

1. FLOOR OR WALL ASSEMBLY—MIN 4-1/2 IN. THICK SOLID LIGHTWEIGHT OR NORMAL WEIGHT (100-150 PCF) CONCRETE. WALL ASSEMBLY MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS\*. MAXIMUM DIAMETER OF CIRCULAR THROUGH OPENING IS 12 IN. SEE CONCRETE BLOCK (CAZT) CATEGORY IN FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURERS.

2. STEEL PIPE OR CONDUIT—NOMINAL 10 IN. DIAMETER (OR SMALLER) SCHEDULE 40 (OR HEAVIER) STEEL PIPE, NOMINAL 6 IN. DIAMETER (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE OR RIGID STEEL CONDUIT, NOMINAL 4 IN. DIAM (OR SMALLER) STEEL EMT OR NOM 2 IN. DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING. MAX ONE PIPE OR CONDUIT PER THROUGH OPENING. MIN ANNUAL SPACE BETWEEN PIPE OR CONDUIT AND EDGE OF THROUGH OPENING SHALL BE 1/4 IN.

3. PACKING MATERIAL—NOMINAL 3 IN. THICKNESS OF MINERAL-WOOL BATT OR CERAMIC (ALUMINA SLICK) FIBER BLANKET PACKED INTO OPENING AS A PERMANENT FORM. PACKING MATERIAL TO BE RECESSED FROM TOP SURFACE OF FLOOR OR FORM BOTH SURFACES OF WALL AS REQUIRED TO ACCOMMODATE THE REQUIRED THICKNESS OF CAULK FILL MATERIAL. (ITEM 4)

4. FILL, VOID OR CAVITY MATERIAL—FILL MATERIAL PUMPED OR TROWELED INTO ANNULAR SPACE TO FILL OPENING ON TOP SURFACE OF FLOOR OR ON BOTH SURFACES OF WALL WITH AN ADDITIONAL BEAD OF CAULK AROUND PERIMETER OF THROUGH OPENING LAPPING 1/4 IN TO 1/2 IN ON FLOOR OR WALL SURFACES. WHEN MAX ANNUAL SPACE IS 1 IN AND WHEN FILL MATERIAL THICKNESS IS 1/2 IN, F RATING IS 2 HR. WHEN NOM PIPE OR CONDUIT DIAM IS 6 IN OR LESS AND WHEN MIN FILL MATERIAL THICKNESS IS 1 IN, F RATING IS 3 HR.

MINNESOTA MINING & MFG. CO.—TYPE FD-150.  
BEARING THE UL CLASSIFICATION MARKING

**THROUGH PENETRATION FIRESTOP SYSTEM**  
1998 UL CODE SYSTEM NO. CA1017

1. WALL ASSEMBLY—THE FIRE-RATED GYPSUM WALLBOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER DESCRIBED IN THE INDIVIDUAL U300 OR U400 SERIES WALL OR PARTITION DESIGN IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:

A. STUDS—WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOM. 2X4 INCH LUMBER SPACED 16 IN. OC. STEEL STUDS TO BE MIN. 2 1/2 INCH WIDE AND SPACED 24 IN. OC.

B. WALLBOARD—GYPSUM—TWO LAYERS OF 5/8 INCH THICK GYPSUM WALLBOARD, AS SPECIFIED IN THE INDIVIDUAL WALL AND PARTITION DESIGN. MAX DIAM OF OPENING IS 14 1/4 IN.

2. THROUGH PENETRANTS—ONE METALLIC PIPE, CONDUIT OR TUBING TO BE CENTERED WITHIN THE FIRESTOP SYSTEM. PIPE, CONDUIT, OR TUBING TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF METALLIC PIPES, CONDUIT, OR TUBING MAY BE USED:

A. STEEL PIPE—NOM 12 IN. DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE. A NOM ANNUAL SPACE OF 3/4 IN. IS REQUIRED WITHIN THE FIRESTOP SYSTEM.

B. STEEL PIPE—NOM 4 IN. DIAM (OR SMALLER) SCHEDULE 5 (OR HEAVIER) STEEL PIPE. A NOM ANNUAL SPACE OF 1/4 IN. IS REQUIRED WITHIN THE FIRESTOP SYSTEM.

C. CONDUIT—NOM 4 IN. DIAM (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING OR STEEL CONDUIT. A NOM ANNUAL SPACE OF 1/4 IN. IS REQUIRED WITHIN THE FIRESTOP SYSTEM.

