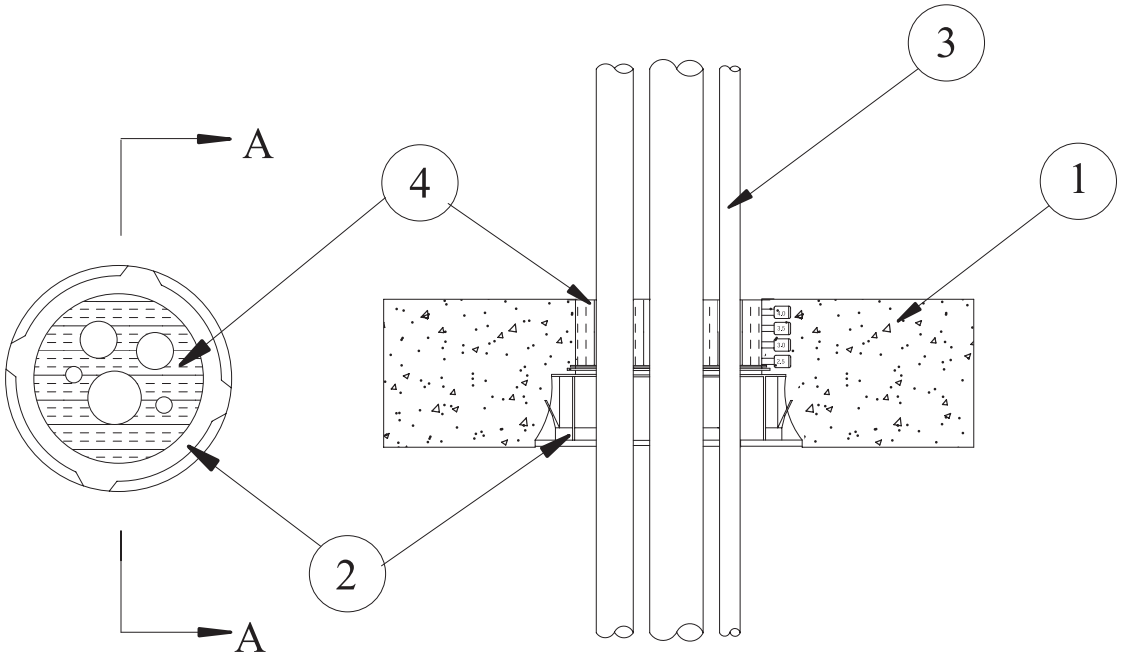
      3M COMPANY – 3M Fire Barrier Cast-In Device, 2MCID, 3MCID, 4MCID
3. **Through Penetrants** – One metallic pipe, tubing or conduit installed within the firestop system. Pipe, tubing or conduit to be rigidly supported on both sides of floor assembly. The nom pipe, tubing or conduit size shall correspond to the nom size of the firestop device with the exception that both nom 1-1/2 in. and 2 in. (38 mm and 51 mm) pipes, tubing or conduits are suitable for use with the nom 2 in. (51 mm) device. The following types of metallic pipes, tubing or conduits may be used:
   A. **Steel Pipe** – Schedule 5 (or heavier) steel pipe.
   B. **Iron Pipe** – Cast or ductile iron pipe.
   C. **Conduit** – Steel conduit or steel electrical metallic tubing.
   D. **Copper Tubing** – Type L (or heavier) copper tubing.
   E. **Copper Pipe** – Regular (or heavier) copper pipe.
4. **Packing Material** – (not shown) - Min 1/2 in. (13 mm) thick of min 4 pcf (64 kg/m^3) mineral wool batt insulation shall be tightly packed within the firestop device around the penetrant, flush with the top surface of floor for all nom 3 in. and 4 in. (76 mm and 102 mm) penetrants. Packing material is optional with all nom 2 in. (51 mm) diam (and smaller) penetrants and may be flush with top surface of floor or top of device.
5. **Fill, Void or Cavity Materials – Putty** – (not shown) - As an alternate to the packing material (Item 4), a min 1/2 in. (13 mm) thickness of putty may be installed within the firestop device around the penetrant, flush with the top surface of floor for all nom 3 in. and 4 in. (76 mm and 102 mm) penetrants.

   3M COMPANY – MP+ Stix

*Bearing the UL Classification Mark

System No. F-A-1050

May 11, 2005
F Rating – 3 Hr
T Rating – 1/2 Hr



Section A-A

1. **Floor Assembly** – Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m^3) concrete.
2. **Firestop Device*** – Cast in place firestop device permanently embedded during concrete placement or grouted in concrete assembly in accordance with accompanying installation instructions. The device may be trimmed flush with top surface of floor or may project up to a max 3-1/2 in. (89 mm) above top surface of floor.

   3M COMPANY – 3M Fire Barrier Cast-In Device 2MCID, 3MCID, 4MCID

2A. **Firestop Device** – **Height Adapter*** (not shown) – For use in floors greater than 8 in. thick. Adapter snaps onto top of firestop device (Item 2).

   3M COMPANY – 3M Fire Barrier Cast-In Device Height Adapter, 2HA, 3HA, 4HA

3. **Through Penetrant** – One or more metallic pipes, conduits or tubes installed concentrically or eccentrically within the firestop system. Annular space between penetrants and periphery of opening shall be min of 0 in. (0 mm) (point contact) to max 2 in. (51 mm). Space between penetrants shall be min of 1/4 in. to max 2 in. (6 mm to max 51 mm). 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 1-1/2 in. (38 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. **Iron Pipe** – Nom 1-1/2 in. (38 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Conduit** – Nom 1-1/2 in. (38 mm) diam (or smaller) steel conduit or steel electrical metallic tubing.
   D. **Copper Tubing** – Nom 1 in. (25 mm) diam (or smaller) Type L (or heavier) copper tubing.
   E. **Copper Pipe** – Nom 1 in. (25 mm) diam (or smaller) Regular (or heavier) copper pipe.
4. **Packing Material** – Min 2 in. (51 mm) thick of min 4 pcf (64 kg/m^3) mineral wool batt insulation firmly packed within annulus, flush with the top surface of floor.

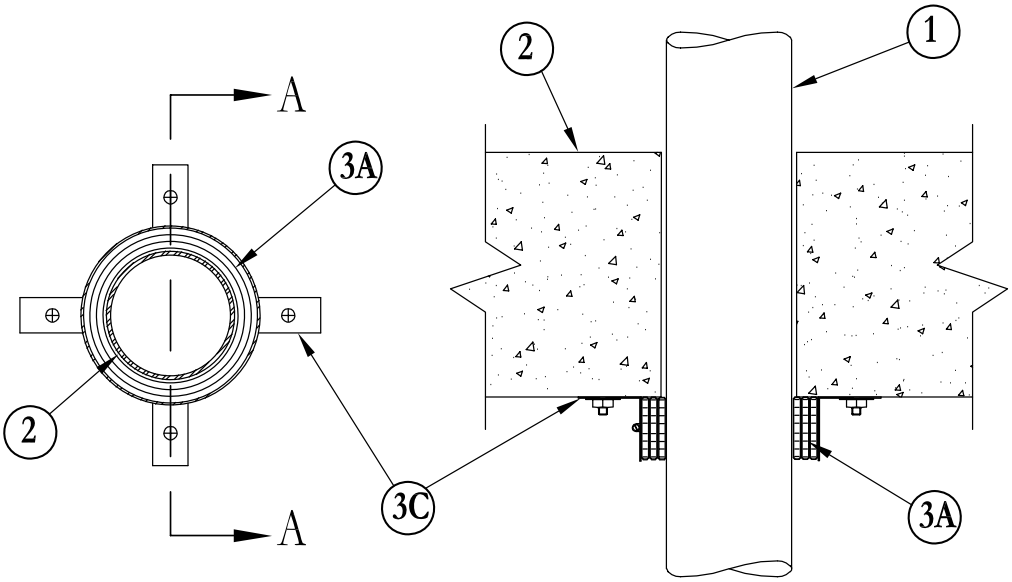
4A. **Fill, Void or Cavity Materials** – **Sealant, Caulk or Putty*** (optional, not shown) – As an option, the packing material (Item 4) may be reduced in thickness by 1/4 in. to 1/2 in. (6 mm to 13 mm) and recessed from the top surface of floor to accommodate a 1/4 in. to 1/2 in. (6 mm to 13 mm) thickness of sealant, caulk or putty, installed within annulus, flush with the top surface of floor.

   3M COMPANY – FB-1000 NS, FB-1003 SL, FB-3000 WT sealant, CP 25WB+, FireDam 150+, IC 15WB+ caulk or MP+ Stix putty.

*Bearing the UL Classification Mark

System No. C-AJ-2001

May 18, 2005
F Rating – 2 Hr
T Ratings – 0, 1-1/2 and 2 Hr (See Item 3)
L Rating at Ambient – 7 CFM/sq ft (See Item 3B)
L Rating at 400 F – 1 CFM/sq ft (See Item 3B)



SECTION A-A

1. **Floor or Wall Assembly** – Lightweight or normal weight (100-150 pcf or 1600-2400 kg/m^3) concrete. Except as footnoted for floor assembly in table under Item 3, min thickness of solid concrete floor or wall assembly is 4-1/2 in. (114 mm). Floor assembly 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***. Diam of opening through floor or wall to be 0 in. to 1/4 in. (0 mm to 6 mm) larger than the outside diam of nom 2 in. (51 mm) diam and smaller pipes or conduits. Diam of opening to be 0 in. to 1/2 in. (0 mm to 13 mm) larger than the outside diam of nom 2-1/2 in. (64 mm) diam and larger pipes or conduits. Max diam of opening is 7 in. (178 mm).

   See **Concrete Blocks** (CAZT) and **Precast Concrete Units** (CFTV) categories in Fire Resistance Directory for names of manufacturers.

2. **Through Penetrants** – One nonmetallic pipe or conduit to be centered in the through opening. 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) Schedule 40 solid-core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.

   B. **Cellular – Core Polyvinyl Chloride (ccPVC) Pipe** – Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.

   C. **Chlorinated Polyvinyl Chloride (CPVC) Pipe** – Nom 6 in. (152 mm) diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.

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

   E. **Cellular Core Acrylonitrile Butadiene Styrene (ccABS) Pipe** – Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

   F. **Polybutylene (PB) Pipe** – Nom 3 in. (76 mm) diam (or smaller) SDR11 (or heavier) PB pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

   G. **Rigid Nonmetallic Conduit++** – Nom 4 in. (102 mm) diam (or smaller) (Schedule 40 or 80) PVC conduit installed in accordance with Article 347 of the National Electric Code (NFPA No. 70).

   H. **Flame Retardant Polypropylene (FRPP) Pipe** – Nom 4 in. (102 mm) diam (or smaller) Schedule 40 (or heavier) FRPP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

   See **Rigid Nonmetallic Conduit** (DZKT) category in UL Electrical Construction Materials Directory for names of manufacturers.

3. **Firestop System** – The details of the firestop system shall be as follows:

   A. **Fill, Void or Cavity Materials*** – **Wrap Strip** – Nom 1/4 in. (6 mm) thick intumescent elastomeric material faced on one side with aluminum foil, supplied in 1 in. and 2 in. (25 mm and 51 mm) wide strips. Strips tightly wrapped around nonmetallic pipe (foil side exposed) with the edges butted against the underside of the concrete floor or both sides of wall surface. Sufficient layers of wrap strip shall be installed to lap a min of 3/16 in. (5 mm) on the concrete around the entire perimeter of the through opening. The min wrap strip width and the min number of layers of wrap required is dependent upon the pipe type, the nom pipe diam, the wall of floor thickness and the hourly T Rating required, as shown in the following table.

