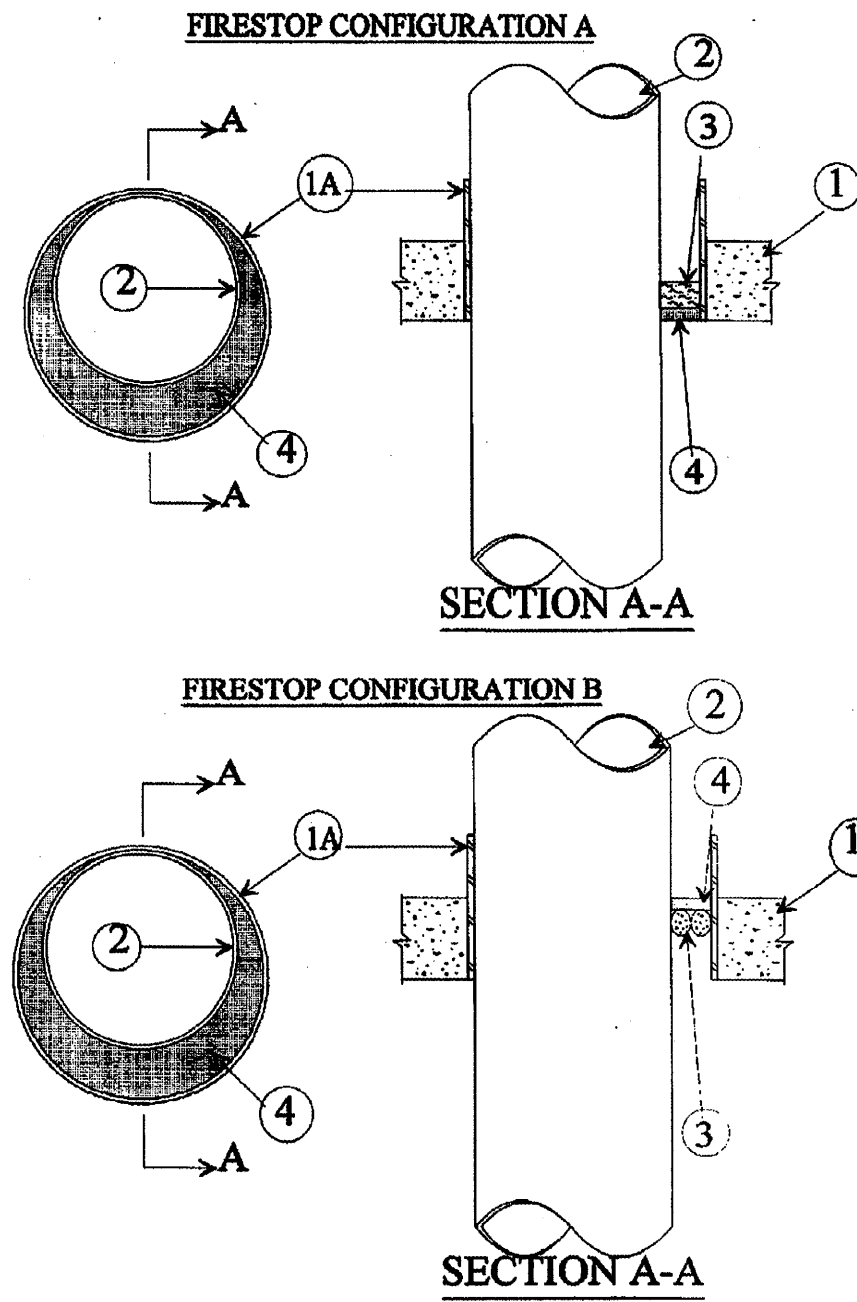
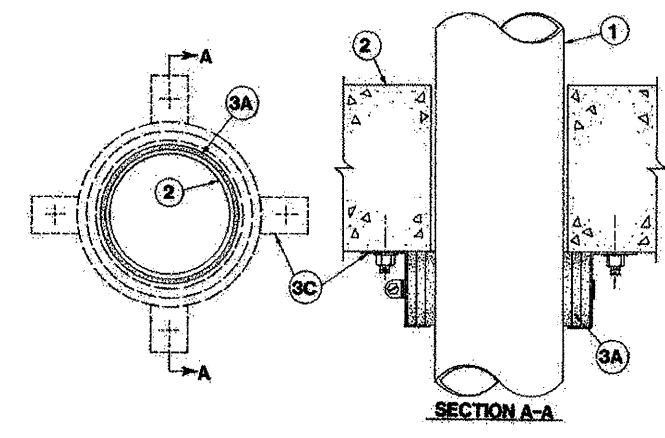


