



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 Expanrol™ Flexible Intumescent Strip (E-FIS)
Fire Barrier Pass-Through Device
Fire Barrier RC-1 Restricting 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
ELECTRICAL PENETRATIONS IN RATED GYPSUM WALLS AND CONCRETE FLOOR &
WALL CONSTRUCTION

Penetrating Item	Assembly Penetrated	F Rating	System Number	Products Used
Metal Pipe/Conduit	Framed Gypsum Walls	1 & 2 Hr.	W-L-1296	IC15WB
Rigid non-metallic conduit	Framed Gypsum Walls	1 & 2 Hr.	W-L-2088	IC15WB
Jacketed Cables	Framed Gypsum Walls	1 & 2 Hr.	W-L-3195 W-L-3148	IC15WB
Cable Trays	Framed Gypsum Walls	1 Hr. 1 & 2 Hr. 1 & 2 Hr.	W-L-4018 W-L-4037 W-L-4052	CS-195 Pillows CS-195 & Pillows
Plastic Cable Trough	Framed Gypsum Walls	2 Hr.	W-L-6002	CS-195 & FS-195
Multiple Conduit	Framed Gypsum Walls	1 & 2 Hr.	W-L-1228 W-L-1255	CP25WB Pillows & Putty
Outlet Boxes	Framed Gypsum Walls	1 & 2 Hr.	CLIV	Putty Pads
Concrete Floor & Walls				
Metal Pipe/Conduit	Concrete Floor & Walls	2Hr.	C-AJ-1427	IC15WB
ENT, Single	Concrete Floor & Walls	2 Hr.	C-AJ-2028	FS-195 & CP25WB
ENT, Multiples	Concrete Floor & Walls	2 Hr.	C-AJ-2029	PPD
Rigid non-metallic conduit	Concrete Floor & Walls	2 Hr.	C-AJ-2378	IC15WB
Jacketed Cables	Concrete Floor & Walls	3 Hr.	C-AJ-3200	IC15WB
Cable Trays	Concrete Floor & Walls	2 & 3 Hr. 3 Hr.	C-AJ-4003 C-AJ-4056	CS-195 Pillows
Busways	Concrete Floor & Walls	2 & 3 Hr. 3 Hr.	C-AJ-6001 C-AJ-6002	CS-195 FB-1000
Multiple Metal Pipe/Conduit	Concrete Floor & Walls	2 Hr. 3 Hr. 2 Hr.	C-AJ-1429 C-AJ-8001 C-AJ-8073	IC15WB CS-195 Mortar
Insulated Cables	Concrete Floor	3 Hr.	F-A-3017	Cast-in-Place
Insulated Cable	Concrete Floor	2 Hr.	F-A-3020	Cast-in-Place
Insulated Cables	Concrete Floor	3 Hr.	C-AJ-3250	Pass-Through Device
Insulated Cables	Concrete Floor	3 Hr.	C-AJ-3252	Pass-Through Device
Insulated Cables	Framed Gypsum Walls	1 & 2 Hr.	W-L-3289	Pass-Through Device

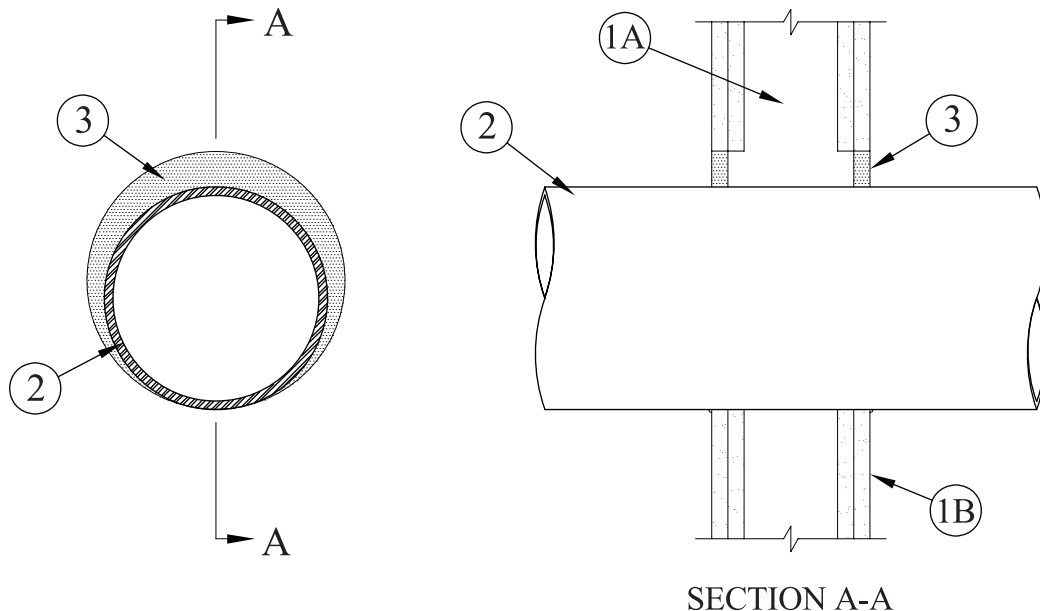
Updated 1-4-07

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)



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

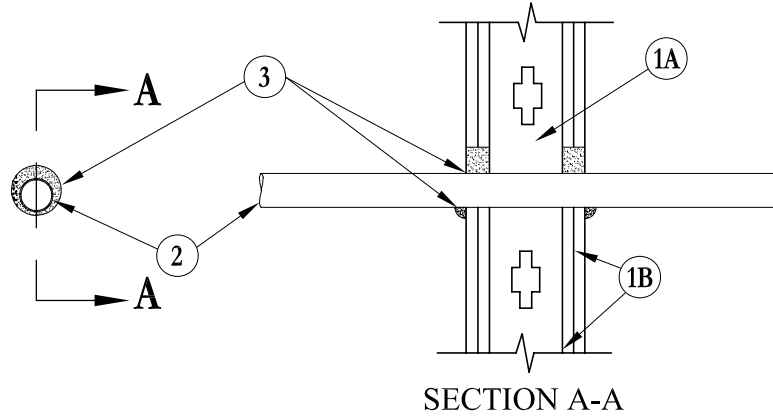
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System No. W-L-2088

May 23, 2005

F Ratings – 1 and 2 Hr (See Item 1)

T Ratings – 0, 1 and 2 Hr (See Item 2)



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

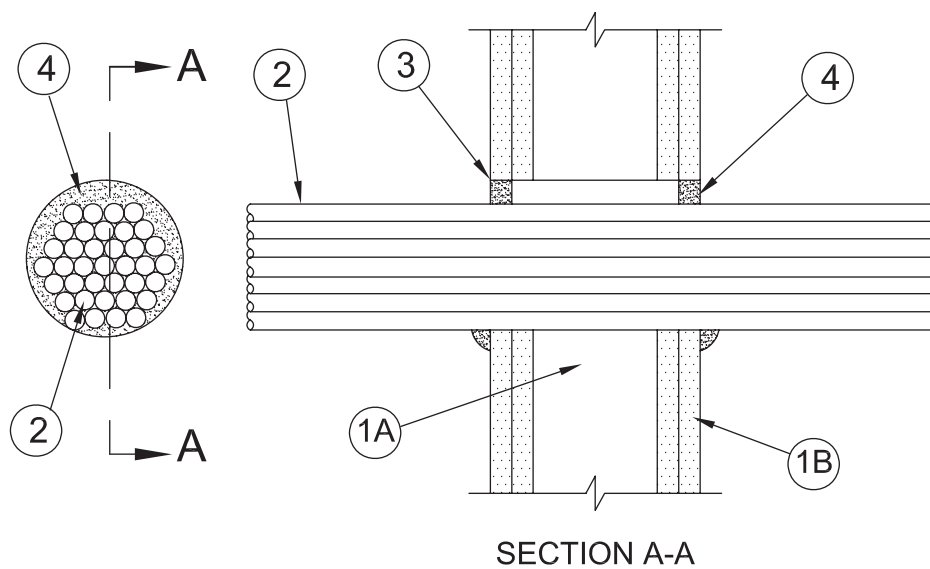
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System No. W-L-3195

December 12, 2006

F Ratings – 1 and 2 Hr (See Item 1)

T Ratings – 0 and 1/2 Hr (See Item 1)



1. **Wall Assembly** – The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual 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 Design in the UL Fire Resistance Directory. 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. The hourly T Rating is 0 and 1/2 Hr for 1 and 2 Hr fire rated assemblies, respectively.
2. **Steel Sleeve** – (Optional) – Cylindrical sleeve fabricated from min 0.018 in. (0.46 mm) thick (No. 28 gauge) galv sheet steel and having a min 1 in. (25 mm) lap along the longitudinal seam. Length of sleeve to be equal to or max 2 in. (51 mm) greater than the thickness of wall. Ends of sleeve to be flush with or extend a max 1 in. (25 mm) beyond each surface of wall.
3. **Cable** – Max 4 in. (102 mm) diam cable bundle installed eccentrically or concentrically within opening. Annular space between cable bundle and periphery of opening or sleeve to be min 0 in. (0 mm, point contact) to max 1 in. (25 mm). Cable bundle to be rigidly supported on both sides of wall. The following types and sizes of cables may be used:
 - A. Max 200 pair No. 22 AWG (or smaller) copper conductor with polyvinyl chloride (PVC) insulation and jacketing material.
 - B. Max 1/C No. 350 kcmil (or smaller) copper conductor cable with cross-linked polyethylene (XLPE) or PVC jacket.
 - C. Max 7/C No. 12 AWG (or smaller) copper conductor power and control cables with XLPE or PVC insulation with XLPE or PVC jacket.
 - D. Max 3/C No. 2/0 AWG (or smaller) copper or aluminum conductor SER cables with XLPE or PVC insulation and jacket.
 - E. Max 4/C No. 2/0 AWG (or smaller) copper conductor, aluminum clad or steel clad TECK 90 cable with or without PVC jacketed.
 - F. Max 110/125 fiber optic (F.O.) cable with PVC insulation and jacket.
 - G. Max 3/C with ground No. 8 AWG (or smaller) copper conductor NM cable with PVC insulation and jacket.
 - H. Max RG/U coaxial cable with fluorinated ethylene insulation and jacket.
 - I. Max 4 pair No. 24 AWG (or smaller) copper conductor data cable with Hylar jacket and insulation.
 - J. **Through Penetrating Product*** – Any cables, **Armored Cable+** or **Metal Clad Cable+** currently Classified under the **Through Penetrating Product** category.

See **Through Penetrating Product** (XHLY) category in the Fire Resistance Directory for names of manufacturers.
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/cable bundle 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

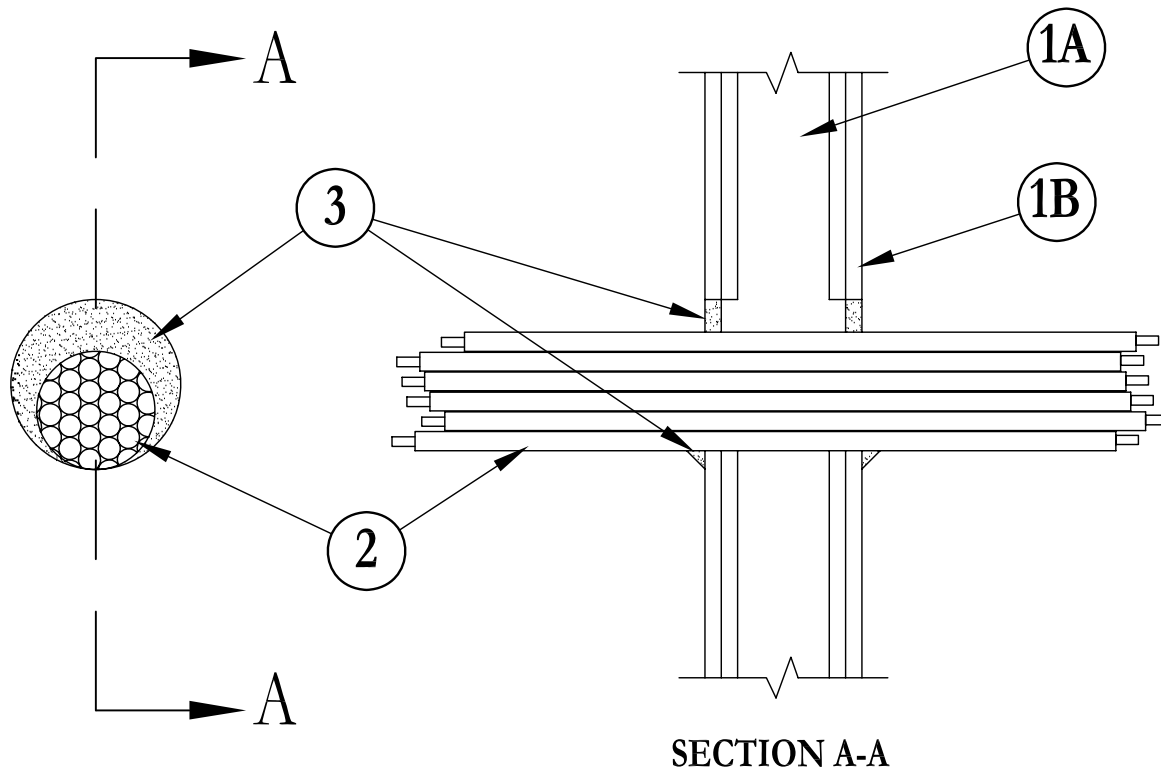
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System No. W-L-3148

May 19, 2005

F Ratings – 1 and 2 Hr (See Item 1)

T Ratings – 0 and 1/2 Hr (See Item 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:
 - 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.
 - Gypsum Board*** – Thickness, type, number of layers and fasteners as required in the individual Wall and Partition Design. Max diam of opening is 4-1/2 in. (114 mm).

The hourly F Rating of the firestop 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 and 2 hr rated walls, respectively.
- Cables** – Max 4 in. (102 mm) diam tight bundle of cables to be installed either concentrically or eccentrically within the opening. The annular space between the cable bundle and the periphery of the opening to be min 0 in. (point contact) to max 1/2 in. (0 mm to max 13 mm) Any combination of the following types and sizes of cables may be used:
 - Max 150 pair No. 24 AWG (or smaller) copper conductor with polyvinyl chloride (PVC) insulation and jacket.
 - Max 1/C 350 kcmil (or smaller) copper conductor cable with cross-linked polyethylene (XLPE) jacket.
 - Max 3/C No. 2/0 AWG (or smaller) aluminum or copper conductor cable with XLPE insulation and PVC jacket.
 - Max 7/C No. 12 AWG (or smaller) copper conductor cable with PVC insulation and jacket.
 - Max No. 18 AWG RG 6/U coaxial cable with PVC insulation and jacket.
 - Max 3/C with ground No. 12 AWG (or smaller) NM cable with PVC insulation and jacket.
 - Max 3/C No. 2/0 aluminum or copper SE cable with PVC insulation and jacket.
 - Max 3/C No. 2/0 (or smaller) copper conductor PVC jacketed aluminum clad or steel clad TEK cable.
- Fill, Void or Cavity Materials* – Caulk or Sealant** – Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with each surface of wall. Min 5/8 in. (16 mm) thickness of fill material applied into interstices of cables on both sides of wall. Min 1/2 in. (13 mm) diam bead of caulk applied at the cable/wallboard interface to the point contact location on both sides of wall.

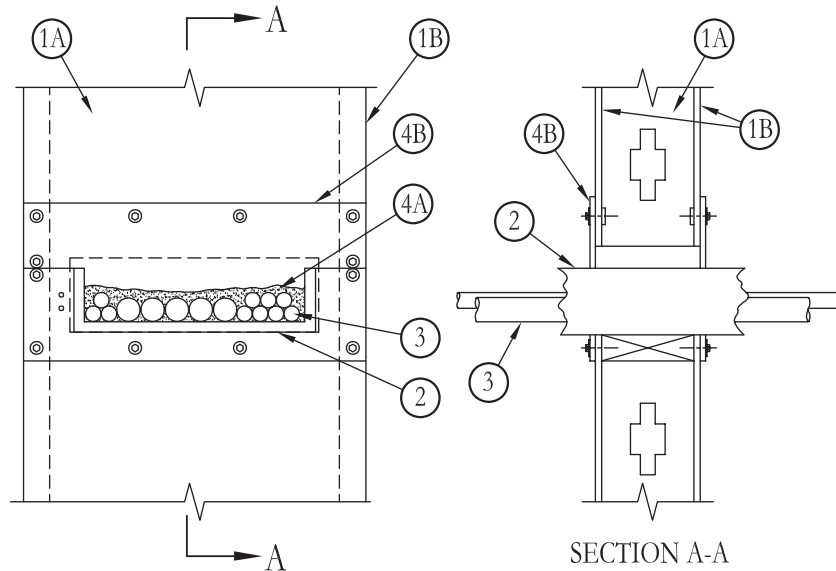
3M COMPANY – FireDam 150+, CP 25WB+, IC 15WB+ caulk or FB-3000 WT sealant

*Bearing the UL Classification Marking

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System No. W-L-4018

May 19, 2005
F Rating – 1 Hr
T Rating – 1/4 Hr



1. **Wall Assembly** – The 1 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. Additional framing member shall be installed in stud cavity at the bottom of the opening to support cable tray (Item 2).
 - B. **Gypsum Board*** – One layers of nom 5/8 in. (16 mm) thick gypsum board, as specified in the individual Wall and Partition Design. The opening shall be sized to be 1 in. (25 mm) wider and 2 in. (51 mm) higher than the width and depth of the cable tray. If cable tray is installed in a wood stud/gypsum board assembly, max width of opening is 14-1/2 in. (368 mm).
2. **Cable Tray+** – Max 18 in. (457 mm) wide by max 4 in. (102 mm) deep aluminum or steel open-ladder cable tray. One cable tray to be installed in the opening. The annular space between the cable tray and the periphery of the opening shall be min 0 in. (0 mm) (point contact) to max 2 in. (51 mm). Cable tray to be rigidly supported on both sides of wall assembly.
3. **Cables** – Aggregate cross-sectional area of cables in cable tray to be max 43 percent of the cross-sectional area of the cable tray based on a max 3 in. (76 mm) cable loading depth within the cable tray. Any combination of the following types and sizes of cables may be used:
 - A. Max 200 pair No. 24 AWG (or smaller) copper conductor with polyvinyl chloride (PVC) insulation and jacket.
 - B. Max 1/C 1000 kcmil (or smaller) copper conductor cable with cross-linked polyethylene (XLPE) jacket.
 - C. Max 3/C No. 2/0 AWG (or smaller) aluminum or copper conductor cable with XLPE insulation and PVC jacket.
 - D. Max 7/C No. 12 AWG (or smaller) copper conductor cable with PVC insulation and jacket.
 - E. Max No. 18 AWG RG 6/U coaxial cable with PVC insulation and jacket.
 - F. Max 3/C with ground No. 12 AWG (or smaller) NM cable with PVC insulation and jacket.
4. **Firestop System** – The firestop system shall consist of the following:
 - A. **Fill, Void or Cavity Materials* – Caulk, Sealant or Putty** – Min 5/8 in. (16 mm) thickness of caulk or putty installed within annular space between sides of cable tray and periphery of opening flush with each side of wall surfaces. Nom 1/2 in. (13 mm) thick by 1 in. (25 mm) wide strips of caulk or putty shall be applied to follow the contours of top of cables prior to installation of intumescent sheets (Item 4B). Caulk or putty strips installed to project approx 1/2 in. (13 mm) beyond each face of the intumescent sheet on each side of the wall assembly. After installation of the intumescent sheets, min 5/8 in. (16 mm) thickness of caulk or putty applied within all openings between the intumescent sheet and the cables and cable tray, on each side of wall, flush with each face of intumescent sheet or extending a max of 3/8 in. (10 mm) beyond each face of intumescent sheet.
3M COMPANY – CP 25WB+, IC 15WB+ caulk, FB-3000 WT sealant or MP+ Stix putty
 - B. **Fill, Void or Cavity Materials* – Intumescent Sheet** – Foil-faced sheet with galv steel sheet backer. Sheets cut in two pieces (top and bottom). Bottom piece cut to tightly follow the contours of cable tray with a 0 in. (point contact) to max 3/8 in. (0 mm to max 10 mm) space between sheet and cable tray on each side of wall. Top piece cut to tightly-follow the contours of cable tray and cable fill on each side of wall with a 0 in. (point contact) to max 3/8 in. (0 mm to max 10 mm) space between sheet and cable tray and a min 1/4 in. to max 3/8 in. (6 mm to max 10 mm) space between sheet and cables. Sheets cut to lap a min of 2 in. (51 mm) on the wall on top and bottom of opening and to extend a min of 1 in. (25 mm) onto vertical studs on both sides of opening. Sheets to be installed on each side of wall with the galv steel sheet backer exposed (foil facing against wall surface) and secured to steel framing, through gypsum board layers, with min 1-1/2 in. (38 mm) long steel drywall screws in conjunction with min 1-1/4 in. (32 mm) diam steel fender washers. Max spacing of fasteners not to exceed 6 in. (152 mm) with additional fasteners located on each side of batted seams of top and bottom pieces. Sheets to be fastened to gypsum board with min 1/4 in. (6 mm) diam steel toggle bolts in conjunction with min 1-1/4 in. (32 mm) diam steel fender washers in any areas when no stud is present.
3M COMPANY – CS-195+

*Bearing the UL Classification Marking

+Bearing the UL Listing Mark

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System No. W-L-4037

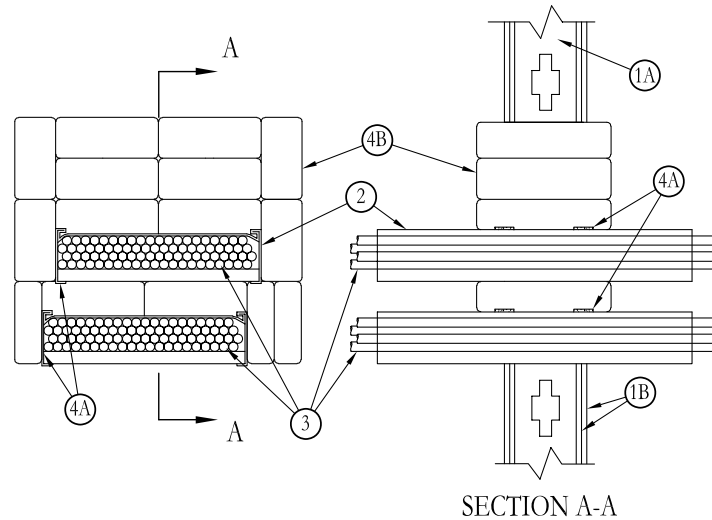
December 19, 2007

F Ratings – 1 and 2 Hr (See Item 1)

T Ratings – 0 and 1/2 Hr (See Item 1)

L Rating at Ambient – 7 and 22 CFM/sq ft. (See Item 4)

L Rating at 400 F – 4 and 21 CFM/sq ft. (See Item 4)



- 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 or Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

- Studs** – Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-5/8 in. (92 mm) wide and spaced max 24 in. (610 mm) OC. Additional framing members shall be used to completely frame around opening.
- Gypsum Board*** – Thickness, type, number of layers and fasteners as required in the individual Wall and Partition Design. Max area of opening is 540 sq. in. (84 cm²) with a max dimension of 30 in. (762 mm).