D. COPPER TUBING—NOM 2 IN. DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING. A NOM ANNUAL SPACE OF 3/4 IN. IS REQUIRED WITHIN THE FIRESTOP SYSTEM.

3. FIRESTOP SYSTEM—THE FIRESTOP SYSTEM SHALL CONSIST OF THE FOLLOWING:

A. METALLIC SLEEVE—CYLINDRICAL SLEEVE FABRICATED FROM MIN 0.020 IN. THICK (NO. 25 GAUGE) GALV SHEET STEEL WITH SQUARE MOUNTING FLANGES. SCREW ATTACHED TO BOTH SURFACES OF GYPSUM WALLBOARD.

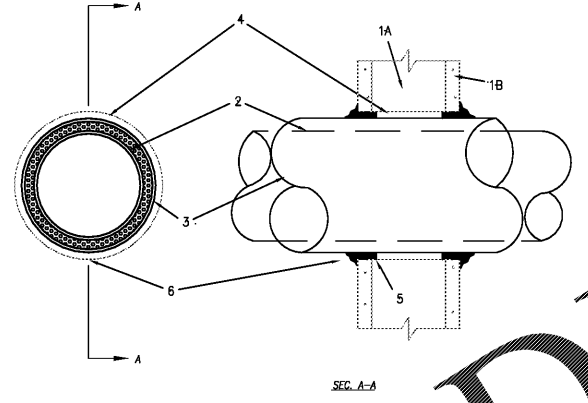
B. PACKING MATERIAL—MIN 4 IN. THICKNESS OF MIN 4 PCF MINERAL WOOL BATT INSULATION FIRMLY PACKED INTO OPENING AS A PERMANENT FORM. PACKING MATERIAL TO BE RECESSED FROM BOTH SURFACES OF WALL AS REQUIRED TO ACCOMMODATE THE REQUIRED THICKNESS OF FILL MATERIAL.

C. FILL, VOID, OR CAVITY MATERIAL—SEALANT—MIN 1/2 IN. THICKNESS OF FILL MATERIAL APPLIED WITHIN THE ANNULUS ON BOTH SURFACES OF WALL. ADDITIONAL FILL MATERIAL TO BE INSTALLED SUCH THAT A MIN 1/4 IN. BEAD OF FILL MATERIAL FORMED AROUND PENETRATING ITEM AND LAPPING OVER SLEEVE MOUNTING FLANGE.

D. COPPER TUBING—NOM 2 IN. DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING. A NOM ANNUAL SPACE OF 3/4 IN. IS REQUIRED WITHIN THE FIRESTOP SYSTEM.

**THROUGH PENETRATION FIRESTOP SYSTEM**  
1998 UL CODE SYSTEM NO. W11008

**HOURLY RATINGS**  
F RATING - 2 HR.  
T RATING - 0 HR.



1. WALL ASSEMBLY—THE FIRE RATED GYPSUM WALLBOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER SPECIFIED IN THE INDIVIDUAL U300 OR U400 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. 2X4 INCH LUMBER SPACED 16 IN. OC. STEEL CHANNEL STUDS TO BE MIN. 5/8 IN. WIDE AND SPACED 24 IN. OC.

B. WALLBOARD—GYPSUM—TWO LAYERS OF NOM 5/8 IN. THICK GYPSUM WALLBOARD AS SPECIFIED IN THE INDIVIDUAL WALL AND PARTITION DESIGN. MAXIMUM THROUGH OPENING IS 14 IN. FOR 3000 STUD WALLS AND 17 IN. FOR STEEL STUD WALLS.

2. STEEL SLEEVE—NOM 12 IN. DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE, NOM 4 IN. DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING. A NOM ANNUAL SPACE OF 3/4 IN. IS PERMITTED IN THE FIRESTOP SYSTEM. PIPE OR TUBING TO BE INSTALLED NEAR CENTER OF STUD CAVITY WIDTH AND RIGIDLY SUPPORTED ON BOTH SIDES OF THE WALL ASSEMBLY.