System No. C-AJ-1175  
 F Rating - 2 Hr  
 T Rating - 0 Hr



- Floor or Wall Assembly - Min 2-1/2 in. thick lightweight or normal weight (100-150 pcf) concrete. Floor may 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 circular through opening is 10 in.
- See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
- Steel Sleeve - (Optional) - Nom 10 in. diam (or smaller) Schedule 10 (or heavier) steel pipe sleeve cast into concrete floor or wall. Sleeve to be flush with or project max 2 in. from top surface of floor or wall.
- Through Penetrants - One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. Max annular space between pipe, conduit or tubing and edge of through opening not to exceed 1-3/8 in. Min annular space between pipe or conduit and edge of through opening is zero in. (point contact). Pipe, conduit or tubing to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
  - Steel Pipe - Nom 8 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
  - Conduit - Nom 6 in. diam (or smaller) rigid steel conduit.
  - Conduit - Nom 4 in. diam (or smaller) steel electrical metallic tubing.
  - Iron Pipe - Nom 4 in. diam (or smaller) cast or ductile iron pipe.
  - Copper Tubing - Nom 6 in. diam (or smaller) Type L (or heavier) copper tube.
  - Copper Pipe - Nom 6 in. diam (or smaller) Regular (or heavier) copper pipe.

System No. C-AJ-2001  
 May 18, 2005  
 F Rating - 2 Hr  
 T Ratings - 4, 1-1/2 and 2 Hr (See Item 3)  
 L Rating at Ambient - 7 CFM/sq ft (See Item 3B)  
 L Rating at 400 F - 1 CFM/sq ft (See Item 3B)



- Floor or Wall Assembly - Lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m3) concrete. Except as footnoted for floor assembly in table under Item 3, min thickness of solid concrete floor or wall assembly is 4-1/2 in. (114 mm). Floor assembly may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow core Precast Concrete Units\*. Wall may also be constructed of any UL Classified Concrete Blocks\*. Diam of opening through floor or wall to be 0 to 1/4 in. (0 to 6 mm) larger than the outside diam of nom 2 in. (51 mm) diam and smaller pipes or conduits. Diam of opening to be 0 to 1/2 in. (0 to 13 mm) larger than the outside diam of nom 2-1/2 in. (64 mm) diam and larger pipes or conduits. Max diam of opening is 1 in. (178 mm).
- See Concrete Blocks (CAZT) and Precast Concrete Units (CFTV) categories in Fire Resistance Directory for names of manufacturers.
- Through Penetrants - One nonmetallic pipe or conduit to be centered in the through opening. Pipe or conduit to be rigidly supported on both sides of the floor or wall assembly. The following types and sizes of nonmetallic pipes or conduits may be used:
  - Polyvinyl Chloride (PVC) Pipe - Nom 6 in. (152 mm) diam (or smaller) Schedule 40 solid-core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
  - Cellular - Core Polyvinyl Chloride (ccPVC) Pipe - Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
  - Chlorinated Polyvinyl Chloride (CPVC) Pipe - Nom 6 in. (152 mm) diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.
  - Acrylonitrile Butadiene Styrene (ABS) Pipe - Nom 4 in. (102 mm) diam (or smaller) Schedule 40 solid-core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
  - Cellular Core Acrylonitrile Butadiene Styrene (ccABS) Pipe - Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
  - Polybutylene (PB) Pipe - Nom 3 in. (76 mm) diam (or smaller) SDR11 (or heavier) PB pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
  - Rigid Nonmetallic Conduit - Nom 4 in. (102 mm) diam (or smaller) (Schedule 40 or 80) PVC conduit installed in accordance with Article 347 of the National Electric Code (NECA No. 70).
  - Flame Retardant Polypropylene (FRPP) Pipe - Nom 4 in. (102 mm) diam (or smaller) Schedule 40 (or heavier) FRPP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- See Rigid Nonmetallic Conduit (DZKT) category in UL Electrical Construction Materials Directory for names of manufacturers.
- Firestop System - The details of the firestop system shall be as follows:
  - Fill, Void or Cavity Materials\* - Wrap Strip - Nom 1/4 in. (6 mm) thick intumescent elastomeric material faced on one side with aluminum foil, supplied in 1 and 2 in. (25 and 51 mm) wide strips. Strips tightly wrapped around nonmetallic pipe (foil side exposed) with the edges butted against the underside of the concrete floor or both sides of wall surface. Sufficient layers of wrap strip shall be installed to lap a min of 3/16 in. (5 mm) on the concrete around the entire perimeter of the through opening. The min wrap strip width and the min number of layers of wrap required is dependent upon the pipe type, the nom pipe diam, the wall or floor thickness and the hourly T Rating required, as shown in the following table.