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

- Cable Tray** – Max 24 in. (610 mm) wide by max 4 in. (102 mm) deep open ladder cable tray with channel-shaped side rails formed of min 0.058 in. (1.5 mm) thick (16 gauge) galv steel with nom 1 in. (25 mm) diam rungs spaced 9 in. (229 mm) OC or max 24 in. (610 mm) wide by max 4 in. (102 mm) deep open ladder cable tray with channel-shaped side rails formed from 0.060 in. (1.5 mm) thick aluminum with nom 1 in. (25 mm) diam rungs spaced 9 in. (229 mm) OC. Max two cable trays per opening. The annular space between the cable trays is a min 6 in. (152 mm) to max 10 in. (254 mm). The annular space between the cable trays and the periphery of the opening will be min 0 in. (0 mm, point contact) to max 5 in. (127 mm). Cable trays to be rigidly supported on both sides of wall assembly.
- Cables** – Aggregate cross-sectional area of cables in cable tray not to exceed 40 percent of the cross-sectional area of the cable tray based on a max 3 in. (76 mm) cable loading depth within the tray. Any combination of the following types and sizes of cables may be used:
 - Max 1/C 750 kcmil (or smaller) copper conductor cable with cross-linked polyethylene (XLPE) jacket.
 - Max 300 pair No. 22 AWG (or smaller) copper conductor telecommunication cables with polyvinyl chloride (PVC) insulation and jacket.
 - Max 7/C No. 12 AWG copper conductor power and control cables with XLPE or PVC insulation with XLPE or PVC jacket.
 - Max 4/C No. 2/0 AWG copper or aluminum conductor cables with PVC insulation and jacket..
 - Max 1-10/125 Fiber Optic (F.O) cable with PVC insulation and jacket.
 - Max No. 18 AWG Type RG coaxial cable with polyvinyl chloride insulation.
- Firestop System** – The firestop system shall consist of the following:
 - Fill Void or Cavity Material* – Putty** – Min 1/2 in. (13 mm) thickness of putty formed to a min 1 in. (25 mm) width and applied within annulus at all corners of opening and extending a min 1 in. (25 mm) in both directions from each corners, flush with both surfaces of wall. Additional putty installed inside cable tray side rails to completely fill side rails within the opening and extending approximately 1/2 in. (13 mm) beyond both surfaces of wall. After installation of pillows (Item 4B) all voids within the opening shall be filled with a min 1 in. (25 mm) thickness of putty. The individual cables may be wrapped with a min 1/4 in. (6 mm) thickness, min 2 in. (51 mm) width of putty such that the putty extends approximately 1/2 in. (13 mm) beyond both surfaces of wall.

3M COMPANY – MP+ or Cable Wrap

L Ratings are 7 and 4 CFM/sq ft. at ambient and 400° F, respectively, when individual cables are wrapped with 3M Cable Wrap or MP+ putty in accordance with the installation instructions. L Ratings are 22 and 21 CFM/sq ft. at ambient and 400° F, respectively, when individual cables are not wrapped with 3M Cable Wrap or MP+ putty.

- Fill Void or Cavity Material* – Pillows** – Max 9 in. (229 mm) long by 6 in. (152 mm) wide by 2 and 3 in. (51 and 76 mm) thick plastic covered pillows packed to a min compression of 33 percent and to fill annular space between cable tray and periphery of opening. Pillows installed with 9 in. (229 mm) dimension projecting through wall and centered within the opening.

3M COMPANY – Fire Barrier Pillow or Fire Barrier Self-Locking Pillows

*Bearing the UL Classification Mark

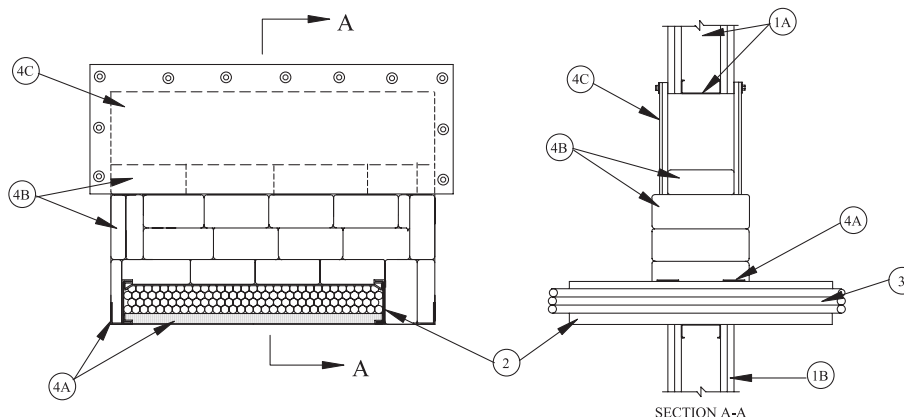
This material was extracted and drawn by 3M Fire Protection Products from the 2007 edition of the UL Fire Resistance Directory. 

System No. W-L-4052

June 09, 2004

F Ratings – 1 and 2 Hr (See Item 1)

T Ratings – 0 and 1/2 Hr (See Item 1)



1. **Wall Assembly** – The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U400 or V400 Series Wall or Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

- A. **Studs** – Min 3-1/2 in. (89 mm) wide steel studs spaced max 24 in. (610 mm) OC. Additional framing members shall be used to completely frame around opening.
- B. **Gypsum Board*** – Thickness, type, number of layers and fasteners as required in the individual Wall and Partition Design. Max area of opening is 720 in.² (4645 cm²) with a max dimension of 30 in. (762 mm).

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

2. **Cable Tray** – Max 24 in. (610 mm) wide by max 4 in. (102 mm) deep open ladder cable tray with channel-shaped side rails formed of min 0.058 in. thick (1.47 mm) galv steel with nom 1 in. (25 mm) diam rungs spaced 9 in. (229 mm) OC or max 24 in. (610 mm) wide by max 4 in. (102 mm) deep open ladder cable tray with channel-shaped side rails formed from 0.060 in. (1.52 mm) thick aluminum with nom 1 in. (25 mm) diam rungs spaced 9 in. (229 mm) OC. Max two cable trays per opening. The annular space between the cable trays is a min 6 in. (152 mm) to max 18 in. (457 mm). The annular space between the cable trays and the periphery of the opening will be min 0 in. (point contact) to max 18 in. (457 mm). Cable trays to be rigidly supported on both sides of wall assembly.
3. **Cables** – Aggregate cross-sectional area of cables in cable tray not to exceed 40 percent of the cross-sectional area of the cable tray based on a max 3 in. (76 mm) cable loading depth within the tray. Any combination of the following types and sizes of cables may be used:
 - A. Max 1/C 750 kcmil (or smaller) copper conductor cable with cross-linked polyethylene (XLPE) jacket.
 - B. Max 300 pair No. 22 AWG (or smaller) copper conductor telecommunication cables with polyvinyl chloride (PVC) insulation and jacket.
 - C. Max 7/C No. 12 AWG copper conductor power and control cables with XLPE or PVC insulation with XLPE or PVC jacket.
 - D. Max 4/C No. 2/0 AWG copper or aluminum conductor cables with PVC insulation and jacket.
 - E. Max 1-10/125 Fiber Optic (F.O) cable with PVC insulation and jacket..
 - F. Max No. 18 AWG Type RG coaxial cable with polyvinyl chloride insulation.
4. **Firestop System** – The firestop system shall consist of the following:
 - A. **Fill, Void or Cavity Materials* – Putty** – Min 1/2 in. (13 mm) thickness of putty formed to a min 1 in. (25 mm) width and applied within annulus at the bottom corners of opening and extending a min 1 in. (25 mm) in both directions from each corner, flush with both surfaces of wall. Min 5/8 in. (16 mm) thickness of putty installed between bottom of cable tray and bottom of opening on both surfaces of wall. As an option, the putty between the bottom of the cable tray and the bottom of the opening may be replaced by pillows (Item 4B), provided the annular space is such that the pillows can be tightly fitted into the annular space. After installation of pillows and intumescent sheet (Items 4B and 4C), all voids within the opening shall be filled with a min 1 in. (25 mm) thickness of putty on both sides of wall.

3M COMPANY – MP+
 - B. **Fill, Void or Cavity Materials* – Pillow** – Max 9 in. (229 mm) long by 6 in. (152 mm) wide by 2 and 3 in. (51 and 76 mm) thick plastic covered pillows tightly packed to fill annular space between the cable trays and periphery of opening and the annular space between the cable trays when two trays are installed within the opening. A min of two rows of pillows to be installed above the top cable tray in opening. Pillows installed with 9 in. (229 mm) dimension projecting through wall and centered within the opening except that the top row of pillows in the opening shall be installed with the 6 in. (152 mm) dimension centered in the wall such that the top row is completely covered by the intumescent sheet (Item 4C).

3M COMPANY – Fire Barrier Pillow or Fire Barrier Self-Locking Pillows
 - C. **Fill, Void or Cavity Materials* – Intumescent Sheet** – Rigid aluminum foil-faced sheet with galv steel sheet backer. The one piece sheet shall be cut to lap a min of 2 in. (51 mm) onto the wall at the top and sides of the opening on both sides of the wall. Sheet shall be cut to completely lap the top row of pillows above the top cable tray on both sides of the wall. Sheet to be installed with the galv steel sheet backer exposed (aluminum foil facing against wall surface) and secured to steel framing, through gypsum wallboard layers, with min 1/4 in. (6 mm) diam by 2-1/4 in. (57 mm) long steel screws in conjunction with min 1-1/4 in. (32 mm) diam steel washers. Max spacing of fasteners not to exceed 6 in. (152 mm) with fasteners located a max 1 in. (25 mm) from each corner of the sheet.

3M COMPANY – Type CS-195+

*Bearing the UL Classification Mark

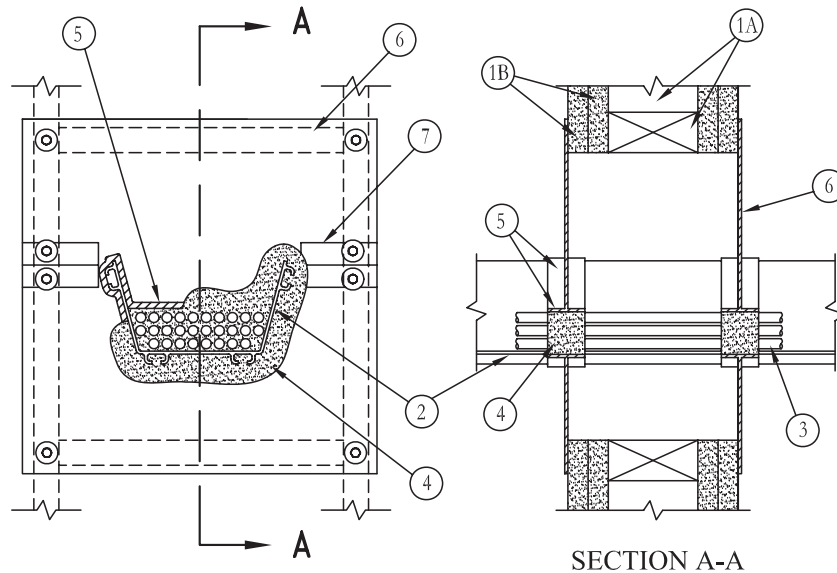
This material was extracted and drawn by 3M Fire Protection Products from the 2006 edition of the UL Fire Resistance Directory.

System No. W-L-6002

May 19, 2005

F Rating – 2 Hr

T Rating – 2 Hr



1. **Wall Assembly** – The 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 in. by 4 in. (51 mm by 102 mm) lumber spaced max 16 in. (406 mm) OC. Steel studs to be min 3-5/8 in. (92 mm) wide and spaced max 24 in. (610 mm) OC. The opening in the wall to accommodate the cable trough (Item 2) shall be framed on all sides using lengths of stud installed between the vertical studs and secured to the studs at each end. The framed opening in the wall shall be min 4 in. to max 6 in. (102 mm to max 152 mm) wider and higher than the width and height of the cable trough such that, when the cable trough is centered in the opening, a 2 in. to 3 in. (51 mm to 76 mm) clearance is present between the cable trough and the framing on all four sides.
 - B. **Gypsum Board*** – Two layers of nom 5/8 in. (16 mm) thick gypsum board, as specified in the individual Wall and Partition Design.
2. **Cable Trough** – Max 7 in. (178 mm) wide by max 4 in. (102 mm) deep telecommunication cable trough formed from nom 0.105 in. (2.7 mm) thick polyvinyl chloride (PVC). Cable trough centered in framed opening and rigidly supported on both sides of wall assembly.
3. **Fiber Optic Cables** – Multiple fiber optical communication cable jacketed on the outside with PVC and having a max outside diam of 1/2 in. (13 mm) Aggregate cross-sectional area of cables in cable trough not to exceed 31 percent of the cross-sectional area of the cable trough.
4. **Fill, Void or Cavity Materials* – Caulk, Sealant or Putty** – Moldable putty material kneaded by hand and packed tightly into cable interstices within cable trough. A min 2 in. (51 mm) wide band of moldable putty shall be applied inside the cable trough and inside the cable bundle on each side of the assembly. The nom 2 in. (51 mm) wide moldable putty band shall extend approx 1 in. (25 mm) into the framed opening and approx 1 in. (25 mm) beyond the wall surface. After installation of the wrap strip (Item 5) and intumescent sheet (Item 6) fill materials, a nom 1/8 in. (3.2 mm) thickness of the moldable putty shall be applied to completely cover the wrap strip fill material at its egress from the intumescent sheet on each side of the wall.

3M COMPANY – CP 25WB+, IC 15WB+ caulk, FB-3000 WT sealant, MPP+ putty
5. **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 nom 2 in. (51 mm) wide strips. Nom 2 in. (51 mm) wide strip installed (foil side out) to tightly-follow the contours of the moldable putty band (Item 4) within the cable trough and also to the entire perimeter of the cable trough at its egress from the intumescent sheet (Item 6) on each side of the wall assembly. Narrow pieces of wrap strip to be inserted in the “support channels” of the cable trough. Wrap strips to project approx 7/8 in. (22 mm) beyond each face of the intumescent sheet (Item 6) on each side of the wall.

3M COMPANY – FS-195+
6. **Fill, Void or Cavity Materials* – Intumescent Sheet** – Rigid aluminum foil-faced sheet with galv steel sheet backer. Sheets cut to tightly-follow the contours of the wrap strip (Item 4) around the entire perimeter of the cable trough and cable fill. Sheets cut to lap a min of 2 in. (51 mm) on the wall on all sides of the opening on both sides of the wall. Prior to installation, a nom 1/8 in. by 1/2 in. (3.2 mm by 13 mm) ribbon of putty (Item 4) shall be applied as a gasket approx 1 in. (25 mm) from and on all sides of the through opening. Sheet to be installed with the galv steel sheet backer exposed (aluminum foil facing against wall surface) and secured to framing, through gypsum board layers, with steel screws or nails in conjunction with min 1-1/4 in. (32 mm) diam steel fender washers. Max spacing of fasteners not to exceed 6 in. (152 mm) with additional fasteners located on each side of butted seams or slits made to permit installation of the sheet around the cable trough.

3M COMPANY – CS-195+
7. **Steel Cover Strip** – Min 2 in. (51 mm) wide strip of min 0.020 in. (0.51 mm) thick (26 gauge) galv steel centered over entire length of each butted seam or slit made in the intumescent sheet (Item 6). Prior to installation of the steel strip, the seam or slit in the intumescent sheet shall be covered with a nom 1/8 in. by 1/2 in. (3.2 mm by 13 mm) ribbon of putty (Item 4). Steel cover strip secured to galv steel sheet backer of intumescent sheet with steel sheet metal screws or steel rivets spaced max 3 in. (76 mm) OC on each side of seam or slit.

