

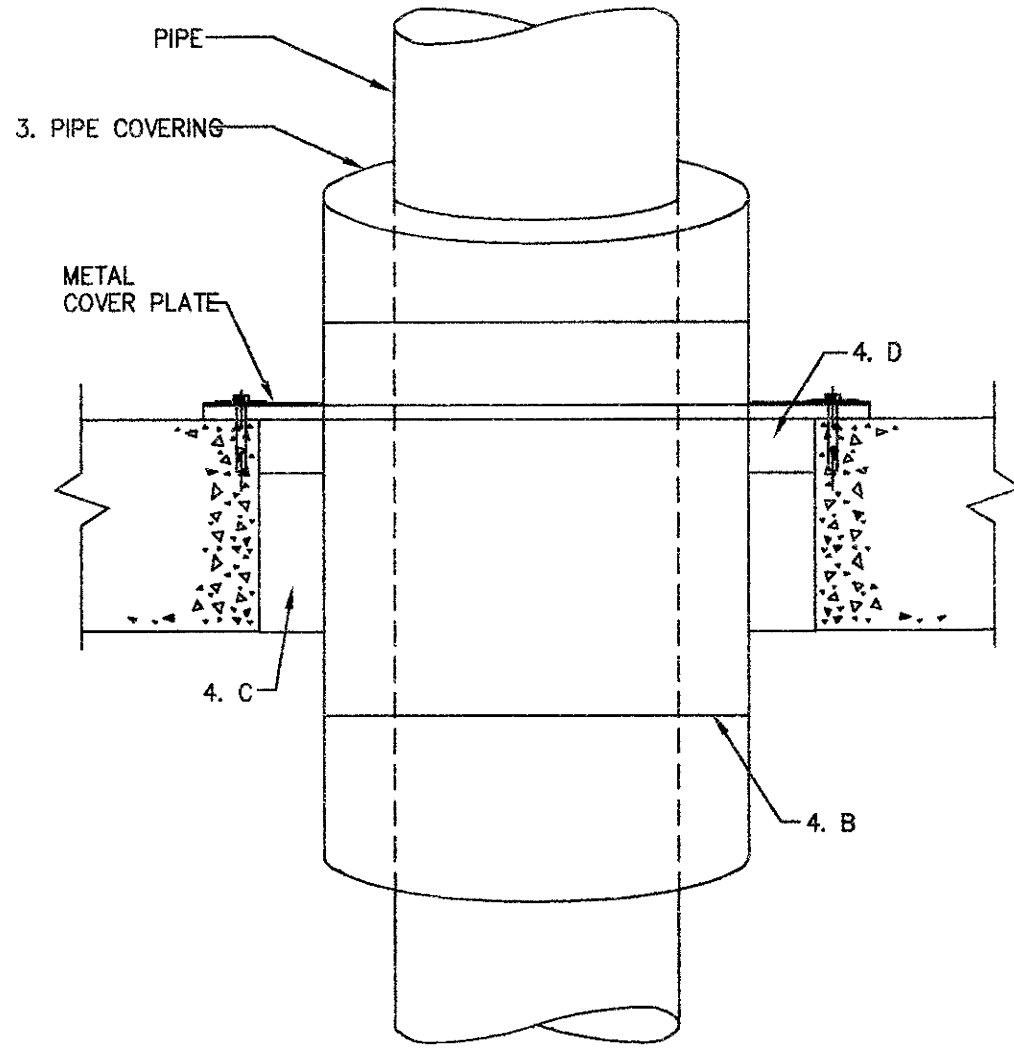
CONSULT CURRENT UNDERWRITERS LABORATORIES "FIRE RESISTANCE DIRECTORY" FOR DETAILS

UL SYSTEM CAJ5020

- 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\*. Max. diam of opening is 27 in. outside diam of insulated pipe. Max. diam of opening is 12 in. See Concrete Blocks (CAZ7) category in the Fire Resistance Directory for names of manufacturers.
- Steel Pipe - 17-1/4 in. diam. (or smaller) 0.125 in. wall thickness (or heavier) steel pipe. One pipe to be installed either concentrically or eccentrically within the firestop system. Pipe to be rigidly supported on both sides of floor or wall assembly.
- Pipe Covering\* - Nom 3 in. thick hollow cylindrical heavy density (min. 8.0 pcf) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing top tape. Transverse joints secured with metal fasteners or with butt strip tape supplied with the product. Pipe covering material secured to pipe with Metowrap 60 (Item 4A) as described below. 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.

