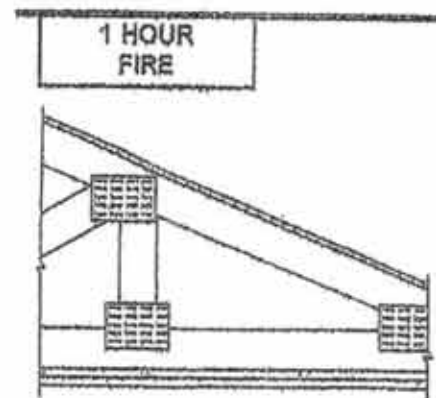


GA FILE NO. RC 2602

GENERIC

# WOOD TRUSSES, GYPSUM WALLBOARD

Base layer 1/4" type X gypsum wallboard applied at right angles to wood roof trusses 24" o.c. with 1 1/2" Type W or S drywall screws 3/4" o.c. Face layer 1/2" type X gypsum wallboard or gypsum veneer base applied at right angles to trusses with 1 1/2" Type W or S drywall screws 12" o.c. at joints and intermediate trusses and 1 1/2" Type G drywall screws 12" o.c. placed 2" back on either side of end joints. Joints offset 24" from base layer joints. Wood trusses supporting 1/2" wood structural panels applied at right angles to trusses with 8d nails. Appropriate roof covering. Ceiling provides one hour fire resistance protection for trusses.



Approx. Ceiling  
Weight:  
Fire Test:  
8 pcf  
UL PC 172, 5-22-72;  
179, 5-2-98

## DETAIL

SCALE: N.T.S.

GYPSUM ASSOCIATION RC-2602

8XUV.U356

Fire Resistance Ratings - ANSI/UL 263

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### Design/System/Construction/Assembly Usage Disclaimer

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- Authorities Having Jurisdiction should be consulted before construction.
- Fire resistance assemblies and products are developed by the design submitter and have been investigated by UL for compliance with applicable requirements. The published information cannot always address every construction nuance encountered in the field.
- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
- Only products which bear UL's Mark are considered as Classified, Listed, or Recognized.

Fire Resistance Ratings - ANSI/UL 263

See General Information for Fire Resistance Ratings - ANSI/UL 263

Design No. U356

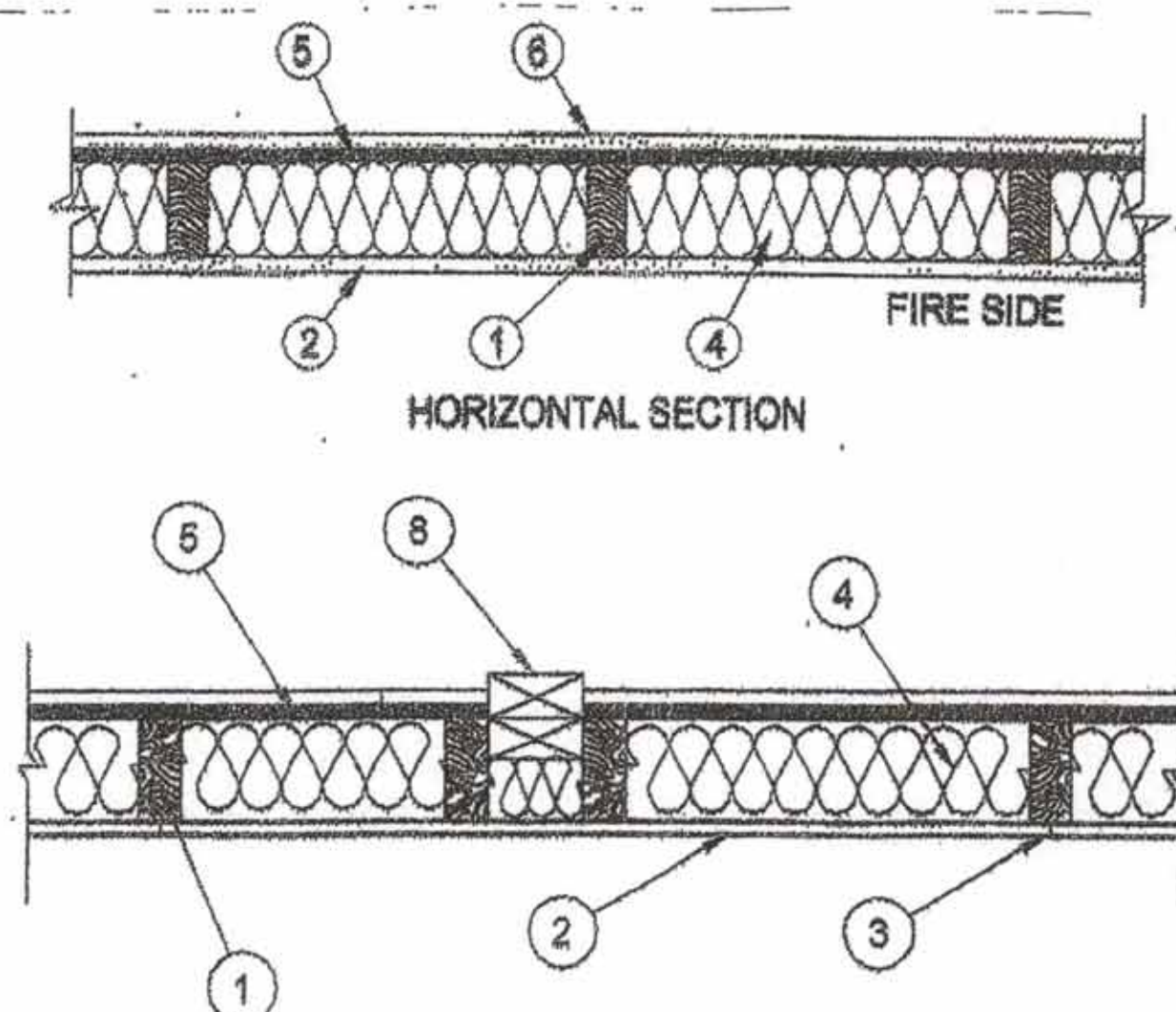
July 28, 2009

(Exposed to Fire on Interior Face Only)

Bearing Wall Rating - 1 Hr

Finish Rating - 23 Min or 25 Min (See Item 2C)

Load Restricted for Canadian Applications - See Guide 8XUVZ



HORIZONTAL SECTION

2

## DETAIL

SCALE: N.T.S.

U.L. ASSEMBLY U-356

1. Wood Studs - Nom 2 by 4 in. spaced 16 in. OC with two 2 by 4 in. top and one 2 by 4 in. bottom plates. Studs laterally-braced by wood structural panel sheathing (Item 8). When Mineral and Fiber Boards\* (Item 5A) are considered as bracing for the studs, the load is restricted to 75% of allowable axial load. Walls effectively fire stopped at top and bottom of wall.

2. Gypsum Board\* - Any Classified 5/8 in. thick, 4 ft wide, applied vertically and nailed to studs and bearing plates 7 in. OC with 6d cement-coated nails, 1-7/8 in. long with 1/4 in. diam head.

When Item 7, Steel Framing Members\*, is used, gypsum panels attached to furring channels with 1 in. long Type S bugle-head steel screws spaced 12 in. OC.

When Item 7A, Steel Framing Members\*, is used, two layers of gypsum panels attached to furring channels. Base layer attached to furring channels with 1 in. long Type S bugle-head steel screws spaced 12 in. OC. Face layer attached to furring channels with 1-8/9 in. long Type S bugle-head steel screws spaced 12 in. OC. All joints in face layers staggered with joints in base layers.

See Gypsum Board (GKNX) Category for names of Classified Companies.

2A. Gypsum Board\* - (As an alternate to Item 2, not shown) - Any 5/8 in. thick 4 ft wide gypsum panels supplied by the Classified Companies listed below shown Gypsum Board\* (GKNX) category. Applied vertically and attached to studs and bearing plates with 1-1/4 in. long Type W coarse thread gypsum panel steel screws spaced a max 8 in. OC, with last screw 1 in. from edge of board.

CANADIAN GYPSUM COMPANY

UNITED STATES GYPSUM CO

USG MEXICO S A DE CV

2B. Gypsum Board\* - (As an alternate to Item 2, not shown) - 5/8 in. thick 4 ft wide gypsum panels applied vertically and attached to studs and bearing plates with 1-1/4 in. long Type W coarse thread gypsum panel steel screws spaced a max 8 in. OC, with last screw 1 in. from edge of board.

AMERICAN GYPSUM CO - Types AGX-1, AG-C

CERTAINTEED GYPSUM INC - ProRec Type C or ProRec Type X

CERTAINTEED GYPSUM CANADA INC - ProRec Type C or ProRec Type X

PABCO BUILDING PRODUCTS L L C, DBA

PABCO GYPSUM - Type PG-11

TEMPLE-INLAND FOREST PRODUCTS CORP - Types X, Veneer Plaster Base-Type X, Water Rated-Type X, Sheathing Type-X, Soffit-Type X, Type X ComfortSound Sound Dampening Gypsum Board.

2C. Gypsum Board\* - (As an alternate to Item 2, not shown) - For Use with Item 5A only - 5/8 in. thick 4 ft wide gypsum panels applied horizontally and attached to studs and bearing plates with 1-1/4 in. long Type W coarse thread gypsum panel steel screws spaced a max 8 in. OC, with last screws 1 in. and 4 in. from edges of board. Finish Rating is 25 min.

PABCO BUILDING PRODUCTS L L C, DBA

PABCO GYPSUM - Type PG-11

TEMPLE-INLAND FOREST PRODUCTS CORP - Type X, Veneer Plaster Base-Type X, Water Rated-Type X, Sheathing Type-X, Soffit-Type X

3. Joints and Nailheads - (Not Shown) - Wallboard joints covered with tape and joint compound. Nail heads covered with joint compound.