Pipe Type	Nom Pipe Diam. In.	Min. Wall or Floor Thickness In.	Min. Wrap Strip Width In.	Min. Wrap Strip Layers	T Rating Hr
PVC, ccPVC or CPVC	1/2 to 1-1/2 (39)	2-1/2 (64)	1 (25)	1	0
ABS, ccABS or FRPP(a)	1/2 to 1-1/2 (39)	2-1/2 (64)	1 (25)	1	1
PVC, ccPVC or CPVC	2 (51)	2-1/2 (64)	2 (51)	1	0
ABS, ccABS or FRPP(a)	2 (51)	2-1/2 (64)	2 (51)	1	1
PVC, ccPVC or CPVC	3 (76)	2-1/2 (64)	3 (76)	1	0
PVC, ccPVC or CPVC	4 (102)	2-1/2 (64)	4 (102)	1	0
PB	1-1/2 (38)	4-1/2 (114)	1 (25)	1	0
PB	2 (51)	4-1/2 (114)	2 (51)	1	0
PVC, ccPVC or CPVC	3 (76)	4-1/2 (114)	3 (76)	1	0
ABS, ccABS or FRPP(a)	3 (76)	4-1/2 (114)	3 (76)	1	1
PVC, ccPVC or CPVC	4 (102)	4-1/2 (114)	4 (102)	1	0
ABS, ccABS or FRPP(a)	4 (102)	4-1/2 (114)	4 (102)	1	1
PVC	6 (152)	4-1/2 (114)	6 (152)	1	0
PVC	6 (152)	4-1/2 (114)	6 (152)	1	1

- Requires use of aluminum tape detailed in Item 3E.
  - Requires use of pipe covering detailed in Item 3D.
  - For nom 6 in. (152 mm) diam pipe, 1 in. and 2 in., (25 and 51 mm) wide wrap strips are "Stacked" to attain nom 3 in. (76 mm) wrap strip width.
- Each layer of wrap strip to be installed with butted seam with butted seams in successive layers staggered. Wrap strip layers temporarily held in position using aluminum foil tape, steel wire tie, or equivalent. In wall assemblies, the wrap strip is to be installed in the same manner used for floor assemblies, but it is to be installed symmetrically on both sides of the wall assembly.

B. Fill, Void or Cavity Materials\* - Caulk, Sealant or Putty - (Not Shown) - Generous bead of caulk or putty to be applied to outer perimeter of wrap strip at its interface with floor or wall surface(s).  
 3M COMPANY - CP 25WB+ caulk; FB-3000 WT sealant; Type MP+ Stix putty or IC 15WB+ caulk (Note: L Ratings apply only when Type CP 25WB+ caulk or FB-3000 WT sealant is used. CP 25WB+ not suitable for use with CPVC pipes.)

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

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

See Pipe and Equipment Covering - Materials (BRGU) category in Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.