- Firestop System - The details of the firestop system shall be as follows:
  - Fill, Void or Cavity Material\* - Wrap Strip - Nom. 0.062 in. thick intumescent wrap strip faced on one side with stainless steel. A nom 1/4 in. bead of Metacaulk 835 is applied to the intumescent side of the wrap strip in a 2 in. wide wave pattern. The Metacaulk 835 is to be applied along the longitudinal centerline of the Metowrap 60. Another bead of Metacaulk 835 to be applied to the intumescent side of the wrap strip along the overlapping edge. The wrap strip is then wrapped around the pipe insulation (intumescent side to the pipe) such that the edges overlap by a min 2 in. The wrap strip to be held in place by one soft 20 SWG steel wire located between the planes of the floor or wall surfaces but not in the Fill, Void, or Cavity material of the firestop system. As an alternate, the wrap strip may be held in place with two soft 20 SWG steel wires located 2 in. away from each face of the wall or floor surface. In floors, wrap strip to extend min 7-1/2 in. above the face of the floor and min. 12 in. below the lower surface of the floor. In walls, Metowrap 60 to extend min. 9-1/2 in. beyond each surface of the wall. The annular space between the wrap strip and the periphery of the opening shall range from 0 to 3-3/4 in. Restored Corp. - Metowrap 60
  - Packing Material - Min 1 in. thickness of min. 4.0 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.
  - Fill, Void or Cavity Material\* - Caulk - Min. 3/4 in. thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall. At the point contact location between pipe and concrete, a min. 1/2 in. diam. bead of fill material shall be applied at the concrete/pipe interface on the top surface of floor and on both surfaces of wall. The Restored Corp. - Metacaulk 835

\*Bearing the UL Classification Marking



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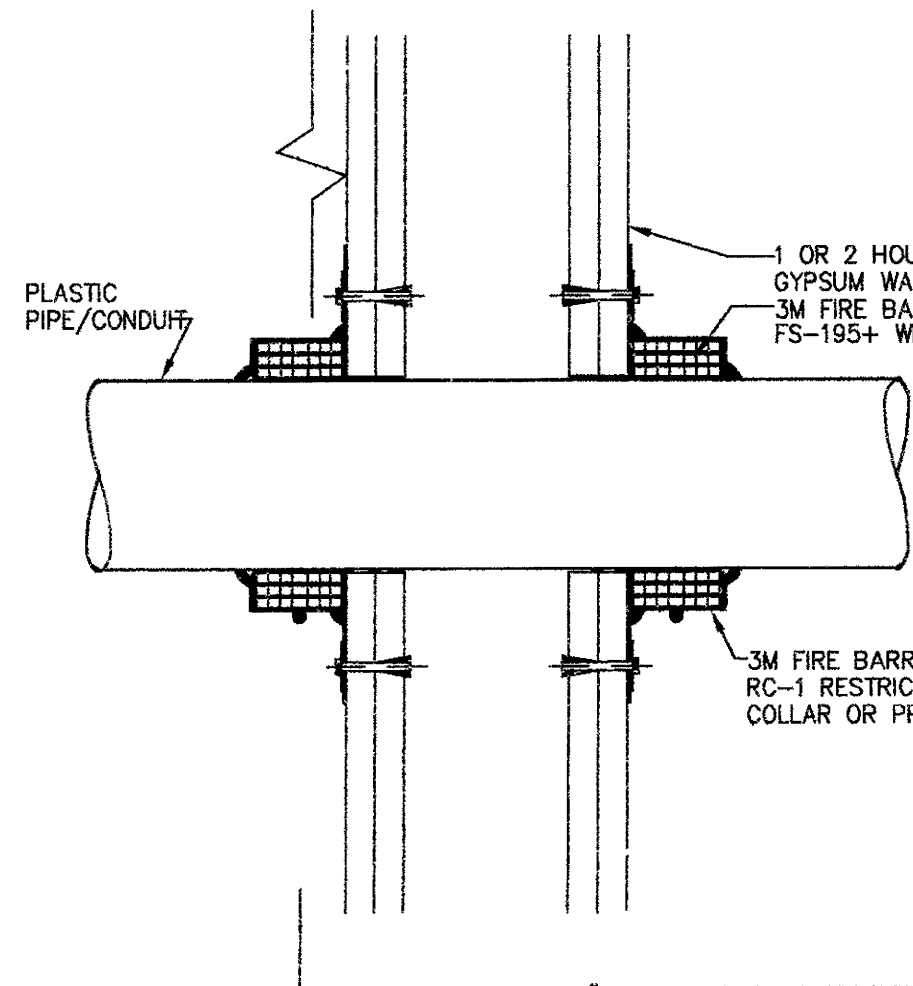
UL SYSTEMS CBJ5006

- Floor or Wall Assembly - Min 5-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete floor or wall. 6 in. thick reinforced lightweight or normal weight concrete wall. Wall may also be constructed of any UL Classified Concrete Blocks\*. Max. diam of opening is 12 in. See Concrete Blocks (CAZ7) category in the Fire Resistance Directory for names of manufacturers.
- Through Penetrants - One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. 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 20 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
  - Conduit - Nom 6 in. diam (or smaller) steel conduit or nom. 4 in. diam. (or smaller) steel electrical metallic tubing.
- Pipe Covering\* - Max. 3 in. thick hollow cylindrical heavy density (min. 3.5 pcf) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing top tape. Transverse joints secured with metal fasteners or with butt strip tape supplied with the product. Pipe covering to terminate min. 6 in. from each side of floor or wall assembly. 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.