4. Batts and Blankets\* - Mineral fiber or glass fiber insulation, 3-1/2 in. thick, pressure fit to fill wall cavities between studs and plates. Mineral fiber insulation to be un-faced and to have a min density of 3 pcf. Glass fiber insulation to be faced with aluminum foil or kraft paper and to have a min density of 0.9 pcf (min R-12 thermal insulation rating).

See Batts and Blankets (BKNV) Category in the Building Materials Directory and Batts and Blankets (BZ12) Category in the Fire Resistance Directory for names of Classified Companies.

4A. Fiber, Sprayed\* - As an alternate to Batts and Blankets (Item 4) - Spray applied cellulose material. The fiber is applied with water to completely fill the enclosed cavity in accordance with the application instructions supplied with the product. Nominal dry density of 3.0 lb/ft<sup>3</sup>. Alternate application method: The fiber is applied with U.S. Gypsum LLC Type AD100 hot melt adhesive at a nominal ratio of one part adhesive to 6.5 parts fiber to completely fill the enclosed cavity in accordance with the application instructions supplied with the product. Nominal dry density of 2.5 lb/ft<sup>3</sup>.

U S GREENFIBER L L C - Cocoon2 Stabilized or Cocoon-FRM (Fire Rated Material)

4B. Fiber, Sprayed\* - As an alternate to Item 4 and 4A - Spray applied cellulose material. The fiber is applied with water to completely fill the enclosed cavity in accordance with the application instructions supplied with the product. Nominal dry density of 4.58 lb/ft<sup>3</sup>.

NU-WOOL CO INC - Cellulose Insulation

5. Wood Structural Panel Sheathing - Min 7/16 in. thick, 4 ft wide wood structural panels, min grade "C-D" or "Sheathing". Installed with long dimension of sheet (strength axis) or face grain of plywood parallel with or perpendicular to studs. Vertical joints centered on studs. Horizontal joints backed with nom 2 by 4 in. wood blocking. Attached to studs on exterior side of wall with 6d cement coated box nails spaced 6 in. OC at perimeter of panels and 12 in. OC along interior studs. As an option a weather resistive barrier may be applied over the Mineral and Fiber Boards.

5A. Mineral and Fiber Boards\* - As an alternate to Item 5 - Min 1/2 in. thick, 4 ft wide sheathing, installed vertically to studs. Vertical joints centered on studs. Horizontal joints backed with nom 2 by 4 in. wood blocking. Attached to studs on exterior side of wall with 1-1/2 in. long galvanized roofing nails spaced 6 in. OC at perimeter of panels and 12 in. OC along interior studs. As an option a weather resistive barrier may be applied over the Mineral and Fiber Boards.

TEMPLE-INLAND FOREST PRODUCTS CORP - Types FiberBrace or QuietBrace

6. Exterior Facings - Installed in accordance with the manufacturer's installation instructions. One of the following exterior facings is to be applied over the sheathing:

A. Vinyl Siding - Molded Plastic\* - Contoured rigid vinyl siding having a flame spread value of 50 or less.

See Molded Plastic (BTAT) category in the Building Materials Directory for names of manufacturers.

B. Particle Board Siding - Hardboard exterior sidings including patterned panel or lap siding.

C. Wood Structural Panel or Lap Siding - APA Rated Siding - Exterior, plywood, OSB or composite panels with veneer faces and structural wood core, per PS 1 or APA Standard PRP-108, including textured, rough sawn, medium density overlay, brushed, grooved and lap siding.

D. Cementitious Stucco - Portland cement or synthetic stucco systems with self-furring metal lath or adhesive base coat. Thickness from 3/8 to 3/4 in., depending on system.

E. Brick Veneer - Any type on nom 4 in. wide brick veneer. When brick veneer is used, the rating is applicable with exposure on either face. Brick veneer fastened with corrugated metal wall ties attached over sheathing to wood studs with 8d nail per tie; ties spaced not more than each sixth course of brick and max 32 in. OC horizontally. One in. air space provided between brick veneer and sheathing.

F. Exterior Insulation and Finish System (EIFS) - Nom 1 in. Foamed Plastic\* insulation bearing the UL Classification Marking, attached over sheathing and finished with coating system, or Portland cement or synthetic stucco systems, in accordance with manufacturer's instructions. See Foamed Plastic (BRTX and CCVV) categories for names of Classified companies.

G. Siding - Aluminum or steel siding attached over sheathing to studs.

H. Fiber-Cement Siding - Fiber-cement exterior sidings including smooth and patterned panel or lap siding.

7. Steel Framing Members - (Optional, Not Shown)\* - Furring Channels and Steel Framing Members as described below:

a. Furring Channels - Formed of No. 25 MSG galv steel, 2-3/8 in. wide by 7/8 in. deep, spaced 26 in. OC perpendicular to studs. Channels secured to studs as described in Item b. Ends of adjoining channels are overlapped 6 in. and tied together with double strand of No. 18 SWG galv steel wire near each end of overlap. As an alternate, ends of adjoining channels may be overlapped 6 in. and secured together with two self-tapping #6 framing screws, min. 7/16 in. long at the midpoint of the overlap, with one screw on each flange of the channel. Gypsum board attached to furring channels as described in Item 2.

b. Steel Framing Members\* - Used to attach furring channels (Item 7a) to studs. Clips spaced 48 in. OC, and secured to studs with No. 8 x 2-1/2 in. coarse drywall screw through the center grommet. Furring channels are friction fitted into clips.

PAC INTERNATIONAL INC - Type RSIC-1.

7A. Steel Framing Members (Optional, Not Shown)\* - Furring channels and Steel Framing Members as described below:

a. Furring Channels - Formed of No. 25 MSG galv steel, spaced 24 in. OC perpendicular to studs. Channels secured to studs as described in Item b. Ends of adjoining channels are overlapped 6 in. and tied together with double strand of No. 18 SWG galv steel wire near each end of overlap. Two layers of gypsum board attached to furring channels as described in Item 2.

b. Steel Framing Members\* - Used to attach furring channels (Item 7Aa) to interior side of studs. Clips spaced 48 in. OC, and secured to studs with two No. 8 x 2-1/2 in. coarse drywall screws, one through the hole at each end of the clip. Furring channels are friction fitted into clips.

KINETICS NOISE CONTROL INC - Type Isomax.

8. Non-Bearing Wall Partition Intersection - (Optional) Two nominal 2 by 4 in. stud or nominal 2 by 6 in. stud nailed together with two 3in. long 10d nails spaced a max. 16 in. OC, vertically and fastened to one side of the minimum 2 by 4 in. stud with 3 in. long 10d nails spaced a max. 16 in. OC. Intersection between partition wood studs to be flush with the 2 by 4 in. studs. The wall partition wood studs are to be framed by with a second 2 by 4 in. wood stud fastened with 3 in. long 10d nails spaced a max. 16 in. OC vertically. Maximum one non-bearing wall partition intersection per stud cavity. Non-bearing wall partition stud depth shall be at a minimum equal to the depth of the bearing wall.

\*Bearing the UL Classification Mark

Last Updated on 2009-07-28

UL ONLINE CERTIFICATIONS DIRECTORY

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8XUV.U902

Fire Resistance Ratings - ANSI/UL 263

### Design/System/Construction/Assembly Usage Disclaimer

- Authorities Having Jurisdiction should be consulted in all cases as to the particular requirements covering the installation and use of UL Listed or Classified products, equipment, systems, devices, and materials.
- Authorities Having Jurisdiction should be consulted before construction.
- Fire resistance assemblies and products are developed by the design submitter and have been investigated by UL for compliance with applicable requirements. The published information cannot always address every construction nuance encountered in the field.
- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
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Fire Resistance Ratings - ANSI/UL 263

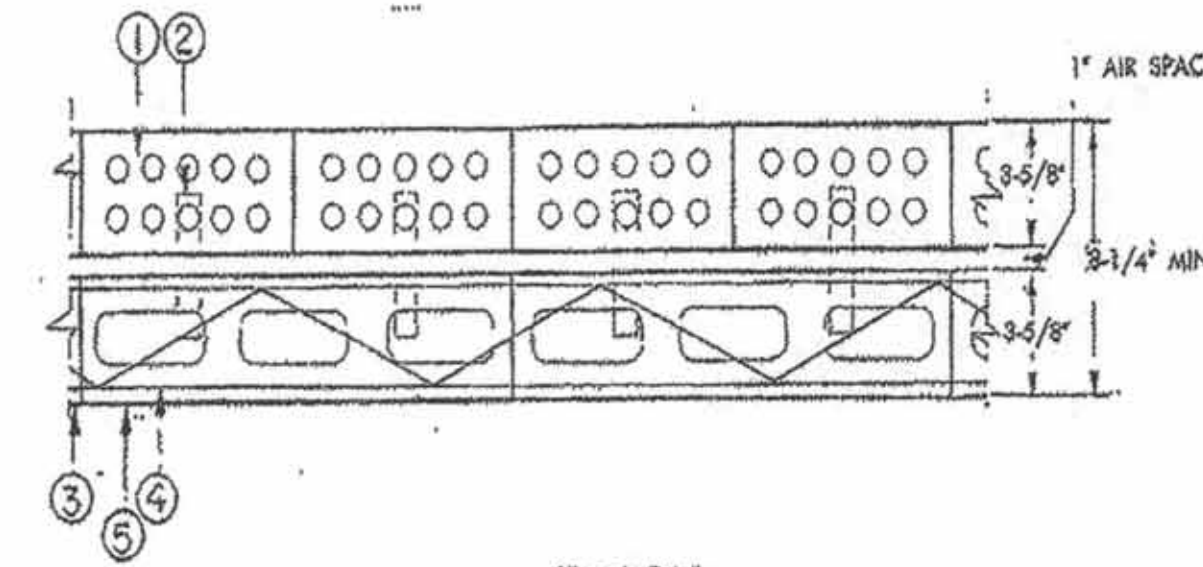
See General Information for Fire Resistance Ratings - ANSI/UL 263

Design No. U902

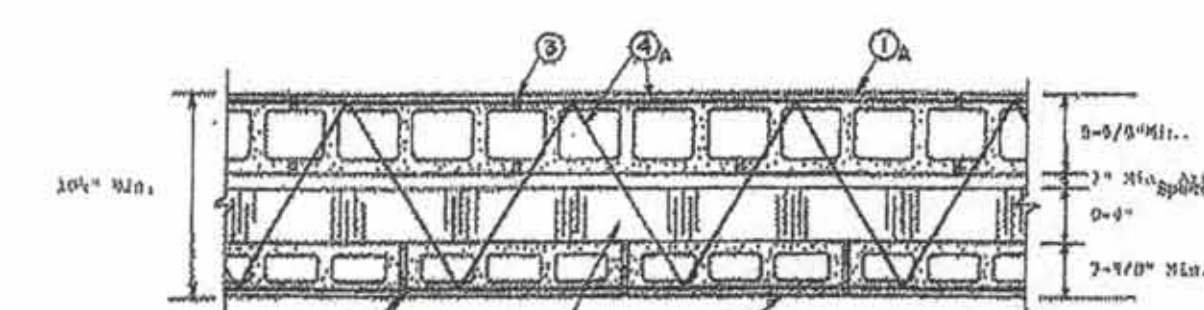
October 30, 2009

Bearing Wall Rating - 4 HR.