System No. C-AJ-2001 *continued*

Pipe Type	Nom Pipe Diam In. (mm)	Min Wall or Floor Thkns In. (mm)	Wrap Strip Width In.(mm)	Min Wrap Strip Layers	T Rating Hr
PVC, ccPVC or CPVC	1/2 to 1-1/2 (13 to 38)	2-1/2 (64)	1 (25)	1	0
ABS, ccABS or FRPP(a)	1/2 to 1-1/2 (13 to 38)	2-1/2 (64)	1 (25)	1	1
PVC, ccPVC or CPVC	1/2 to 2 (13 to 51)	2-1/2 (64)	2 (51)	1	0
PVC, ccPVC or CPVC	2 (51)	2-1/2 (64)	1 (25)	2	0
ABS, ccABS or FRPP(a)	2 (51)	2-1/2 (64)	1 (25)	2	1
PVC, ccPVC or CPVC	2-1/2 to 3 (64 to 76)	2-1/2 (64)	2 (51)	2	0
PVC, ccPVC or CPVC	3-1/2 to 4 (89 to 102)	2-1/2 (64)	2 (51)	3	0
PVC, ccPVC or CPVC, ABS, ccPVC or FRPP(a)	1/2 to 1-1/2 (13 to 38)	4-1/2 (114)	1 (25)	1	2
PVC, ccPVC, CPVC, ABS, ABS, ccABS or FRPP(a)	2 (51)	4-1/2 (114)	1 (25)	2	2
PVC, ccPVC, CPVC, ABS, ccABS or FRPP(a)	2-1/2 to 3 (64 to 76)	4-1/2 (114)	1 (25)	3	2
PVC, ccPVC, CPVC, ABS, ccABS, PB or FRPP(a)	2-1/2 to 3 (64 to 76)	4-1/2 (114)	2 (51)	2	2
PVC, ccPVC or CPVC	3-1/2 to 4 (89 to 102)	4-1/2 (114)	2 (51)	2	1-1/2
PVC, ccPVC, CPVC, ABS,ccABS or FRPP(b)	3-1/2 to 4 (89 to 102)	4-1/2 (114)	2 (51)	3	2
PVC	6 (152)	4-1/2 (114)	3 (76)	3	0

(a) – Requires use of aluminum tape detailed in Item 3E.
(b) – Requires use of pipe covering detailed in Item 3D.
(c) – For nom 6 in. (152 mm) diam pipe, 1 in. and 2 in. (25 mm and 51 mm) , wide wrap strips are "Stacked" to attain nom 3 in. (76 mm) wrap strip width.

Each layer of wrap strip to be installed with butted seam with butted seams in successive layers staggered. Wrap strip layers temporarily held in position using aluminum foil tape, steel wire tie, or equivalent. In wall assemblies, the wrap strip is to be installed in the same manner used for floor assemblies, but it shall be installed symmetrically on both sides of the wall assembly.

3M COMPANY – FS-195+

B. **Fill, Void or Cavity Materials*** – **Caulk, Sealant or Putty** (Not Shown) – Generous bead of caulk or putty to be applied to outer perimeter of wrap strip at its interface with floor or wall surface(s).

3M COMPANY – CP 25WB+, IC 15WB+ caulk, FB-3000 WT sealant or MP+ Stix putty.
(Note: L Ratings apply only when CP 25WB+ caulk or FB-3000 WT sealant is used.
CP 25WB+ not suitable for use with CPVC pipes.)

C. **Steel Collar** – Nom 1 in., 2 in. or 3 in. (25 mm, 51 mm or 76 mm) deep collar, dependent upon wrap strip width, with 1-1/4 in. (32 mm) wide by 2 in. (51 mm) long anchor tabs and min 1/2 in. (13 mm) long tabs to retain wrap strip layers. Coils of precut 0.016 in. (0.41 mm) thick (28 gauge) galv sheet steel available from wrap strip manufacturer. As an alternate, collar may be field-fabricated from min 0.016 in. (0.41 mm) thick (28 gauge) galv sheet steel in accordance with instruction sheet supplied by wrap strip manufacturer. Steel collar, with anchor tabs bent outward 90 deg, wrapped tightly around wrap strip layers with min 1 in. (25 mm) overlap at seam. Anchor tabs to be pressed tightly against floor or wall surface(s), and collar to be compressed around wrap strip layers using a min 1/2 in. (13 mm) wide by 0.028 in. (0.71 mm) thick stainless steel band clamp at the collar midheight. Two band clamps are required for 3 in. (76 mm) high collar on nom 6 in. (152 mm) diam pipe. As an alternate to the band clamps, 1 in. and 2 in. (25 mm and 51 mm) deep collars may be secured by a means No. 10 by 1/2 in.
(13 mm) long sheet metal screws installed in the vertical axis at the center of the 1 in. (25 mm) overlap along the perimeter joint of the collar. A min of two and three screws are required for 1 in. and 2 in. (25 mm and 51 mm) deep collars, respectively. Collar to be secured to floor or wall surface(s) with 1/4 in. (6 mm) diam by min 1-1/2 in. (38 mm) long steel expansion bolts, or equivalent, in conjunction with steel nuts and min 1-1/4 in. (32 mm) diam steel fender washers. Anchor bolts to be used with every other anchor tab or as described in the following which ever is greater. Two anchor bolts, symmetrically located, required for nom 1/2 in. (13 mm) to nom 2 in. (51 mm) diam pipes. Three anchor bolts, symmetrically located, required for nom
2-1/2 in. to 3 in. (64 mm to 76 mm) diam pipes. Four anchor bolts, symmetrically located, required for nom 3-1/2 in. and 4 in. (89 mm to 102 mm) diam pipes. For 6 in. (152 mm) diam pipes, anchor bolts to be used with each anchor tab. Retainer tabs to be bent 90 deg toward pipe to lock wrap strip layers in position.

D. **Pipe Covering*** – Nom 1 in. (25 mm) thick hollow cylindrical heavy density glass fiber units jacketed on the outside with an all service jacket. When required (see table), min 6 in. (152 mm) length of pipe covering installed around pipe at its egress from the steel collar (Item C) on the underside of floor or on both sides of wall. Pipe covering secured to pipe with steel wire ties spaced max 4 in. (102 mm) OC. Edge of pipe covering abutting steel collar to be sealed with a min 1/4 in. (6 mm) diam bead of caulk or putty (Item B).

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.

E. **Foil Tape** (Not Shown) – When required (see tables), nom 4 in. (102 mm) wide, 3 mil thick aluminum tape installed around pipe prior to installation of wrap strip (Item 3A) or Firestop Device (Item 3F). Min one layer wrapped around pipe with top edge of tape flush with bottom of surface of floor and extending downward. In walls, min one layer wrapped around pipe flush with both sides of wall and extending outward.

F. **Firestop Device*** (Not Shown) – As an alternate to Items A and C when nom 1-1/2, 2, 3, 4 or 6 in. (38, 51, 76,102 or 152 mm) diam nonmetallic pipes are used, a firestop device consisting of a sheet-steel split collar lined with intumescent material and provided with steel clips for attachment may be used. Firestop device to be installed on underside of floor or on both sides of wall in accordance with the accompanying installation instructions. The firestop device type to be used is dependent upon the wall of floor thickness, the pipe type and nom pipe diam, as tabulated below:

Pipe Type	Nom Pipe Diam In. (mm)	Min Wall or Floor Thkns In. (mm)	Firestop Device
PVC, ccPVC or CPVC, ABS, ccABS or FRPP(a)	1-1/2 (38 mm)	2-1/2 (64)	PPD 1.5 or PPD 150
PVC, ccPVC or CPVC, ABS, ccABS or FRPP(a)	2 (51 mm)	2-1/2 (64)	PPD 2 or PPD 200
PVC, ccPVC or CPVC	3 (76 mm)	2-1/2 (64)	PPD 300
PVC, ccPVC or CPVC	4 (102 mm)	2-1/2 (64)	PPD 400
PB	1-1/2 (38 mm)	4-1/2 (114 mm)	PPD 150
PB	2 (51 mm)	4-1/2 (114 mm)	PPD 200
PVC, ccPVC or CPVC, ABS, ccABS or FRPP(a)	3 (76 mm)	4-1/2 (114 mm)	PPD 3 or PPD 300
PB	3 (76 mm)	4-1/2 (114 mm)	PPD 300
PVC, ccPVC or CPVC, ABS, ccABS or FRPP(a)	4 (102 mm) 4 (102 mm)	4-1/2 (114 mm) 4-1/2 (114 mm)	PPD 4 or PPD 400 PPD 400
PVC	6 (152 mm)	4-1/2 (114 mm)	PPD 6

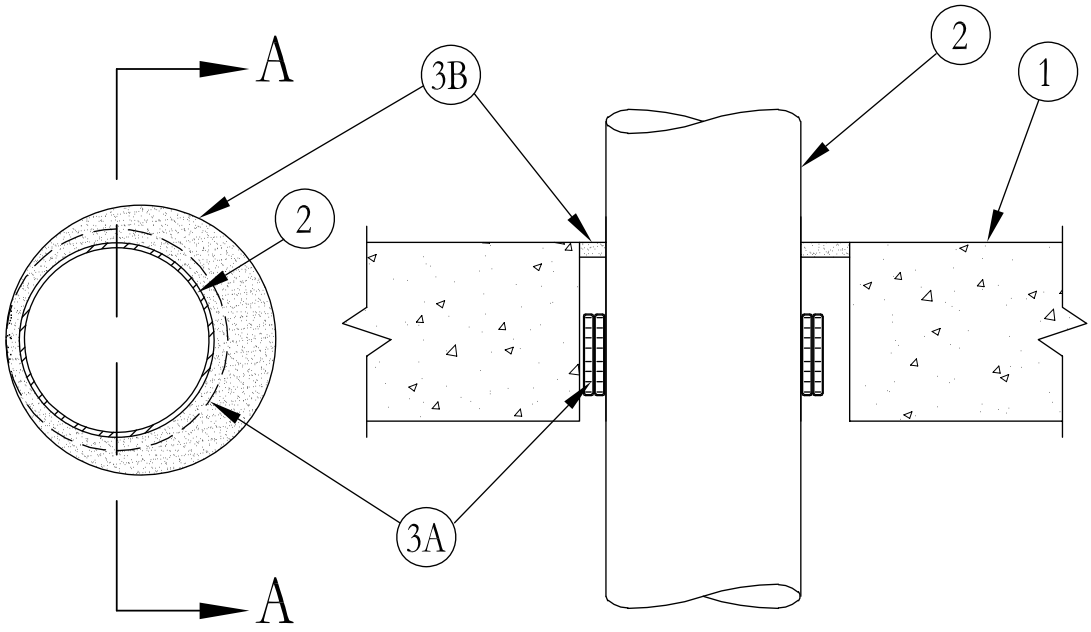
(a) – Requires use of aluminum tape detailed in Item 3E.
(b) – Requires use of pipe covering detailed in Item 3D.