- Sheathing Material - All service jacket material shall be wrapped around the outer circumference of the pipe covering material (Item 4A) with kraft facing exposed. Longitudinal joints sealed with metal fasteners. See Sheathing Material (DVID) category in Building Materials Directory for names of manufacturers. Any sheathing material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
- Packing Material - Min 4 in. thickness of min 4.0 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.
- Fill, Void or Cavity Material\* - Caulk - Min. 1 in. thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall. A min. 1/2 in. diam. bead of fill material to be installed at interface of pipe covering and metal cover plate (Item no. 4E) and over butted seams of metal cover plate. HHI Construction Chemicals, Inc. - FS605
- Metal Cover Plate - Two piece cover plate of min 18 gauge steel with I.D. same as O.D. of pipe, conduit, or tubing, O.D. of cover plate to be sized to overlap the periphery of opening a min 1-1/2 in. installed at top surface of floor or both sides of wall. Two pieces to be butted together around perimeter of pipe or conduit, penetrating the sheathing material and pipe covering (Item nos. 4B and 4A) to fully contact the pipe or conduit. Secured with 1/4 in. diam. by min. 1 in. long steel expansion bolts, or equivalent, in conjunction with steel nuts and washers a max. of 1 in. from each side of each seam and a max. of 4 in. OC throughout.

\*Bearing the UL Classification Marking

SHOP DRAWINGS SHALL BE SUBMITTED FOR ALL UL SYSTEMS USED ON THIS PROJECT. CONTRACTOR SHALL KEEP A COPY OF APPROVED SHOP DRAWINGS ON THE JOB AT ALL TIMES.



CONSULT CURRENT UNDERWRITERS LABORATORIES "FIRE RESISTANCE DIRECTORY" FOR DETAILS

UL SYSTEM WL2002

- Wall Assembly - The 1 or 2 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner described in the individual U300 or U400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
  - Studs - Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. OC with nom 2 by 4 in. lumber and plates and cross braces. Steel studs to be min. 3-5/8 in. wide by 3-5/8 in. deep by 1-3/8 in. deep channels spaced max 24 in. OC.
  - Wallboard, Gypsum\* - 5/8 in. thick, 4 ft wide with square or tapered edges. The gypsum wallboard type, thickness, number of layers, fastener type on sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max. diam of opening is 7 in.
- Nonmetallic Pipe or Conduit - One nonmetallic pipe or conduit is centered within the firestop system. Pipe or conduit to be installed near center of stud cavity width and to be rigidly supported on both sides of wall. The following types and sizes of nonmetallic pipes or conduit may be used:
  - Nom 6 in. diam (or smaller) Schedule 40 solid-core polyvinyl chloride (PVC) pipe.
  - Nom 4 in. diam (or smaller) Schedule 40 cellular core polyvinyl chloride (PVC) pipe.
  - Nom 4 in. diam (or smaller) Schedule 40 solid-core acrylonitrile-butadiene-styrene (ABS) pipe.
  - Nom 4 in. diam (or smaller) Schedule 40 fire retardant polypropylene (PPRP) pipe.
  - Nom 4 in. diam (or smaller) Rigid Nonmetallic Conduit formed of PVC.
  - Nom 1 in. diam (or smaller) Electrical Nonmetallic Tubing formed of PVC.
  - Nom 6 in. diam (or smaller) Schedule 40 chlorinated polyvinyl chloride (CPVC) pipe. See Rigid Nonmetallic Conduit (DZKT) and Electrical Nonmetallic Tubing (FNUH) categories in UL Electrical Construction Materials Directory for names of manufacturers.