*Bearing the UL Classification Marking

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System No. W-L-1228

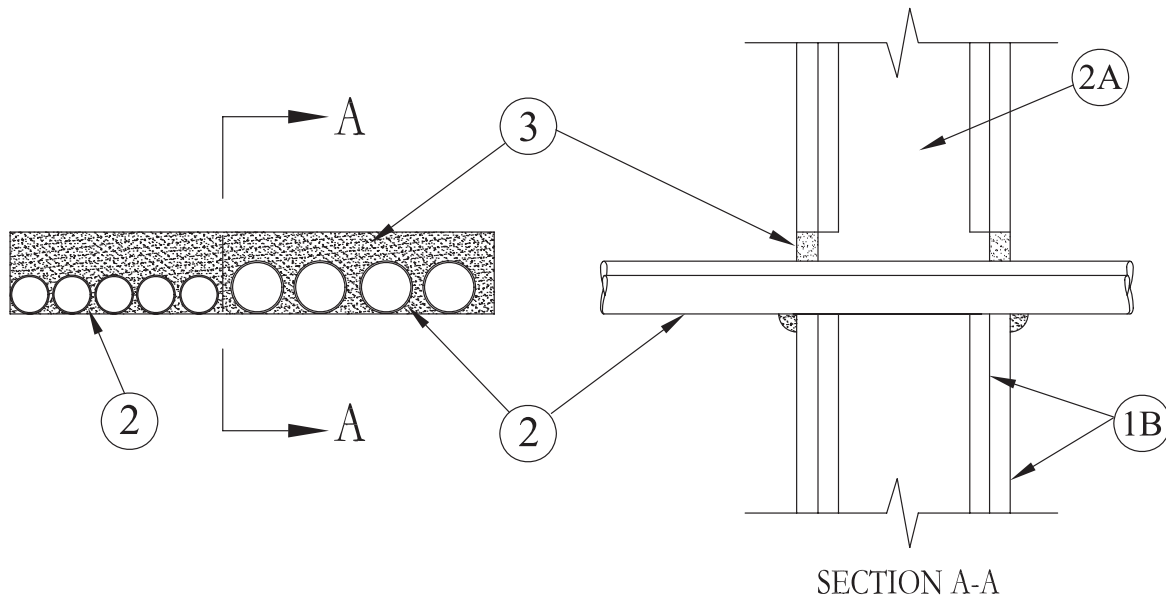
May 19, 2005

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



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

Through Penetrations

Metallic Pipes

1000 Series

Gypsum

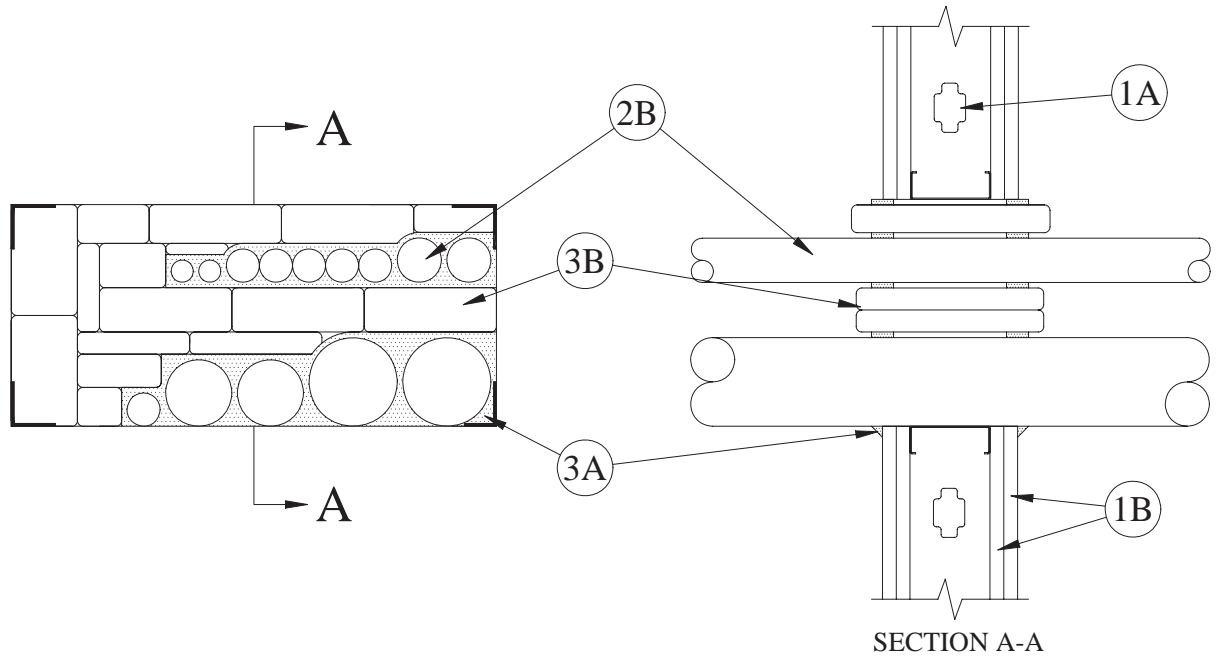
WL

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System No. W-L-1255

December 19, 2007

F Ratings – 1 and 2 Hr (See Item 1)
 T Ratings – 0 and 1/2 Hr (See Item 1)
 L Rating at Ambient – 7 CFM/sq ft.
 L Rating at 400 F – 4 CFM/sq ft.



1. **Wall Assembly** – The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or V400 Series Wall or 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 3-5/8 in. (92 mm) wide spaced max 24 in. (610 mm) OC. Additional framing members shall be used to completely frame around opening.
- B. **Gypsum Board*** – Thickness, type, number of layers and fasteners as required in the individual Wall and Partition Design. Max area of opening is 225 sq in. (1452 sq cm) with a max dimension of 22-1/2 in. (572 mm).

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

2. **Through Penetrant** – One or more nom 4 in. (102 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. (0 mm) (point contact) to max 4 in. (102 mm). The horizontal space between conduits or tubing shall be min 1/4 in. (6 mm) to max 4 in. (102 mm). The vertical space between conduits or tubing shall be min 1-1/2 in. (38 mm) to max 4 in. (102 mm). Conduit or tubing to be rigidly supported on both sides of wall assembly.
3. **Firestop System** – The firestop system shall consist of the following:
- A. **Fill Void or Cavity Material* – Caulk, Sealant or Putty** – Min 1/2 in. (13 mm) thickness of caulk or putty formed to a min 1 in. (25 mm) width and applied within annulus at all corners of opening and extending a min 1 in. (25 mm) in both directions from each corner, flush with both surfaces of wall. Min 1/4 in. (6 mm) thickness, min 2 in. (51 mm) width of caulk or putty wrapped applied around each penetrant such that caulk or putty extends approximately 1/2 in. (51 mm) beyond both surfaces of wall. After installation of pillows (Item 4B) all voids within the opening shall be filled with a min 1 in. (25 mm) thickness of caulk or putty.
- 3M COMPANY** – CP 25WB+ or FB-3000 WT or MP+
- B. **Fill Void or Cavity Material* – Pillows** – Max 9 in. (229 mm) long by 6 in. (152 mm) wide by 2 in. and 3 in. (51 mm and 76 mm) thick plastic covered pillows tightly packed to fill annular space between penetrants and periphery of opening. Pillows installed with 9 in. (229 mm) dimension projecting through wall and centered within the opening.

3M COMPANY – Fire Barrier Pillow or Fire Barrier Self-Locking Pillows

*Bearing the UL Classification Mark

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WALL OPENING PROTECTIVE MATERIALS (CLIV)

This category covers proprietary compositions which are used to maintain the hourly ratings of fire resistive walls and partitions containing flush mounted devices such as outlet boxes, electrical cabinets and mechanical cabinets. The individual Classifications indicate the specific applications and the method of installation for which the materials have been evaluated.

The basic standard used to investigate products in this category is ANSI/UL 263, "Fire Tests of Building Construction and Materials".

LOOK FOR CLASSIFICATION MARKING ON PRODUCT

The Classification Marking of Underwriters Laboratories Inc. (shown below) on the product or container is the only method provided by Underwriters Laboratories Inc. to identify Wall Opening Protective Materials produced under its Classification and Follow-Up Service.

**UNDERWRITERS LABORATORIES INC.®
CLASSIFIED**

**WALL OPENING PROTECTIVE MATERIAL
FIRE RESISTANCE CLASSIFICATION**

SEE PRODUCT CATEGORY IN UL FIRE RESISTANCE DIRECTORY

3M COMPANY

R9700

3M CENTER, ST PAUL MN 55144 USA

Type MPP+ moldable putty pads for use with max 4-11/16 by 4-11/16 by 2-1/8 in. deep flush device UL Listed Metallic Outlet Boxes installed with steel cover plates for use in 1 or 2 hr fire rated gypsum board wall assemblies framed with min 3-1/2 in. wide wood or steel studs and constructed as specified in the individual U300, U400 or V400 Series Wall and Partition Designs in the Fire Resistance Directory.

Type MPP+ moldable putty pads for use with max 4-11/16 by 4-11/16 by 2 1/8 in. deep flush device UL Listed Metallic Outlet Boxes installed with steel or plastic cover plates for use in 1 hr or 2 hr fire rated gypsum board wall assemblies framed with min 5-1/2 in. wide wood or steel studs and constructed as specified in the individual U300, U400 or V400 Series Wall and Partition Designs in the Fire Resistance Directory. Metallic outlet boxes to be provided with steel attachment brackets which offset box min 1/4 in. from stud. Putty pad to be affixed to the back and all four sides of the box. Boxes may be installed back-to-back within the stud cavity. When back-to-back boxes are interconnected, a ball of putty is to be installed to plug the open end of each electrical metallic tube or conduit within the outlet boxes.

Type MPP+ moldable putty pads for use with max 4 by 4 by 2-1/8 in. deep flush device UL Listed Metallic Outlet Boxes installed with plastic cover plates for use in 1 or 2 hr fire rated gypsum board wall assemblies framed with min 3-1/2 in. wide wood or steel studs and constructed as specified in the individual U300, U400 or V400 Series Wall and Partition Designs in the Fire Resistance Directory.

Type MPP+ moldable putty pads for use with max 14 by 4 by 2-1/2 in. deep flush device UL Listed Metallic Outlet Boxes installed with steel cover plates for use in 1 or 2 hr fire rated gypsum board wall assemblies framed with min 3-1/2 in. wide steel studs and constructed as specified in the individual U400 or V400 Series Wall and Partition Designs in the Fire Resistance Directory.

Type MPP+ moldable putty pads for use with max 14 by 4-1/2 by 2-1/2 in. deep UL Listed Nonmetallic Outlet Boxes manufactured by Carlon Electrical Products, made of PVC and bearing a 2 hr rating under the "Outlet Boxes and Fittings Classified for Fire Resistance" category in the Fire Resistance Directory. Boxes installed with steel cover plates, for use in 1 or 2 hr rated gypsum board wall assemblies framed with min 3-1/2 in. wide wood studs and constructed as specified in the individual U300 Series Wall and Partition Designs in the Fire Resistance Directory.

Type MPP+ moldable putty pads for use with max 4 by 3-1/4 by 3-3/4 in. deep UL Listed Nonmetallic Outlet Boxes manufactured by Thomas & Betts Corp., made of polycarbonate, Type 234 or made of phenolic, Type 1052 and bearing a 2 hr rating under the "Outlet Boxes and Fittings Classified for Fire Resistance" category in the Fire Resistance Directory. Boxes installed with steel cover plates. For use in 1 hr fire rated gypsum board wall assemblies framed with min 3-1/2 in. wide wood studs and constructed as specified in the individual U300 series Wall and Partition Designs in the Fire Resistance Directory.

Type MPP+ moldable putty pads for use with max 4 by 3-3/4 by 3 in. deep UL Listed Nonmetallic Outlet Boxes manufactured by Carlon Electrical Products, made of PVC and bearing a 2 hr rating under the "Outlet Boxes and Fittings Classified for Fire Resistance" category in the Fire Resistance Directory. Boxes installed with plastic cover plates, for use in 1 hr rated gypsum board wall assemblies framed with min 3-1/2 in. wide wood studs and constructed as specified in the individual U300 Series Wall and Partition Designs in the Fire Resistance Directory.

Type MPP+ moldable putty pads for use with max 4 by 3-1/4 by 3-3/4 in. deep UL Listed Nonmetallic Outlet Boxes manufactured by Thomas & Betts Corp., made of phenolic, Type 2002-738-C and bearing a 2 hr rating under the "Outlet Boxes and Fittings Classified for Fire Resistance" category in the Fire Resistance Directory. Boxes installed with steel cover plates. For use in 2 hr fire rated gypsum board wall assemblies framed with min 3-1/2 in. wide steel studs and constructed as specified in the individual U400 or V400 Series Wall and Partition Designs in the Fire Resistance Directory.

Moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud unless otherwise noted) including nailing tabs and to completely seal against the stud within the stud cavity. Multiple moldable putty pads may be installed on an outlet box to attain the required minimum thickness of putty material. Additional putty material used to seal around each conduit and/or cable fitting on the exterior of each box. A min 1/10 in. thickness of putty material is required on the exterior surfaces of flush device boxes in 1 and 2 hr fire rated Wall and Partition Designs. When the moldable putty pad outlet box protective material is used on boxes on both sides of wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. provided that the outlet boxes are not installed back to back, except as noted.

This material was extracted and drawn by 3M Fire Protection Products from the 2007 edition of the UL Fire Resistance Directory.

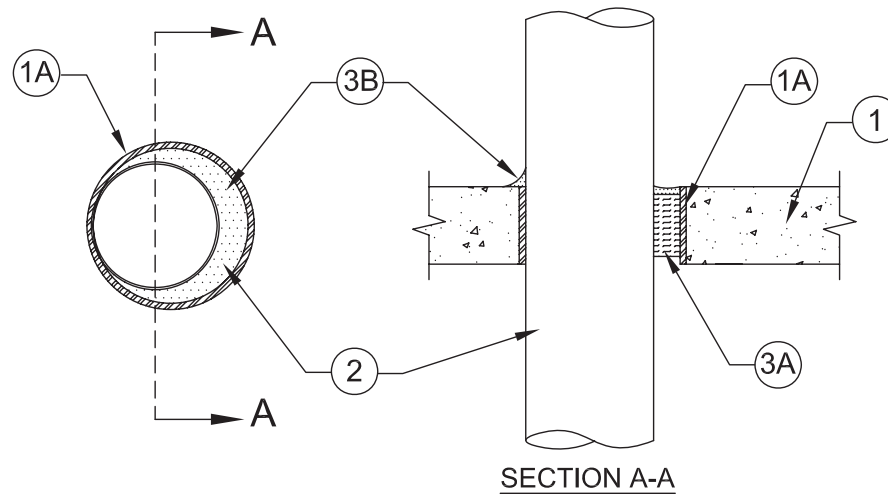
System No. C-AJ-1427

March 05, 2007

F Rating – 3 Hr

T Rating – 0 Hr

W Rating – Class 1 (See Item 3)



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/m³) 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 TITFLEX
 - 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/m³) 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

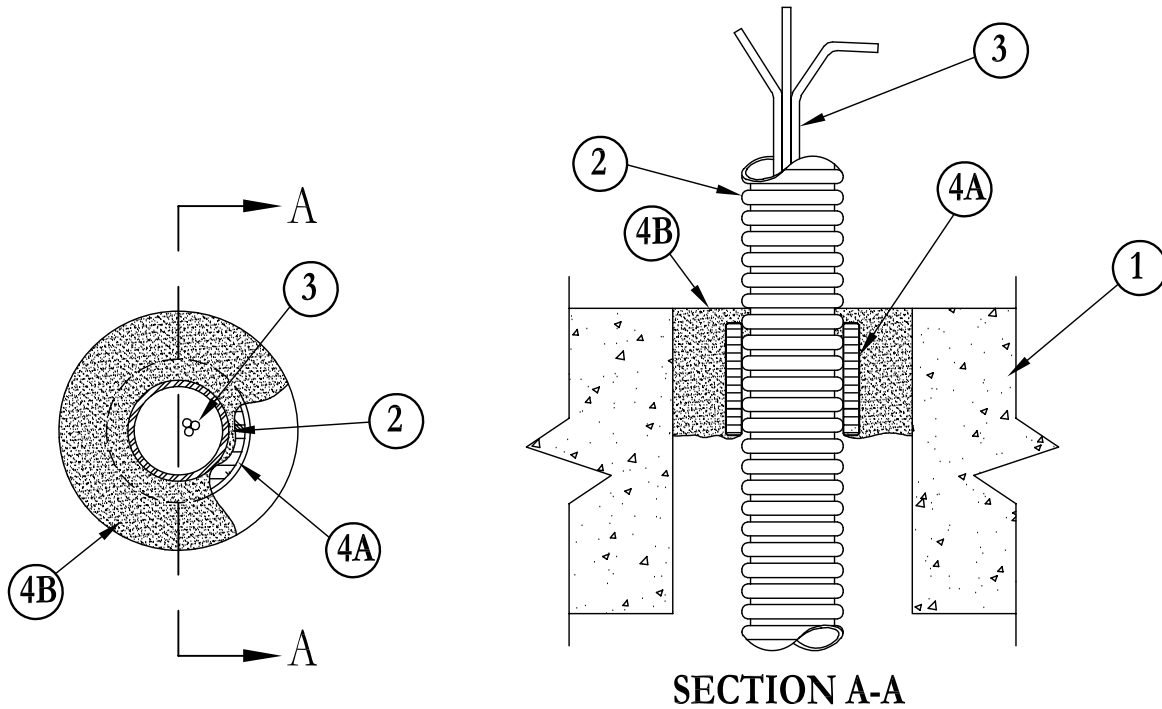
(Note: W Rating applies only when FB-3000 WT is used.)

*Bearing the UL Classification Mark

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System No. C-AJ-2028

December 14, 1995
 (Formerly System No. 448)
 F Ratings – 2 Hr
 T Ratings – 2 Hr



1. **Floor or Wall Assembly** – Min 4-1/2 in. thick lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening not to exceed 4 in.
 See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Electrical Nonmetallic Tubing++** – Nom 1-1/4 in. diam (or smaller) corrugated wall ENT constructed of polyethylene (PE) or nom 2 in. diam (or smaller) corrugated wall ENT constructed of polyvinyl chloride (PVC). ENT to be installed as a complete system with all terminations in junction boxes, outlet boxes or other approved enclosures as specified in the National Electrical Code. A max of one ENT is allowed in the opening. The ends of the ENT shall be sealed with a min 1/4 in. thickness of moldable putty fill material (Item 4B) unless it is determined that the enclosure in which it terminates is relatively air tight and is normally closed. ENT to be rigidly supported on each side of the floor or wall assembly.
 See **Electrical Nonmetallic Tubing** (FKHU) category in Electrical Construction Materials Directory for names of manufacturers.
3. **Fiber Optic Cables** – Multiple fiber optical communication cables jacketed with PE or PVC and having a max outside diam of 3/4 in. Max cross-sectional area of fiber optic cables in ENT shall not exceed 40 percent.
4. **Firestop System** – The details of the firestop system shall be as follows:
 - A. **Fill, Void or Cavity Materials* – Wrap Strip** – Nom 1/4 in. thick intumescent elastomeric material faced on one side with aluminum foil, supplied in nom 2 in. wide by 24 in. long strips. Nom 2 in. wide strips tightly-wrapped around ENT (foil side exposed), secured in place with two min 0.062 in. diam (16 gauge) steel tie wires and slid into through opening such that the top edge is recessed 1/4 in. from top surface of the floor. When nom 1-1/4 in. diam (or smaller) ENT is used, a single layer of wrap strip is required. When nom 1-1/2 or 2 in. diam ENT is used, two layers of wrap strip are required. In wall assemblies, wrap strip layer(s) on ENT to be installed in same manner used for floor assemblies but shall be installed symmetrically on both sides of the wall assembly.
3M COMPANY – FS-195+
 - B. **Fill, Void or Cavity Materials* – Putty** – Moldable putty material applied to fill annular space between wrap strip layer(s) and perimeter of through opening to a min depth of 2 in. with an additional 1/4 in. thickness applied over edge(s) of wrap strip layer(s) flush with top surface of floor and both surfaces of wall.
3M COMPANY – MP+ Stix