3M COMPANY

++Bearing the UL Listing Mark
*Bearing the UL Classification Mark

System No. C-AJ-2256

May 18, 2005
F Rating – 2 Hr
T Rating – 1/4 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/m^3) concrete. Max diam of opening is 5 in. (127 mm).
2. **Through Penetrants** – One nonmetallic pipe to be installed either concentrically or eccentrically within the firestop system. The annular space between the pipe and the periphery of the opening shall be a min of 3/8 in. to a max 1-1/8 in. (10 mm to max 29 mm) Pipe 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 3 in. (76 mm) diam (or smaller) Schedule 40 solid core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe** – Nom 3 in. (76 mm) diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.
3. **Firestop System** – The firestop system shall consist of the following:
   A. **Fill, Void or Cavity Materials*** – **Wrap Strip** – Nom 1/8 in. (3.2 mm) thick intumescent material supplied in 2 in. (51 mm) wide strips. Min three continuous layers of wrap strip tightly wrapped around nonmetallic pipe. Wrap strip secured with two 1/2 in. (13 mm) wide bands of filament tape completely wrapped around layers of wrap 1/2 in. (13 mm) from bottom of wrap strips. Wrap strips to be covered with one layer of 2 in. (51 mm) wide min 3 mil thick foil tape and recessed 1-1/4 in. (32 mm) from bottom of floor or both surfaces of wall.

      3M COMPANY – Ultra GS

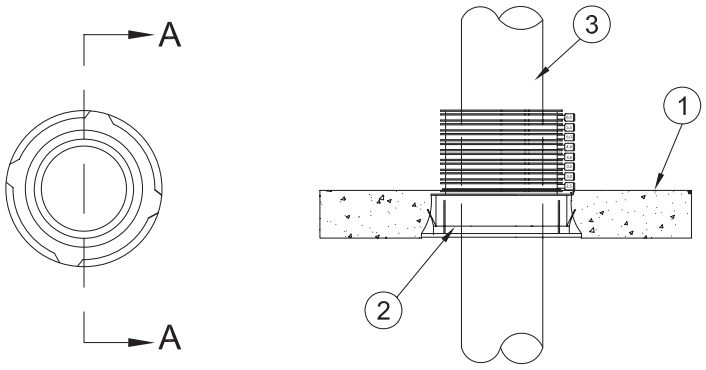
   B. **Fill, Void or Cavity Materials*** – **Caulk or Sealant** – Min 1/2 in. (13 mm) thickness of caulk installed in annular space, flush with top surface of floor or both surfaces of wall.

      3M COMPANY – CP 25WB+, IC 15WB+ caulk or FB-3000 WT sealant.
      (Note: CP 25WB+ not suitable for use with CPVC pipes.)

*Bearing the UL Classification Mark
+Bearing the UL Listing Mark

System No. F-A-2097

January 09, 2007
F Rating – 2 Hr
T Ratings – 0, 1/4, 3/4, 1, 1-1/4, 1-1/2 and 1-3/4 Hr (See Item 3)
L Rating at Ambient – Less Than 1 CFM/sq ft (See Item 4)
L Rating at 400° F – Less Than 1 CFM/sq ft (See Item 4)
W Rating – Class 1 (See Item 4)



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/m^3) concrete.
2. **Firestop Device*** – Cast in place firestop device permanently embedded during concrete placement or grouted in concrete assembly in accordance with accompanying installation instructions. The device may be trimmed flush with top surface of floor or may project up to a max 5-1/2 in. (140 mm) above top surface of floor.

   3M COMPANY – 3M Fire Barrier Cast-In Device 2PCID, 3PCID, 4PCID.
3. **Through Penetrants** – One nonmetallic pipe or conduit installed within the firestop system. Pipe or conduit to be rigidly supported on both sides of floor assembly. The nom pipe or conduit size shall match the nom size of the firestop device with the exception that both nom 1-1/2 in. (38 mm) and 2 in. (51 mm) diam pipes or conduits are suitable for use with the nom 2 in. (51 mm) diam device. The following types of nonmetallic pipes or conduits may be used:
   A. **Polyvinyl Chloride (PVC) Pipe** – Schedule 40 solid core PVC or cellular core PVC (ccPVC) pipe for use in closed (process or supply) or vented (drain, waste or vent piping systems.
   B. **Rigid Nonmetallic Conduit (RNC)**+ – Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA No. 70).
   C. **Chlorinated Polyvinyl Chloride (CPVC) Pipe** – SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.
   D. **Acrylonitrile Butadiene Styrene (ABS) Pipe** – Schedule 40 solid core ABS or cellular core ABS (ccABS) pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   E. **Fire Retardant Polypropylene (FRPP) Pipe** – Schedule 40 FRPP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

   The hourly T rating is dependent on the size and type of penetrant as well as the direction in which the penetrant is installed through the firestop device as shown in the following table:

Type Note: Penetrant	Size, in. (mm)	Installation Direction**	T Rating, Hr
PVC, RNC, CPVC, FRPP	1-1/2 (38 mm)	B	1-1/4
PVC, RNC, CPVC, FRPP	1-1/2 (38 mm)	T	1
ccPVC, ABS, ccABS	1-1/2 (38 mm)	T & B	3/4
PVC, RNC, CPVC, FRPP	2 (51 mm)	T & B	1-3/4
ccPvc, ABS, CCabs	2 (51 mm)	T	1
ccPVC, ABS, ccABS	2, 3 (51, 76 mm)	B	1-1/4
PVC, RNC, CPVC, FRPP	3 (76 mm)	B	1
All	3 (76 mm)	T	1-1/2
All	4 (102 mm)	B	0
All	4 (102 mm)	T	1/4

****- B indicates installed from the bottom of floor, T indicates installed from the top of floor.**

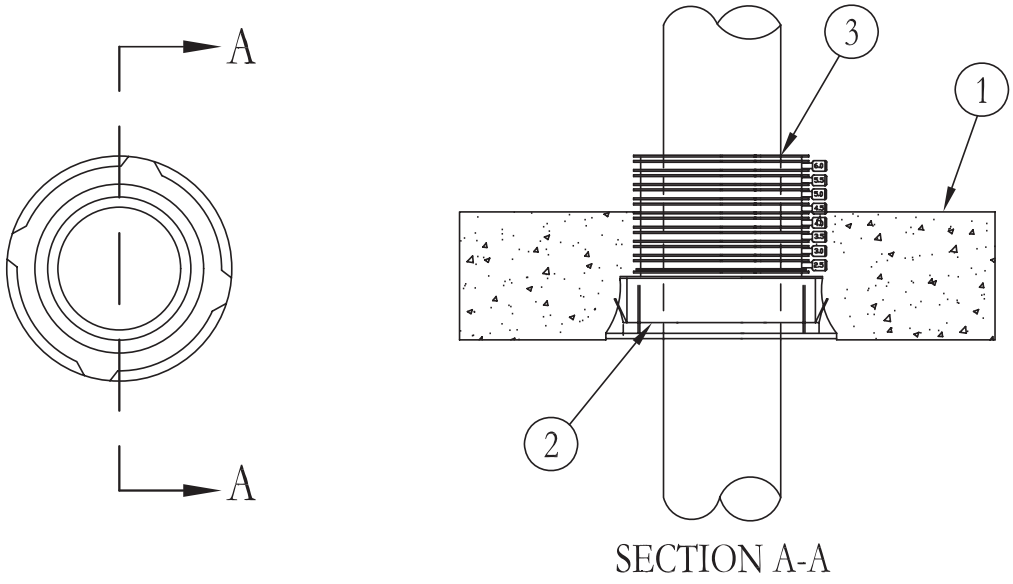
4. **Fill, Void or Cavity Materials – Sealant** – (Optional, Not Shown) – For W Rating, a min 1/4 in. (6 mm) bead of sealant is required at the device/concrete interface on the top surface of the floor. When nom 1-1/2 in. (38 mm) diam pipe is installed in nom 2 in. (51 mm) diam device, a min 1/2 in. (13 mm) depth of sealant is required in the annular space between the pipe and the inside of the device to attain the W and L Ratings.

   3M COMPANY – FB-1000 NS Sealant, FB-1003 SL Sealant or FB-3000 WT Sealant

*Bearing the UL Classification Mark
+ - Bearing the UL Listing Mark

System No. F-A-2098

August 02, 2004
F Rating – 3 Hr
T Rating – 0, 1/4, and 3 Hr (See Item 3)



SECTION A-A

1. **Floor Assembly** – Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete.
2. **Firestop Device*** – Cast in place firestop device permanently embedded during concrete placement or grouted in concrete assembly in accordance with accompanying installation instructions. The device may be trimmed flush with top surface of floor or may project up to a max 3-1/2 in. above top surface of floor.

   3M COMPANY – 3M Fire Barrier Cast-In Device 2PCID, 3PCID, 4PCID.

2A. **Firestop Device – Height Adapter*** – (not shown) – For use in floors greater than 8 in. thick. Adapter snaps onto top of firestop device (Item 2).

   3M COMPANY – 3M Fire Barrier Cast-In Device Height Adapter, 2HA, 3HA, 4HA.

3. **Through Penetrants** – One nonmetallic pipe or conduit installed within the firestop system. Pipe or conduit to be rigidly supported on both sides of floor assembly. The nom pipe or conduit size shall correspond to the nom size of the firestop device with the exception that both nom 1-1/2 in. and 2 in. pipes or conduits are suitable for use with the nom 2 in. device. The following types of nonmetallic pipes or conduits may be used:

   A. **Polyvinyl Chloride (PVC) Pipe** – Schedule 40 solid core PVC or cellular core PVC (ccPVC) pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

   B. **Rigid Nonmetallic Conduit (RNC)+** – Schedule 40 PVC conduit installed in accordance with Article 347 of the National Electrical Code (NFPA) No. 70).

   C. **Chlorinated Polyvinyl Chloride (CPVC) Pipe** – SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.

   D. **Acrylonitrile Butadiene Styrene (ABS) Pipe** – Schedule 40 solid core ABS or cellular core ABS (ccABS) pipe for use inclosed (process or supply) or vented (drain, waste or vent) piping systems.

   E. **Fire Retardant Polypropylene (FRPP) Pipe** – Schedule 40 FRPP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

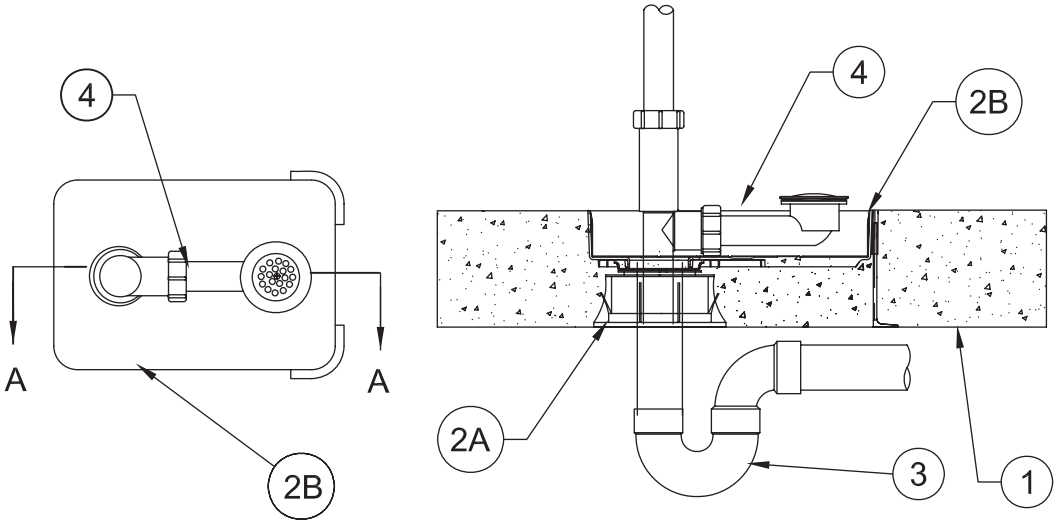
   The hourly T Rating is dependent on the size and type of penetrant as well as the direction in which the penetrant is installed through the firestop device as shown in the following table:

Type Note: Penetrant	Size, in.	Installation Direction**	T Rating, Hr
All	1-1/2	T & B	3
PVC, RNC, CPVC, FRPP	2	T & B	3
ccPVC, ABS, ccABS	2, 3	T & B	0
All	4	T & B	3

*Bearing the UL Classification Mark
+ Bearing the UL Listing Marking.