Load Restricted for Canadian Applications - See Guide 8XUVZ



Alternate Detail



1. Clay Face Brick - 3-5/8 in. wide by 2-1/4 in. high by 8 in. long.

1A. Concrete Blocks\* - Various designs, Classification D-2 (2 h).

See Concrete Blocks category for list of eligible manufacturers.

2. Brick Ties - 3/4 in. wide, 7 in. long corrugated 26 MSG galv steel. Spaced one to each brick in every second course of blocks.

3. Mortar - Bricks and blocks laid in full bed of mortar nom. 3/8 in. thick of not less than 2-1/4 and not more than 3-1/2 parts clean sharp sand to 1 part Portland cement (proportioned by vol) and not more than 50 percent hydrated lime (by cement vol). Vertical joints staggered.

4. Reinforcement - Parallel and diagonal rods, 0.190 in. min diam with welded joints a max 16 in. OC. Placed the width of concrete block wall in every second course of blocks alternately with brick ties.

4A. Masonry Reinforcement - Prefabricated steel reinforcement, truss or ladder type, used for embedment in every second horizontal mortar joint. Placed the full width of wall assembly. Side and cross rods No. 9 (0.190 in.) min diam with welded joints a max 16 in. OC.

5. Concrete Blocks\* - Various designs Classification D-2 (2 h). See Concrete Blocks category for list of eligible manufacturers.

6. Foamed Plastic\* - (Optional - Not shown with clay face brick detail) Rigid polystyrene insulation for use between brick and/or concrete blocks. One or more layers of rigid extruded polystyrene insulation, 4 in. thick max having 1 in. min air space with face brick or blocks.

THE DOW CHEMICAL CO

OC CELFORTEC ZINC

OWENS CORNING SPECIALTY & FOAM

PRODUCTS - Type 150 or 250.

6A. Foamed Plastic\* - (Optional - Not shown with clay face brick detail) Rigid polystyrene insulation for use between brick and/or concrete blocks. One or more layers of rigid extruded polystyrene insulation, 4 in. thick max having 1 in. min air space with face brick or blocks.

THE DOW CHEMICAL CO - Type Thermax

NCFE POLYURETHANES

\*Bearing the UL Classification Mark

Last Updated on 2009-10-30

3

## DETAIL

SCALE: N.T.S.

U.L. ASSEMBLY U-902

(4-HR FIREWALL ABOVE ROOF DECK - USED AS 2-HR)

David R. Polston - Architect

104 BED NURSING FACILITY

FS 1

PRUITT HEALTH CRYSTAL COAST Beaufort, North Carolina

David R. Polston 12.18.2021 13.17.2021



**5XUV.U305**  
**Fire Resistance Ratings ~ ANSI/UL 263**

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**Design/System/Construction/Assembly Usage Disclaimer**

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- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer (not) for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specific concerning alternate materials and alternate methods of construction.
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**Fire Resistance Ratings ~ ANSI/UL 263**

See General Information for Fire Resistance Ratings ~ ANSI/UL 263

Design No. U305

December 23, 2008

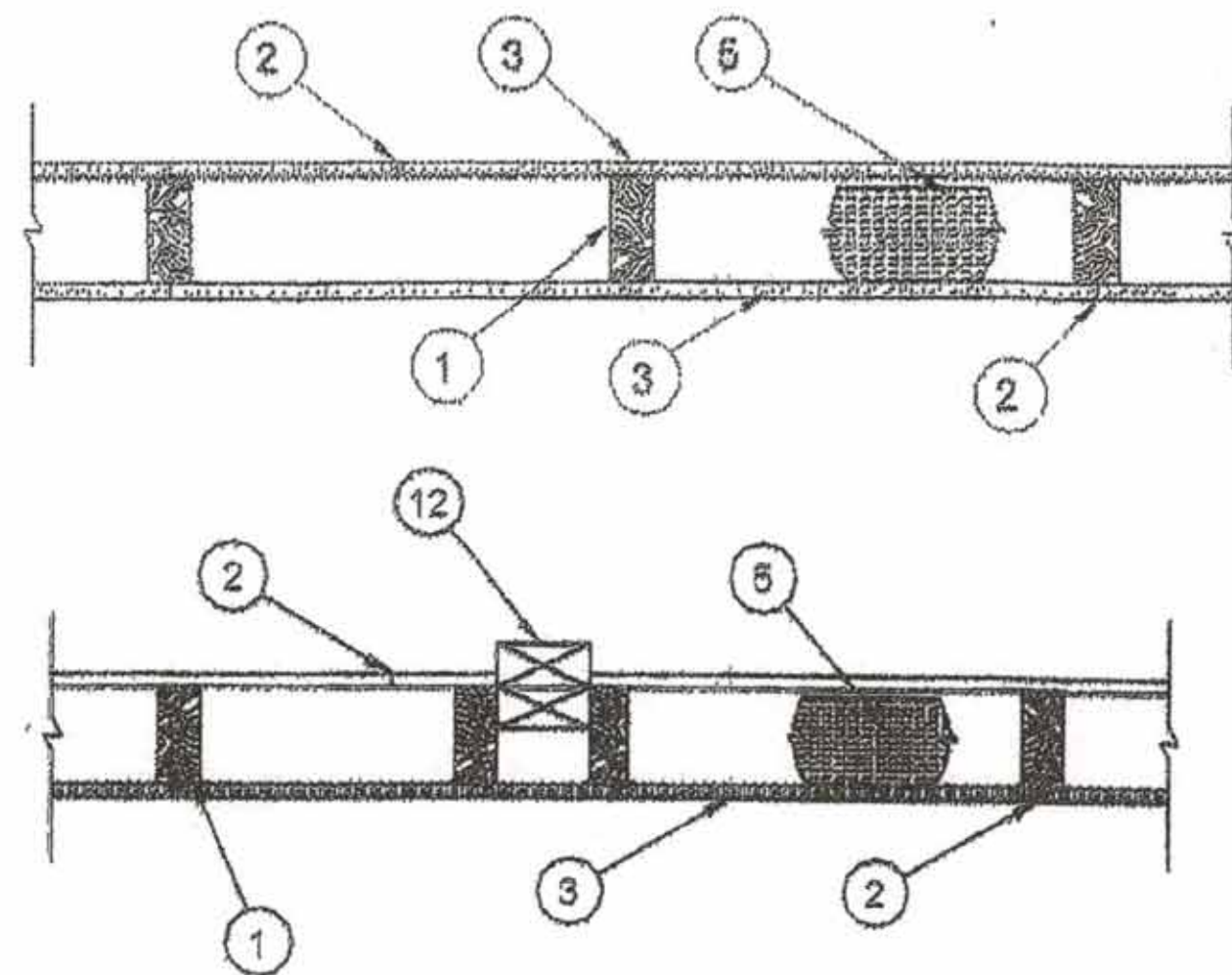
Bearing Wall Rating ~ 1 HR.

Bearing Wall Rating ~ ¾ HR (See Item 6B)

Finish Rating ~ See Items 3, 3A, 3D, 3E, 3F, 3G and 3H.

STC Rating ~ 96 (See Item 9)

Load Restricted for Canadian Applications ~ See Guide 5XUVZ



1. Wood Studs ~ Nom 2 by 4 in. spaced 16 in. OC max, effectively firestopped.

2. Joints and Nail-Heads ~ Exposed or covered with fiber tape and joint compound, except where required for specific edge configuration. For tapered, rounded-edge gypsum board, joints covered with joint compound or fiber tape and joint compound. As an alternate, nom 3/32 in. thick gypsum veneer plaster may be applied to the entire surface of Classified veneer baseboard. Joints reinforced. Nailheads exposed or covered with joint compound.

3. Gypsum Board\* ~ 5/8 in. thick paper or vinyl surfaced, with beveled, square, or tapered edges, applied either horizontally or vertically. Gypsum panels nailed 7 in. OC with 6d cement coated nails 1-7/8 in. long, 0.0915 in. shank diam and 15/64 in. diam heads. When used in widths other than 48 in., gypsum panels are to be installed horizontally. For an alternate method of attachment of gypsum panels, refer to Item 6, 6A or 6B, Steel Framing Members\*.

When Item 6, Steel Framing Members\*, is used, gypsum panels attached to furring channels with 1 in. long Type 8 bugle-head steel screws spaced 12 in. OC.

When Item 6A, Steel Framing Members\*, is used, two layers of gypsum panels attached to furring channels. Base layer attached to furring channels with 1 in. long Type 8 bugle-head steel screws spaced 12 in. OC. Face layer attached to furring channels with 1-5/8 in. long Type 8 bugle-head steel screws spaced 12 in. OC. All joints in face layer staggered with joints in base layer. One layer of gypsum board attached to opposite side of wood stud without furring channels as described in Item 3.