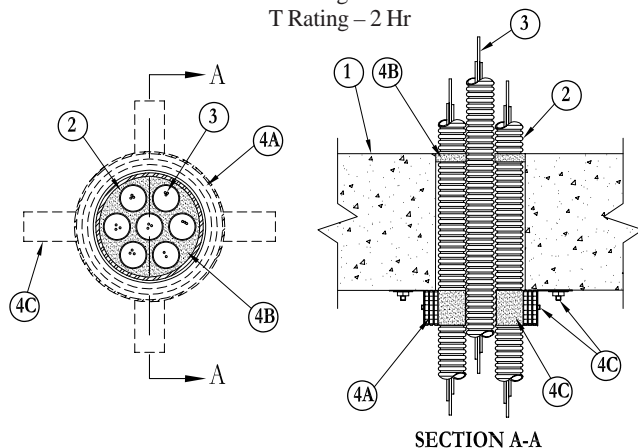
++Bearing the UL Listing Mark

*Bearing the UL Classification Marking

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System No. C-AJ-2029

December 16, 1995
(Formerly System No. 448-B)
F Rating – 2 Hr
T Rating – 2 Hr



- Floor or Wall Assembly** – Min 4-1/2 in. thick lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening not to exceed 5 in.
See **Concrete Blocks (CAZT)** category in the Fire Resistance Directory for names of manufacturers.
- Electrical Nonmetallic Tubing⁺⁺** – Nom 1-1/4 in. diam (or smaller) corrugated wall ENT constructed of polyethylene (PE) or nom 2 in. diam (or smaller) corrugated wall ENT constructed of polyvinyl chloride (PVC). ENT to be installed as a complete system with all terminations in junction boxes, outlet boxes or other approved enclosures as specified in the National Electrical Code. Individual or multiple (three, four or seven ENT of the same size) ENT may be installed in opening. When individual ENT is installed, max annular space between ENT and edge of circular opening shall be 1/4 in. When multiples of three, four or seven ENT of the same size are installed in the opening, max annular space between the tightly-grouped ENT and the edge of the circular opening is 1/2 in. The ends of each ENT shall be sealed with a min 1/4 in. thickness of moldable putty fill material (Item 4B) unless it is determined that the enclosure in which it terminates is relatively air tight and is normally closed. ENT to be rigidly supported on each side of the floor or wall assembly.
See Electrical Nonmetallic Tubing (FKHU) category in Electrical Construction Materials Directory for names of manufacturers.
- Fiber Optic Cables** – Multiple fiber optical communication cables jacketed with PE or PVC and having a max outside diam of 3/4 in. Max cross-sectional area of fiber optic cables in ENT shall not exceed 40 percent.
- Firestop System** – The details of the firestop system shall be as follows:
 - Fill, Void or Cavity Materials* – Wrap Strip** – Nom 1/4 in. thick intumescent elastomeric material faced on one side with aluminum foil, supplied in nom 2 in. wide by 24 in. long strips. Nom 2 in. wide strips tightly wrapped around individual or tightly-bundled group of ENT (foil side exposed) with the top edges butted against the underside of the concrete floor. Sufficient layers of wrap strip shall be installed to lap a min of 3/16 in. on the concrete around the entire perimeter of the through opening. When a single ENT is installed, a min of one layer of wrap strip is required. When a tightly bundled group of three, four or seven equally sized ENT is installed, a min of three layers of wrap strip is required. Each layer of wrap strip to be installed with butted seam. Butted seams in successive layers staggered. Wrap strip layers temporarily held in position using tape, wire or equivalent. In wall assemblies, wrap strip is to be installed symmetrically on both sides of the wall. Prior to installation of the wrap strip layer(s), moldable putty fill material (Item B) shall be applied to ENT within the 2 in. depth of the wrap strip layers.
3M COMPANY – FS-195+
 - Fill, Void or Cavity Materials* – Putty** – Moldable putty material applied to fill interstices between tightly bundled ENT throughout the 2 in. depth of the wrap strip layers. In floor assemblies, a min 1/4 in. depth of putty shall also be installed in annular space and in interstices between tightly bundled ENT flush with the top surface of the floor.
3M COMPANY – MP+ Stix
 - Steel Collar** – Nom 2 in. deep collar with 1-1/4 wide by 2 in. long anchor tabs and min 3/4 in. tabs to retain wrap strip layers. Coils of precut 0.016 in. thick (No. 30 gauge) galv sheet steel available from wrap strip manufacturer. As an alternate, collar may be field-fabricated from min 0.016 in. thick (No. 30 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 layer with min 1 in. overlap at seam. With steel anchor tabs pressed tightly against floor or wall surface, compress collar around wrap strip layers using a min 1/2 in. wide by 0.028 in. thick stainless steel band clamp with worm drive tightening mechanism at the collar midheight. Secure collar to floor or wall surface(s) with min 3/16 in. diam by 1-1/2 in. long steel anchor bolts, or equivalent, in conjunction with 1-1/4 in. diam steel fender washers. Three anchor bolts, symmetrically located, required for steel collars having an outside diam less than 4-1/2 in. Four anchor bolts, symmetrically located, required for steel collars having an outside diam of 4-1/2 in. to 6 in. As a final step, bend retainer tabs 90 deg toward ENT to lock wrap strip layers in position.
 - Firestop Device*** (Not shown) – As an alternate to Items A and C for individual or bundled ENT, 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 approximately sized to closely conform with outside diam of individual or bundled ENT. Max diam of ENT bundle is 4-1/2 in. Firestop device to be installed on underside of floor or on both sides of wall in accordance with the accompanying installation instructions. Moldable putty fill material (Item B) to be installed to fill annular space and interstices between tightly-bundled ENT throughout the 2 in. depth of the firestop device.
3M COMPANY – PPD 150, PPD 200, PPD 300, PPD 400

⁺⁺Bearing the UL Listing Mark

*Bearing the UL Classification Marking

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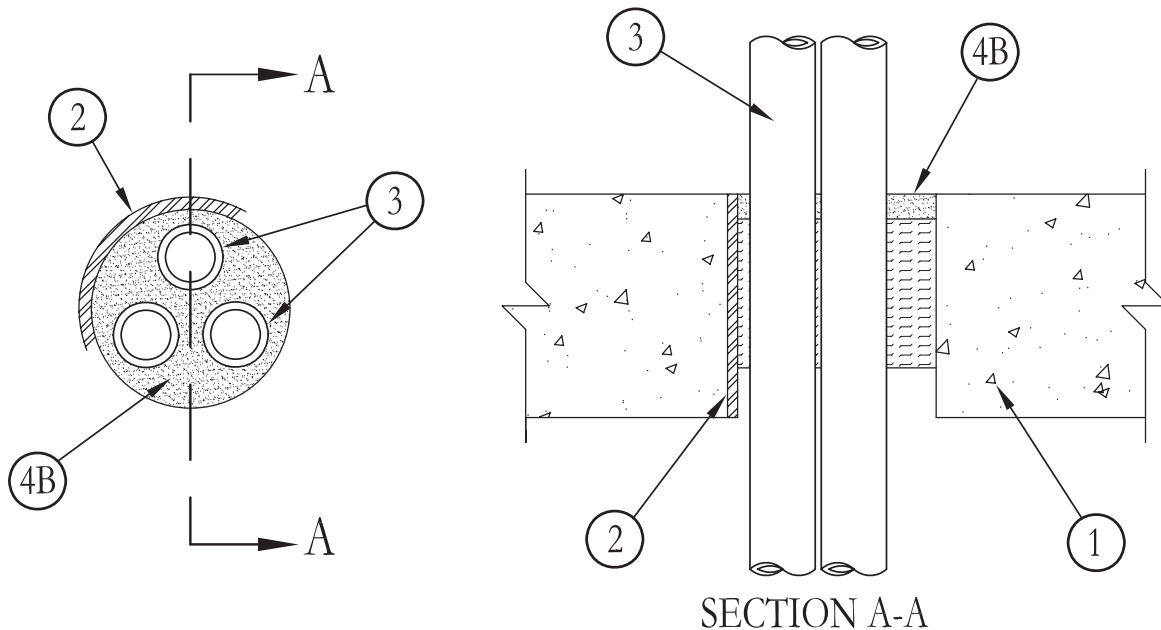
System No. C-AJ-2378

May 19, 2005

F Rating – 2 Hr

T Rating – 0 Hr

W Rating – Class I (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/m³) 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 5 in. (127 mm). See **Concrete Blocks** (CAZT) and **Precast Concrete Units** (CFTV) categories in Fire Resistance Directory for names of manufacturers.
- 2. Steel Sleeve** (Optional) – Nom 5 in. (127 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 or more nonmetallic pipes, conduits or tubes installed concentrically or eccentrically within opening. Annular space between penetrants and periphery of opening or sleeve shall be min of 1/4 in. to max 2 in. (6 mm to max 51 mm). The 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 or wall assembly. 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 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.
- 4. 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 (64 kg/m³) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or 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 concrete.

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

(Note: W Rating applies only when FB-3000 WT sealant is used. CP 25WB+ not suitable for use with CPVC pipes.)

*Bearing the UL Classification Marking

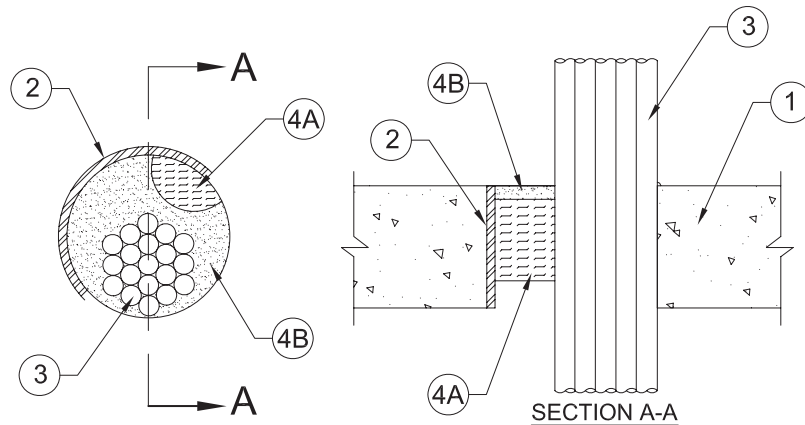
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System No. C-AJ-3200

March 15, 2007

F Rating – 2 Hr

T Rating – 1/4 Hr



1. **Floor or Wall Assembly** – Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m³) concrete. Floor assembly may also be constructed of any min 6 in. thick UL Classified hollow-core **Precast Concrete Units***. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening 6 in. (152 mm).
See **Concrete Blocks (CAZT)** and **Precast Concrete Units (CFTV)** categories in Fire Resistance Directory for names of manufacturers.
2. **Steel Sleeve** – (Optional) - Nom 6 in. (152 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 6 in. (152 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.
3. **Cables** – Aggregate cross-sectional area of cables in opening to be max 49 percent of the cross-sectional area inside the sleeve or opening. Annular space between cables and periphery of opening or sleeve shall be min of 0 in. (0 mm) (point contact) to max 2 in. (51 mm). Cables to be rigidly supported on both sides of floor or wall assembly. Any combination of the following types and sizes of cable may be used;
 - A. Max 200 pair No. 22 AWG (or smaller) copper conductor with polyvinyl chloride (PVC) insulation and jacketing material.
 - B. Max 1/C No. 750 kcmil (or smaller) copper conductor cable with cross-linked polyethylene (XLPE) jacket.
 - C. Max 7/C No. 12 AWG (or smaller) copper conductor power and control cables with XLPE or PVC insulation with XLPE or PVC jacket.
 - D. Max 3/C No. 3/0 AWG (or smaller) copper or aluminum conductor SER cables with PVC insulation and jacket.
 - E. Max 3/C No. 2/0 AWG (or smaller) copper conductor PVC jacketed aluminum clad or steel clad TECK 90 cable.
 - F. Max 110/125 fiber optic (F.O.) cable with PVC insulation and jacket.
 - G. Max 3/C with ground No. 8 AWG (or smaller) copper conductor NM cable with PVC insulation and jacket.
 - H. RG/U coaxial cable with fluorinated ethylene (FE) or PVC insulation and jacket.
 - I. Max 4 pair No. 24 AWG (or smaller) copper conductor data cable with Hylar jacket and insulation.
 - J. Max three conductor No. 12 AWG (or smaller) MC (BX) copper cable with polyvinyl chloride insulation and jacket materials.
 - K. **Through Penetrating Product*** – Any cables, **Armored Cable+** or **Metal Clad Cable+** currently Classified under the **Through Penetrating Product** category.
See **Through Penetrating Product (XHLY)** category in the Fire Resistance Directory for names of manufacturers.
4. **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 (64 kg/m³) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or 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 4A, 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 top edge of sleeve or from both surfaces of wall as necessary to accommodate the required thickness of caulk 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.

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 sleeves. 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 concrete.

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

* Bearing the UL Classification Marking

+ Bearing the UL Listing Mark

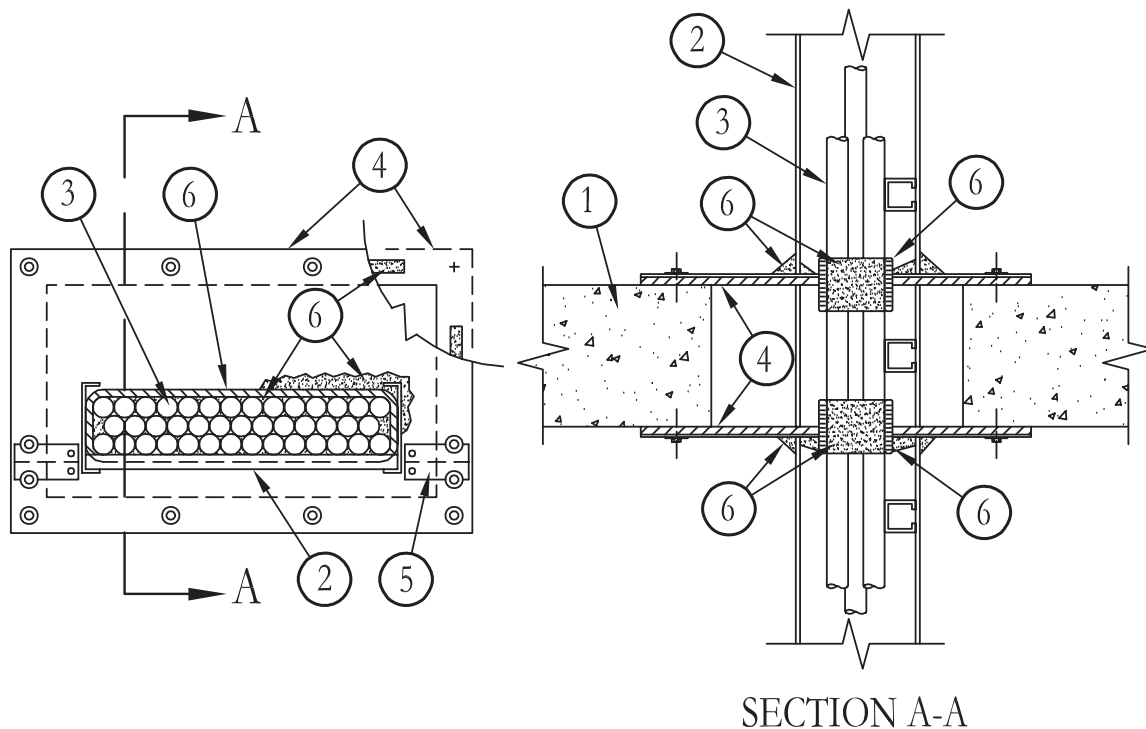
This material was extracted and drawn by 3M Fire Protection Products from the 2007 edition of the UL Fire Resistance Directory. 

System No. C-AJ-4003

May 19, 2005

F Ratings – 2 and 3 Hr (See Item 4)

T Rating – 0 Hr



SECTION A-A

1. **Floor or Wall Assembly** – Min 4-1/2 in. (114 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m³) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max area of opening 36 sq ft (3.3 m²) with one dimension of opening being 36 in. (914 mm) or less.
See **Concrete Blocks*** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Cable Tray** – Max 36 in. (914 mm) wide by max 6 in. (152 mm) deep steel or aluminum open ladder cable tray. Cable tray to consist of channel-shaped side-rails with boxed channel rungs spaced 9 in. (229 mm) OC. Cable tray side-rails to be formed of min 0.056 in. (1.4 mm) thick (16 ga) galv steel or min 0.125 in. (3.2 mm) thick aluminum. Cable tray rungs to be formed of min 0.029 in. (.8 mm) thick (22 ga) galv steel or min 0.080 in. (2 mm) thick aluminum. When more than one cable tray is installed in opening, min distance between cable trays is 26 in. (660 mm). Min annular space between cable tray and edge of opening is zero in. (point contact). When annular space between cable tray and edge of opening or between multiple cable trays exceeds 6 in., (152 mm), a support channel (Item 8) shall be installed between the cable tray and the edge of the opening to support the edge of the intumescent sheet (Item 5) parallel with the width dimension of the cable tray. Cable trays rigidly supported on both sides of floor or wall assembly.
3. **Cables** – Aggregate cross-sectional area of cables in cable tray not to exceed 39 percent of the cross-sectional area of the cable tray based on a max 3 in. (76 mm) cable loading depth within the cable tray. Any combination of the following types and sizes of cables may be used:
 - A. Max 1000 kcmil single-conductor power cables; cross-linked polyethylene insulation.
 - B. Max No.2 AWG multiconductor power and control cables; cross-linked polyethylene insulation, polyvinyl chloride jacket.
 - C. Max 300 pair No. 22 AWG (or smaller) copper conductor communication cable with polyvinyl chloride insulation and jacket material.
 - D. Multiple fiber optical communication cable jacketed with polyvinyl chloride and having a max outside diam of 5/8 in. (16 mm).
 - E. Max 22 AWG coaxial data cable with polyethylene insulation and polyvinyl chloride jacket.
 - F. Max 7C No. 12 AWG (or smaller) multi conductor power and control cables; XLPE insulation, XLPE or polyvinyl chloride (PVC) jacket.
 - G. Max No. 18 AWG RG 6/U coaxial cable with PVC insulation and jacket.
 - H. Max 4/C No. 2/0 AWG (or smaller) copper or aluminum conductor cables with XLPE or PVC insulation and jacket.
4. **Fill, Void or Cavity Materials* – Intumescent Sheet** – Rigid aluminum foil-faced sheet with galv steel sheet backer. Sheets cut to tightly follow the contours of the cable tray and the cables. Sheets cut to lap a min of 2 in. (51 mm) on the floor or wall surface on all sides of the opening. Sheet is required to be installed on both sides of the floor or wall assembly to attain the 3 hr F Rating. As an option for steel cable tray in floors, the sheet may be installed on only the top surface of the floor to attain a max 2 hr F Rating. When sheet is installed on only the top surface of the floor, the caulk (Item 6) fill materials are also required to be installed on only the top surface of the floor. Sheet to be installed with the galv steel sheet backer exposed (aluminum foil facing against floor or wall surface) and secured to floor or wall surface with min 3/16 in. (5 mm) diam by 1-1/4 in. (32 mm) long steel anchor screws, or equivalent, in conjunction with min 1-1/4 in. (32 mm) diam steel fender washers. Max spacing of fasteners not to exceed 6 in. (152 mm) with additional fasteners located on each side of butted seams or slits made to permit installation of the sheet around the cable tray.

3M COMPANY – CS-195+

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System No. C-AJ-4003 *continued*

- Steel Cover Strip** – Min 2 in. (51 mm) wide strip of min 0.020 in. (.51 mm) thick galv steel centered over entire length of each butted seam or slit made in the intumescent sheet (Item 4). Prior to installation of the steel strip, the seam or slit in the intumescent sheet shall be covered with a nom 1/4 in. (6 mm) diam bead of caulk (Item 6). Steel cover strip secured to galv steel sheet backer of intumescent sheet with steel sheet metal screws or steel rivets spaced max 3 in. (76 mm) OC on each side of seam or slit.
- Fill, Void or Cavity Materials*** – **Graphite seal, Caulk, Sealant or Putty** – One layer of 1/2 in. x 1/16 in. (13 mm by 1.6 mm) adhesive backed graphite intumescent seal positioned under intumescent sheet around entire perimeter of through opening or min 1/4 in. (6 mm) diam continuous bead of caulk or putty applied to edge of intumescent sheet at its interface with surface of floor or wall around entire perimeter of through opening. Generous application of caulk or putty to be applied to fill all interstices between cables. Generous application of caulk or putty to be applied around the base of the cable tray side-rails and contour of cables at their egress from the intumescent sheet on both sides of the floor or wall assembly.

3M COMPANY – E-FIS or Ultra GS seals, CP 25WB+ caulk, IC 15WB+ caulk, FB-3000 WT Sealant, or MP+ putty

- Support Channel** – (Not Shown) – When area of through opening exceeds 1440 sq in. (9290 cm²), an intermediate support channel shall be installed flush with top surface of floor or both surfaces of wall. Support channels to be min 1-5/8 by 1-5/8 in. (41 by 41 mm) and formed of min 0.093 in. (2.4 mm) thick (No. 12 gauge) painted or galv steel. Ends of steel channel bolted or welded to steel angles anchored to inside walls of through opening. When width of cable tray exceed 24 in. (610 mm) and/or when more than one cable tray is installed in the opening, additional support channels are to be installed such that intumescent sheet is supported within 6 in. (152 mm) of each side of the cable tray(s). When steel support channels are centered beneath butted seams of intumescent sheets, no steel cover strip (Item 5) is required over butted seam. Intumescent sheet secured to steel support channels with steel sheet metal screws in conjunction with min 1-1/4 in. (32 mm) diam steel fender washers.

When support channel is used beneath butted seam of intumescent sheets, fasteners spaced max 3 in. (76 mm) OC on each side of butted seam. When support channel is located away from intumescent sheet seam, fasteners spaced max 6 in. (152 mm) OC. Prior to installation of the intumescent sheet(s), a nom 1/4 in. (6 mm) diam continuous bead of caulk (Item 6) shall be applied as gasket over the steel support channel.