System No. F-A-2109

January 09, 2007
F Rating – 2 Hr
T Rating – 1 Hr
L Rating at Ambient – Less Than 1 CFM/sq ft (See Item 5)
L Rating at 400° F – Less Than 1 CFM/sq ft (See Item 5)
W Rating – Class 1 (See Item 5)



SECTION A-A

1. **Floor Assembly** – Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m^3) concrete.
2. **Firestop Devices*** – The firestop devices are cast in place and permanently embedded during concrete placement or grouted in concrete assembly in accordance with accompanying installation instructions.
   A. **Firestop Device*** – Cast in place firestop device installed flush with bottom surface of floor and trimmed to be 2 in. (51 mm) below top surface of floor.

      3M COMPANY – 3M Fire Barrier Cast-In Device, 2MCID

   B. **Firestop Device – Tub Box*** – Nom 8 by 12 by 2 in. (203 by 305 by 51 mm) deep polyethylene tub box, with adjustable legs, snapped into top of Cast-In Device, 2MCID (Item 2A) and cast in concrete slab, flush with top surface of floor.

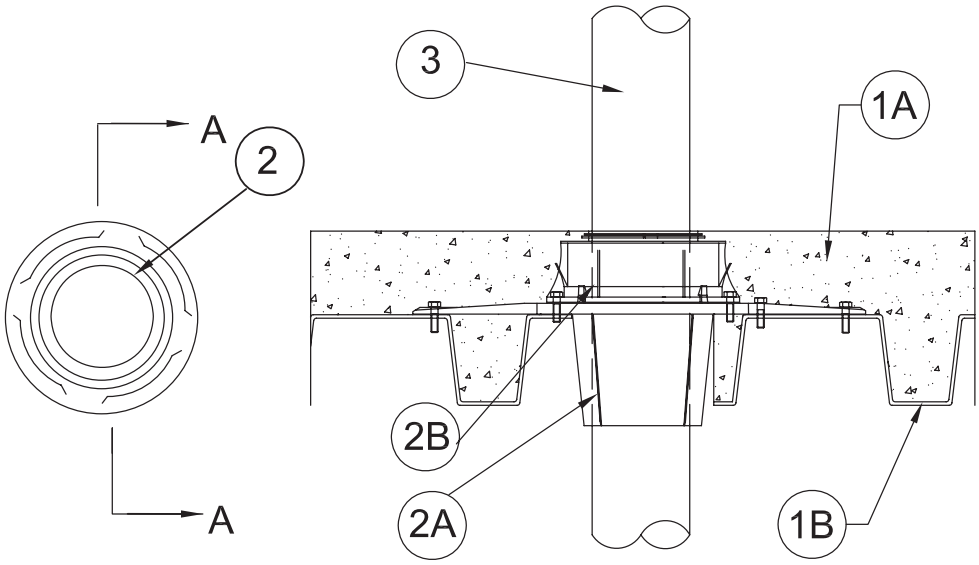
      3M COMPANY – 3M Fire Barrier Cast-In Device Tub Box, 2TB
3. **Drain Piping** – Nom 1-1/2 in. or 2 in. (38 or 51 mm) diam nonmetallic pipe and drain fittings cemented together. Drain piping rigidly supported away from tub box with suitable hangers. The following types of nonmetallic pipes may be used:
   A. **Polyvinyl Chloride (PVC) Pipe** – Schedule 40 solid core PVC or cellular core PVC (ccPVC) pipe.
   B. **Acrylonitrile Butadiene Styrene (ABS) Pipe** – Schedule 40 solid core ABS or cellular core ABS (ccABS) pipe.
4. **Waste/Overflow Fitting** – Nom 1-1/2 in. (38 mm) diam waste/overflow fitting, formed of polyvinyl chloride (PVC).
5. **Fill, Void or Cavity Materials – Sealant** – (Optional, Not Shown) – For W Rating, a min 1/4 in. (6 mm) bead of sealant is required at the tub box/concrete interface on the top surface of the floor. For W and L Ratings, a min 1/2 in. (13 mm) depth of sealant is required in the annular space between the drain piping and the tub box throat flush with the bottom inside surface of the tub box.

   3M COMPANY – FB-1000 NS Sealant, FB-1003 SL Sealant or FB-3000 WT Sealant

*Bearing the UL Classification Mark

System No. F-A-2110

January 09, 2007
F Rating – 2 Hr
T Rating – 0 Hr
L Rating at Ambient – Less Than 1 CFM/sq ft (See Item 4)
L Rating at 400° F – Less Than 1 CFM/sq ft (See Item 4)
W Rating – Class 1 (See Item 4)



SECTION A-A

1. **Floor Assembly** – The fire-rated unprotected 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/m^3) concrete.
   B. **Steel Floor and Form Units*** – Composite or noncomposite max 3 in. (76 mm) deep fluted galv units as specified in the individual Floor-Ceiling design.
2. **Firestop Devices*** – The firestop devices are cast in place and permanently embedded during concrete placement or grouted in concrete assembly in accordance with accompanying installation instructions.
   A. **Firestop Device** – **Metal Deck Adapter*** – Nom adapter size to match the nom penetrant size (Item 3), except that 2 in. (51 mm) adapter is suitable for both nom 1-1/2 in. and 2 in. (38 and 51 mm) diam penetrants. Adapter to be installed through opening in deck and secured with four sheet metal screws to deck in accordance with installation instructions.

      3M COMPANY – 3M Fire Barrier Cast-In Device Metal Deck Adapter, 2MDA, 3MDA, 4MDA
   B. **Firestop Device** – Snapped into top of metal deck adapter in accordance with accompanying installation instructions. The device may be trimmed flush with top surface of floor or may project up to a max 5-1/2 in. (140 mm) above top surface of floor.

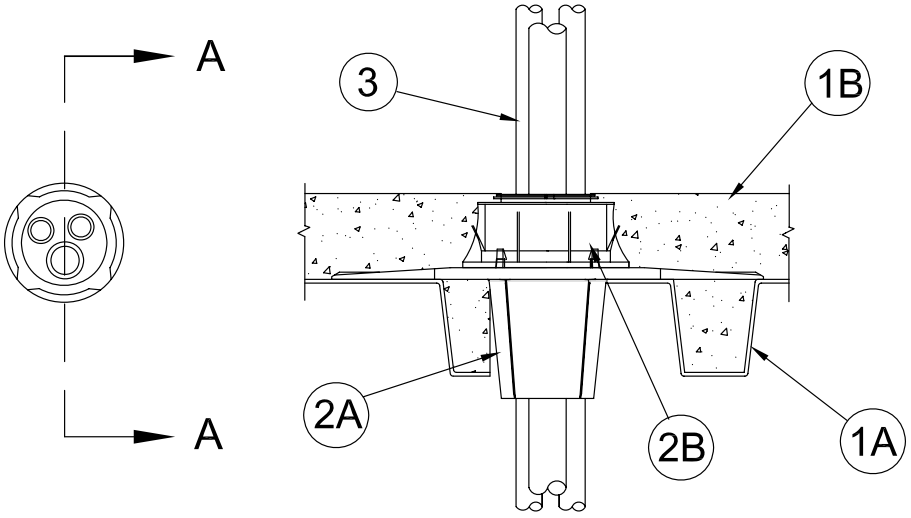
      3M COMPANY – 3M Fire Barrier Cast-In Device, 2PCID, 3PCID, 4PCID
3. **Through Penetrants** – One nonmetallic pipe or conduit installed within the firestop system. Pipe or conduit to be rigidly supported on both sides of floor assembly. The nom pipe or conduit size shall match the nom size of the firestop device with the exception that both nom 1-1/2 in. and 2 in. (38 and 51 mm) diam pipes or conduits are suitable for use with the nom 2 in. (51 mm) diam device. The following types of nonmetallic pipes or conduits may be used:
   A. **Polyvinyl Chloride (PVC) Pipe** – Schedule 40 solid core PVC or cellular core PVC (ccPVC) pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   B. **Rigid Nonmetallic Conduit (RNC)**+ – Schedule 40 PVC conduit installed in accordance with Article 347 of the National Electrical Code (NFPA No. 70).
   C. **Chlorinated Polyvinyl Chloride (CPVC) Pipe** – SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.
   D. **Acrylonitrile Butadiene Styrene (ABS) Pipe** – Schedule 40 solid core ABS or cellular core ABS (ccABS) pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   E. **Fire Retardant Polypropylene (FRPP) Pipe** – Schedule 40 FRPP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
4. **Fill, Void or Cavity Materials** – **Sealant** – (Optional, Not Shown) – For W Rating, a min 1/4 in. (6 mm) bead of sealant is required at the device/concrete interface on the top surface of the floor. When nom 1-1/2 in. (38 mm) diam pipe is installed in nom 2 in. (51 mm) diam device, a min 1/2 in. (13 mm) depth of sealant is required in the annular space between the pipe and the inside of the device to attain the W and L Ratings.

   3M COMPANY – FB-1000 NS Sealant, FB-1003 SL Sealant or FB-3000 WT Sealant

*Bearing the UL Classification Mark
+ - Bearing the UL Listing Mark

System No. F-A-2115

January 09, 2007
F Rating – 2 Hr
T Rating – 1/4 Hr
L Rating at Ambient – Less Than 1 CFM/sq ft (See Item 5)
L Rating at 400° F – Less Than 1 CFM/sq ft (See Item 5)
W Rating – Class 1 (See Item 5)



Section A-A

1. **Floor Assembly** – The fire-rated unprotected 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/m^3) concrete.
   B. **Steel Floor and Form Units*** – Composite or noncomposite max 3 in. (76 mm) deep fluted galv units as specified in the individual Floor-Ceiling design.
2. **Firestop Devices*** – The firestop devices are cast in place and permanently embedded during concrete placement or grouted in concrete assembly in accordance with accompanying installation instructions.
   A. **Firestop Device*** – **Metal Deck Adapter** – Nom 2 in. (51 mm) adapter, installed through opening in deck and secured with four sheet metal screws to deck in accordance with installation instructions.

      3M COMPANY – 3M Fire Barrier Cast-In Device Metal Deck Adapter, 2MDA
   B. **Firestop Device*** – Snapped into top of metal deck adapter in accordance with accompanying installation instructions. The device may be trimmed flush with top surface of floor or may project up to a max 5-1/2 in. (140 mm) above top surface of floor.