When Item 6B (¾ hr rating), Steel Framing Members\*, is used, one layer of gypsum panels attached to furring channels with 1 in. long Type 8 bugle-head steel screws spaced 12 in. OC. Joints oriented vertically and staggered on opposite sides of the assembly. One layer of gypsum board attached to opposite side of wood stud without furring channels as described in Item 3.

When Item 6B (1 hr rating), Steel Framing Members\*, is used, two layers of gypsum panels attached to furring channels. Base layer attached to furring channels with 1 in. long Type 8 bugle-head steel screws spaced 12 in. OC. Face layer attached to furring channels with 1-5/8 in. long Type 8 bugle-head steel screws spaced 12 in. OC. All joints in face layer staggered with joints in base layer a minimum of 16 in. Joints oriented vertically and base layer staggered on opposite sides of the assembly. One layer of gypsum board attached to opposite side of wood stud without furring channels as described in Item 3.

When Item 7, resilient channels are used, 5/8 in. thick, 4 ft wide gypsum panels applied vertically. Screw attached furring channels with 1 in. long, self-drilling, self-tapping Type 3 or 5-12 steel screws spaced 8 in. OC, vertical joints located midway between studs.

AMERICAN GYPSUM CO ~ Types AGX-1 (finish rating 23 min.), Type AGX-11 (finish rating 26 min) or Type AG-C

BEIJING NEW BUILDING MATERIALS PUBLIC

LTD CO ~ Type DBX-1 (finish rating 24 min).

CERTAINTED GYPSUM INC ~ Type 1, Type SP3 (finish rating 20 min) or FRPC, ProRoce Type C or ProRoce Type X (finish rating 25 min), Type GRX2 (finish rating 23 min)

CERTAINTED GYPSUM CANADA INC ~ ProRoce Type C, ProRoce Type X or ProRoce Type Abuse-Resistant (finish rating 26 min)

CANADIAN GYPSUM COMPANY ~ Type AR (finish rating 24 min), Type C (finish rating 24 min), Type FCV (finish rating 24 min), Type IP-AR (finish rating 24 min), Type WRC (finish rating 24 min), Type IP-X1 (finish rating 24 min), Type IP-X2 (finish rating 24 min), Type SCX (finish rating 24 min), Type SHX (finish rating 24 min), Type WRC (finish rating 24 min), Type WRX (finish rating 24 min).

GEORGIA-PACIFIC GYPSUM L L C ~ Type 5 (finish rating 26 min), Type 6 (finish rating 23 min), Type 9 (finish rating 26 min), Type C (finish rating 26 min), Type DGG (finish rating 20 min), Type GPF5 (finish rating 20 min), Type GPF2 (finish rating 20 min), Type GPF8 (finish rating 26 min), Type D8, Type DAF, Type DD (finish rating 20 min), 5A, DAF5.

LAFARGE NORTH AMERICA INC ~ Type LGFC2 (finish rating 20 min), Type LGFC3 (finish rating 20 min), Type LGFC5 (finish rating 26 min), Type LGFC-C (finish rating 20 min), Type LGFC6A (finish rating 24 min), Type LGFC2A, Type LGFC-A.

NATIONAL GYPSUM CO ~ Type FSK (finish rating 20 min), Type FSK-G (finish rating 20 min), Type FSW (finish rating 20 min), Type FSW-2 (finish rating 24 min), Type FSW-3 (finish rating 20 min), Type FSW-5 (finish rating 22 min), Type FSW-6 (finish rating 20 min), Type FSK-C (finish rating 20 min), Type FSW-C (finish rating 20 min), Type FSKR-C, Type FSW-5 (finish rating 20 min).

PABCO BUILDING PRODUCTS L L C, DBA

PABCO GYPSUM ~ Types C, PG-2 (finish rating 20 min), PG-3 (finish rating 20 min), Types PG-SW, PG-SW (finish rating 20 min), Type PG-4 (finish rating 20 min), Type PG-6 (finish rating 23 min), Types PG-SWS, PG-SWS (finish rating 20 min), Types PG-8, PG-9 (finish rating 26 min), PG-11 or Type PG-C.

PANEL REY SA ~ Type PRX.

SIAM GYPSUM INDUSTRY (SARABURI) CO LTD ~ Type EX-1 (finish rating 26 min)

TEMPLE-INLAND FOREST PRODUCTS CORP ~ Type X, Veneer Plaster Base ~ Type X, Water Rated ~ Type X, Sheathing ~ Type X, Soffit ~ Type X.

UNITED STATES GYPSUM CO ~ Type AR (finish rating 24 min), Type SCX (finish rating 24 min), Type C (finish rating 24 min), Type WRX (finish rating 24 min), Type WRC (finish rating 24 min), Type IP-X1 (finish rating 24 min), Type PCV (finish rating 24 min), Type IP-X2 (finish rating 24 min), Type SHX (finish rating 24 min), Type PRX-G (finish rating 26 min), Type IP-AR (finish rating 24 min), Type IPC-AR (finish rating 24 min).

USG MEXICO S A DE C V ~ Type AR (finish rating 24 min), Type C (finish rating 24 min), Type WRX (finish rating 24 min), Type WRC (finish rating 24 min), Type IP-X1 (finish rating 24 min), Type PCV (finish rating 24 min), Type IP-X2 (finish rating 24 min), Type SHX (finish rating 24 min), Type SCX (finish rating 24 min), Type IP-AR (finish rating 24 min), Type IPC-AR (finish rating 24 min).

3A. Gypsum Board\* ~ (As an alternate to Item 3) ~ 5/8 in. thick gypsum panels, with beveled, square, or tapered edges, applied either horizontally or vertically. Gypsum panels fastened to framing with 1-1/4 in.

long Type W coarse thread gypsum panel steel screws spaced a max 8 in. OC, with lead screw 1 in. from edge of board. When used in widths of other than 48 in., gypsum boards are to be installed horizontally.

AMERICAN GYPSUM CO ~ Types AGX-1 (finish rating 26 min.), Type AG-C (finish rating 26 min.).

CANADIAN GYPSUM COMPANY ~ Type AR (finish rating 24 min), Type C (finish rating 24 min), Type FCV (finish rating 24 min), Type IP-AR (finish rating 24 min), Type IPC-AR (finish rating 24 min), Type IP-X1 (finish rating 24 min), Type IP-X2 (finish rating 24 min), Type SCX (finish rating 24 min), Type SHX (finish rating 24 min), Type WRC (finish rating 24 min), Type WRX (finish rating 24 min).

UNITED STATES GYPSUM CO ~ Type AR (finish rating 24 min), Type SCX (finish rating 24 min), Type C (finish rating 24 min), Type WRX (finish rating 24 min), Type WRC (finish rating 24 min), Type IP-X1 (finish rating 24 min), Type PCV (finish rating 24 min), Type IP-X2 (finish rating 24 min), Type SHX (finish rating 24 min), Type PRX-G (finish rating 26 min), Type IP-AR (finish rating 24 min), Type IPC-AR (finish rating 24 min).

USG MEXICO S A DE C V ~ Type AR (finish rating 24 min), Type C (finish rating 24 min), Type WRX (finish rating 24 min), Type WRC (finish rating 24 min), Type IP-X1 (finish rating 24 min), Type PCV (finish rating 24 min), Type IP-X2 (finish rating 24 min), Type SHX (finish rating 24 min), Type SCX, Type IP-AR (finish rating 24 min), Type IPC-AR (finish rating 24 min).

3B. Gypsum Board\* ~ (As an alternate to Item 2) ~ Nom 3/4 in. thick, installed with 1-7/8 in. long cement coated nails as described in Item 3 or 1-3/8 in. long Type W coarse thread gypsum panel steel screws as described in Item 3A.

CANADIAN GYPSUM COMPANY ~ Types AR, IP-AR.

UNITED STATES GYPSUM CO ~ Types AR, IP-AR.

USG MEXICO S A DE C V ~ Types AR, IP-AR.

3C. Gypsum Board\* ~ (As an alternate to Items 3, 3A and 3B) ~ 5/8 in. thick, 2 ft wide, tongue and groove edge, applied horizontally to one side of the assembly. Installed with 1-7/8 in. long cement coated nails as described in Item 3 or 1-1/4 in. long Type W coarse thread gypsum panel steel screws as described in Item 3A. Joint covering (Item 2) not required.

CANADIAN GYPSUM COMPANY ~ Type SHX.

UNITED STATES GYPSUM CO ~ Type SHX.

USG MEXICO S A DE C V ~ Type SHX.

3D. Wall and Partition Fittings and Accessories\* ~ (As an alternate to Items 3, 3A, 3B and 3C, not shown) ~ Nominal 5/8 in. thick lead backed gypsum panels, applied vertically to studs and bearing plates on one side of the assembly with 1-5/8 in. long Type S screws spaced 12 in. OC at perimeter of panels and 8 in. OC in the field. Horizontal joints of vertically applied panels need not be backed by studs. Panel joints covered with paper tape and two layers of joint compound. Screws covered with two layers of joint compound. Batts and Blankets placed in stud cavity as described in Item 5E. Not evaluated for use with Steel Framing Members, Furring Channels or Fiber, Sprayed.

QUIET SOLUTION INC ~ Type QuietRock QR-530 (finish rating 23 min).

3E. Gypsum Board\* ~ (As an alternate to Items 3, 3A, 3B, 3C, or 3D - not shown) For Direct Application to Studs Only: Nom 5/8 in. thick lead backed gypsum panels with beveled, square or tapered edges, applied vertically. Vertical joints centered over studs and staggered min 1 stud cavity on opposite sides of studs.