*Bearing the UL Classification Mark

Through Penetrations

Cable Trays

4000 Series

Concrete

CAJ

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System No. C-AJ-4056

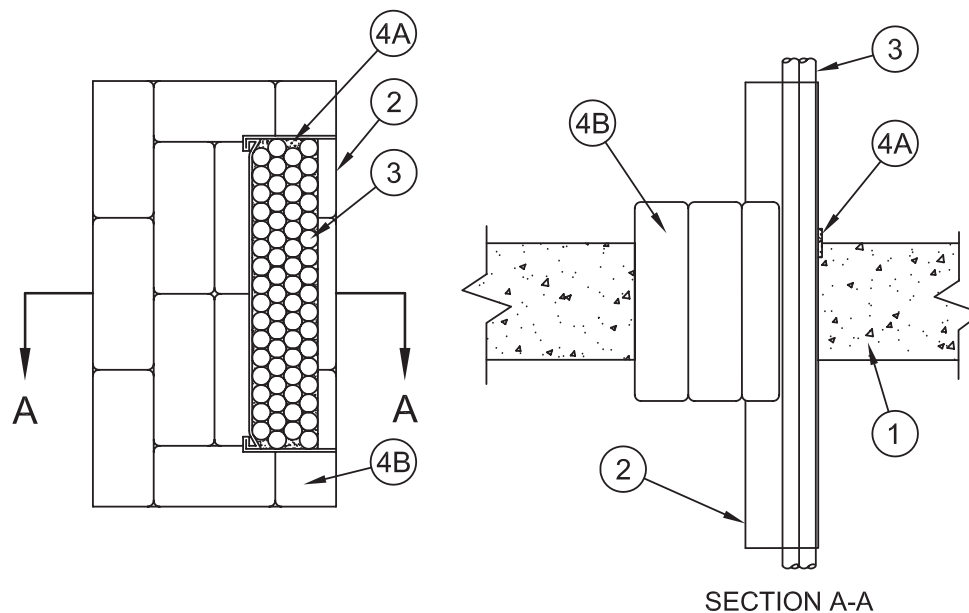
December 18, 2007

F Rating – 3 Hr

T Rating – 3/4 Hr

L Rating at Ambient – 7 and 22 CFM/sq ft. (See Item 4)

L Rating at 400 F – 4 and 21 CFM/sq ft. (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/m³) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max area of opening is 528 in.² (0.34 m²) with a max dimension of 44 in. (1.2 m).
See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
- 2. Cable Tray** – Max 40 in. (1 m) wide by max 4 in. (102 mm) deep open ladder cable tray with channel-shaped side rails formed of min 0.058 in. (1.5 mm) thick (16 gauge) galv steel with nom 1 in. (25 mm) diam rungs spaced 9 in. (229 mm) OC or max 40 in. wide by max 4 in. (102 mm) deep open ladder cable tray with channel-shaped side rails formed from 0.060 in. (1.5 mm) thick aluminum with nom 1 in. (25 mm) diam rungs spaced 9 in. (229 mm) OC. Max one cable tray per opening. The annular space between the cable tray and the periphery of the opening will be min 0 in. (0 mm, point contact) to max 8 in. (203 mm). Cable tray to be rigidly supported on both sides of floor or wall assembly.
- 3. Cables** – Aggregate cross-sectional area of cables in cable tray not to exceed 40 percent of the cross-sectional area of the cable tray based on a max 3 in. (76 mm) cable loading depth within the tray. Any combination of the following types and sizes of cables may be used:
 - Max 1/C 750 kcmil (or smaller) copper conductor cable with cross-linked polyethylene (XLPE) jacket.
 - Max 300 pair No. 22 AWG (or smaller) copper conductor telecommunication cables with polyvinyl chloride (PVC) insulation and jacket.
 - Max 7/C No. 12 AWG copper conductor power and control cables with XLPE or PVC insulation with XLPE or PVC jacket.
 - Max 4/C No. 2/0 AWG copper or aluminum conductor cables with PVC insulation and jacket.
 - Max 1-10/125 Fiber Optic (F.O.) cable with PVC insulation and jacket.
 - Max No. 18 AWG Type RG coaxial cable with polyvinyl chloride insulation.
- 4. Firestop System** – The firestop system shall consist of the following:
 - Fill Void or Cavity Material*** – **Putty** – Min 1/4 in. (6 mm) thickness, min 2 in. (51 mm) width of putty wrapped around each cable such that putty extends approximately 1/2 in. (13 mm) above floor or beyond both surfaces of wall. Additional putty installed inside cable tray side rails to completely fill side rails within the opening and extending approximately 1/2 in. (13 mm) beyond both surfaces of floor or wall. After installation of pillows (Item 4B) all voids within the opening shall be filled with a min 1 in. (25 mm) thickness of putty. The individual cables may be wrapped with a min 1/4 in. (6 mm) thickness, min 2 in. (51 mm) width of putty such that the putty extends approximately 1/2 in. (13 mm) above top surface of floor or beyond both surfaces of wall.

3M COMPANY – MP+ or Cable Wrap

L Ratings are 7 and 4 CFM/sq ft. at ambient and 400° F, respectively, when individual cables are wrapped with 3M Cable Wrap or MP+ putty in accordance with the installation instructions. L Ratings are 22 and 21 CFM/sq ft. at ambient and 400° F, respectively, when individual cables are not wrapped with 3M Cable Wrap or MP+ putty.

- Fill Void or Cavity Material*** – **Pillows** – Max 9 in. (229 mm) long by 6 in. (152 mm) wide by 2 and 3 in. (51 and 76 mm) thick plastic covered pillows packed into the opening to a min 33 percent compression. Pillows to fill annular space between cable tray and periphery of opening and installed with 9 in. (229 mm) dimension projecting through floor or wall and centered within the opening.

3M COMPANY – Fire Barrier Pillow or Fire Barrier Self-Locking Pillows

*Bearing the UL Classification Mark

This material was extracted and drawn by 3M Fire Protection Products from the 2007 edition of the UL Fire Resistance Directory. c(UL)us

System No. C-AJ-6001

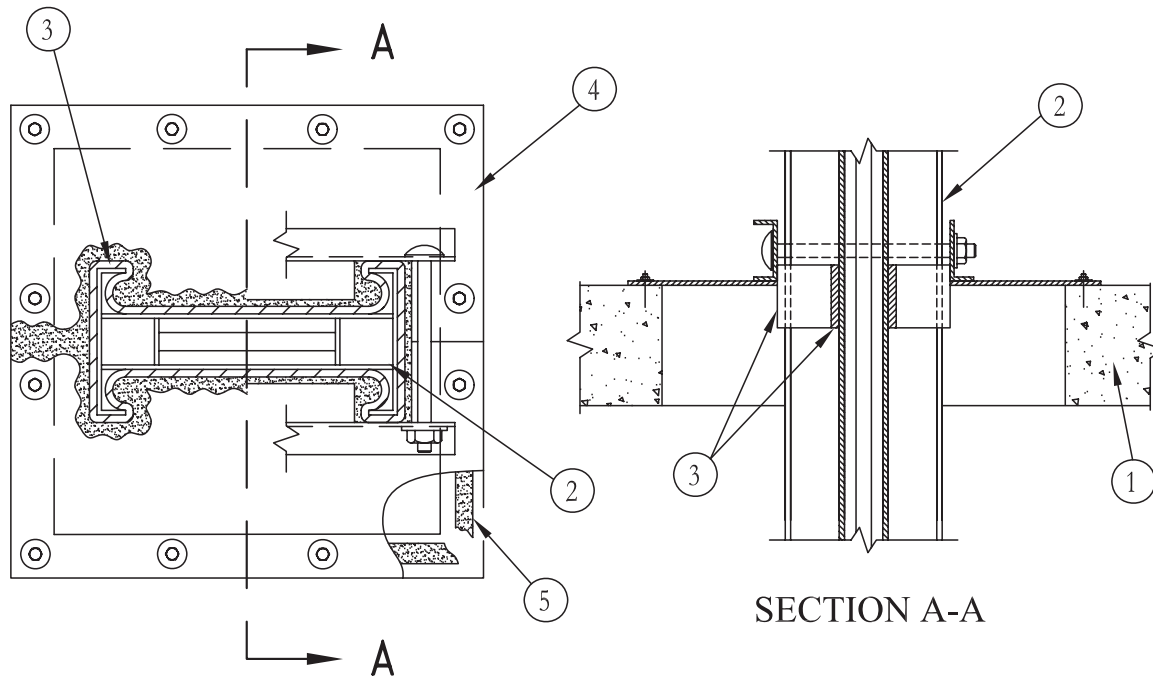
May 19, 2005

F Ratings – 2 and 3 Hr (See Items 1 and 2)

T Rating – 0 Hr

L Rating At Ambient – 2 CFM/sq ft

L Rating At 400 F – less than 1 CFM/sq ft



1. **Floor or Wall Assembly** – Lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete. Min thickness of concrete floor or wall assembly is 2-1/2 in. (64 mm) for 2 hr F Rating and 4-1/2 in. (114 mm) for 3 hr F Rating. Wall may also be constructed of any UL Classified **Concrete Blocks***. The size of the rectangular through opening shall be such that the annular space between the outside corners of the busway (Item 2) and the periphery of the through opening is in the range of 1/2 in. to 3 in. (13 mm to 76 mm).

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

2. **Busway** – For 3 hr F Rating, the busway shall consist of a nom 9 in. (229 mm) wide (or smaller) by 4-1/2 in. (114 mm) deep (or smaller) “P”-shaped steel and aluminum enclosure containing factory mounted copper bars rated for max 600V, 1600A. For 2 hr F Rating, the busway shall consist of a nom 23 in. (584 mm) wide (or smaller) by 4-1/2 in. (114 mm) deep (or smaller) “T”-shaped aluminum or steel and aluminum enclosure containing factory mounted copper bars rated for max 600V, 4000A or aluminum bars rated for max 600V, 3000A. The busway shall bear the UL Listing Mark and shall be installed in accordance with all provisions of Article 364 of the National Electrical Code, NFPA No. 70. Busway to be installed with min 1/2 in. to max 3 in. (13 mm to max 76 mm) clearance from its outside corners to the sides of the rectangular floor or wall opening and shall be rigidly supported on both sides of floor or wall assembly.

See **Busways and Associated Fittings** (CWFT) category in the Electrical Construction Materials Directory for names of manufacturers.

3. **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 strips. Min 2 in. (51 mm) wide strip formed to follow the contours around the entire periphery of the busway (foil side exposed) and secured in place with steel wire. Busway wrap to extend 1 in. (25 mm) above and 1 in. (25 mm) below the top plane of the floor assembly. For wall assemblies, the busway wrap 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. When steel cover flange (Item 7) provided by the busway manufacturer is used, the busway wrap is not used.

3M COMPANY – FS-195+

4. **Fill, Void or Cavity Materials*** – **Intumescent Sheet** – Rigid aluminum foil-faced sheets with galv steel sheet backer. Sheet cut to tightly follow the contours of the busway and with a min lap of 2 in. (51 mm) on all sides of the through opening. Sheets to be installed with the galv steel sheet backer exposed (aluminum foil facing against floor or wall surface). Sheet secured to top surface of floor and to both surfaces of wall using min 1/4 in. (6 mm) diam by 1-1/2 in. (38 mm) long steel expansion bolts, or equivalent, in conjunction with min 1-1/4 in. (32 mm) diam steel fender. Max spacing of sheet fasteners not to exceed 5 in. (127 mm) OC When steel cover flange (Item 7) supplied by the busway manufacturer is used, the sheet (s) shall be secured using the same fasteners used to secure the steel cover flange sections. Prior to installation of the sheet(s), a nom 1/4 in. (6 mm) diam bead of caulk (Item 5) shall be applied to the top surface of the floor and to both surfaces of the wall around the perimeter of the through opening.

3M COMPANY – CS-195+

This material was extracted and drawn by 3M Fire Protection Products from the 2007 edition of the UL Fire Resistance Directory. 

System No. C-AJ-6001 *continued*

5. **Fill, Void or Cavity Materials* – Graphite Seal, Caulk, Sealant or Putty** – One layer of 1/2 in. x 1/16 in. (13 mm by 1.6 mm) adhesive backed graphite intumescent seal positioned under intumescent sheet around entire perimeter of through opening or in 1/4 in. (6 mm) diam continuous bead of caulk or putty applied to edge of intumescent sheet at its interface with surface of floor or wall around entire perimeter of through opening. Generous application of caulk to be applied around the base of the busway or the busway wrap at its egress from the intumescent sheet (s) in addition to completely covering the busway wrap up to the interface (s) with the busway. All seams in the intumescent sheet (s) made to accommodate the busway to be covered with a generous bead of caulk.

3M COMPANY – E-FIS or Ultra GS seals, CP 25WB+, IC 15WB+ caulk, FB-3000 WT sealant or MP+ Stix putty.

6. **Steel Cover Strip** (Not Shown) – Min 2 in. (51 mm) wide strip of min 0.020 in. (0.51 mm) thick (No. 26 gauge) galv steel centered over entire length of each slit made in intumescent sheet (Item 4) to permit installation about the busway. Prior to installation of the steel strip, the seam or slit in the intumescent sheet shall be covered with a nom 1/4 in. (6 mm) diam bead of caulk (Item 5). Steel cover strip secured to galv steel sheet backer of intumescent sheet with steel sheet metal screws or steel rivets spaced max 3 in. (76 mm) O.C. on each side of seam or slit.
7. **Steel Cover Flange** (Optional, Not Shown) – Four piece interlocking cover flange formed from nom 1/8 in. (3.2 mm) thick steel, supplied by busway manufacturer. Steel cover flange to lap min 2 in. (51 mm) on floor or wall surface on all sides of the through opening and secured to top surface of floor and to both surfaces of wall using min 1/4 in. (6 mm) diam by 2 in. (51 mm) long steel expansion bolts, or equivalent. Sheet fasteners installed in factory drilled and field-drilled holes in cover flange sections, through intumescent sheet; and spaced max 5 in. (127 mm) O.C. When steel cover flange is used, a generous application of caulk (Item 5) shall be applied around the base of the busway at its egress from the cover flange (s) and around the perimeter of the cover flange to cover the edges of the cover flange and the intumescent sheet.

*Bearing the UL Classification Marking

Through Penetrations

Misc. Electrical

6000 Series

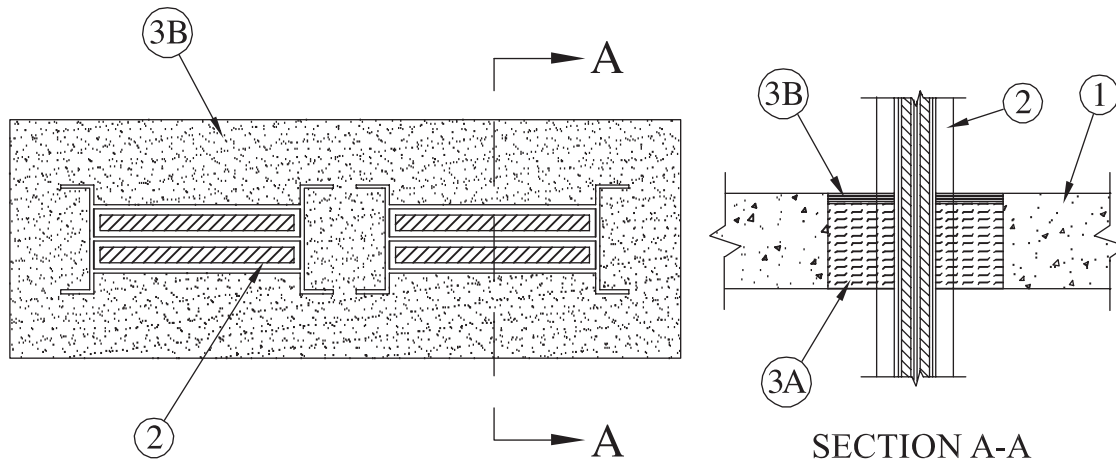
Concrete

C-AJ

This material was extracted and drawn by 3M Fire Protection Products from the 2007 edition of the UL Fire Resistance Directory. 

System No. C-AJ-6002

September 03, 2004
(Formerly System No. 486)
F Rating – 3 Hr
T Rating – 0 Hr



- Floor or Wall Assembly** – Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight concrete (100-150 pcf or 1600-2400 kg/m³). Wall may also be constructed of any UL Classified **Concrete Blocks***. Max area of opening is 300 sq in. (1935 c/m²) with max dimension of 30 in. (762 mm).
See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
- Busway+** – Nom 23 in. (584 mm) wide (or smaller) by 4.5 in. (114 mm) deep “T” shaped aluminum enclosure containing factory mounted copper bars rated for 600 V, 5000 A or aluminum bars rated for 600 V, 4000 A. The busway shall bear the UL Listing Mark and shall be installed in accordance with all provisions of Article 364 of the National Electrical Code, NFPA No. 70. The annular space between the busway and the periphery of the opening shall be min 3/4 in. to max 1-3/4 in. (76 mm to max 44 mm).
- Firestop System** – The firestop system shall consist of the following components:
 - Packing Material** – Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m³) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of fill material.
 - Fill, Void or Cavity Material* – Sealant** – Min 1/2 in. (13 mm) thickness of fill material applied within annulus, flush with top surface of floor or with both surfaces of wall.

3M COMPANY – FB-1000 NS, FB-1003 SL, FB-2000, FB-2000+ or FB-3000 WT sealant.

+Bearing the UL Listing Mark

*Bearing the UL Classification Marking

Through Penetrations

Misc. Electrical

6000 Series

Concrete

CAJ

This material was extracted and drawn by 3M Fire Protection Products from the 2007 edition of the UL Fire Resistance Directory. c(UL)us

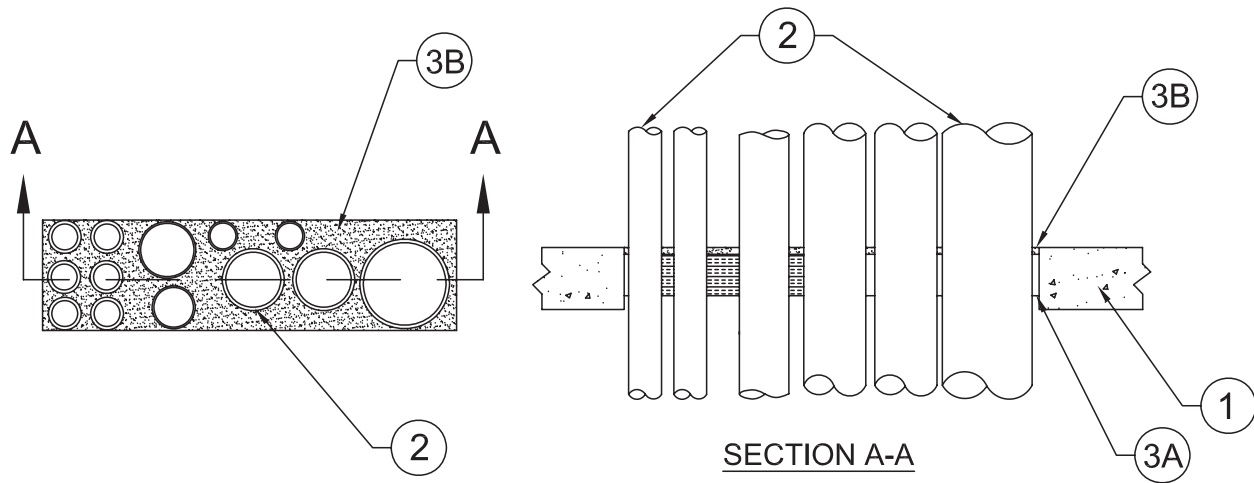
System No. C-AJ-1429

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/m³) 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 Material** – Min 3 in. (76 mm) thickness of min 4 pcf (64 kg/m³) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall 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.

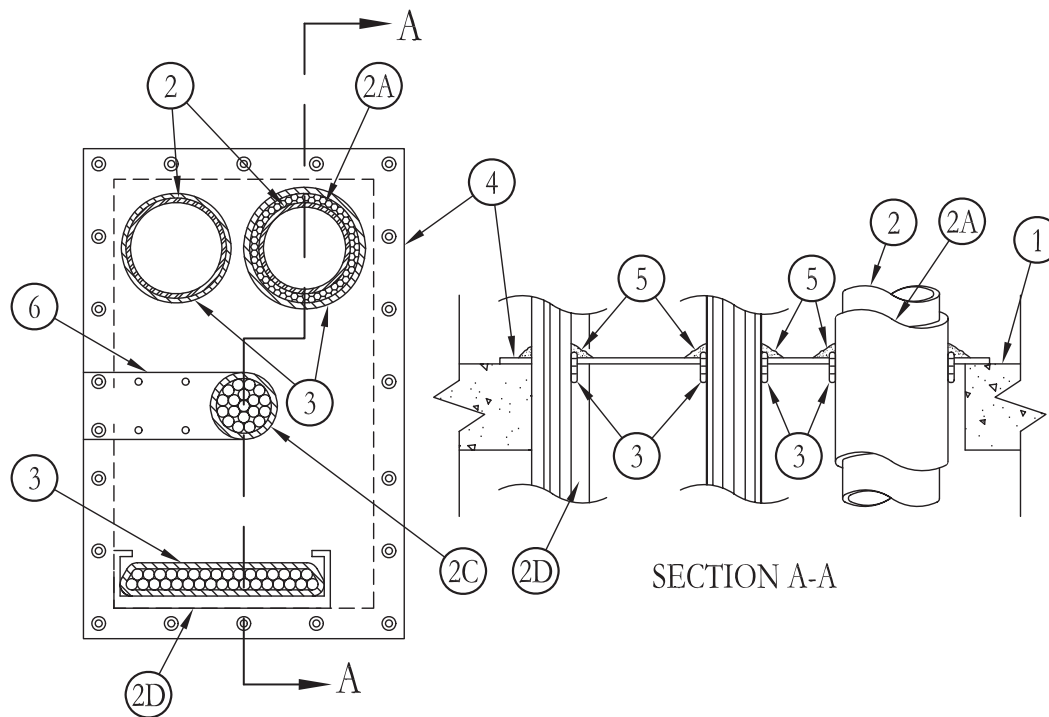
(Note: W Rating applies only when FB-3000 WT is used.)