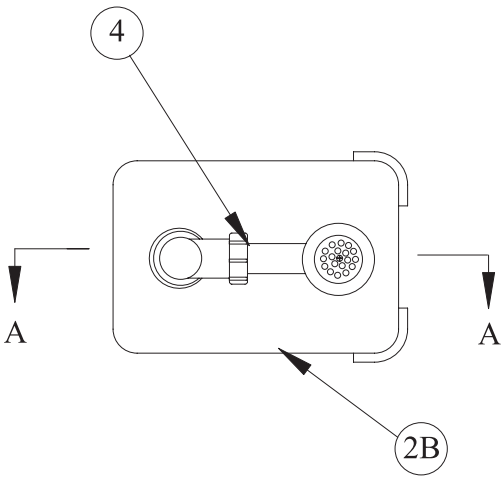
      3M COMPANY – 3M Fire Barrier Cast-In Device, 2MCID or 2PCID
3. **Through Penetrants** – A max of three nonmetallic pipes, conduit or tube installed eccentrically or concentrically within the firestop system. Annular space between the penetrants and the periphery of the opening shall be min 0 in. (0 mm) (point contact) to max 1 in. (25 mm). Annular space between penetrants is min 1/4 in. (25 mm) to max 1 in. (25 mm). Pipe or conduit to be rigidly supported on both sides of floor assembly. The following types of nonmetallic pipes or conduits may be used:
   A. **Polyvinyl Chloride (PVC) Pipe** – Nom 1 in. (25 mm) diam (or smaller) Schedule 40 solid core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   B. **Rigid Nonmetallic Conduit (RNC)**+ – Nom 1 in. (25 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA No. 70).
   C. **Chlorinated Polyvinyl Chloride (CPVC) Pipe** – Nom 1 in. (25 mm) diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.
   D. **Crosslinked Polyethylene (PEX) Tubing** – Nom 3/4 in. (19 mm) diam (or smaller) SDR 9 PEX tubing for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
4. **Packing Material** – (Not Shown) – Min 1/2 in. (13 mm) thickness of min 4 pcf (64 kg/m^3) mineral wool batt insulation firmly packed into the top of the firestop device (Item 2B) as a permanent form, flush with the top surface of the floor.
5. **Fill, Void or Cavity Materials – Sealant** – (Optional, Not Shown) – For W Rating, a min 1/4 in. (6 mm) bead of sealant is required at the device/concrete interface on the top surface of the floor. When nom 1-1/2 in. (38 mm) diam pipe is installed in nom 2 in. (51 mm) diam device, a min 1/4 in. (6 mm) depth of sealant atop a min 1/2 in. (13 mm) thickness of mineral wool packing material is required in the annular space between the pipe and the inside of the device to attain the W and L Ratings.

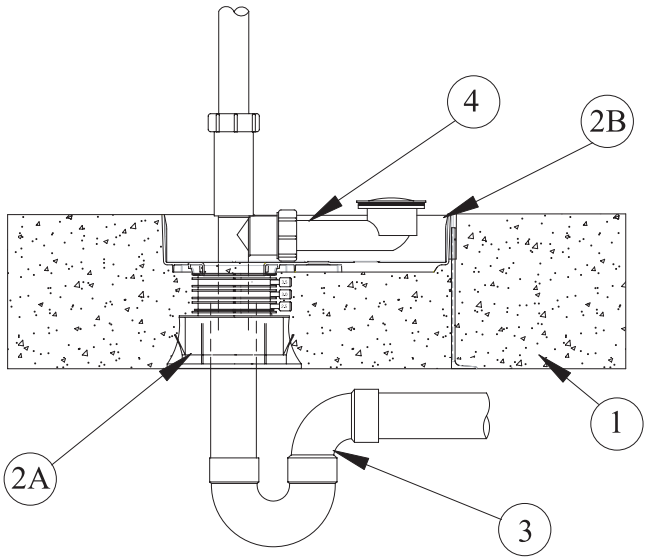
   3M COMPANY – FB-1000 NS Sealant, FB-1003 SL Sealant or FB-3000 WT Sealant

*Bearing the UL Classification Mark
+ - Bearing the UL Listing Mark

System No. F-B-2015

February 06, 2003
F Rating – 3 Hr
T Rating – 2 Hr





SECTION A-A

1. **Floor Assembly** – Min 6 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete.
2. **Firestop Devices*** – The firestop devices are cast in place and permanently embedded during concrete placement or grouted in concrete assembly in accordance with accompanying installation instructions.
   A. **Firestop Device*** – Cast in place firestop device installed flush with bottom surface of floor and trimmed to be 2 in. below top surface of floor.

      3M COMPANY – 3M Fire Barrier Cast-In Device, 2MCID

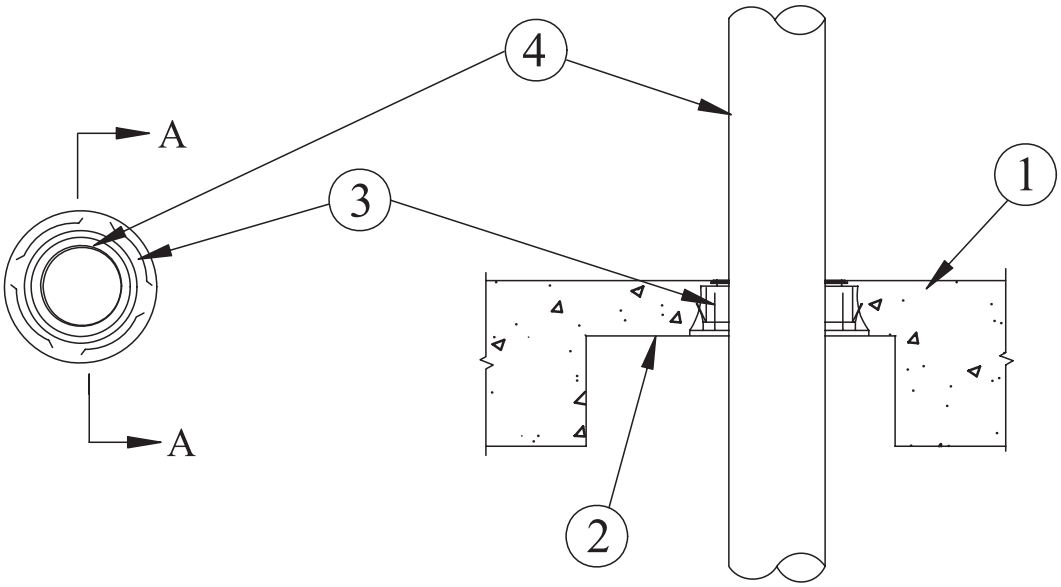
   B. **Firestop Device – Tub Box*** – Nom 8 by 12 by 2 in. deep polyethylene tub box, with adjustable legs, snapped into top of Cast-In Device, 2MCID (Item 2A) and cast in concrete slab, flush with top surface of floor.

      3M COMPANY – 3M Fire Barrier Cast-In Device Tub Box, 2TB
3. **Drain Piping** – Nom 1-1/2 in. or 2 in. diam nonmetallic pipe and drain fittings cemented together. Drain piping rigidly supported away from tub box with suitable hangers. The following types of nonmetallic pipes may be used:
   A. **Polyvinyl Chloride (PVC) Pipe** – Schedule 40 solid core PVC or cellular core PVC (ccPVC) pipe.
   B. **Acrylonitrile Butadiene Styrene (ABS) Pipe** – Schedule 40 solid core ABS or cellular core ABS (ccABS) pipe.
4. **Waste/Overflow Fitting** – Nom 1-1/2 in. diam waste/overflow fitting, formed of polyvinyl chloride (PVC).

*Bearing the UL Classification Mark

System No. F-B-2018

November 22, 2004
F Rating – 3 Hr
T Rating – 1 Hr



SECTION A-A

1. **Floor Assembly** – Min 6-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete.
2. **Aerator Adapter** – Nom 14 in. by 9 in., min 4 in. deep cast-in-place galv steel adapter box provided with max 5 in. diam opening on top side. Firestop device (Item 3) mechanically fastened to the top side of box prior to placement of the concrete. The concrete thickness on top of adapter box shall be a min 2-1/2 in.

2A. **Firestop Device – Aerator Adapter*** – As an alternate to Item 2, a nom 10 in. by 7 in. by 4 in. deep nonmetallic adapter box may be used. Firestop device (Item 3) latched to the top side of box with snaps provided as part of the adapter prior to placement of the concrete. The concrete thickness on top of adapter box shall be a min 2-1/2 in.

3M COMPANY – 3M Fire Barrier Cast-In Device Aerator Adapter

3. **Firestop Device*** – The firestop device is mechanically attached to top of adapter (Item 2) with a min of four No. 8 (or larger) steel sheet metal screws or latched to the top side of nonmetallic box and cast in place and permanently embedded during concrete placement in accordance with accompanying installation instructions.

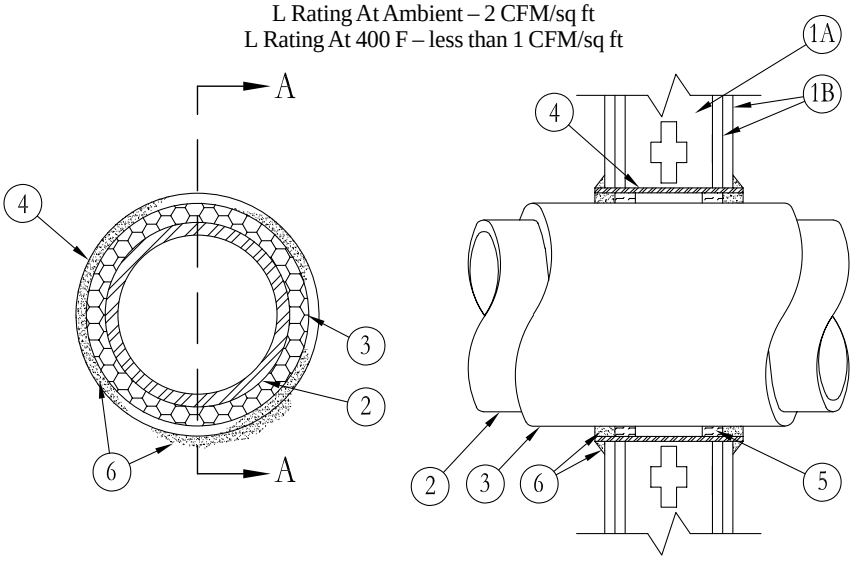
3M COMPANY – 3M Fire Barrier Cast-In Device, 3PCID, 4PCID

4. **Drain Piping** – Nom 3 in. or 4 in. diam schedule 40 solid core or cellular core polyvinyl chloride (PVC) pipe. Drain piping rigidly supported on both sides of floor assembly.
5. **Aerator Fitting** – (Not Shown) – Nom 3 in. or 4 in. diam cast iron aerator fitting attached to drain piping below floor assembly. Fitting shall not penetrate the firestop device.

*Bearing the UL Classification Mark

System No. W-L-5011

September 07, 2004
(Formerly System No. 568)
F Ratings – 1 and 2 Hr(See Item 1)
T Ratings – 1/2 and 1 Hr(See Item 2)
L Rating At Ambient – 2 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 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. lumber spaced 16 in. OC with nom 2 by 4 in. lumber end plates and cross braces. Steel studs to be min 3-5/8 in. wide by 1-3/8 deep channels spaced max 24 in. OC.

   B. **Gypsum Board*** – Nom 5/8 in. thick, 4 ft wide with square or tapered edges. The gypsum wallboard 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 14-1/2 in. for wood stud walls and 17 in. for steel stud walls.

   The hourly F Rating of the firestop system is 1 hr when installed in a 1 hr fire rated wall and 2 hr when installed in a 2 hr fire rated wall.

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 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. When steel pipe is used, T Rating is 1 hr.

   B. **Copper Tubing** – Nom 6 in. diam (or smaller) Type L (or heavier) copper tubing. When copper tubing is used, T Rating is 1/2 and 1 hr when installed in 1 and 2 hr rated walls, respectively.

   C. **Copper Pipe** – Nom 6 in. diam (or smaller) Regular (or heavier) copper pipe. When copper pipe is used, T Rating is 1/2 and 1 hr when installed in 1 and 2 hr rated walls, respectively.

