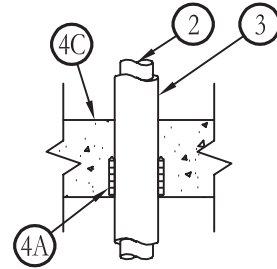
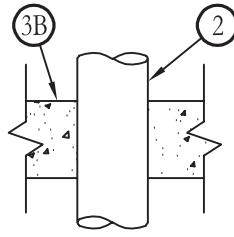
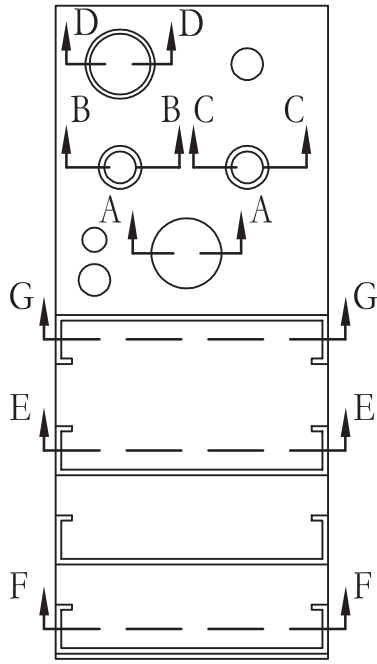


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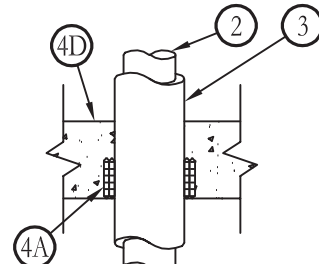
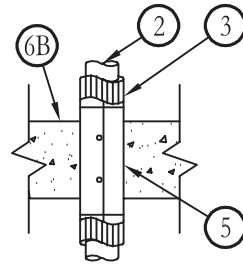
F Rating – 2 Hr

T Ratings – 0, 3/4 and 2 Hr



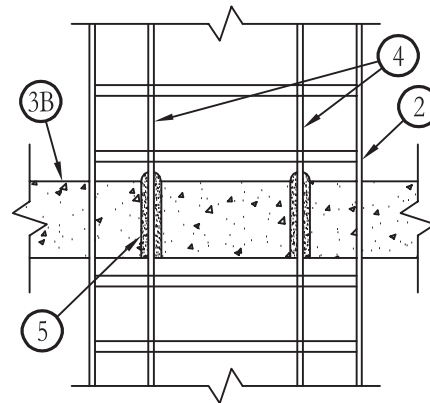
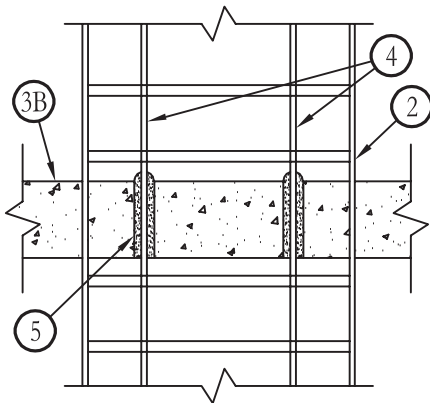
SECTION A-A
FIRESTOP
CONFIGURATION A

SECTION B-B
FIRESTOP
CONFIGURATION B



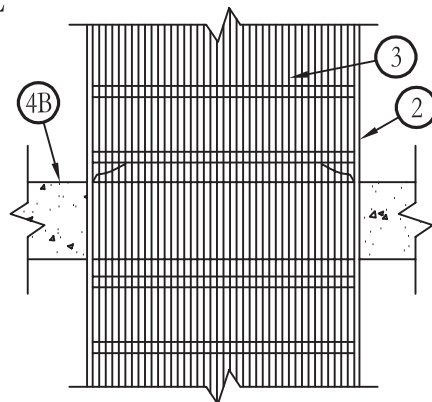
SECTION C-C
FIRESTOP
CONFIGURATION C

SECTION D-D
FIRESTOP
CONFIGURATION D



SECTION E-E
FIRESTOP
CONFIGURATION E

SECTION F-F
FIRESTOP
CONFIGURATION F



SECTION G-G
FIRESTOP
CONFIGURATION G

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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 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+
 - 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

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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

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

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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.
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.
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:

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- 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

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Through Penetrations

Compos

8000 Series

Concrete

CAJ