* Bearing the UL Classification Marking

This material was extracted and drawn by 3M Fire Protection Products from the 2007 edition of the UL Fire Resistance Directory. 

System No. C-AJ-8001

May 19, 2005
F Ratings – 1, 2 and 3 Hr
(See Items 1, 2A, 2B and 2C)
T Rating – 0 Hr



1. **Floor or Wall Assembly** – Lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete. Min thickness of concrete floor or wall is 2-1/2 in. (64 mm) for 1 hr F Rating and 4-1/2 in. (114 mm) for 2 or 3 hr F Rating. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max area of opening 36 sq ft (3.4 m²) with one dimension of opening being 36 in. (914 mm) or less.
See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Pipe or Conduit** – Nom 12 in. (305 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe, nom 6 in. (152 mm) diam (or smaller) steel conduit, nom 4 in. (102 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe, steel EMT or nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing. Min clearance between pipes 1 in. (25 mm). Min clearance between pipe and wall of through opening 1/4 in. (6 mm). When single nom 4 in. (102 mm) diam (or smaller) pipe, conduit or EMT is installed in nom 7 in. (178 mm) diam (or smaller) circular through opening, min clearance between pipe, conduit or EMT and wall of through opening is 0 in. (0 mm) (point contact). Pipes and conduits rigidly supported on both sides of floor or wall assembly.
- 2A. **Pipe Covering** (Optional) – Nom 1 in. to 2 in. (25 mm to 51 mm) thick hollow cylindrical heavy density (min 3.5 pcf or 56 kg/m³) glass fiber units jacketed on the outside with an all service jacket may be used on nom 12 in. (305 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe or on nom 6 in. (152 mm) diam (or smaller) copper tubing. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt strip tape supplied with the product. **When pipe covering material is used, max F Rating is 2 hr.**
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.
- 2B. **Pipe Insulation** (Optional, Not Shown) – As an alternate to Item 2A, nom 1 in. (25 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing with skin may be used on nom 4 in. (102 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe or on nom 4 in. (102 mm) diam (or smaller) copper tubing. **When pipe insulation material is used, max F Rating is 2 hr.**
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.
- 2C. **Cables** – Nom 4 in. (102 mm) diam (or smaller) tight bundle of cable. When cable bundle is installed in through opening containing pipes or conduits, a min separation of 12 in. (305 mm) shall be maintained between cable bundle and pipe/conduit. Cable bundle rigidly supported on both sides of floor or wall assembly. The following types and sizes of cables may be used:
 - A. Max 150 pair No. 24 AWG telephone cable; polyvinyl chloride (PVC) insulation and jacket materials.
When telephone cable is used, F Rating is 2 hr.
 - B. Max No. 2/0 AWG multi conductor power/control cable; cross-linked polyethylene (XLPE) insulation, PVC jacket.
When power/control cable is used, F Rating is 3 hr.
 - C. Max 350 kcmil single-conductor power cable; XLPE insulation. **When power cable is used, F Rating is 3 hr.**
 - D. Multiple fiber optical communication cable jacketed with polyvinyl chloride and having a max outside diam of 5/8 in. (16 mm).
 - E. Max 22 AWG coaxial data cable with polyethylene insulation and polyvinyl chloride jacket.

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System No. C-AJ-8001 *continued*

Through Penetrations

Compos

8000 Series

Concrete

CAJ

2D. **Cable Tray** – Max 36 in. (914 mm) wide by max 6 in. (152 mm) deep steel or aluminum open ladder cable tray. Cable tray to consist of channel-shaped side-rails with boxed channel rungs spaced 9 in. (229 mm) OC. Cable tray side-rails to be formed of min 0.056 in. (1.42 mm) thick (16 ga) galv steel or min 0.125 in. (3.2 mm) thick aluminum. Cable tray rungs to be formed of min 0.029 in. (0.72 mm) thick (22 ga) galv steel or min 0.080 in. (2 mm) thick aluminum. When more than one cable tray is installed in opening, min distance between cable trays is 24 in. (610 mm). Min annular space between cable tray and edge of opening is 0 in. (0 mm) (point contact). When annular space between cable tray and edge of opening exceeds 3 in. (76 mm), a support channel (Item 7) shall be installed between the cable tray and the edge of the opening to support the edge of the intumescent sheet (Item 4) parallel with the width dimension of the cable tray. Aggregate cross-sectional area of cables in cable tray not to exceed 39 percent of the cross-sectional area of the cable tray based on a max 3 in. (76 mm) loading depth within the cable tray. Any combination of the types and sizes specified in Item 2C may be used. Cable tray(s) rigidly supported on both sides of floor or wall assembly.

3. **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 strips. Min 2 in. (51 mm) wide strip wrapped around pipe/conduit, cable bundle, pipe insulation or cable fill within cable tray (foil side exposed) and secured in place with steel wire or aluminum foil tape. One layer of wrap strip is required when max 1 in. (25 mm) thick pipe covering is used. Two layers of wrap strip are required when nom 2 in. (51 mm) thick pipe covering is used. Wrap strip to extend approx 7/8 in. (22 mm) beyond each face of the intumescent sheet (Item 4). Prior to installation of the wrap strip on cable bundle or cable fill within cable tray, caulk (Item 5) to be forced into cable bundle to fill all interstices between cables throughout 2 in. (51 mm) height of wrap strip layer. When nom 6 in. (152 mm) diam (or smaller) uninsulated pipe, conduit or EMT is installed in through opening, no wrap strip is required on pipe, conduit or EMT for 2 hr F Rating.

3M COMPANY – FS-195+

4. **Fill, Void or Cavity Materials* – Intumescent Sheet** – Rigid aluminum foil-faced sheet with galv steel sheet backer. Sheet cut to tightly follow the contours of the pipe/cable wrap strip (or individual pipe) and with a min lap of 2 in. (51 mm) on all sides of the through opening. Sheet to be installed with the galv steel sheet backer exposed (aluminum foil facing against floor or wall surface). Sheet secured to top surface of floor and both sides of wall using min 3/16 in. (5 mm) diam by 1-1/4 in. (32 mm) long steel masonry fasteners with min 1-1/4 in. (32 mm) diam steel washers. Max spacing of fasteners not to exceed 6 in. (152 mm) OC. As an alternate when (1) the max pipe or conduit size is nom 4 in. (102 mm) diam, (2) each pipe or conduit is provided with a layer of wrap strip and (3) no bundled cables or insulated pipes are installed in the through opening, the intumescent sheet may be installed on bottom surface of floor or on only one side of wall.

3M COMPANY – CS-195+

5. **Fill, Void or Cavity Materials* – Graphite Seal, Caulk, Sealant or Putty** – One layer of 1/2 in. x 1/16 in. (13mm by 1.6 mm) adhesive backed graphite intumescent seal positioned under intumescent sheet around entire perimeter of through opening or min 1/4 in. (6 mm) diam continuous bead of caulk or putty applied to edge of intumescent sheet at its interface with surface of floor or wall around entire perimeter of through opening. Generous application of caulk to be applied around the base of the wrap strip (or individual pipe) at its egress from the intumescent sheet(s) in addition to completely covering the wrap strip up to the interface(s) with the pipe, pipe insulation and/or cable bundle. All interstices between cables to be filled with caulk throughout the 2 in. (51 mm) height of the wrap strip .

3M COMPANY – E-FIS or GS seals, CP 25WB+, IC 15WB+ caulk, FB-3000 WT sealant or MP+ Stix putty.

6. **Steel Cover Strip** – Min 2 in. (51 mm) wide strip of min 0.015 in. (0.4 mm) thick (30 gauge) galv steel centered over entire length of slit made in intumescent sheet (Item 4) to permit installation about the pipe/cable bundle. Prior to installation of the steel strip, slit in intumescent sheet covered with nom 1/4 in. (6 mm) diam bead of caulk (Item 5). Steel cover strip secured to galv steel backer of intumescent sheet with steel sheet-metal screws or steel rivets spaced max 2 in. (51 mm) OC on each side of slit.

7. **Support Channels (Not Shown)** – When area of through opening exceeds 1440 sq in. (9290 cm²), an intermediate support channel shall be installed flush with top surface of floor or both surfaces of wall. Support channels to be min 1-5/8 in. by 1-5/8 in. (41 mm by 41 mm) and formed of min 0.093 in. (2.4 mm) thick (No. 12 gauge) painted or galv steel. Ends of steel channel bolted or welded to steel angles anchored to inside walls of through opening. When width of cable tray (Item 2D) exceed 24 in. (610 mm) and/or when more than one cable tray is installed in the opening, additional support channels are to be installed such that intumescent sheet is supported within 3 in. (76 mm) of each side of the cable tray(s). When steel support channels are centered beneath butted seams of intumescent sheets, no steel cover strip (Item 6) is required over butted seam. Intumescent sheet secured to steel support channels with steel sheet metal screws in conjunction with min 1-1/4 in. (32 mm) diam steel fender washers.

When support channel is used beneath butted seam of intumescent sheets, fasteners spaced max 3 in. (76 mm) OC on each side of butted seam. When support channel is located away from intumescent sheet seam, fasteners spaced max 6 in. (152 mm) OC. Prior to installation of the intumescent sheet(s), a nom 1/4 in. (6 mm) diam continuous bead of caulk (Item 5) shall be applied as gasket over the steel support channel.

*Bearing the UL Classification Mark

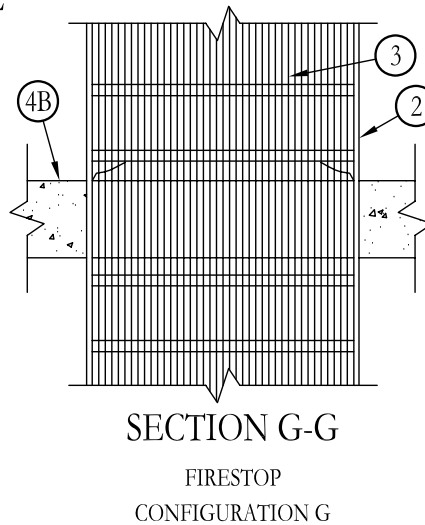
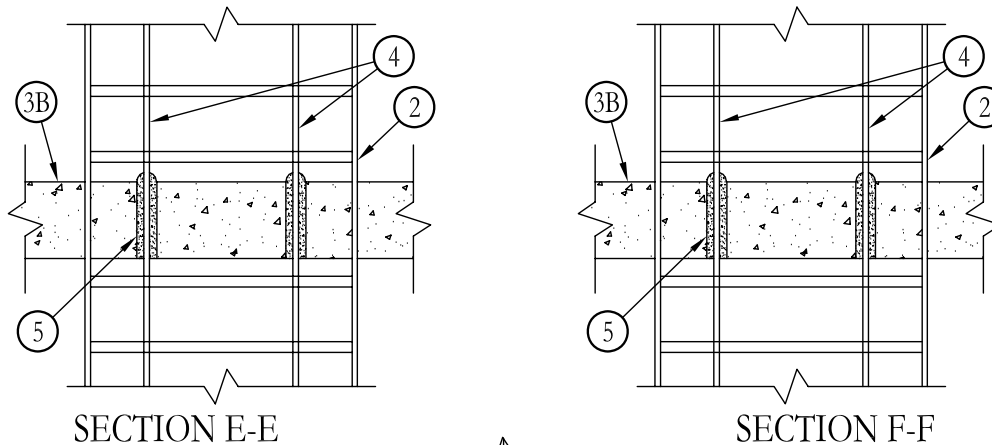
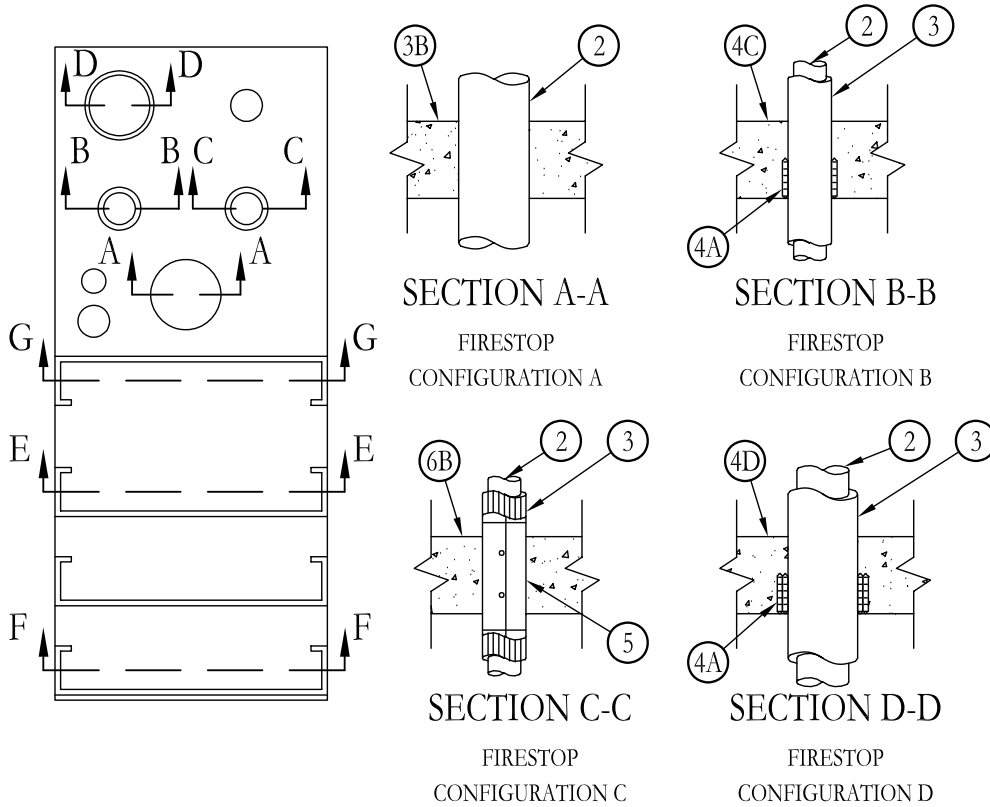
This material was extracted and drawn by 3M Fire Protection Products from the 2007 edition of the UL Fire Resistance Directory. 

System No. C-AJ-8073

September 07, 2004

F Rating – 2 Hr

T Ratings – 0, 3/4 and 2 Hr



This material was extracted and drawn by 3M Fire Protection Products from the 2007 edition of the UL Fire Resistance Directory. 

System No. C-AJ-8073 continued

1. **Floor or Wall Assembly** – Min 4-1/2 in. thick reinforced normal weight (140-150 pcf) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max area of opening is 24 sq ft with max dimension of 8 ft.
See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Through Penetrants** – A max of seven firestop configurations complying with Firestop Configuration A, B, C or D, and a max of four firestop configurations complying with Firestop Configuration E, F or G may be installed within the opening in any combination. The annular space between penetrating items and between penetrating items and periphery of opening shall be as specified in the individual firestop configurations. The maximum open area within the opening shall be 480 sq in. with smaller dimension not exceeding 10 in. Pipe, conduit, tubing, cable tray or cable to be rigidly supported on both sides of floor or wall assembly. The T Rating of the system is dependent on the firestop configuration, as shown in the table below:

Firestop Config	T Rating Hr
A	0
B	0
C	3/4
D	2
E	0
F	0
G	0

Firestop Configuration A

2. **Metallic Penetrants** – One metallic pipe, conduit or tubing to be installed within this firestop configuration. The annular space between pipes, conduit and tubing with a nom diam of 4 in. or less and the periphery of the opening shall be min 1/4 in. The annular space between pipes, conduit and tubing with a nom diam greater than 4 in. and the periphery of the opening shall be min 4-1/4 in. The annular space between pipes, conduit or tubing with a diam of 4 in. or less and other non-insulated penetrating items shall be min 1/2 in. The annular space between pipes, conduit and tubing with a nom diam greater than 4 in. and other non-insulated penetrating items shall be min 4-3/4 in. The following types and sizes of metallic pipes, conduits or tubing may be used:
 - A. **Steel Pipe** – Nom 8 in. diam (or smaller) Schedule 40 (or heavier) steel pipe.
 - B. **Iron Pipe** – Nom 8 in. diam (or smaller) cast or ductile iron pipe.
 - C. **Conduit** – Nom 3 in. diam (or smaller) steel electrical metallic tubing or nom 6 in. diam (or smaller) steel conduit.
 - D. **Copper Tubing** – Nom 3 in. diam (or smaller) Type M (or heavier) copper tubing.
 - E. **Copper Pipe** – Nom 3 in. diam (or smaller) Regular (or heavier) copper pipe.
3. **Firestop System** – The firestop system shall consist of the following:
 - A. **Forms** (Not Shown) – Used as a form to prevent leakage of mortar during installation. Forms to be a rigid sheet material, cut to fit the contour of the penetrating item and fastened to the underside of floor or both sides of wall. Forms to be removed after mortar has cured.
 - B. **Fill, Void or Cavity Materials*** – **Mortar** – Min 3 in. thickness of mortar applied within the annulus, flush with top surface of floor or with both surfaces of wall. Cementitious mortar mixed with water at a rate of 1.0 part dry mixture to 0.3 parts water by weight in accordance with the installation instructions supplied with the product.
3M COMPANY – 3M Fire Barrier Mortar

Firestop Configuration B

2. **Metallic Penetrants** – One metallic pipe or tubing to be installed within this firestop configuration. The following types and sizes of metallic pipes or tubing may be used:
 - A. **Steel Pipe** – Nom 3 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
 - B. **Iron Pipe** – Nom 3 in. diam (or smaller) cast or ductile iron pipe.
 - C. **Copper Tubing** – Nom 3 in. diam (or smaller) Type M (or heavier) copper tubing.
 - D. **Copper Pipe** – Nom 3 in. diam (or smaller) Regular (or heavier) copper pipe.
3. **Tube Insulation – Plastics**** – Nom 3/4 in. thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The annular space between the insulated pipe or tubing and periphery of opening shall be min 6-1/2 in. The annular space between insulated pipe or tubing and other adjacent insulated penetrating items shall be min 1 in. The annular space between insulated pipe or tubing and other adjacent uninsulated penetrating items or cable trays shall be min 5 in.
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 firestop system shall consist of the following:
 - A. **Fill, Void or Cavity Materials*** – **Wrap Strip** – Nom 1/4 in. thick intumescent elastomeric material faced on one side with aluminum foil, supplied in 2 in. wide strips. One nom 2 in. wide strip tightly-wrapped around tube insulation (Item 3) with ends butted and foil side exposed, and slid into through opening such that the bottom edge is flush with bottom surface of mortar in floors or both surfaces of mortar in walls. Wrap strip held in place with pressure-sensitive tape, steel tie wire, or equivalent.
3M COMPANY – FS-195+

This material was extracted and drawn by 3M Fire Protection Products from the 2007 edition of the UL Fire Resistance Directory. 

System No. C-AJ-8073 *continued*

- B. **Forms** (Not Shown) – Used as a form to prevent leakage of mortar during installation. Forms to be a rigid sheet material, cut to fit the contour of the penetrating item and fastened to the underside of floor or both sides of wall. Forms to be removed after mortar has cured.
- C. **Fill, Void or Cavity Materials* – Mortar** – Min 3 in. thickness of mortar applied within the annulus, flush with top surface of floor or with both surfaces of wall. Cementitious mortar mixed with water at a rate of 1.0 part dry mixture to 0.3 parts water by weight in accordance with the installation instructions supplied with the product.