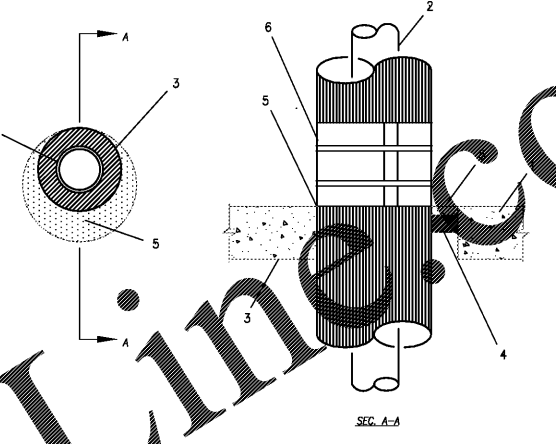
3. PIPE COVERING—NOM 1 IN. THICK HOLLOW CYLINDRICAL HEAVY DENSITY (MIN 3.5 PCF) GLASS FIBER UNITS JACKETED ON THE OUTSIDE WITH AN ALL SERVICE JACKET. LONGITUDINAL JOINTS SEALED WITH METAL FASTENERS OR FACTORY APPLIED SELF SEALING LP TAPE. TRANSVERSE JOINTS SEALED WITH METAL FASTENER STRIP TAPE SUPPLIED WITH THE PRODUCT. SEE PIPE AND EQUIPMENT COVERINGS—MATERIALS—(BRU) CATEGORY IN BUILDING MATERIALS DIRECTORY. FOR NAMES OF MANUFACTURERS. ANY PIPE COVERING MATERIAL MEETING THE ABOVE SPECIFICATIONS AND BEARING THE UL CLASSIFICATION MARKING WITH A FLAME SPREAD INDEX OF 25 OR LESS AND A SMOKE DEVELOPED INDEX OF 50 OR LESS MAY BE USED.

4. STEEL SLEEVE—CYLINDRICAL SLEEVE FABRICATED FROM MIN 0.019 IN. THICK (NO. 28 GAUGE) GALV SHEET STEEL AND HAVING A MIN 2 IN. LAP ALONG THE LONGITUDINAL SEAM. LENGTH OF STEEL SLEEVE TO BE EQUAL TO THICKNESS OF WALL PLUS 1 IN. SUCH THAT, WHEN INSTALLED, THE ENDS OF THE SLEEVE WILL PROJECT APPROX 1/2 IN. BEYOND THE SURFACE OF THE WALL ON BOTH SIDES OF THE WALL ASSEMBLY. THE DIAM OF THE TO BE 2 TO 2 1/2 IN. LARGER THAN OUTSIDE DIAM OF PIPE INSULATION SUCH THAT, WHEN THE STEEL SLEEVE IS INSTALLED, A 1 TO 1 1/4 IN. ANNULAR SPACE WILL BE PRESENT BETWEEN THE STEEL SLEEVE AND THE PIPE INSULATION AROUND THE ENTIRE CIRCUMFERENCE OF THE PIPE. SLEEVE INSTALLED BY COILING THE SHEET STEEL TO A DIAM SMALLER THAN THROUGH OPENING, INSERTING THE COIL THROUGH THE OPENINGS AND RELEASING THE COIL TO LET IT UNCOIL AGAINST THE CIRCULAR OUTLINES IN THE GYPSUM WALLBOARD LAYERS.

5. PACKING MATERIAL—POLYETHYLENE BACKER ROD OR MIN 1 IN. THICKNESS OF MINERAL WOOL BATT INSULATION FIRMLY PACKED INTO STEEL SLEEVE ON BOTH SIDES OF THE WALL ASSEMBLY AS PERMANENT FORMS. PACKING MATERIAL TO BE RECESSED MIN 1 IN. FROM END OF STEEL SLEEVE 1/2 IN. INTO GYPSUM WALLBOARD SURFACE) ON BOTH SIDES OF WALL ASSEMBLY.

6. FILL, VOID OR CAVITY MATERIAL—CAULK—MIN 1 IN. THICKNESS OF FILL MATERIAL APPLIED WITHIN THE ANNULUS, ON BOTH SIDES OF WALL ASSEMBLY. A NOM 1/4 IN. DIAM CONTINUOUS BEAD OF CAULK SHALL BE APPLIED AROUND THE CIRCUMFERENCE OF THE STEEL SLEEVE AT ITS EGRESS FROM THE GYPSUM WALLBOARD LAYERS ON BOTH SIDES OF THE WALL ASSEMBLY.

**THROUGH PENETRATION FIRESTOP SYSTEM**  
1998 UL CODE SYSTEM NO. W15011



1. FLOOR OR WALL ASSEMBLY—MIN 2 1/2 IN THICK LIGHTWEIGHT OR NORMAL WEIGHT (100-150 PCF) CONCRETE. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS\*. F RATINGS AND T RATINGS ARE DEPENDENT ON THE THICKNESS OF FLOOR OR WALL, AS WELL AS THE MAX SIZE OF THE PIPE AND THE NOM THICKNESS OF THE CELLULAR GLASS INSULATION, AS NOTED IN ITEM 3. MAX DIAM OF THROUGH OPENING IS 28 1/2 IN. SEE CONCRETE BLOCK (CAZT) CATEGORY IN THE FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURERS.