3. **Pipe Covering*** – Nom 1 or 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 sealed with metal fastener strip tape supplied with the product.

   See **Pipe and Equipment Coverings – 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.

4. **Steel Sleeve** – Cylindrical sleeve fabricated from min 0.019 in. thick (No. 28 gauge) galv sheet steel and having a min 2 in. lap along the longitudinal seam. Length of steel sleeve to be equal to thickness of wall plus 1 in. such that, when installed, the ends of the sleeve will project approx 1/2 in. beyond the surface of the wall on both sides of the wall assembly. The diam of the openings cut in the gypsum wallboard layers on each side of the wall assembly (concentric with pipe) to be 2 to 2-1/2 in. larger than outside diam of pipe insulation such that, when the steel sleeve is installed, a 1 to 1-1/4 in. annular space will be present between the steel sleeve and the pipe insulation around the entire circumference of the pipe. Sleeve installed by coiling the sheet steel to a diam smaller than the through opening, inserting the coil through the openings and releasing the coil to let it uncoil against the circular cutouts in the gypsum wallboard layers.

5. **Packing Material** – Polyethylene backer rod or min 1 in. thickness of mineral wool batt insulation firmly packed into steel sleeve on both sides of the wall assembly as permanent forms. Packing material to be recessed min 1 in. from end of steel sleeve (recessed min 1/2 in. into gypsum wallboard surface) on both sides of wall assembly.

6. **Fill, Void or Cavity Materials* – Caulk or Sealant** – Min 1 in. thickness of fill material applied within annulus on both sides of wall assembly. Thickness for fill material for nom 3 in. diam (or smaller) steel pipes or conduits may be reduced to a min 1/2 in. A nom 1/4 in. diam continuous bead of caulk shall be applied around the circumference of the steel sleeve at its egress from the gypsum wallboard layers on both sides of the wall assembly.

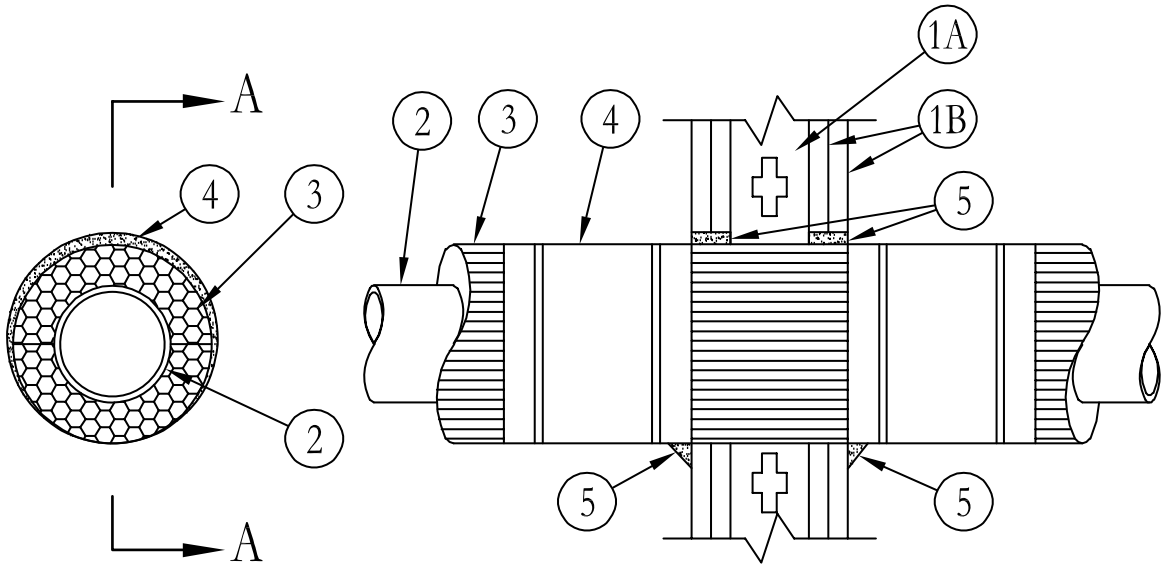
   3M COMPANY – CP 25WB+ caulk or FB-3000 WT sealant

*Bearing the UL Classification Mark

This material was extracted and drawn by 3M Fire Protection Products from the 2006 edition of the UL Fire Resistance Directory.

System No. W-L-5045

May 19, 2005
F Rating – 1 & 2 Hr (See Item 1)
T Rating – 1/2, 1 & 1-1/2 Hr (See Item 3)



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 in. by 4 in. (51 mm by 102 mm) lumber spaced 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*** – Nom 5/8 in. (16 mm) thick gypsum board, as specified in the individual Wall and Partition Design. Max diam of opening is 14-1/2 in. (368 mm) for wood stud walls and 20 in. (508 mm) for steel stud walls.

1A. **Steel Sleeve** (Optional, not shown) – Cylindrical sleeve fabricated from min 0.019 in. (0.48 mm) thick (No. 28 gauge) galv sheet steel and having a min 2 in. (51 mm) lap along the longitudinal seam. Length of steel sleeve to be equal to thickness of wall plus 1 in. (25 mm) such that, when installed, the ends of the sleeve will project approx 1/2 in. (13 mm) beyond the surface of the wall on both sides of the wall assembly. Sleeve installed by coiling the sheet steel to a diam smaller than the through opening, inserting the coil through the openings and releasing the coil to let it uncoil against the circular cutouts in the gypsum board layers.

2. **Through Penetrants** – One metallic pipe or tubing to be positioned 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. (305 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. **Copper Tubing** – Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.
   C. **Copper Pipe** – Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe.

3. **Pipe Covering Materials* – Cellular Glass Insulation** – Nom 1-1/2 to 3 in. (38 mm to 76 mm) thick cellular glass units sized to the outside diam of the steel pipe 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. The annular space between insulation and edge of opening shall be min 0 in. (point contact) to max 1-1/4 in. (0 mm to max 32 mm). When optional sleeve is used, the annular space between insulation and sleeve shall be min 1/2 in. to max 1-1/4 in. (13 mm to max 32 mm). **T Rating is 1/2 hr when nom 1-1/2 in. (30 mm) thick pipe insulation is used in 1 hr and 2 hr fire-rated wall assembly. T Rating is 1 hr when nom 3 in. (76 mm) thick pipe insulation is used in 1 hr fire-rated wall assembly. T Rating is 1-1/2 hr when nom 3 in. (76 mm) thick pipe insulation is used in 2 hr fire-rated wall assembly.**

   PITTSBURGH CORNING CORP – FOAMGLAS

4. **Metal Jacket** – Min 12 in. (305 mm) long jacket formed of min 0.010 in. (0.25 mm) thick steel or aluminum sheet cut to wrap tightly around the pipe insulation with a min 2 in. (51 mm) lap. Jacket secured with min 1/2 in. (13 mm) wide stainless steel hose clamps or bands located within 2 in. (51 mm) of each end of the jacket and spaced a max of 10 in. (254 mm) O.C. Jacket to be installed with edges abutting surface of caulk fill material (Item 5) on both surfaces of wall. Metal jacket to be used in addition to any other jacketing material which may be required or desired on the the pipe insulation.

5. **Fill, Void or Cavity Materials* – Caulk or Sealant** – Installed to fill annular space to a min depth of the gypsum board, flush with both surfaces of wall. A min 1/2 in. (13 mm) diam bead of caulk shall be applied to the pipe insulation/wallboard interface at the point contact location on both sides of wall.

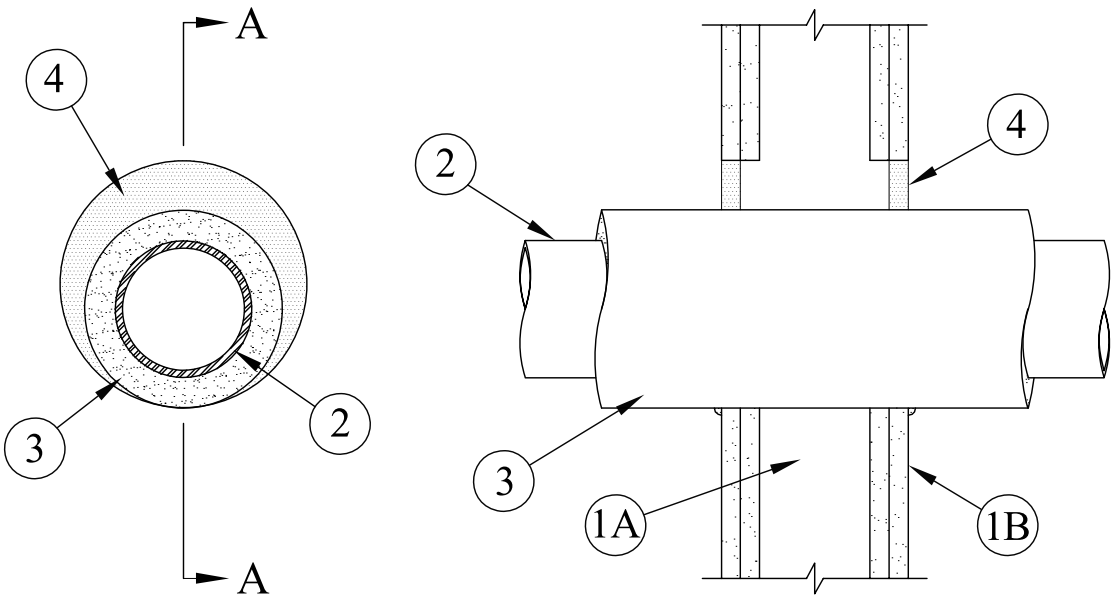
   3M COMPANY – CP 25WB+, IC 15WB+ caulk or FB-3000 WT sealant

*Bearing the UL Classification Mark

This material was extracted and drawn by 3M Fire Protection Products from the 2006 edition of the UL Fire Resistance Directory.

System No. W-L-5168

May 19, 2005
F Ratings – 1 & 2 Hr (See Item 1)
T Ratings – 0, 1/2, 3/4, 1-1/4 and 1-1/2 Hr (See Item 3)



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 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 in. by 4 in. (51 mm by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide spaced max 24 in. (610 mm) OC.
   B. **Gypsum Board*** – 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 12-1/2 in. (318 mm).

   The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.
2. **Through Penetrants** – One metallic pipe or tubing installed concentrically or eccentrically within opening. Penetrant to be rigidly supported on both sides of wall. The following types and sizes of penetrants may be used:
   A. **Steel Pipe** – Nom 8 in. (203 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. **Iron Pipe** – Nom 8 in. (203 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Copper Tubing** – Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tubing.
   D. **Copper Pipe** – Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
3. **Pipe Covering*** – Nom 1 in., 1-1/2 in. or 2 in. (25 mm, 38 mm or 51 mm) thick hollow cylindrical heavy density glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied SSL tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. Annular space between pipe covering and periphery of opening to be min 0 in. (point contact) to max 1-7/8 in. (0 mm to max 48 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.