3M COMPANY – 3M Fire Barrier Mortar

Firestop Configuration C

2. **Metallic Penetrants** – One metallic pipe to be installed within the opening. The following types and sizes of metallic pipes may be used:
- A. **Steel Pipe** – Nom 3 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
- B. **Iron Pipe** – Nom 3 in. diam (or smaller) cast or ductile iron pipe.
3. **Pipe Covering Materials* – Cellular Glass Insulation** – Nom 1 in. thick cellular glass units sized to the outside diam of pipe and supplied in nom 24 in. long half sections or nom 18 in. long segments. Pipe insulation installed on pipe in accordance with the manufacturer's instructions. The annular space between the insulated pipe and periphery of opening shall be min 6 in. The annular space between insulated pipe and other adjacent penetrating items shall be min 4-1/4 in.
4. **Fill, Void or Cavity Materials* – Caulk or Sealant** – (Not Shown) Nom 1/4 in. diam bead of caulk applied between adjacent sections of pipe covering material at longitudinal and transverse joints.

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

5. **Metal Jacket** – Jacket, formed of min 0.015 in. thick aluminum sheet cut to wrap tightly around the pipe insulation with a min 2 in. lap and secured using min 18 gauge steel tie wire spaced 16 in. OC and nom 3/8 in. diam steel screws, located 1/2 in. from top of floor or both surfaces of wall.
6. **Firestop System** – The firestop system shall consist of the following:
- A. **Forms** (Not Shown) – Used as a form to prevent leakage of mortar during installation. Forms to be a rigid sheet material, cut to fit the contour of the penetrating item and fastened to the underside of floor or both sides of wall. Forms to be removed after mortar has cured.
- B. **Fill, Void or Cavity Materials* – Mortar** – Min 3 in. thickness of mortar applied within the annulus, flush with top surface of floor or with both surfaces of wall. Cementitious mortar mixed with water at a rate of 1.0 part dry mixture to 0.3 parts water by weight in accordance with the installation instructions supplied with the product.

3M COMPANY – 3M Fire Barrier Mortar

Firestop Configuration D

2. **Metallic Penetrants** – One metallic pipe, conduit or tubing to be installed within the opening. The following types and sizes of metallic pipes, conduits or tubing may be used:
- A. **Steel Pipe** – Nom 10 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
- B. **Iron Pipe** – Nom 10 in. diam (or smaller) cast or ductile iron pipe.
3. **Pipe Covering Material* – Fiberglass Insulation** – Nom 2 in. 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 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 periphery of opening shall be min 2-1/4 in. The annular space between insulated pipe and other adjacent insulated penetrating items shall be min 1 in. The annular space between insulated pipe and other adjacent uninsulated penetrating items or cable trays shall be min 8 in.
- See **Pipe and Equipment Covering – Materials*** (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.

4. **Firestop System** – The firestop system shall consist of the following:
- A. **Fill, Void or Cavity Materials* – Wrap Strip** – Nom 1/4 in. thick intumescent elastomeric material faced on one side with aluminum foil, supplied in 2 in. wide strips. Two nom 2 in. wide strips tightly-wrapped around pipe covering material (Item 3) with the foil side exposed and slid into through opening such that the bottom edge is flush with bottom surface of mortar in floors or both surfaces of mortar in walls. Each layer of wrap strip to be installed with butted seam with butted seams in successive layers staggered. Wrap strip held in place with pressure-sensitive tape, steel tie wire, or equivalent.

3M COMPANY – FS-195+

- B. **Fill, Void or Cavity Materials* – Caulk or Sealant** (Not Shown) – Generous bead of caulk applied to fill any voids which exist between pipe covering material and wrap strip.

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

- C. **Forms** (Not Shown) – Used as a form to prevent leakage of mortar during installation. Forms to be a rigid sheet material, cut to fit the contour of the penetrating item and fastened to the underside of floor or both sides of wall. Forms to be removed after mortar has cured.
- D. **Fill, Void or Cavity Materials* – Mortar** – Min 3 in. thickness of mortar applied within the annulus, flush with top surface of floor or with both surfaces of wall. Cementitious mortar mixed with water at a rate of 1.0 part dry mixture to 0.3 parts water by weight in accordance with the installation instructions supplied with the product.

3M COMPANY – 3M Fire Barrier Mortar

This material was extracted and drawn by 3M Fire Protection Products from the 2007 edition of the UL Fire Resistance Directory. 

System No. C-AJ-8073 *continued*

Firestop Configuration E

2. **Cable Tray*** – Max 36 in. wide by max 6 in. deep open-ladder or solid back cable tray with channel-shaped side rails formed of galv steel and with rungs spaced 9 in. OC. The annular space between cable trays and the periphery of the opening shall be min 0 in. (point contact) to max 10 in. The annular space between cable trays and other adjacent uninsulated penetrating items shall be min 2 in. The annular space between adjacent cable trays shall be 10 in.
3. **Firestop System** – The firestop system shall consist of the following:
 - A. **Forms** (Not Shown) – Used as a form to prevent leakage of mortar during installation. Forms to be a rigid sheet material, cut to fit the contour of the cable tray and fastened to the underside of floor or both sides of wall. Forms to be removed after mortar has cured.
 - B. **Fill, Void or Cavity Materials* – Mortar** – Min 3 in. thickness of mortar applied within the annulus, flush with top surface of floor or with both surfaces of wall. Cementitious mortar mixed with water at a rate of 1.0 part dry mixture to 0.3 parts water by weight in accordance with the installation instructions supplied with the product.

3M COMPANY – 3M Fire Barrier Mortar

4. **Cables** – One cable to be centered in each of max two preformed or core-drilled openings within confines of cable tray. Diam of openings to be 1-3/8 in. Openings to be spaced min 21 in. OC and min 2-1/2 in. from back and sides of cable tray. Cables to be rigidly supported on both sides of floor or wall assembly. Any of the following types and sizes of cables may be used:
 - A. Max 1/C 1000 kcmil aluminum conductor cable with cross-linked polyethylene (XLPE) insulation and polyvinyl chloride (PVC) jacket.
 - B. Max 1/C No. 4/0 AWG aluminum conductor cable with cross-linked polyethylene (XLPE) insulation and polyvinyl chloride (PVC) jacket.
 - C. Max 1/C No. 6/0 AWG copper conductor cable with cross-linked polyethylene (XLPE) insulation and polyvinyl chloride (PVC) jacket.
 - D. Max 2/C No. 16 AWG shielded copper conductor cable with flame retardant polyvinyl chloride (FR-PVC) insulation and jacket.
 - E. Max 3/C No. 12 AWG copper conductor cable with flame retardant cross-linked polyethylene (FR-XLPE) insulation and polyvinyl chloride (PVC) jacket.
 - F. Max 3/C No. 4 AWG copper conductor TECK 90 cable with cross-linked polyethylene (XLPE) insulation and polyvinyl chloride (PVC) inner and outer jackets.
5. **Fill, Void or Cavity Materials* – Caulk, Sealant or Putty** – Min 3 in. thickness of caulk or putty applied within the annulus around cables, flush with top surface of floor or with both surfaces of wall. Additional caulk to be installed such that a min 1/4 in. crown is formed around the cables and at any voids between the cable trays and mortar, and between the cable trays and concrete floor or wall.

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

Firestop Configuration F

2. **Cable Tray*** – Max 36 in. wide by max 6 in. deep open-ladder or solid back cable tray with channel-shaped side rails formed of galv steel and with rungs spaced 9 in. OC. The annular space between cable trays and the periphery of the opening shall be min 0 in. (point contact) to max 10 in. The annular space between cable trays and other adjacent uninsulated penetrating items shall be min 2 in. The annular space between adjacent cable trays shall be 10 in.
3. **Firestop System** – The firestop system shall consist of the following:
 - A. **Forms** (Not Shown) – Used as a form to prevent leakage of mortar during installation. Forms to be a rigid sheet material, cut to fit the contour of the cable tray and fastened to the underside of floor or both sides of wall. Forms to be removed after mortar has cured.
 - B. **Fill, Void or Cavity Materials* – Mortar** – Min 3 in. thickness of mortar applied within the annulus, flush with top surface of floor or with both surfaces of wall. Cementitious mortar mixed with water at a rate of 1.0 part dry mixture to 0.3 parts water by weight in accordance with the installation instructions supplied with the product.

3M COMPANY – 3M Fire Barrier Mortar

4. **Cables** – One cable to be centered in each of max two preformed opening within confines of cable tray. Size of opening to be maximum 1-1/2 by 2-1/2 in. Openings to be spaced min 21 in. OC and min 2-1/2 in. from back and sides of cable tray. Cables to be rigidly supported on both sides of floor or wall assembly. Any of the following types and sizes of cables may be used:
 - A. Max 1/C 1000 kcmil aluminum conductor cable with cross-linked polyethylene (XLPE) insulation and polyvinyl chloride (PVC) jacket.
 - B. Max 1/C No. 4/0 AWG aluminum conductor cable with cross-linked polyethylene (XLPE) insulation and polyvinyl chloride (PVC) jacket.
 - C. Max 1/C No. 60 AWG copper conductor cable with cross-linked polyethylene (XLPE) insulation and polyvinyl chloride (PVC) jacket.
 - D. Max 2/C No. 16 AWG shielded copper conductor cable with flame retardant polyvinyl chloride (FR-PVC) insulation and jacket.
 - E. Max 3/C No. 12 AWG copper conductor cable with flame retardant cross-linked polyethylene (FR-XLPE) insulation and polyvinyl chloride (PVC) jacket.
 - F. Max 3/C No. 4 AWG copper conductor TECK 90 cable with cross-linked polyethylene (XLPE) insulation and polyvinyl chloride (PVC) inner and outer jackets.

This material was extracted and drawn by 3M Fire Protection Products from the 2007 edition of the UL Fire Resistance Directory. 

System No. C-AJ-8073 *continued*

5. **Fill, Void or Cavity Materials* – Mortar** – Min 3 in. thickness of mortar applied within the annulus around cables, flush with top surface of floor or with both surfaces of wall. Additional mortar to be installed such that a min 1/4 in. crown is formed around the cables. Cementitious mortar mixed with water at a rate of 1.0 part dry mixture to 0.3 parts water by weight in accordance with the installation instructions supplied with the product.

3M COMPANY – 3M Fire Barrier Mortar

6. **Fill, Void or Cavity Materials* – Caulk or Sealant** – (Not Shown) Min 1/4 in. bead of caulk to be installed at any voids between the cable trays and mortar, and between the cable trays and concrete floor or wall

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

Firestop Configuration G

2. **Cable Tray*** – Max 36 in. wide by max 6 in. deep open-ladder or solid back cable tray with channel-shaped side rails formed of aluminum and with rungs spaced 9 in. OC. The annular space between cable trays and the periphery of the opening shall be min 0 in. (point contact) to max 10 in. The annular space between cable trays and other adjacent uninsulated penetrating items shall be min 2 in. The annular space between adjacent cable trays shall be 10 in.
3. **Cables** – Aggregate cross-sectional area of cables in cable tray to be max 51 percent of the cross-sectional area of the cable tray. Any of the following types and sizes of cables, up to the quantity shown, may be used:
- A. Max 10, max 1/C 1000 kcmil aluminum conductor cable with cross-linked polyethylene (XLPE) insulation and polyvinyl chloride (PVC) jacket.
 - B. Max 10, max 1/C 500 kcmil aluminum conductor cable with cross-linked polyethylene (XLPE) insulation and polyvinyl chloride (PVC) jacket.
 - C. Max 29, max 1/C No. 4/0 AWG aluminum conductor cable with cross-linked polyethylene (XLPE) insulation and polyvinyl chloride (PVC) jacket.
 - D. Max 8, max 1/C No. 6/0 AWG copper conductor cable with cross-linked polyethylene (XLPE) insulation and polyvinyl chloride (PVC) jacket.
 - E. Max 9, max 2/C No. 16 AWG shielded copper conductor cable with flame retardant polyvinyl chloride (FR-PVC) insulation and jacket.
 - F. Max 2, max 3/C No 12 AWG copper conductor cable with flame retardant cross-linked polyethylene (FR-XLPE) insulation and polyvinyl chloride (PVC) jacket.
 - G. Max 2, max 3/C No. 4 AWG copper conductor TECK 90 cable with cross-linked polyethylene (XLPE) insulation and polyvinyl chloride (PVC) inner and outer jackets.
4. **Firestop System** – The firestop system shall consist of the following:
- A. **Forms** (Not Shown) – Used as a form to prevent leakage of mortar during installation. Forms to be a rigid sheet material, cut to fit the contour of the cable tray and cables, and fastened to the underside of floor or both sides of wall. Forms to be removed after mortar has cured.
 - B. **Fill, Void or Cavity Materials* – Mortar** – Min 3 in. thickness of mortar applied within the annulus, flush with top surface of floor or with both surfaces of wall. Additional fill material to be installed such that a min 2 in. crown is formed around the cables and lapping 2 in. beyond the cables. Cementitious mortar mixed with water at a rate of 1.0 part dry mixture to 0.3 parts water by weight in accordance with the installation instructions supplied with the product.
- 3M COMPANY** – 3M Fire Barrier Mortar
5. **Fill, Void or Cavity Materials* – Caulk or Sealant** (Not Shown) Min 1/4 in. bead of caulk to be installed at any voids between the cable trays and mortar, and between the cable trays and concrete floor or wall.

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

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

Through Penetrations

Combos

8000 Series

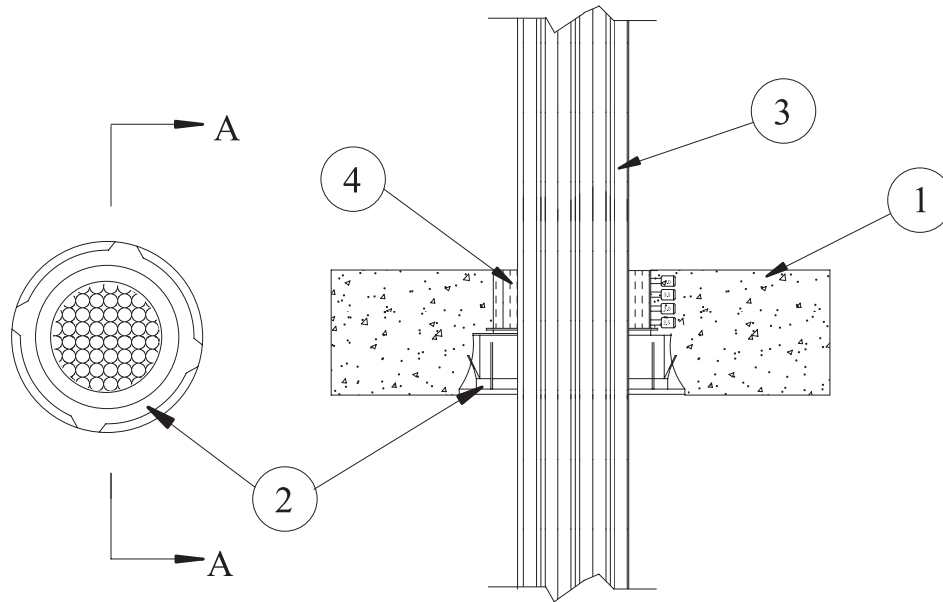
Concrete

CAJ

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System No. F-A-3017

May 18, 2005
 F Rating – 3 Hr
 T Rating – 1/4 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/m³) 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. **Cables** – Max cable bundles of 2-1/2, 3 and 4 in. (64, 76, and 102 mm) diam for 2MCID, 3MCID and 4MCID devices, respectively. Annular space between cables and periphery of opening shall be min of 0 in. (point contact) to max 2 in. (0 mm to max 51 mm) Cables may or may not be routed through flexible metal conduit with or without vinyl coating. Cables to be rigidly supported on both sides of floor assembly. Any combination of the following types and sizes of cable may be used;
 - A. Max 200 pair No. 22 AWG (or smaller) copper conductor with polyvinyl chloride (PVC) insulation and jacketing material.
 - B. Max 1/C No. 750 kcmil (or smaller) copper conductor cable with cross-linked polyethylene (XLPE) jacket.
 - C. Max 7/C No. 12 AWG (or smaller) copper conductor power and control cables with XLPE or PVC insulation with XLPE or PVC jacket.
 - D. Max 3/C No. 3/0 AWG (or smaller) copper or aluminum conductor SER cables with PVC insulation and jacket.
 - E. Max 3/C No. 2/0 AWG (or smaller) copper conductor PVC jacketed aluminum clad or steel clad TECK 90 cable.
 - F. Max 110/125 fiber optic (F.O.) cable with PVC insulation and jacket.
 - G. Max 3/C with ground No. 8 AWG (or smaller) copper conductor NM cable with PVC insulation and jacket.
 - H. RG/U coaxial cable with fluorinated ethylene (FE) or PVC insulation and jacket.
 - I. Max 4 pair No. 24 AWG (or smaller) copper conductor data cable with Hylar jacket and-insulation.
 - J. Max three conductor No. 12 AWG (or smaller) MC (BX) copper cable with polyvinyl chloride insulation and jacket materials.
 - K. **Through Penetrating Product*** – Any cables, Armored Cable+ or Metal Clad Cable+ currently Classified under the Through Penetrating Product category.

See **Through Penetrating Product** (XHLY) category in the Fire Resistance Directory for names of manufacturers
4. **Packing Material** – Min 2 in. (51 mm) thick of min 4 pcf (64kg/m³) 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 2B) may be reduced in thickness by 1/4 to 1/2 in. (6 mm to 13 mm) and recessed from the top surface of floor to accommodate a 1/4 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

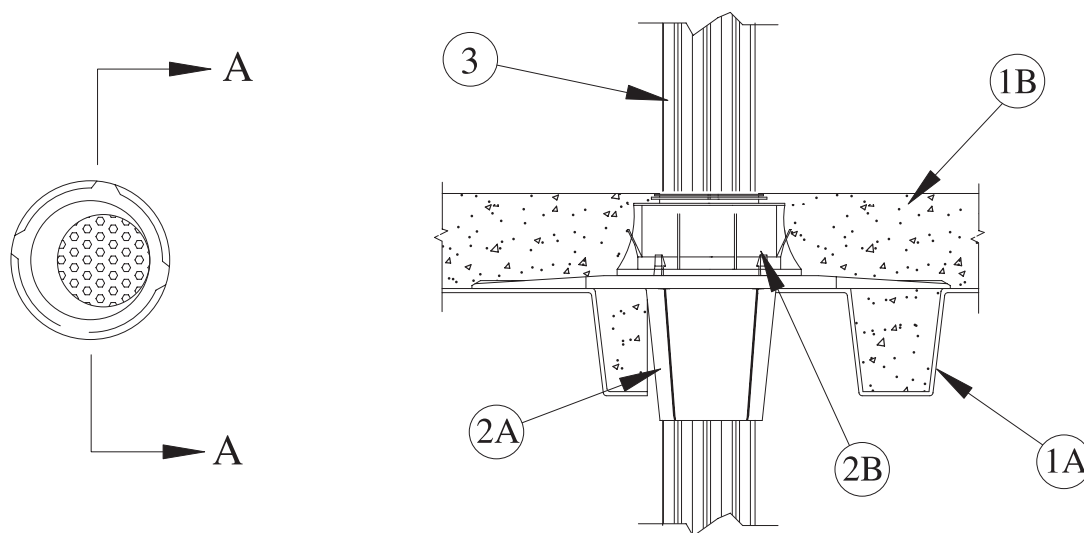
This material was extracted and drawn by 3M Fire Protection Products from the 2007 edition of the UL Fire Resistance Directory. 

System No. F-A-3020

August 18, 2003

F Rating – 2 Hr

T Rating – 1/4 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/m³) 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*** – 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, 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, 2MCID, 3MCID, 4MCID
3. **Cables** – A max 3 in. (76 mm) diam of tightly bundled cables to be installed eccentrically or concentrically within the firestop system. Annular space between cables and periphery of opening shall be min of 0 in. (point contact) to max 1-1/2 in. (0 mm to max 38 mm). Cables to be rigidly supported on both sides of floor assembly. Any combination of the following types and sizes of cable may be used;
 - A. Max 300 pair No. 22 AWG (or smaller) copper conductor with polyvinyl chloride (PVC) insulation and jacketing material.
 - B. Max 1/C No. 750 kcmil (or smaller) copper conductor cable with cross-linked polyethylene (XLPE) jacket.
 - C. Max 7/C No. 12 AWG (or smaller) copper conductor power and control cables with XLPE or PVC insulation with XLPE or PVC jacket.
 - D. Max 3/C No. 3/0 AWG (or smaller) copper or aluminum conductor SER cables with PVC insulation and jacket.
 - E. Max 3/C No. 2/0 AWG (or smaller) copper conductor PVC jacketed aluminum clad or steel clad TECK 90 cable.
 - F. Max 110/125 fiber optic (F.O.) cable with PVC insulation and jacket.
 - G. Max 3/C with ground No. 8 AWG (or smaller) copper conductor NM cable with PVC insulation and jacket.
 - H. RG/U coaxial cable with fluorinated ethylene (FE) or PVC insulation and jacket.
 - I. Max 4 pair No. 24 AWG (or smaller) copper conductor data cable with Hylar jacket and insulation.
 - J. Max three conductor No. 12 AWG (or smaller) MC (BX) copper cable with polyvinyl chloride insulation and jacket materials.
 - K. **Through Penetrating Product*** – Any cables, **Armored Cable+** or **Metal Clad Cable+** currently Classified under the **Through Penetrating Product** category.