1A. STEEL SLEEVE—(OPTIONAL, NOT SHOWN)—MAX 15 IN. ID (OR SMALLER), MIN 0.25 IN. WALL THICKNESS (OR HEAVIER) STEEL SLEEVE CAST OR GROUTED INTO FLOOR OR WALL ASSEMBLY. SLEEVE MAY EXTEND A MAX OF 2 IN. ABOVE TOP OF FLOOR OR BEYOND EITHER SURFACE OF WALL. T RATING IS 0 HR WHEN SLEEVE IS USED.

2. THROUGH PENETRANTS—ONE METALLIC PIPE OR TUBING TO BE POSITIONED WITHIN THE FIRESTOP SYSTEM. PIPE OR TUBING TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR OR WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF METALLIC PIPES OR TUBING MAY BE USED:

A. STEEL PIPE—NOM 20 IN. DIAM (OR SMALLER) SCHEDULE 40 (OR HEAVIER) STEEL PIPE.

B. COPPER TUBING—NOM 6 IN. DIAM (OR SMALLER).

C. COPPER PIPE—NOM 6 IN. DIAM (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.

3. PIPE COVERING MATERIALS—CELLULAR GLASS INSULATION—NOM 1 1/2 TO 3 IN. THICK CELLULAR GLASS UNITS SIZED TO THE OUTSIDE DIAM OF THE STEEL 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. F RATINGS AND T RATINGS ARE DEPENDENT ON THE ITEMS NOTED IN THE FOLLOWING TABLE:

MIN FLOOR OR WALL THICK IN.	MAX PIPE DIAM IN.	NOM GLASS INSUL THICK IN.	F RATING HR	T RATING HR
2 1/2	6	1 1/2 AND 3	2	3/4
4 1/2	6	1 1/2	3	1
4 1/2	6	3	3	1 1/2
4 1/2	20	1 1/2	2	1 1/2
4 1/2	20	3	2	1

PITTSBURGH CORNING CORP.—FOAMGLAS

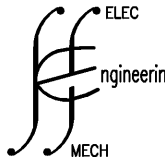
4. PACKING MATERIAL—MIN 1 IN. THICKNESS OF TIGHTLY-PACKED MINERAL WOOL BATT INSULATION MATERIAL USED AS A PERMANENT FORM. PACKING MATERIAL TO BE RECESSED 1 IN. FROM TOP SURFACE OF FLOOR OR BOTH SURFACES OF WALL TO ACCOMMODATE THE CAULK FILL MATERIAL (ITEM 5). 5. FILL VOID OR CAVITY MATERIALS—CAULK—INSTALLED TO FILL ANNULAR SPACE TO A MIN DEPTH OF 1 IN. FLUSH WITH TOP SURFACE OF FLOOR OR BOTH SURFACES OF WALL. A MIN 1/2 IN. DIAM BEAD OF CAULK SHALL BE APPLIED TO THE PIPE INSULATION/ CONCRETE INTRFACE AT THE POINT CONTACT LOCATION ON THE TOP SURFACE OF THE FLOOR AND ON BOTH SIDES OF WALLS. MINNESOTA MINING AND MFG. CO.—CP 25WB+.

6. METAL JACKET—MIN 12 IN. LONG JACKET FORMED OF MIN 0.010 IN. THICK STEEL OR ALUMINUM SHEET CUT TO WRAP TIGHTLY AROUND THE PIPE INSULATION WITH A MIN 2 IN. LAP AND SECURED USING BANDS AND SEALS OF SIMILAR MATERIAL. BANDS TO BE LOCATED WITHIN 2 IN. OF EACH END OF THE JACKET AND SPACED MAX 10 IN. OC. JACKET TO BE INSTALLED WITH EDGE ABUTTING SURFACE OF CAULK FILL MATERIAL (ITEM 5) ON TOP SURFACE OF FLOOR OR BOTH SURFACES OF WALL. METAL JACKET TO BE USED IN ADDITION TO ANY OTHER JACKETING MATERIAL WHICH MAY BE REQUIRED OR DESIRED ON THE PIPE INSULATION.

**THROUGH PENETRATION FIRESTOP SYSTEM**  
1998 UL CODE SYSTEM NO. CA5060

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**THROUGH PENETRATION DETAILS**  
**MEP001**