Wallboard secured to studs with 1-5/8 in. long Type W coarse thread gypsum panel steel screws spaced 8 in. OC at perimeter and in the field. Lead batten strips required behind vertical joints of lead backed gypsum wallboard and optional at remaining stud locations. Lead batten strips, min 1-1/2 in. wide, max 10 ft long with a max thickness of 0.125 in. placed on the face of studs and attached to the stud with two 1 in. long Type 5-12 pan head steel screws, one at the top of the strip and one at the bottom of the strip. Lead discs or tabs may be used in lieu of or in addition to the lead batten strips or optional at other locations. Max 3/4 in. diam by max 0.125 in. thick lead discs compression fitted or adhered over steel screw heads or max 1/2 in. by 1-1/4 in. by max 0.125 in. thick lead tabs placed on gypsum boards underneath screw locations prior to the installation of the screws. Lead batten strips to have a purity of 98.8% meeting the Federal specification QQ-L-201F, Grade "C".

RAY-BAR ENGINEERING CORP ~ Type RB-LBG (finish rating 24 min).

3F. Gypsum Board\* ~ (As an alternate to Items 3, 3A, 3B, 3C, 3D, and 3E) ~ 5/8 in. thick gypsum panels, with square edges, applied either horizontally or vertically. Gypsum panels fastened to framing with 1-1/4 in. long Type W coarse thread gypsum panel steel screws spaced a max 8 in. OC, with two 2 screws 4 and 4 in. from edge of board or nailed 7 in. OC with 6d cement coated nails 1-7/8 in. long, 0.0915 in. shank diam and 15/64 in. diam heads. When used in widths of other than 48 in., gypsum boards are to be installed horizontally. Joints and nail heads treated as described in Item 2.

TEMPLE-INLAND FOREST PRODUCTS CORP ~ GreenGlass Type X (finish rating 23 min).

3G. Gypsum Board\* ~ (As an alternate to Items 3, 3A, 3B, 3C, 3D, 3E and 3F) ~ 5/8 in. glass-mat faced with square edges, applied either horizontally or vertically. Gypsum panels nailed 7 in. OC around the perimeter and in the field with 6d cement coated nails 1-7/8 in. long, 0.0915 in. shank diam and 15/64 in. diam heads. Nails shall be placed 1 inch and 3 inch from horizontal joints and 7 inch OC thereafter.

UNITED STATES GYPSUM CO ~ Type USGX (finish rating 22 min.).

3H. Gypsum Board\* ~ (As an alternate to Items 3, 3A, 3B, 3C, 3D, 3E 3F and 3G) ~ 5/8 in. thick paper surfaced applied vertically. Gypsum panels nailed 7 in. OC with 6d cement coated nails 1-7/8 in. long, 0.0915 in. shank diam and 15/64 in. diam heads.

TEMPLE-INLAND FOREST PRODUCTS CORP ~ Type X ComfortGuard Sound Densening Gypsum Board (finish rating 27 min).

4. Steel Corner Fasteners ~ (Optional) ~ For use at wall corners, Channel shaped, 2 in. long by 1 in. high on the back side with two 1/8 in. wide tabs protruding into the 5/8 in. wide channel, fabricated from 24 gauge galv steel. Fasteners applied only to the end or cut edge (not along tapered edges) of the gypsum board, no greater than 2 in. from corner of gypsum board, max spacing 16 in. OC. Nailed to adjacent stud through tab using one No. 6d cement coated nail per fastener. Corners of wall board shall be nailed to top and bottom plate using No. 6d cement coated nails.

5. Batts and Blankets\* ~ (Optional ~ Required when Item 6A is used) Glass fiber or mineral wool insulation. Placed to completely or partially fill the stud cavities. When Item 6A is used, glass fiber or mineral wool insulation shall be placed to completely fill the stud cavities and shall be secured to the studs 24 in. OC with staples, nails or screws.

CERTAINTED CORP

GUARDIAN FIBERGLASS INC

JOHNS MANVILLE INTERNATIONAL INC

KNAUF INSULATION GMBH

OWENS CORNING HT INC, DIV OF OWENS

CORNING ~ Corning Fiberglas Corp.

ROCK WOOL MANUFACTURING CO ~ Dolta Board.

ROXUL ASEA SDN BHD ~ Acoustical Fire Batts

ROXUL INC ~ Acoustical Fire Batts

THERMAFIBER INC ~ Type SAFB.

5A. Fiber, Sprayed\* ~ (Not shown ~ Not for use with Item 6A) As an alternate to Batts and Blankets (Item 5) ~ Spray applied cellulose material. The fiber is applied with water to completely fill the enclosed cavity in accordance with the application instructions supplied with the product. Nominal dry density of 3.0 lb/ft³. Alternate application method: The fiber is applied with U.S. Greenfiber LCC Type AD100 hot melt adhesive at a nominal ratio of one part adhesive to 6.5 parts fiber to completely fill the enclosed cavity in accordance with the application instructions supplied with the product. Nominal dry density of 2.5 lb/ft³.

U S GREENFIBER L L C ~ Cocoon2 Stabilized or Cocoon-FRM (Fire Rated Material)

5B. Fiber, Sprayed\* ~ (Not shown ~ Not for use with Item 6A) As an alternate to Batts and Blankets (Item 5) and Item 5A ~ Spray applied cellulose insulation material. The fiber is applied with water to interior surfaces in accordance with the application instructions supplied with the product. Applied to completely fill the enclosed cavity. Minimum dry density of 4.3 pounds per cubic ft.

NU-WOOL CO INC ~ Cellulose Insulation

5C. Batts and Blankets\* ~ Required for use with resilient channels, Item 7, 3 in. thick mineral wool batts, placed to fill interior of wall, attached to the 4 in. face of the studs with staples placed 24 in. OC.

THERMAFIBER INC ~ Type SAFB

5D. Glass Fiber Insulation ~ (As an alternate to Item 5C) ~ 3 in. thick glass fiber batts bearing the UL Classification Marking as to Surface Burning and/or Fire Resistance, placed to fill the interior of the wall, attached to the 4 in. face of the studs with staples placed 24 in. OC. See Batts and Blankets (5KIV or 5Z1Z) Categories for names of Classified companies.

5E. Batts and Blankets\* ~ (Required for use with Wall and Partition Fittings and Accessories, Item 3D) ~ Glass fiber insulation, nom 3-1/2 in. thick, min. density of 0.80 pcf, with a flame spread of 25 or less and a smoke developed of 80 or less, friction-fitted to completely fill the stud cavities. See Batts and Blankets Category (5KIV) for names of manufacturers.

6. Steel Framing Members (Optional, Not Shown)\* ~ Furring channels and Steel Framing Members as described below:

a. Furring Channels ~ Formed of No. 25 MSG galv steel, 2-3/8 in. wide by 7/8 in. deep, spaced 24 in. OC perpendicular to studs. Channels secured to studs as described in Item 6. Ends of adjoining channels are overlapped 6 in. and tied together with double strand of No. 16 SWG galv steel wire near each end of overlap. As an alternate, ends of adjoining channels may be overlapped 6 in. and secured together with two self-tapping #6 framing screws, min. 7/16 in. long at the midpoint of the overlap, with one screw on each flange of the channel. Gypsum board attached to furring channels as described in Item 3.

b. Steel Framing Members\* ~ Used to attach furring channels (Item 6a) to studs. Clips spaced 48 in. OC. RSC1-X clips secured to studs with No. 8 x 2-1/2 in. coarse drywall screw through the center grommet. RSC1-X clips secured to studs with No. 8 x 1-1/2 in. coarse drywall screw through the center hole. Furring channels are friction fitted into clips.

PAC INTERNATIONAL INC ~ Types RSC1-X, RSC1-V.

6A. Steel Framing Members (Optional, Not Shown)\* ~ Furring channels and Steel Framing Members on one side of studs as described below:

a. Furring Channels ~ Formed of No. 25 MSG galv steel, spaced 24 in. OC perpendicular to studs. Channels secured to studs as described in Item 6. Ends of adjoining channels are overlapped 6 in. and tied together with double strand of No. 16 SWG galv steel wire near each end of overlap. Batts and Blankets placed in stud cavity as described in Item 5. Two layers of gypsum board attached to furring channels as described in Item 3.

b. Steel Framing Members\* ~ Used to attach furring channels (Item 6Aa) to one side of studs only. Clips spaced 48 in. OC, and secured to studs with two No. 8 x 2-1/2 in. coarse drywall screws, one through the hole at each end of the clip. Furring channels are friction fitted into clips.

KINETICS NOISE CONTROL INC ~ Type Isomax.

6B. Steel Framing Members (Optional, Not Shown)\* ~ Furring channels and Steel Framing Members as described below:

a. Furring Channels ~ Formed of No. 25 MSG galv steel, 2-3/8 in. wide by 7/8 in. deep, spaced 24 in. OC perpendicular to studs. Channels secured to studs as described in Item 6. Ends of adjoining channels are overlapped 6 in. and tied together with double strand of No. 16 SWG galv steel wire near each end of overlap. As an alternate, ends of adjoining channels may be overlapped 6 in. and secured together with two self-tapping #6 framing screws, min. 7/16 in. long at the midpoint of the overlap, with one screw on each flange of the channel. One layer of gypsum board attached to furring channels as described in Item 3 for 3/4-hr rating. Two layers of gypsum board attached to furring channels as described in Item 3 for 1-hr rating.

b. Steel Framing Members\* ~ Used to attach furring channels (Item 6Ba) to studs. Clips spaced 48 in. OC. Gentle clips secured to studs with No. 8 x 1-1/2 in. coarse drywall screw through the center hole. Furring channels are friction fitted into clips.

FLITEQ INC ~ Type Gentle Clip

7. Furring Channel ~ Optional ~ Not Shown ~ For use on one side of the wall ~ Resilient channels, 25 MSG galv steel, spaced vertically 24 in. OC, flange portion screw attached to one side of studs with 1-1/4 in. long diamond shaped point, double lead Phillips head steel screws. When resilient channels are used, insulation, Items 5C or 5D is required.