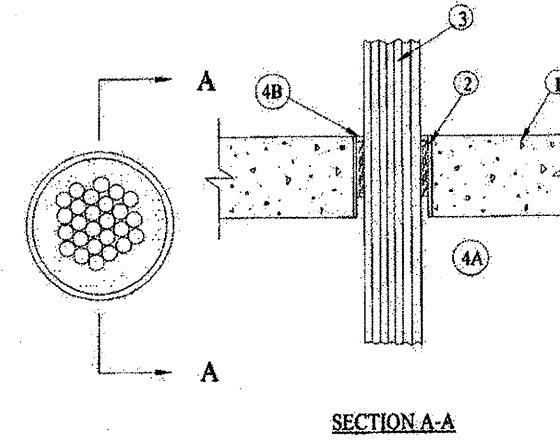
E. Foil Tape - When required (see tables), nom 4 in. (102 mm) wide, 3 mil thick aluminum tape installed around pipe prior to installation of wrap strip (Item 3A) or Firestop Device (Item 3F). Min one layer wrapped around pipe with top edge of tape flush with bottom surface of floor and extending downward. In walls, min one layer wrapped around pipe flush with both sides of wall and extending outward.

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

Pipe Type	Nom Pipe Diam. In.	Min. Wall or Floor Thickness In.	Firestop Device
PVC, ccPVC or CPVC	1-1/2 (39)	2-1/2 (64)	PPD 1 or PPD 150
ABS, ccABS or FRPP(a)	1-1/2 (39)	2-1/2 (64)	PPD 1 or PPD 150
PVC, ccPVC or CPVC	2 (51)	2-1/2 (64)	PPD 1 or PPD 200
ABS, ccABS or FRPP(a)	2 (51)	2-1/2 (64)	PPD 200
PVC, ccPVC or CPVC	3 (76)	2-1/2 (64)	PPD 300
PVC, ccPVC or CPVC	4 (102)	2-1/2 (64)	PPD 400
PB	1-1/2 (38)	4-1/2 (114)	PPD 150
PB	2 (51)	4-1/2 (114)	PPD 200
PVC, ccPVC or CPVC	3 (76)	4-1/2 (114)	PPD 1 or PPD 300
ABS, ccABS or FRPP(a)	3 (76)	4-1/2 (114)	PPD 300
PVC, ccPVC or CPVC	4 (102)	4-1/2 (114)	PPD 1 or PPD 400
ABS, ccABS or FRPP(a)	4 (102)	4-1/2 (114)	PPD 400
PVC	6 (152)	4-1/2 (114)	PPD 4

- Requires use of aluminum tape detailed in Item 3E.
  - Requires use of pipe covering detailed in Item 3D.
- 3M COMPANY  
 \*Bearing the UL Listing Mark  
 \*\*Bearing the UL Classification Mark

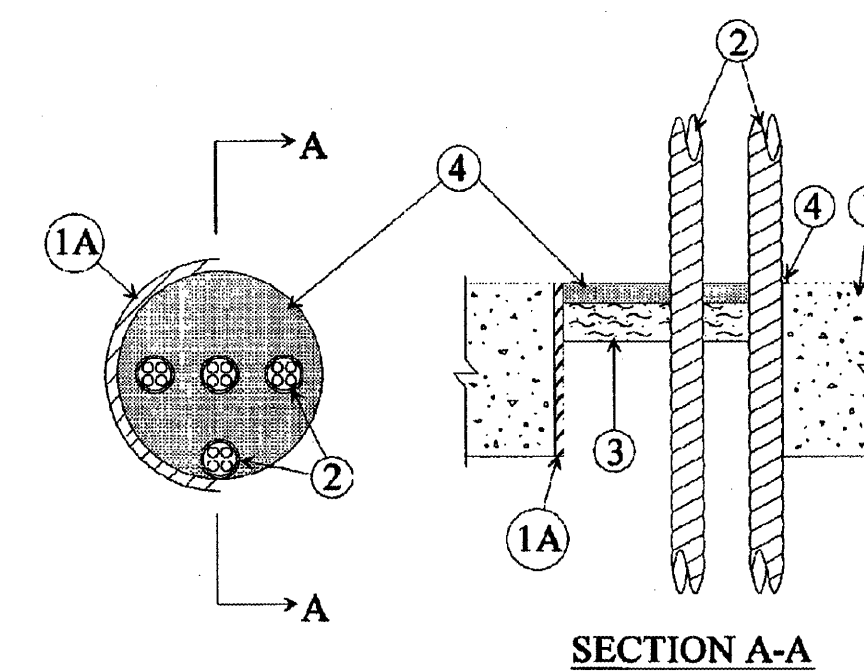
System No. C-AJ-3137  
 September 03, 2004  
 F Rating - 2 Hr  
 T Rating - 0 Hr