33. Firestop System - Installed symmetrically on both sides of wall assembly. The hourly F and T Ratings for the firestop system are dependent upon the type and size of nonmetallic pipe or conduit, the piping system type (closed systems such as process or supply piping or vented systems such as drain, waste or vent piping) and the hourly fire rating of the wall assembly in which it is installed, as shown in the following table.

| Pipe / Conduit Type | Nom. Pipe Dia. (in.) | Annular Space (in.) | Piping System (a) | Wall Fire Rating Hr. | F Rating Hr. | T Rating Hr. |
|---------------------|----------------------|---------------------|-------------------|----------------------|--------------|--------------|
| FRPP                | 1/2 to 2             | 0-3/16              | V                 | 2                    | 1-1/2        | 1-1/2        |
| FRPP, PB            | 1/2 to 2             | 0-3/16              | C                 | 2                    | 2            | 2            |
| ABS                 | 1/2 to 4             | 0-3/16              | C,V               | 1                    | 1            | 3/4          |
| ABS                 | 1/2 to 4             | 0-3/16              | C,V               | 2                    | 1-1/2        | 1-1/2        |
| PVC                 | 1/2 to 4             | 0-3/16              | C,V               | 1                    | 1            | 1            |
| PVC                 | 1/2 to 4             | 0-3/16              | C,V               | 2                    | 2            | 2            |
| FRPP+               | 2-1/2 to 4           | 0-3/16              | C,V               | 2                    | 1-1/2        | 1-1/2        |
| PVC+                | 5, 6                 | 0-3/16              | C,V               | 2                    | 1-1/2        | 1-1/2        |

- (a) Pipe covering material wrap required on pipe on both sides of wall. (b) C + closed systems, V = vented systems. The details of the firestop system shall be as follows:
- Fill, Void or Cavity Material\* - Wrap Side - Nom 1/4 in. thick intumescent elastomeric material faced on one side with aluminum foil, supplied in 2 in. wide strips. Nom 2 in. wide strips tightly wrapped around nonmetallic pipe or conduit (foil side exposed) with the edges butted against the surface of the wall. Sufficient layers of wrap strip shall be installed to lay a min of 3/16 in. on the wall surface around the entire perimeter of the opening through opening. For nom 1/2 in. to nom 1 in. diam pipes or conduits, a min of one layer of wrap strip is required. For nom 2-1/2 in. and nom 3-1/2 in. and nom 4 in. diam pipes, a min of three layers of wrap strip is required. For nom 5 and 6 in. diam, two tiers (4 in. overall length) of three layers of wrap strip is required, with adjoining wrap strip layer edges between tiers tightly butted. Each layer of wrap strip to be installed with butted seams, with butted seams in successive layers staggered. Wrap strip layers temporarily held in position using aluminum foil tape, steel wire ties or equivalent. Minnesota Mining & Mfg. Co. - Type FS-195+

- Steel Collar - Nom 2 or 4 in. deep collar with 1-1/4 in. wide by 2 in. long anchor tabs and min 3/4 in. long tabs to retain wrap strip layers. Collar of reat 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 layers with min 1 in. overlap at the seam. Min steel collar anchor tabs pressed lightly against 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 screw tightening mechanism at the collar midheight. As an alternate to the stainless steel band clamp, the steel collar may be compressed around nom 4 in. diam (or smaller) nonmetallic pipes using two min 16 SWG (0.0625 in. diam steel wire secured with multiple twists. Secure collar to wall surface with 3/16 in. diam steel toggle bolts (5/8 in. or 1-1/4 in. grip) in conjunction with min 1-1/2 in. diam steel washers. Three bolts, symmetrically located, required for 2 in. deep steel collar for nom 1/2 in. to nom 3 in. diam pipes. Four bolts, symmetrically located, required for 2 in. deep steel collar for nom 3-1/2 and 4 in. diam pipes. Five to seven bolts (every other anchor tab) required for 4 in. deep steel collar for nom 5 and 6 in. diam pipes. As a final step, bend retainer tabs 90 deg toward pipe to lock wrap strip layers in position.
- Fill, Void or Cavity Material\* - Caulk or Putty - Generous bead of caulk applied to outer perimeter of wrap strip at interface with wall surface and to perimeter of pipe or conduit at its egress from the wrap strip layers. Minnesota Mining & Mfg. Co. - CP 25WB + Caulk and MFS-2+ Putty (Note: L Ratings apply only when Type CP-25 WB+ caulk is used)
- Pipe Covering\* - (Not Shown) - Nom 1 in. thick hollow cylindrical heavy density (min 3.5 pcf) glass fiber units jacketed on the outside with an all service jacket. When required (see table), min 6 in. length of pipe covering installed around PVC pipe at its egress from steel collar on both sides of wall. Pipe covering secured to pipe with steel wire ties spaced max 4 in. OC. Edge of pipe covering abutting steel collar to be sealed with a min 1/4 in. diam bead of caulk (Item C).

- 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.
- Firestop Device\* - (Not Shown) - As an alternate to Items A, B and C for nom 1-1/2, 2, 3, or 4 in. diam nonmetallic pipes, a firestop device consisting of a sheet-steel girth collar lined with intumescent material and provided with butted seams for attachment may be used. Firestop device to be installed on both sides of wall in accordance with the accompanying installation instructions. Minnesota Mining & Mfg. Co. - Types PPD 150, PPD 200, PPD 300, PPD 400 \* Bearing the UL Classification Marking