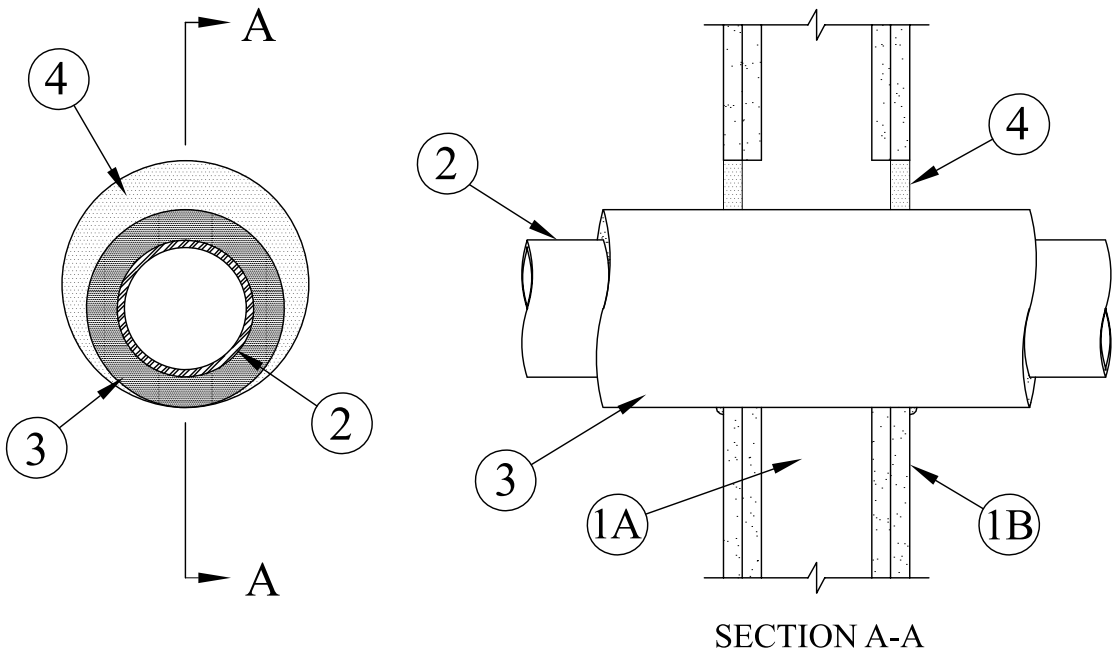
   The hourly T Rating is 1-1/4 Hr for pipe coverings of nom 1 in. and 1-1/2 in. (25 mm and 38 mm) thick for 2 Hr rated assemblies. The hourly T Rating is 1-1/2 Hr for pipe coverings of nom 2 in. (51 mm) thick for 2 Hr rated assemblies. The hourly T Rating is 1/2 Hr for pipe coverings of nom 1 in. and 1-1/2 in. (25 mm and 38 mm) thick for 1 Hr rated assemblies. The hourly T Rating is 3/4 Hr for pipe coverings of nom 2 in. (51 mm) thick for 1 Hr rated assemblies.
4. **Fill, Void or Cavity Material* – Caulk or Sealant** – Min 5/8 in. (16 mm) thickness of caulk applied within annulus, flush with both surfaces of wall. Min 1/4 in. (6 mm) diam bead of caulk applied to gypsum board/pipe covering interface at point contact location on both sides of wall.

   3M COMPANY – CP 25WB+, IC 15WB+ caulk or FB-3000 WT sealant

*Bearing the UL Classification Marking

System No. W-L-5169

May 19, 2005
F Ratings – 1 & 2 Hr (See Item 1)
T Ratings – 0 & 1 Hr (See Item 3)



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 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 in. by 4 in. (51 mm by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide spaced max 24 in. (610 mm) OC.
   B. **Gypsum Board*** – 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 7-1/2 in. (191 mm).

   The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.
2. **Through Penetrants** – One metallic pipe or tubing installed concentrically or eccentrically within opening. Penetrant 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. (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 Tubing** – Nom 2 in. (51 mm) diam (or smaller) Type L (or heavier) copper tubing.
   D. **Copper Pipe** – Nom 2 in. (51 mm) diam (or smaller) Regular (or heavier) copper pipe.
3. **Tube Insulation-Plastics+** – Nom 3/4 in. (19 mm) thick (or less) acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. Annular space between tube insulation and periphery of opening to be min 0 in. (point contact) to max 1-1/2 in. (0 mm to 38 mm).

   See **Plastics** (QMFZ2) category in the Plastics 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.

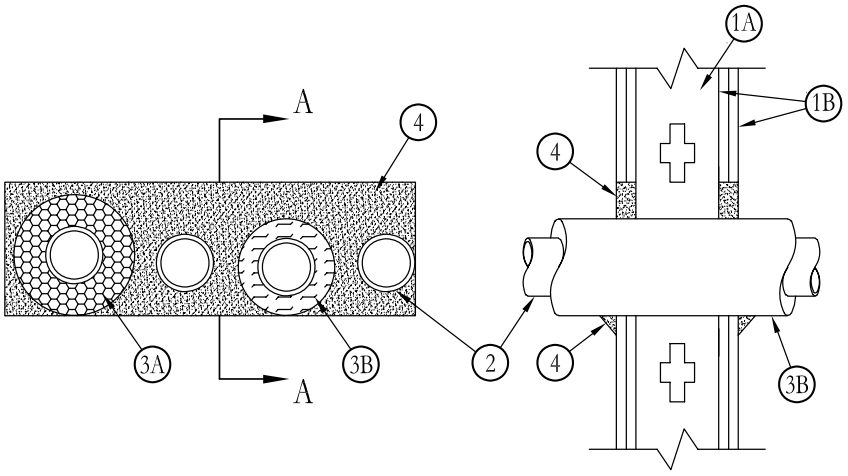
   T Rating is 1 Hr for nom 3/4 in. (19 mm) thick tube insulation in 2 Hr rated assemblies. T Rating is 0 Hr for 3/4 in. (19 mm) thick tube insulation in 1 Hr rated assemblies. T Rating is 0 Hr for tube insulations less than nom 3/4 in. (19 mm) thick in 1 and 2 Hr rated assemblies.
4. **Fill, Void or Cavity Material*** – **Caulk or Sealant** – Min 5/8 in. (16 mm) thickness of caulk applied within annulus, flush with both surfaces of wall. Min 1/4 in. (6 mm) diam bead of caulk applied to gypsum board/tube insulation interface at point contact location on both sides of wall.

   3M COMPANY – CP 25WB+, IC 15WB+ caulk or FB-3000 WT sealant

*Bearing the UL Classification Marking
+Bearing the UL Recognized Component Marking

System No. W-L-8010

May 19, 2005
F Ratings – 1 & 2 Hr (See Item 1)
T Ratings – 1/4, 3/4, 1, 1-1/2 and 1-3/4 Hr (See Items 2 & 3)



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 in. by 4 in. (51 mm to max 102 mm) lumber spaced 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*** – Nom 5/8 in. (16 mm) thick gypsum board, as specified in the individual Wall and Partition Design. Max area of opening is 65-1/4 sq in. (421 cm^2) with max dimension of 14-1/2 in. (368 mm).

   The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly.

2. **Through Penetrants** – A max of four pipes, conduits or tubing to be installed within the opening. The space between pipes, conduits or tubing shall be min 1/2 in to max 1-5/16 in. (13 mm to max 33 mm). The space between pipes, conduits or tubing and periphery of opening shall be min 1-3/16 in. (30 mm) for uninsulated copper tubes and copper pipes (Items 2C and 2D) and 0 in. (point contact) for insulated copper tubes and copper pipes and uninsulated steel pipes and conduit (Item 2B). The space between pipes, conduits or tubing and periphery of opening shall be max 1-5/16 in. (33 mm). 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 2 in. (51 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. **Conduit** – Nom 2 in. (51 mm) diam (or smaller) steel electrical metallic tubing or steel conduit.
   C. **Copper Tubing** – Nom 2 in. (51 mm) diam (or smaller) Type L (or heavier) copper tubing.
   D. **Copper Pipe** – Nom 2 in. (51 mm) diam (or smaller) Regular (or heavier) copper pipe.

   When uninsulated steel pipe or conduit is used, T Rating is 3/4 hr and 1-1/2 hr for 1 and 2 hr rated assemblies, respectively. When uninsulated copper tubing or pipe is used, T Rating is 1/4 hr for both 1 and 2 hr rated assemblies.

3A. **Pipe Covering*** (Optional) – Nom 1 in. (25 mm) hollow cylindrical heavy density 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 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.

   When pipe covering is used on all through penetrants, T Rating is 1 hr and 1-3/4 hr for 1 and 2 hr rated assemblies, respectively.

3B. **Tube Insulation – Plastics#** (Optional) – Nom 3/4 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing.

   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 UL94 Flammability Classification of 94-5VA may be used.

   When tube insulation is used on all through penetrants, T Rating is 3/4 hr and 1-1/2 hr for 1 and 2 hr rated assemblies, respectively.

4. **Fill, Void or Cavity Material*** – **Caulk or Sealant** – Min 5/8 in. or 1-1/4 in. (16 mm or 32 mm) thickness of fill material, for 1 or 2 hr walls, respectively, applied within the annulus, flush with both surfaces of wall. At point contact locations, a min 1/2 in. (13 mm) diam bead of fill material shall be applied at the wall/pipe and wall/pipe insulation interface on both surfaces of wall.

   3M COMPANY– CP 25WB+, IC 15WB+ caulk or FB-3000 WT sealant

5. **Fill, Void or Cavity Materials*** – **Wrap Strip** (Not Shown) – Min one layer of 2 in. (51 mm) wide, nom 1/4 in. (6 mm) thick intumescent elastomeric material faced on one side with aluminum foil, required only when tube insulation (Item 3B) is used in 2 hr rated assemblies. Wrap strip tightly wrapped around tube insulation (foil side exposed) within the opening on both sides of the wall, flush with both surfaces of the wall assembly.

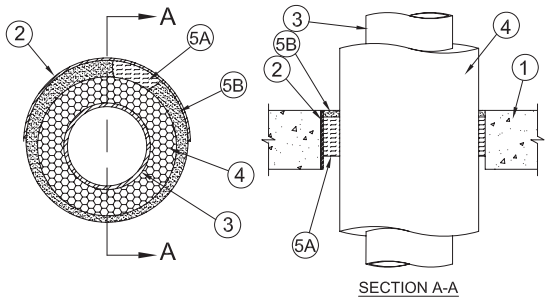
   3M COMPANY – FS-195+

#Bearing the UL Recognized Component Mark
*Bearing the UL Classification Marking

This material was extracted and drawn by 3M Fire Protection Products from the 2006 edition of the UL Fire Resistance Directory.

System No. C-AJ-5210

March 15, 2007
F Ratings – 1-1/2 & 2 Hr (See Item 4)
T Ratings – 1/2, 3/4, 1 & 1-1/4 Hr (See Item 4)



1. **Floor or Wall Assembly** – Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m^3) concrete. Floor assembly 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 14 in. (356 mm). Max diam of opening in floors constructed of hollow-core concrete is 7 in. (178 mm).

   See **Concrete Blocks** (CAZT) and **Precast Concrete Units** (CFTV) categories in Fire Resistance Directory for names of manufacturers.

2. **Steel Sleeve** – (Optional) – Nom 14 in. (356 mm) diam (or smaller) Schedule 10 (or heavier) steel sleeve cast or grouted into floor or wall assembly. Steel sleeve may be installed flush or may project max 2 in. (51 mm) beyond the floor or wall surfaces. As an alternate, nom 14 in. (356 mm) diam (or smaller) sleeve fabricated from nom 0.028 in. (0.71 mm) thick galv steel cast or grouted into floor or wall assembly flush with floor or wall surfaces.

3. **Through Penetrants** – One metallic pipe or tubing to be installed concentrically or eccentrically within opening. Penetrant to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes or tubes may be used:

   A. **Steel Pipe** – Nom 8 in. (203 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. **Iron Pipe** – Nom 8 in. (203 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.