- Floor or Wall Assembly - Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Floor 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 is 4 in.
- See Concrete Block (CAZT) and Precast Concrete Units (CFTV) categories in the Fire Resistance Directory for names of manufacturers.
- Steel Sleeve - (Optional) - Nom 4 in. diam (or smaller) Schedule 10 (or heavier) steel sleeve cast or grouted into floor or wall assembly.
- Cables - Aggregate cross-sectional area of cables in sleeve or opening to be min 11 percent to max 60.5 percent of the cross-sectional area inside the sleeve or opening. The annular space between cables and periphery of opening shall be min of 0 in. (point contact) to max 2-3/4 in. 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:
  - Max 1/3 350 kcmil (or smaller) copper conductor cable with cross-linked polyethylene (XLPE) jacket.
  - Max 200 pair No. 24 AWG copper conductor telecommunication cables; polyvinyl chloride (PVC) insulation and jacket.
  - Max 7/8 No. 12 AWG copper conductor power and control cables; XLPE or PVC insulation with XLPE or PVC jacket.
  - Max 3/8 No. 2/0 AWG copper or aluminum conductor cables; PVC insulation and jacket.
  - Max 3/8 No. 2/0 (or smaller) copper conductor PVC jacketed aluminum clad or steel clad TEK cable.
  - Max 1-10/125 Fiber Optic (F.O.) cable; PVC insulation and jacket.
  - Max 3/8 with ground No. 12 AWG (or smaller) copper conductor NM cable with PVC insulation and jacket.
- Firestop System - The details of the firestop system shall be as follows:
  - Packing Material - Min 1 in. thickness of min 4 pcf mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of fill material. When floor is constructed of hollow-core precast concrete units, packing material to be recessed from both surfaces of floor as required to accommodate the required thickness of fill material.
  - Fill, Void or Cavity Materials\* - Caulk or Sealant - Min 1/2 in. thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall. Min 1/2 in. thickness of fill material applied into interstices of cables on the top surface of floor or both surfaces of wall. When floor is constructed of hollow-core precast concrete units, fill material to be installed symmetrically on both sides of the floor, flush with floor surfaces.

3M COMPANY - CP 25WB+, or FB-3000 WT  
 \*Bearing the UL Classification Mark

System No. C-AJ-3111  
 F Rating - 3 Hr  
 T Rating - 0 Hr



- Floor or Wall Assembly - Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. When individual cable (Item 2) is installed in through opening, diam of opening to be 3/4 in. to 1-1/2 in., larger than diam of cable. When more than one cable is installed in opening, diam of opening to be sufficient to allow separation between cables for installation of caulk fill material (Item 4). Max diam of opening is 6 in.
  - See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
  - Steel Sleeve - (Optional) - Nom 6 in. diam (or smaller) Schedule 40 PVC pipe or Schedule 10 (or heavier) steel pipe cast into concrete floor or wall. Sleeve to be flush with or project max 1-1/2 in. from top of surface of floor or both surfaces of wall.
  - Through Penetrating Products\* - Max four copper conductor No. 2/0 AWG (or smaller) aluminum or steel Armored Cable or Metal-Clad Cable. Aggregate cross-sectional area of cables to be 15 to 30 percent of the cross-sectional area of the opening. Min annular space between cable and edge of through opening is zero in. (point contact). Through penetrating products to be rigidly supported on both sides of floor or wall assembly.
  - Fill, Void or Cavity Material\* - Caulk - Applied to fill the annular space around the through penetrating product. When an individual cable is installed in a max 3 in. diam through opening, a min 1/2 in. depth of caulk fill material is required. When more than one cable is installed in through opening or through opening is larger than 3 in. diam, a min 1 in. depth of caulk fill material is required. Caulk fill material to be installed flush with top surface of floor. In walls, caulk fill material to be installed flush with wall surface on both sides of wall assembly.
- Minnesota Mining & Mfg Co. - CP 25WB+  
 \*Bearing the UL Classification Marking  
 #Bearing the UL Listing Mark