7A. Steel Framing Members\* ~ Optional ~ Not Shown ~ Used as an alternate method to attach resilient channels (Item 7) to one side of studs only. Clips attached at each intersection of the resilient channel and the wood studs (Item 1), resilient channels are friction fitted into clips, and then clips are secured to the wood stud with min. 1-3/4 in. long diamond shaped point, double lead Phillips head steel screws through the center hole of the clip and the resilient channel flange.

KRENE BUILDING PRODUCTS CO INC ~ Type RC Assurance.

8. Caulking and Sealants ~ (not shown, optional) A bead of acoustical sealant applied around the partition perimeter for sound control.

9. STC Rating ~ The STC Rating of the wall assembly is 56 when it is constructed as described by Items 1 through 9, except:

A. Item 2, above ~ Nailheads shall be covered with joint compound.

B. Item 2, above ~ Joints As described, shall be covered with fiber tape and joint compound.

C. Item 5, above ~ Batts and Blankets\* The cavities formed by the studs shall be friction fit with R-19 unfaced fiberglass insulation batts measuring 6-1/4 in. thick and 15-1/4 in. wide.

D. Item 6, above ~ Steel Framing Members\* Type RSC1-X clips shall be used to attach gypsum board to studs on either side of the wall assembly.

E. Item 6, above ~ Caulking and Sealants (not shown) A bead of acoustical sealant shall be applied around the partition perimeter for sound control.

F. Steel Corner Fasteners (Item 4), Fiber, Sprayed (Items 5A and 5B) and Steel Framing Members (Item 6A), not evaluated as alternatives for obtaining STC rating.

10. Wall and Partition Fittings and Accessories\* ~ (Optional, Not shown) ~ Nominal 1/2 in. thick, 4 ft wide panels, for optional use as an additional layer on one or both sides of the assembly. Panels attached in accordance with manufacturer's recommendations. When the QR-510 panel is installed between the wood framing and the UL Classified gypsum board, the required UL Classified gypsum board layer(s) before to be installed as indicated as to fastener type and spacing, except that the required fastener length shall be increased by a minimum of 1/2 in. Not evaluated or intended as a substitute for the required layer(s) of UL Classified Gypsum Board.

QUIET SOLUTION INC ~ Type QuietRock QR-510.

11. Cementitious Backer Units\* ~ (Optional Item Not Shown ~ For Use On Face Of 1 Hr Systems With All Standard Joints Required) ~ 1/2 in., 5/8 in., 3/4 in. or 1 in. thick, min. 32 in. wide. Applied vertically or horizontally with vertical joints centered over studs. Fastened to studs and runners with cement board screws of adequate length to penetrate stud by a minimum of 3/8 in. for steel framing members, and a minimum of 3/4 in. for wood framing members spaced a max of 8 in. OC. When 4 ft. wide boards are used, horizontal joints need not be backed by framing.

NATIONAL GYPSUM CO ~ Type PermaBase

12. Non-Bearing Wall Partition Intersection ~ (Optional) ~ Two nominal 2 by 4 in. studs or nominal 2 by 6 in. studs nailed together with two 3 in. long 10d nails spaced a max. 16 in. OC, vertically and fastened to one side of the minimum 2 by 4 in. stud with 3 in. long 10d nails spaced a max. 16 in. OC, vertically. Intersection between partition wood studs to be flush with the 2 by 4 in. studs. The wall partition wood studs are to be framed by with a second 2 by 4 in. wood stud fastened with 3 in. long 10d nails spaced a max. 16 in. OC, vertically. Maximum one non-bearing wall partition intersection per stud cavity. Non-bearing wall partition stud depth shall be at a minimum equal to the depth of the bearing wall.

\*Bearing the UL Classification Mark

Last Updated on 2008-12-23

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2



**BXUV.U901**  
**Fire Resistance Ratings - ANSI/UL 263**

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**Design/System/Construction/Assembly Usage Disclaimer**

- Authorities Having Jurisdiction should be consulted in all cases as to the particular requirements covering the installation and use of UL Listed or Classified products, equipment, systems, devices, and materials.
- Authorities Having Jurisdiction should be consulted before construction.
- Fire resistance assemblies and products are developed by the design submitter and have been investigated by UL for compliance with applicable requirements. The published information cannot always address every construction nuance encountered in the field.
- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
- Only products which bear UL's Mark are considered as Classified, Listed, or Recognized.

**Fire Resistance Ratings - ANSI/UL 263**

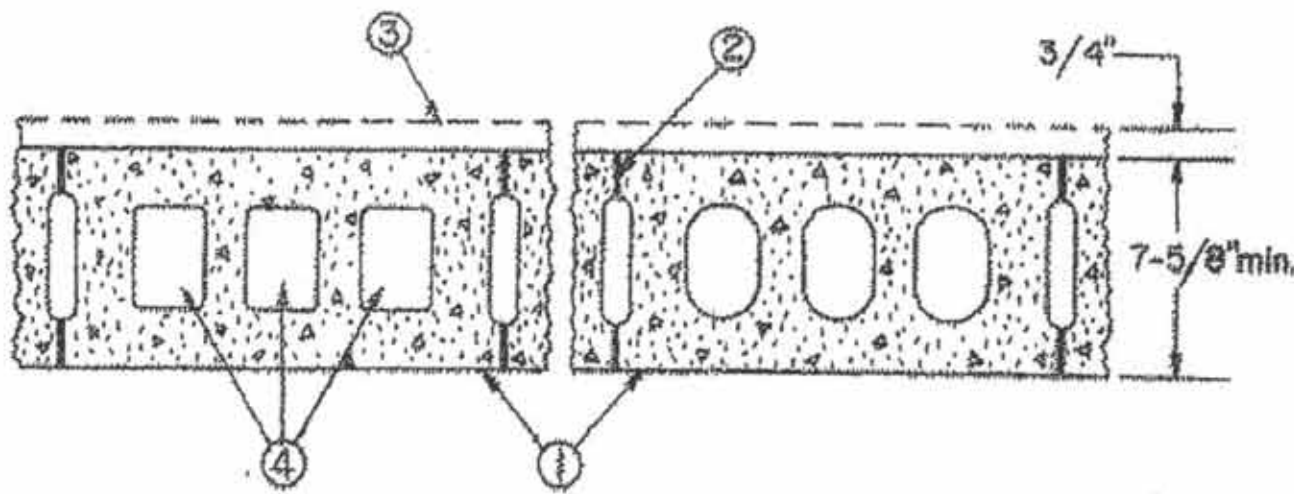
See General Information for Fire Resistance Ratings - ANSI/UL 263

Design No. U901

October 26, 1999

Bearing Wall Rating - 4 Hr.

Nonbearing Wall Rating - 4 Hr.



1. Concrete Blocks\* - Various designs, Classification B-4 (4 hr).

See Concrete Blocks category for lists of eligible manufacturers.

2. Mortar - Blocks laid in full bed of mortar, nom. 3/8 in. thick, of not less than 2-1/4 and not more than

3-1/2 parts of clean sharp sand to 1 part Portland cement (proportioned by volume) and not more than 80 percent hydrated lime (by cement volume). Vertical joints staggered.

3. Portland Cement Stucco or Gypsum Plaster - If used, add 1/2 hr. to Classification.

4. Loose Masonry Fill - If all core spaces are filled with loose dry expanded slag, burned clay or shale (rotary kiln process), water repellent vermiculite masonry fill insulation, or silicone treated perlite loose fill insulation, Class D-2 (2 hr) or C-3 (3 hr) concrete blocks will provide a 4 hr fire resistance rating.

\*Bearing the UL Classification Mark

**BXUV.N502**  
**Fire Resistance Ratings - ANSI/UL 263**

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**Design/System/Construction/Assembly Usage Disclaimer**

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**Fire Resistance Ratings - ANSI/UL 263**