See **Through Penetrating Product** (XHLY) category in the Fire Resistance Directory for names of manufacturers
4. **Packing Material** (not shown) – Min 2 in. (51 mm) thickness of min 4 pcf (64 kg/m³) mineral wool batt insulation firmly packed into the top of the firestop device (Item 2B) a permanent form, flush with the top surface of the floor.

*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. C-AJ-3250

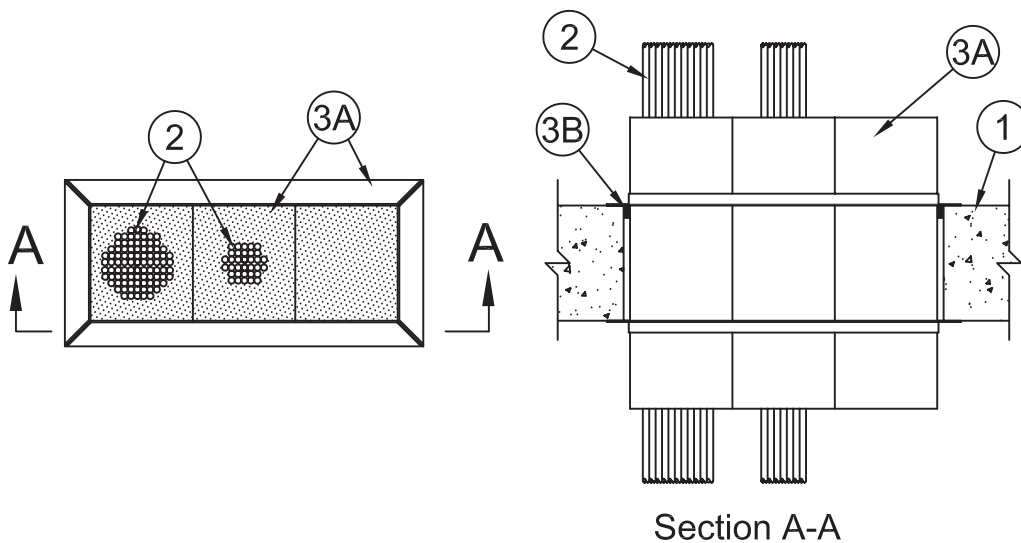
February 26, 2008

F Ratings – 2 and 3 Hr (See Item 1)

T Ratings – 0 and 1 Hr (See Items 2 and 3B)

L Rating At Ambient – 4 to 7 CFM/sq ft (See Item 3B)

L Rating At 400 F – Less Than 1 CFM/sq ft (See Item 3B)



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/m³) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max area of opening is 50 in.² (323 cm²) with a max dimension of is 12-1/8 in. (308 mm) for square devices. Max diam of opening is 2-1/2 in. (64 mm) for 2 in. (51 mm) round devices. Max diam of opening is 4-1/2 in. (114 mm) for 4 in. (114 mm) round devices. **When thickness of floor or wall assembly is less than 4-1/2 in. (114 mm), F Rating is 2 hr.**

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

2. **Cables** – Within the loading area of each firestop device module the cables may represent a 0 to 100 percent visual fill. Cable bundle to be rigidly supported on both sides of floor or wall assembly. Any combination of the following types and sizes of cables may be used:
 - A. Max 2/C No. 18 AWG copper conductor thermostat cable with polyvinyl chloride (PVC) insulation and jacket materials.
 - B. Max 4 pair No. 24 AWG copper conductor Cat5e or Cat 6 telephone cable with PVC insulation and jacket materials.
 - C. Max RG/U (or smaller) coaxial cable with foam high density polyethylene insulation and PVC jacket materials.
 - D. Max 3/C (with ground) No. 14 AWG (or smaller) nonmetallic sheathed (Romex) cable with PVC insulation and jacket materials.
 - E. Max 1/C No. 8 AWG copper conductor cable with PVC insulation and nylon jacket materials.
 - F. Max 12 core No. 26 AWG shielded multi coax cable with foam high density polyethylene insulation and PVC jacket.
 - G. Max 48MM62.5 micron fiber optic cables with having a min FT-6 rating.
 - H. Max 62.5/125 micron micron fiber optic cables with having a min Riser rating.
 - I. Max 1/C 3/0 AWG copper conductor cable with PVC insulation and jacket materials.
 - J. Max three copper conductors (with ground) No. 12 AWG **Metal Clad Cable+**.
 - K. Max four copper conductors No. 2 AWG **Metal Clad Cable+**.

AFC CABLE SYSTEMS INC

- L. Max 1/C 2/0 AWG non halogen copper conductor cable.
- M. Max 300 pair No. 24 AWG copper conductor telephone cable with PVC insulation and jacket materials.
- N. Max 30 pair No. 22 copper conductor shielded switchboard cable with PVC insulation and jacket materials.
- O. Max RG/6 (or smaller) coaxial cable with fluorinated ethylene (FE) or PVC insulation and jacket materials.
- P. Max RG/U (or smaller) coaxial cable with fluorinated ethylene (FE) or PVC insulation and jacket materials.
- Q. Max 7/C No. 12 AWG copper conductors with PVC insulation and jacket materials.
- R. Max 4 pair No. 23 AWG copper conductor Cat 6 telephone cable with PVC insulation and jacket materials.
- S. Max three copper conductors (with ground) No. 12 AWG steel **Armored Cable+**.
- T. Max 04-02 2.5M fiber optic cables having a max diameter of 0.450 in. (11.4 mm).
- U. Max 1/C No. 750 kcmil copper conductors with PVC insulation and fabric jacket materials.
- V. Max 3/C with ground No. 2/0 AWG aluminum conductor SER cable with cross linked polyethylene (XLPE) insulation and PVC jacket.

When min floor or wall thickness is 4-1/2 in. (114 mm) and when cable fill is comprised of Item 2B, T Rating is 1 Hr. Otherwise, T Rating is 0 Hr.

This material was extracted and drawn by 3M Fire Protection Products from the 2008 edition of the UL Fire Resistance Directory. cULus

System No. C-AJ-3250 continued

Through Penetrations

Cables

3000 Series

Concrete

CAJ

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

A. **Firestop Device*** – A max of three square firestop devices may be ganged together. As an alternate, one round device may be centered within a round opening. Each device consists of a nom 4 by 4 by 10 in. (102 by 102 by 254 mm) or 4 in. (102 mm) diam by 10 in. (254 mm) powder coated steel transit incorporating internal intumescent material, foam plugs and mounting flanges. Firestop device to be centered within opening and installed with ends projecting an equal distance beyond each surface of the floor or wall assembly in accordance with the accompanying installation instructions. The annular space between the firestop device(s) and the periphery of the opening shall be nom 1/8 in. (3 mm). Firestop devices secured in place by means of fill material (Item 4B) and steel split mounting flanges sized to accommodate the firestop device. Steel split mounting flanges installed on both sides of floor or wall after installation of fill material and secured to together with supplied steel set screws. Nom 1 in. (25 mm) thick pre-cut foam plugs sized to accommodate the cable bundle and installed flush with each end of device on both sides of floor or wall assembly.

3M COMPANY – 3M Fire Barrier Pass-Through Device

B. **Fill, Void or Cavity Materials* – Caulk or Putty** – Min 1 in. (25 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall prior to the installation of the mounting flanges. When the annular space is 1/8 in. (3.2 mm) or less, the fill material in the annulus is optional. Also, as an option, the foam plugs may be recessed into device and the recess filled with putty or caulk flush with the ends of the device. When annulus around firestop device module(s) is filled with caulk or putty and when both ends of each firestop device module are filled with a nominal 1/8 in. (3.2 mm) depth of caulk or putty the following L Ratings apply:

Max Percent Cable Fill In Device	L Rating At Ambient, CFM/sq ft (CFM/Firestop Device Module)	L Rating At 400F, CFM/sq ft (CFM/Firestop Device Module)
0	4 (Less Than 1)	Less Than 1 (Less Than 1)
50	7 (1)	Less Than 1 (Less Than 1)

3M COMPANY – Moldable Putty+, CP 25WB+, IC 15WB+, 3000 WT

*Bearing the UL Classification Mark

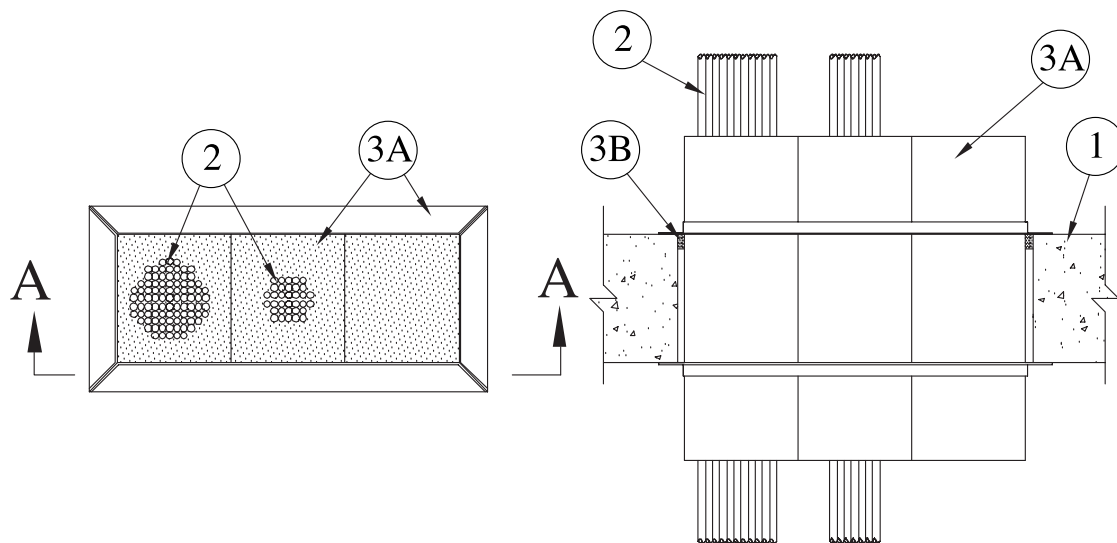
+ Bearing the UL Listing Mark

System No. C-AJ-3252

July 17, 2006

F Rating – 3 Hr

T Rating – 1 Hr



SECTION A-A

- Floor or Wall Assembly** – Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max area of opening is 20-1/8 in.² (130 cm²) with a max dimension of is 7-5/8 in. (194 mm).
See **Concrete Blocks** (CAZT) category in Fire Resistance Directory for names of manufacturers.
- Cables** – One or more cables may be installed concentrically or eccentrically within each firestop device (Item 3A). Cables installed in a bundle having max bundle diam of 2 in. (51 mm). Cable bundle to be rigidly supported on both sides of floor or wall assembly. Any combination of the following types and sizes of cables may be used:
 - Max 4 pair No. 24 AWG copper conductor Cat5e or Cat 6 telephone cable with PVC insulation and jacket materials.
 - Max 4 pair No. 23 AWG copper conductor Cat 6 telephone cable with PVC insulation and jacket materials.
- Firestop System** – The firestop system shall consist of the following:
 - Firestop Device*** – A max of three square firestop devices may be ganged together. Each device consists of a nom 2-1/2 by 2-1/2 by 10 in. (64 by 64 by 254 mm) powder coated steel transit incorporating internal intumescent material, foam plugs and mounting flanges. Firestop device to be centered within opening and installed with ends projecting an equal distance beyond each surface of the floor or wall assembly in accordance with the accompanying installation instructions. The annular space between the firestop device(s) and the periphery of the opening shall be nom 1/8 in. (3 mm). Firestop devices secured in place by means of fill material (Item 4B) and steel split mounting flanges sized to accommodate the firestop device. Steel split mounting flanges installed on both sides of floor or wall after installation of fill material and secured to together with supplied steel set screws. Nom 1 in. (25 mm) thick pre-cut foam plugs sized to accommodate the cable bundle and installed flush with each end of device on both sides of floor or wall assembly.
3M COMPANY – 3M Fire Barrier Pass-Through Device
 - Fill, Void or Cavity Materials*** – **Caulk or Putty** – Min 1 in. (25 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall prior to the installation of the mounting flanges. Also as an option, foam plugs may be recessed into device and the recess filled with putty or caulk flush with the ends of the device.
3M COMPANY – Moldable Putty+, CP 25WB+, IC 15WB+, 3000 WT

*Bearing the UL Classification Mark

Through Penetrations

Cables

3000 Series

Concrete

CAJ

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-3289

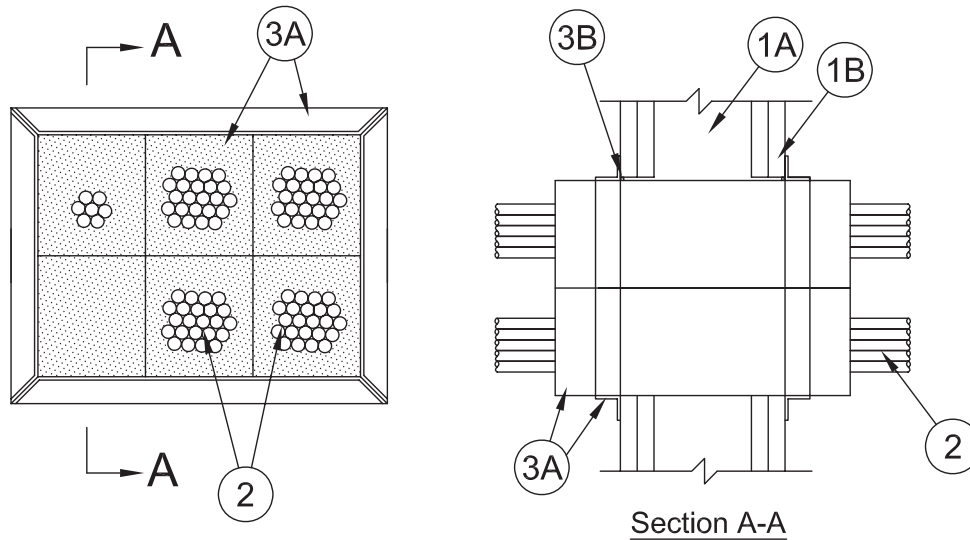
February 26, 2008

F Ratings – 1 or 2 Hr (See Item 1)

T Rating – 0 Hr

L Rating At Ambient - 4 to 7 CFM/sq ft (See Item 3B)

L Rating At 400 F - Less Than 1 CFM/sq ft (See Item 3B)



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 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*** – Min 5/8 in. (16 mm) thick gypsum board. Max area of opening is 98.5 in.2 (635 cm2) with a max dimension of 12-1/8 in. (308 mm) for square devices. Max diam of opening is 2-1/4 in. (57 mm) for nom 2 in. (51 mm) round devices and 4-1/4 in. (108 mm) for 4 in. (102 mm) round devices.

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. **Cables** – Within the loading area of each firestop device module the cables may represent a 0 to 100 percent visual fill. Cable bundles to be rigidly supported on both sides of wall assembly. Any combination of the following types and sizes of cables may be used:

- A. Max 2/C No. 18 AWG copper conductor thermostat cable with polyvinyl chloride (PVC) insulation and jacket materials.
- B. Max 4 pair No. 24 AWG copper conductor Cat5e or Cat 6 telephone cable with PVC insulation and jacket materials.
- C. Max RG/U (or smaller) coaxial cable with foam high density polyethylene insulation and PVC jacket materials.
- D. Max 3/C (with ground) No. 14 AWG (or smaller) nonmetallic sheathed (Romex) cable with PVC insulation and jacket materials.
- E. Max 1/C No. 8 AWG copper conductor cable with PVC insulation and nylon jacket materials.
- F. Max 12 core No. 26 AWG shielded multi coax cable with foam high density polyethylene insulation and PVC jacket.
- G. Max 48MM62.5 micron fiber optic cables with having a min FT-6 rating.
- H. Max 62.5/125 micron fiber optic cables with having a min Riser rating.
- I. Max 1/C 3/0 AWG copper conductor cable with PVC insulation and jacket materials.
- J. Max three copper conductors (with ground) No. 12 AWG **Metal Clad Cable+**.
- K. Max four copper conductors No. 2 AWG **Metal Clad Cable+**.

AFC CABLE SYSTEMS INC

- L. Max 1/C 2/0 AWG non halogen copper conductor cable.
- M. Max 300 pair No. 24 AWG copper conductor telephone cable with PVC insulation and jacket materials.
- N. Max 30 pair No. 22 copper conductor shielded switchboard cable with PVC insulation and jacket materials.
- O. Max RG/6 (or smaller) coaxial cable with fluorinated ethylene (FE) or PVC insulation and jacket materials.
- P. Max RG/U (or smaller) coaxial cable with fluorinated ethylene (FE) or PVC insulation and jacket materials.
- Q. Max 7/C No. 12 AWG copper conductors with PVC insulation and jacket materials.
- R. Max 4 pair No. 23 AWG copper conductor Cat 6 telephone cable with PVC insulation and jacket materials.
- S. Max three copper conductors (with ground) No. 12 AWG steel **Armored Cable+**.
- T. Max 04-02 2 5M fiber optic cables having a max diameter of 0.450 in. (11.4 mm).
- U. Max 1/C No. 750 kcmil copper conductors with PVC insulation and fabric jacket materials.
- V. Max 3/C with ground No. 2/0 AWG aluminum conductor SER cable with cross linked polyethylene (XLPE) insulation and PVC jacket.

This material was extracted and drawn by 3M Fire Protection Products from the 2008 edition of the UL Fire Resistance Directory. cULus

System No. W-L-3289 continued

Through Penetrations

Cables

3000 Series

Gypsum

W/L

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

A. **Firestop Device*** – A max of six square firestop devices may be ganged together. As an alternate, one round device may be centered within a round opening. Each device consists of a nom 2-1/2 by 2-1/2 by 10 in. (64 by 64 by 254 mm), a nom 4 by 4 by 10 in. (102 by 102 by 254 mm) long, a nom 2 in. (51 mm) diam by 10 in. (254 mm) or a nom 4 in. (102 mm) diam by 10 in. (254 mm) long powder coated steel transit incorporating internal intumescent material, foam plugs and mounting flanges. Firestop device(s) to be installed within opening with ends projecting an equal distance beyond each surface of wall assembly in accordance with the accompanying installation instructions. The annular space between device(s) and periphery of opening shall be min 0 in. (0 mm, point contact) to max 1/8 in. (3 mm). Firestop device(s) secured in place by means of steel split mounting flanges sized to accommodate the firestop device. Steel split mounting flanges installed on both sides of wall and secured together with supplied steel set screws. Nom 1 in. (25 mm) thick pre-cut foam plugs sized to accommodate the cables and installed flush with each end of device on both sides of wall assembly.

3M COMPANY – 3M Fire Barrier Pass-Through Device

B. **Fill, Void or Cavity Materials* – Putty or Caulk** – Min 1/8 in. (3 mm) bead of fill material shall be applied at interface of gypsum board and firestop devices immediately prior to the installation of the mounting flanges. If three or less devices (Item 3A) are ganged together, the fill material may be optional. As an option to attain L Ratings, foam plugs of firestop device modules may be recessed 1 in. (25 mm) into device and the recess filled with putty or caulk flush with the ends of the device. When annulus around firestop device module(s) is filled with putty or caulk and when both ends of each firestop device module are filled with nominal 1/8 in. (3.2 mm) depth of putty or caulk the following L Ratings apply:

Max Percent Cable Fill In Device	L Rating At Ambient, CFM/sq ft (CFM/firestop device module)	L Rating At 400 F, CFM/sq ft (CFM/firestop device module)
0	4 (Less Than 1)	Less Than 1 (Less Than 1)
50	7 (1)	Less Than 1 (Less Than 1)

3M COMPANY – Moldable Putty+, CP 25WB+, IC 15WB+, 3000 WT

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