NOTE:  
 THESE SYSTEMS ARE BASED ON "3M FIRE PROTECTION PRODUCTS" SUBMIT SHOP DRAWINGS FOR ALL TYPES OF PENETRATIONS THROUGH RATED ASSEMBLIES AND FIRE STOPPING METHODS.

3M FIRE PROTECTION CHART				
PENETRATING MATERIAL	TYPE	ASSEMBLY TYPE	FIRE RATING	3M ASSEMBLY
2" - 4" CAST IRON	SANITARY, WASTE VENT AND DRAIN PIPING	GYPSTU STUD WALL	2 HOUR	W-L-1001
2" - 4" CAST IRON	SANITARY, WASTE VENT AND DRAIN PIPING	PRECAST PLANK FLOOR/CEILING	2 HOUR	CAJ-1175
1/2" - 2" COPPER	WATER	GYPSTU STUD WALL	2 HOUR	W-L-1001
4" COPPER	WATER	PRECAST PLANK FLOOR/CEILING	2 HOUR	CAJ-1175
4" PVC	HEATING/WATER	GYPSTU STUD WALL	2 HOUR	W-L-2002
5" PVC	HEATING/WATER	PRECAST PLANK FLOOR/CEILING	2 HOUR	C-AJ-2001
1 1/2" - 2 1/2" SCHEDULE 10	SPRINKLER PIPING	GYPSTU STUD WALL	2 HOUR	W-L-1001
4" SCHEDULE 40 STEEL	GAS PIPING	GYPSTU STUD WALL	2 HOUR	W-L-1001
4" SCHEDULE 40 STEEL	GAS PIPING	PRECAST PLANK FLOOR/CEILING	2 HOUR	CAJ-1175
INDIVIDUAL CABLE	TELEPHONE / ROMEK PVC INSULATED	GYPSTU STUD WALL	2 HOUR	W-L-3001
BUNDLE OF CABLES - 4" MAX.	VARIOUS CABLES - PVC INSULATED	GYPSTU STUD WALL	1 HOUR	W-L-3030
BUNDLE OF CABLES - 4" OPENING	VARIOUS CABLES - PVC INSULATED	PRECAST PLANK FLOOR/CEILING	2 HOUR	C-AJ-3137
BX CABLE	ARMORED CABLE (BX)	GYPSTU STUD WALL	2 HOUR	W-L-3015
BX CABLE	ARMORED CABLE (BX) SINGLE AND MULTIPLE	PRECAST PLANK FLOOR/CEILING	2 HOUR	CAJ-3111
ELECTRIC OUTLET BOX ***	METAL	GYPSTU STUD WALL	2 HOUR	CLV PUTTY

NOTES:  
 \*\*\* BACK TO BACK ELECTRICAL BOXES LESS THAN 24" APART PENETRATING THROUGH UL FIRE RATED WALLS SHALL RECEIVE 3M FIRE BARRIER FOLDABLE PUTTY #4 OR EQUAL PER MANUFACTURERS INSTALLATION REQUIREMENTS TO ENSURE FIRE RATED SEAL.

PERMIT ISSUE - 09/27/07

NO.	REVISION	DATE
SCALE: As Noted	DRAWN BY: AVS	
DATE:	CHECKED BY: JR	

LICENSED ARCHITECT  
 MARY FARIA  
 No. 3130  
 STATE OF MAINE

PROJECT

**RESIDENCE INN BY MARRIOTT**

PORTLAND, ME

JOB# 802

TITLE

**FIRE SEPARATION DETAILS**

GROUP ONE  
 21 W. THIRD STREET, BOSTON, MA 02127  
 TEL: (617)268-7000 FAX: (617)268-0200

DRAWING NO.

**A0.4**