See General Information for Fire Resistance Ratings - ANSI/UL 263

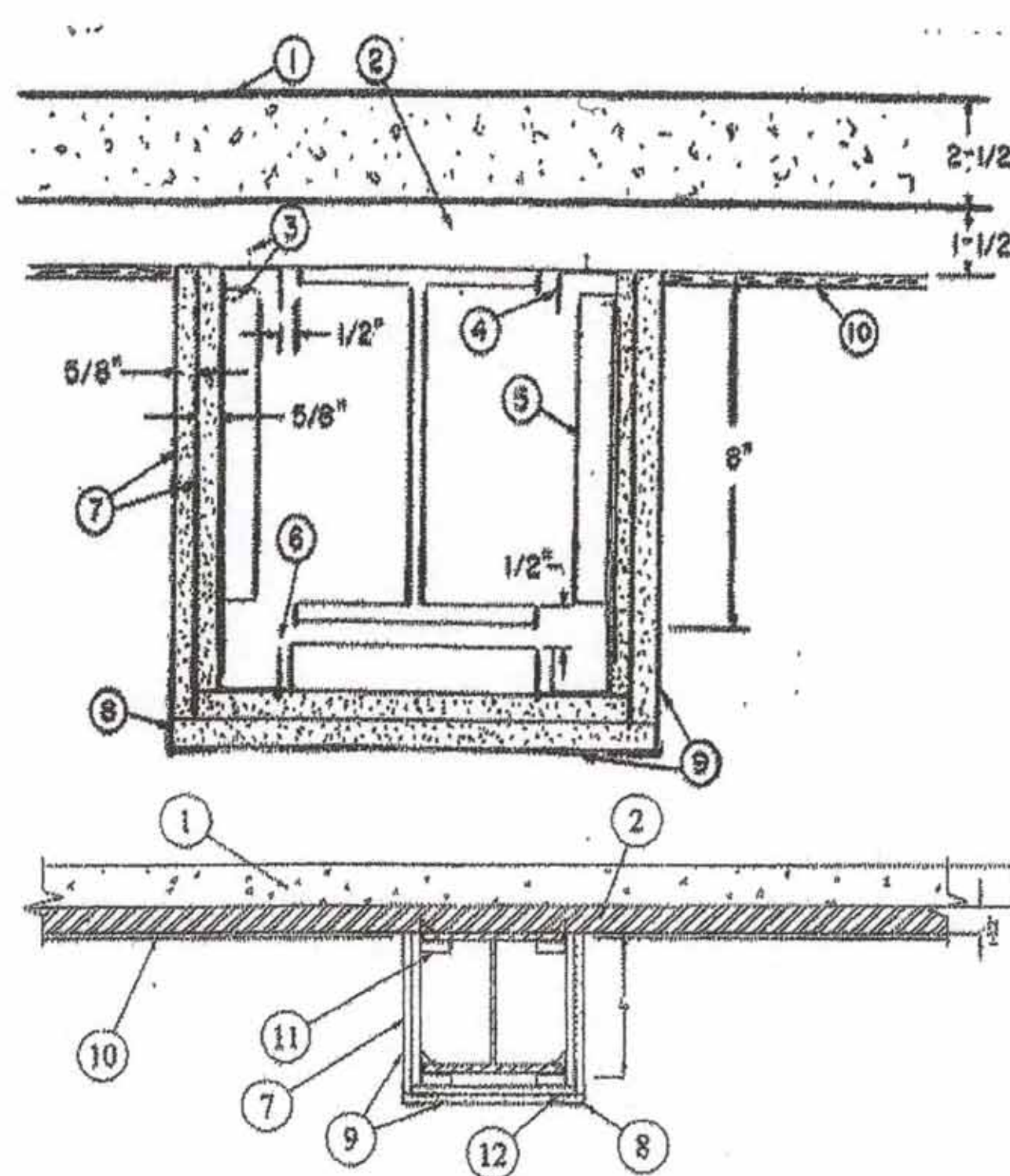
Design No. N502

February 19, 2009

Restrained Beam Rating - 2 Hr.

Unrestrained Beam Rating - 2 Hr.

Load Restricted for Canadian Applications - See Guide BXUVZ



Steel Beam - Min size, a W8 x 24 with outside dimensions of 7-7/8 x 6-1/2 in. with a flange thickness of 3/8 in., a web thickness of 1/4 in., and a cross-sectional area of 7.08 sq in.

1. Normal Weight Concrete - 148 pcf.

2. Steel Floor and Form Units\* - 1-1/2 in. fluted type, welded to beam.

3. Drill Screw - No. 8-18 by 1/2 in. long Phillips panhead drill screws, self-drilling and self-tapping, made of case-hardened steel.

4. Runner Channel - Fabricated from 28 MSG galv steel, 1-11/16 in. deep with 1-in. legs. Fastened to

steel deck with Item 3, 12 in. OC.

5. Channel Bracket - Same material as Item 4 and fastened to runner channels with Item 3. Bracket spaced 24 in. OC.

6. Corner Channel - Same material as Item 4. Placed in outcuts of channel brackets without attachment.

7. Gypsum Board\* - 5/8 in. thick. First layer fastened with 1-1/4 in. long, 0.180-in. diam screws and spaced 16 in. OC. Second layer attached with 1-3/4 in. long, 0.180-in. diam screws spaced 8 in. OC. Screws are self-drilling and self-tapping Phillips head made of case-hardened steel.

AMERICAN GYPSUM CO - Types AGX-1, AG-C, AGX-11.

CERTAINTED GYPSUM INC - Types 1, FRPC, SFS, BGRG, ProRoc Type C, ProRoc Type X.

CERTAINTED GYPSUM CANADA INC - ProRoc Type C; ProRoc Type X; ProRoc Type Abuse-Resistant.

BEIJING NEW BUILDING MATERIALS PUBLIC

LTD CO - Type DBX-1.

CANADIAN GYPSUM COMPANY - Type C, IP-X1, IP-X2, IPC-AR, SCX, SHX or WRX.

GEORGIA-PACIFIC GYPSUM L L C - Types S, S, C, DAF, DD, DA, DAF, DGG, DS, GPF51, GPF59.

LAFARGE NORTH AMERICA INC - Types LGFC3, LGFC6, LGFC6A, LGFC-C, LGFC-Q/A.

PABCO BUILDING PRODUCTS L L C, DBA

PABCO GYPSUM - Type C, PG-3, PG-9, PG-11 or PG-C.

PANEL REY S A - Type PRC

SIAM GYPSUM INDUSTRY (SARABURI) CO LTD - Type BX-1

TEMPLE-INLAND FOREST PRODUCTS CORP - Type TG-C, Type X, Veneer Plaster Base-Type X, Water Rated-Type X, Sheathing Type-X, Softie-Type X, GreenGlass Type X.

UNITED STATES GYPSUM CO - Types C, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRX, USGX (Joint tape and compound, Item 9, optional for use with Type USGX).

USG MEXICO S A DE C V - Types C, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRX.

8. Corner Bead - Fabricated from 20 MSG galv steel to form an angle with 1-1/4 in. legs. Legs perforated with 1/4 in. diam holes approx 1 in. OC. Attached to wallboard with special crimping tool approx 6 in. OC. As an alternate, the bead may be nailed to the wallboard.

9. Joint Compound - 1/32 in. thick on bottom and sides of wallboard from corner beads and feathered out. Paper tape embedded in joint compound over joints with edges of compound feathered out. Nom 3/32 in. thick gypsum veneer plaster may be applied to the entire surface of Classified veneer baseboard. Joints reinforced.

10. Protective Material - Spray-Applied Fire Resistive Materials\* - Spray applied to the underside of the steel floor units, filling the flutes of the units and providing a smooth ceiling which was 1/4 in. thick as measured from the bottom plane of the floor units.

See Spray-Applied Fire Resistive Materials (CHPX) category for names of manufacturers.

11. Alternate Construction - Steel Framing Members - As an alternate to Items 3, 4, 8 and 9, steel clips attached to both sides of beam flanges 2 ft OC and at ends of beam. First layer of gypsum board fastened to steel clips with 1-1/4 in. long Type 5 drywall screws. 2 in. by 2 in. 28 MSG angle fastened to clips on bottom portion of assembly with 2 in. long Type 5 drywall screws. Second layer of gypsum board fastened to angle and clips with 2 in. long Type 5 drywall screws spaced 2 ft OC. Screws are self-drilling and self-tapping Phillips head made of case-hardened steel.

JOHN WAGNER ASSOCIATES INC, DBA

GRABBER - Type CBClip.

See Spray-Applied Fire Resistive Materials (CHPX) category for names of manufacturers.

\*Bearing the UL Classification Mark

**BXUV.X528**  
**Fire Resistance Ratings - ANSI/UL 263**

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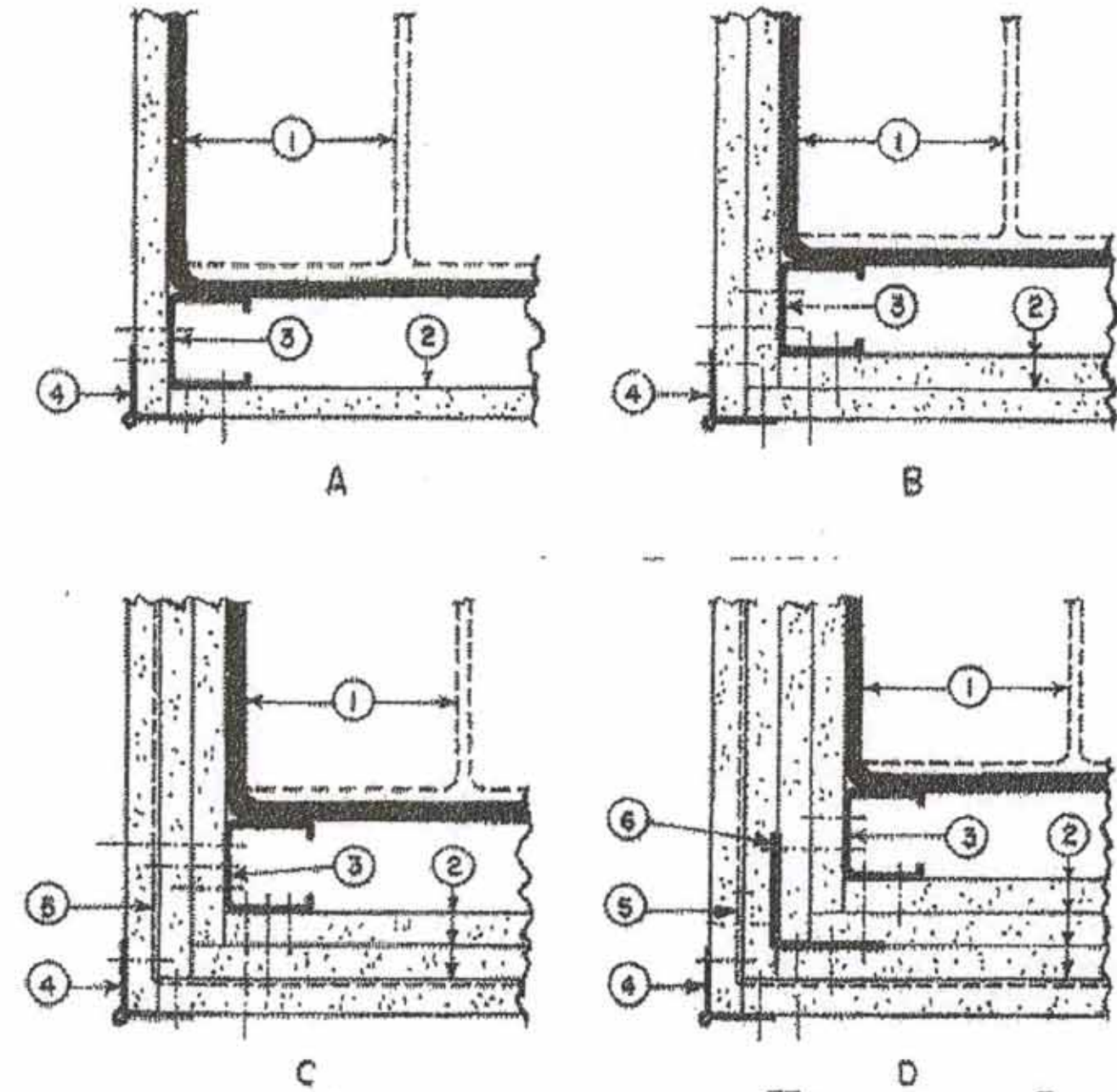
**Fire Resistance Ratings - ANSI/UL 263**

See General Information for Fire Resistance Ratings - ANSI/UL 263

Design No. X528

July 10, 2008

Rating - 1, 2 and 3 Hr.