4. **Pipe Covering** – Nom 2 in. (51 mm) thick (or less) hollow cylindrical heavy density 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 product. Annular space between the pipe covering and periphery of opening or sleeve shall be min 1/2 in. to max 1 in. (13 mm to max 25 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.

   The hourly F and T Ratings are dependent on the type of pipe or tube and the nom thickness of the pipe covering, as shown below:

Penetrant	Pipe Covering Nom Thickness, in. (mm)	F Rating, Hr	T Rating, Hr
A & B	2 (51)	2	1-1/4
C & D	2 (51)	1-1/2	1
A, B, C & D	1 (25)	2	3/4
A, B, C & D	1/2 (13)	2	1/2

5. **Firestop System** – The details of the firestop system shall be as follows:

   A. **Packing Material** – Min 3 in. (76 mm) thickness of min 4 pcf or (64 kg/m^3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or top edge of sleeve or from both surfaces of wall or both ends of sleeve as required to accommodate the required thickness of fill material. In floors constructed of hollow-core concrete, packing material to be recessed from top and bottom surfaces of floor or sleeve as required to accommodate the required thickness of fill material.

   A1. **Forming Material*** – As an alternate to the packing material in Item 5A, nom 4 in. (102 mm) wide strips of min 1/2 in (13 mm) thick compressible mat to be stacked to a thickness greater than the width of the annular space and compression-fitted, edge-first, to fill the annular space to a min 4 in. (102 mm) depth. Top of forming material to be recessed from top surface of floor or from both surfaces of wall as necessary to accommodate the required thickness of caulk fill material. In floors constructed of hollow-core concrete, forming material to be recessed from top and bottom surfaces of floor or sleeve as required to accommodate the required thickness of fill material.

   3M COMPANY – Fire Barrier Packing Material

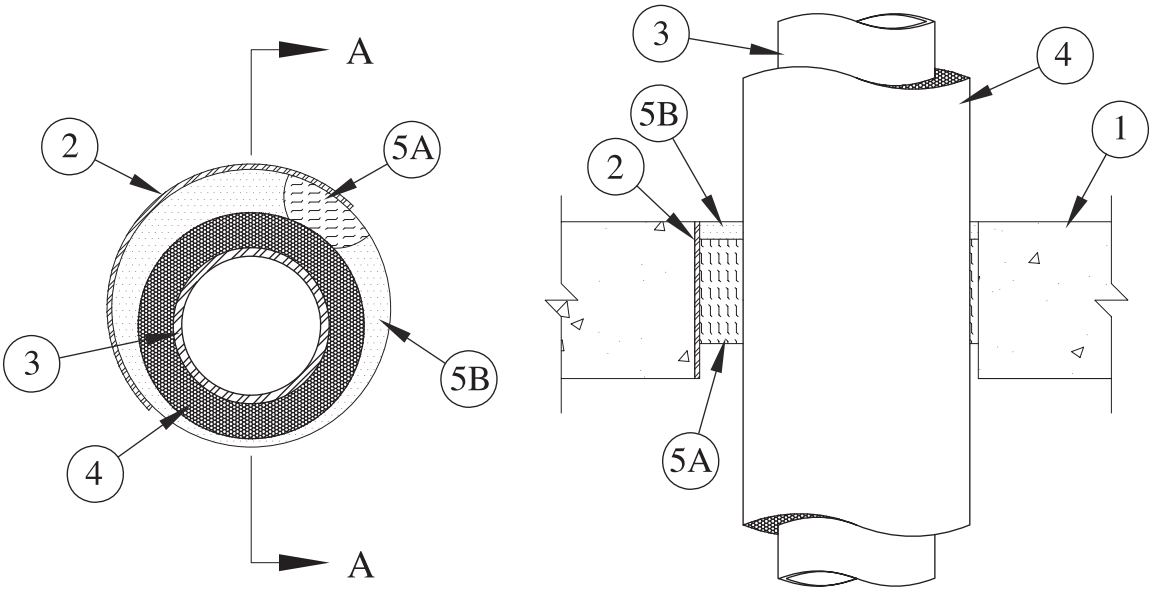
   B. **Fill, Void or Cavity Materials*** – **Caulk or Sealant** – Min 1/2 in. (13 mm) thickness of caulk applied within the annulus, flush with top surface of floor or top edge of sleeve or with both surfaces of wall or both ends of sleeves. In floors constructed of hollow-core concrete, min 1/2 in. (13 mm) thickness of caulk applied within the annulus, flush with top and bottom surfaces of floor or sleeve.

   3M COMPANY – IC 15WB+, CP 25WB+ caulk or FB-3000 WT sealant

*Bearing the UL Classification Mark

System No. C-AJ-5211

May 19, 2005
F Rating – 2 Hr
T Ratings – 0 & 1/2 Hr (See Item 4)
W Rating – Class I (See Item 5)



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/m^3) concrete. Floor assembly 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 8 in. (203 mm). Max diam of opening in floors constructed of hollow-core concrete is 7 in. (178 mm).

   See **Concrete Blocks** (CAZT) and **Precast Concrete Units** (CFTV) categories in Fire Resistance Directory for names of manufacturers.

2. **Steel Sleeve** (Optional) – Nom 8 in. (203 mm) diam (or smaller) Schedule 10 (or heavier) steel sleeve cast or grouted into floor or wall assembly. Steel sleeve may be installed flush or may project max 2 in. (51 mm) beyond the floor or wall surfaces.

3. **Through Penetrants** – One metallic pipe to be installed concentrically or eccentrically within opening. Penetrant 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 10 (or heavier) steel pipe.

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

   C. **Copper Tubing** – Nom 2 in. (51 mm) diam (or smaller) Type L (or heavier) copper tubing.

   D. **Copper Pipe** – Nom 2 in. (51 mm) diam (or smaller) Regular (or heavier) copper pipe.

4. **Tube Insulation-Plastics+** – Nom 3/4 in. (19 mm) thick (or less) acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. Annular space between the insulated penetrating item and the periphery of the opening shall be min 1/2 in. to max 1-1/2 in. (13 mm to 38 mm).

   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.

   T Rating is 1/2 Hr for nom 3/4 in. (19 mm) thick tube insulation. T Rating is 0 Hr for tube insulations less than nom 3/4 in. (19 mm) thick.

5. **Firestop System** – The details of the firestop system shall be as follows:

   A. **Packing Materia**l – Min 3 in. (76 mm) thickness of min 4 pcf (64 kg/m^3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or top edge of sleeve or from both surfaces of wall or both ends of sleeve as required to accommodate the required thickness of fill material. In floors constructed of hollow-core concrete, packing material to be recessed from top and bottom surfaces of floor or sleeve as required to accommodate the required thickness of fill material.

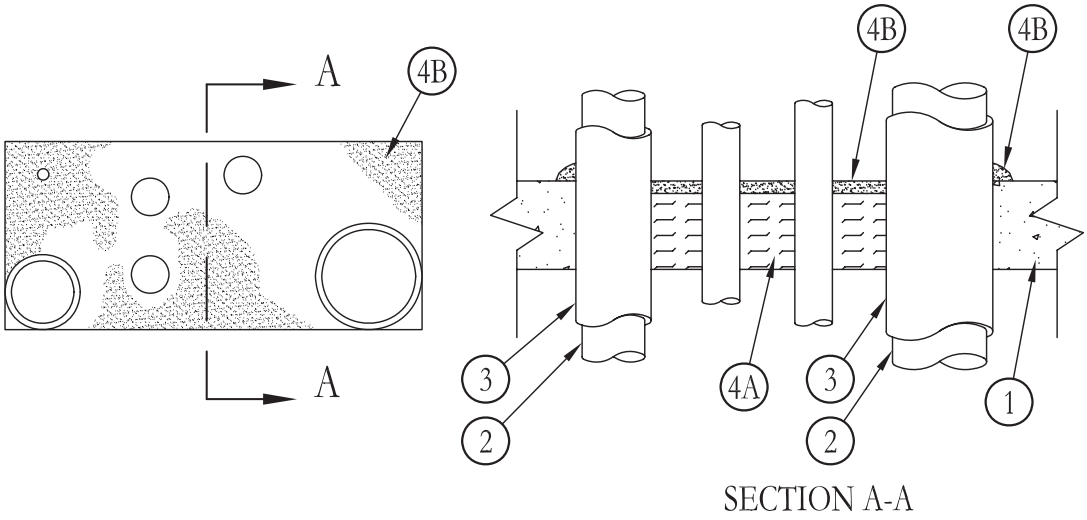
   B. **Fill, Void or Cavity Materials*** – **Caulk or Sealant** – Min 1/2 in. (13 mm) thickness of caulk applied within the annulus, flush with top surface of floor or top edge of sleeve or with both surfaces of wall or both ends of sleeves. In floors constructed of hollow-core concrete, min 1/2 in. (13 mm) thickness of caulk applied within the annulus, flush with top and bottom surfaces of floor or sleeve.

      3M COMPANY – IC 15WB+, CP 25WB+ caulk or FB-3000 WT sealant.
      (Note: W Rating applies only when FB-3000 WT sealant is used.)

* Bearing the UL Classification Marking
\+ Bearing the UL Recognized Component Mark

System No. C-AJ-8072

September 07, 2004
F Rating – 2 Hr
T Ratings – 0, 1/4, 1/2, & 1 Hr (See Item 2)



SECTION A-A

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 concrete wall. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max area of opening 84 square in. with max dimension of 14 in.

   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Through Penetrants** – Multiple metallic pipes, conduits, tubings or cables to be installed within the firestop system. Min 1/2 in. clearance between penetrants. Min clearance between uninsulated penetrants or cables and wall of through opening 0 in. (point contact). Penetrants rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes, conduits, tubings or cables may be used:

   A. **Steel Pipe** – Nom 2 in. diam (or smaller) Schedule 5 (or heavier) steel pipe.

   B. **Iron Pipe** – Nom 2 in. diam (or smaller) cast or ductile iron pipe.

   C. **Conduit** – Nom 2 in. diam (or smaller) steel electrical metallic tubing or steel conduit.

   D. **Copper Tubing** – Nom 2 in. diam (or smaller) Type L (or heavier) copper tube.

   E. **Copper Pipe** – Nom 2 in. diam (or smaller) Regular (or heavier) copper pipe.

   F. **Cable** – Max 7/C No. 12 AWG (or smaller) copper conductor cable with PVC insulation and jacket.

   The hourly T Rating is 1/4 hr when penetrants A, B and C are used, 0 hr when penetrants D and E are used and 1/2 hr when penetrant F is used. The hourly T Rating is 1 hr when penetrants A, B, C, D and E are used with pipe insulation (Item 3).

3. **Pipe Insulation** (Optional) – The following types of pipe insulation may be used:

   A. **Pipe Covering*** – Nom 1-1/2 in. thick (or thinner) hollow cylindrical heavy density 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 pipe and the edge of the through opening shall be min 0 in. (point contact).

   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. **Tube Insulation** – **Plastics**++ – Nom 3/4 in. thick (or thinner) acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The annular space between the insulated pipe and the edge of the through opening shall be min 0 in. (point contact).

   See **Plastics** (QMFZ2) category in the Plastics 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 94-5VA may be used.

4. **Firestop System** – The details of the firestop system shall be as follows:

   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 Materials*** – **Caulk or 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. Min 1/2 in. diam bead of caulk applied to the concrete/penetrant interface at the point contact location on the top surface of floor or both surfaces of wall.

      3M COMPANY – CP 25WB+ caulk or FB-3000 WT sealant.

*Bearing the UL Classification Marking

++Bearing the UL Recognized Component Marking