**CORNER DETAILS OF WALLBOARD SUPPORT SYSTEMS WITHOUT STEEL COVERS**

1. Steel Column - Min sizes of W-shaped and tubular steel columns which appear in the AISC Steel Construction Manual as shown under Item 2.

2. Gypsum Board\* - For 1 Hr rating, any 5/8 in. or 1/2 in. thick gypsum wallboard Classified for use in fire resistance assemblies. For 2 Hr and 3 Hr ratings, any 5/8 in. or 1/2 in. thick gypsum wallboard Classified for use in other 2 Hr, 3 Hr or 4 Hr Column Designs. Min total thickness of layers in inches for the various ratings and min column sizes are as follows:

W Shaped Column Min Column Size	Rating (Hr)			Corner Details For Various Rating		
	1	2	3	1 Hr	2 Hr	3 Hr
Total thickness (in.)						
W4x13	1	1-1/2	2-1/4	B	C	D
W6x15.5	1	1-1/2	2-1/4	B	C	D
W10x49	1/2	1-1/8	1-7/8	A	B	C
Tube Shaped columns						
TS 4 by 4						
by 0.189	1	1-3/4	2-5/8	B	C	D
TS 8 by 8						
by 0.280	5/8	1-1/2	2-1/4	A	C	D

Applied in layers as noted in the above illustrations. Boards are to be applied vertically without horizontal joints.

See Gypsum Board (CKNX) category for names of manufacturers.

2A. Gypsum Board\* - As an alternate to Item 2- 3/4 in. thick gypsum wallboard. For 2 Hr rating, 1-1/2 in. total thickness, installed in accordance with corner detail B. For 3 Hr rating, 2-1/4 in. total thickness installed in accordance with corner detail C. Boards are to be applied vertically without horizontal joints.

CANADIAN GYPSUM COMPANY - Type IP-X3 or ULTRACODE

UNITED STATES GYPSUM CO - Type IP-X3 or ULTRACODE

USG MEXICO S A DE C V - Type IP-X3 or ULTRACODE

3. Steel Stud - 1-5/8 in. wide with 1-5/16 and 1-7/16 in. legs having a 1/4 in. folded flange, fabricated from No. 28 MSG galv steel. Length to be 1/2 in. less than the assembly height.

3A. As an alternate to Item 3 Steel Framing Members\* - galv. steel clips spaced 4 ft OC and 1-1/4 in. from top and bottom of column. A No. 28 MSG galv steel support angle with 1-1/4 in. length shall be placed over clips and secured with screws attaching the wallboard. The angle cut 1 in. less than assembly height splices in angle to occur over clips. The clips for use with wide flange columns only.

JOHN WAGNER ASSOCIATES INC, DBA

GRABBER - Types CB, CB1Clips.

4. Corner Beads - No. 28 MSG galv steel, 1-1/4 in. legs to be attached to the wallboard with No. 6 by 1 in. screws spaced 16 in. OC max.

5. Tie Wire - No. 18 SWG steel wire spaced 24 in. OC used with second layer of wallboard.

6. Screws - For attaching first layer of wallboard to steel studs, and third layer of wallboard to 2 in. by 2 in. steel angle (25 Ga) to be No. 6 by 1 in. (or 1-1/4 in. for 3/4 in. thick wallboard) Phillips head self-drilling, self-tapping double lead screws spaced 24 in. OC. For attaching second layer of wallboard to steel studs and fourth layer of wallboard to 2 in. by 2 in. steel angle (25 Ga) to be No. 6 by 1-3/4 in. (or 2-1/4 in. for 3/4 in. thick wallboard) steel screws of the same type spaced 12 in. OC. For attaching third layer of wallboard to steel studs to be No. 6 by 2-1/4 in. screws of the same type spaced 12 in. OC.

7. Finishing System - (Not Shown) - Joint compound applied over corner beads to a thickness of 1/16 in.

\*Bearing the UL Classification Mark



## System No. W-L-1001

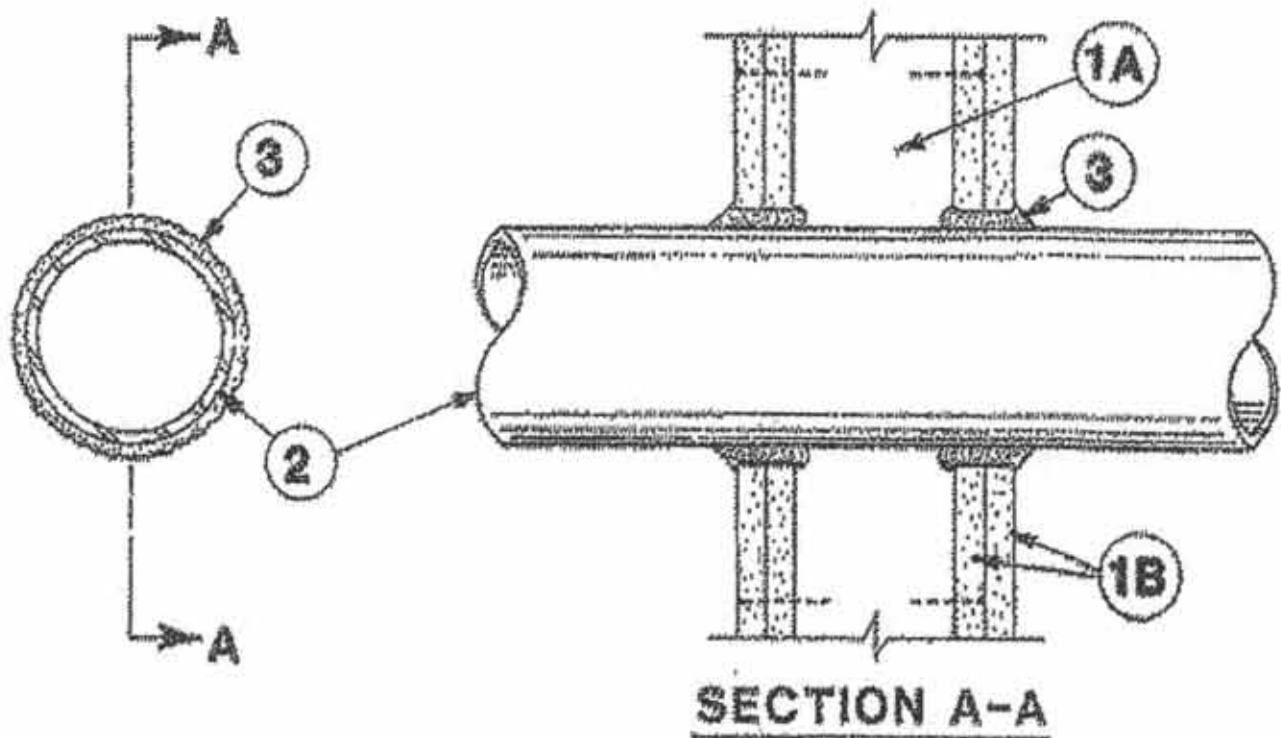
June 16, 2005

F Ratings — 1, 2, 3 and 4 Hr (See Items 2 and 3)

T Ratings — 0, 1, 2, 3, and 4 Hr (See Item 3)

L Rating At Ambient — less than 1 CFM/sq ft

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



1. **Wall Assembly** — The 1, 2, 3 or 4 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 Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs** — Wall framing may consist of either wood studs (max 2 hr fire rated assemblies) 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 with nom 2 by 4 in. (51 by 102 mm) lumber and plates and cross braces. Steel studs to be min 3-5/8 in. (92 mm) wide by 1-3/8 in. (36 mm) deep channels spaced max 24 in. (610 mm) OC.

B. **Gypsum Board\*** — Nom 1/2 or 5/8 in. (13 or 16 mm) thick, 4 ft. (122 cm) wide with square or tapered edges. The gypsum wallboard type, thickness, number of layers, fastener type and 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 26 in. (660 mm).

2. **Through-Penetrant** — One metallic pipe, conduit or tubing installed either concentrically or eccentrically within the firestop system. The annular space between pipe, conduit or tubing and periphery of opening shall be min of 0 in / (0 mm), (point contact) to max 2 in. (51 mm) Pipes, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:

A. **Steel Pipe** — Nom 24 in. (610 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.

B. **Iron Pipe** — Nom 24 in. (610 mm) diam (or smaller) service weight (or heavier) cast iron soil pipe, nom 12 in (305 mm) diam (or smaller) or Class B9 (or heavier) ductile iron pressure 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 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing

E. **Copper Pipe** — Nom 6 in. (152 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 TITEXFLEX

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 L C

3. **Fill, Void or Cavity Material\*** — Caulk or Sealant — Min 5/8", 1-1/4, 1-7/8 and 2-1/2 in. (16, 32, 48 and 64 mm) thickness of caulk for 1, 2, 3 and 4 hr rated assemblies, respectively, 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. The hourly F Rating of the firestop system is dependent upon the hourly fire rating of the wall assembly in which it is installed, as shown in the following table. The hourly T Rating of the firestop system is dependent upon the type or size of the pipe or conduit and the hourly fire rating of the wall assembly in which it is installed, as tabulated below:

Max Pipe or Conduit Diam In (mm)	F Rating Hr	T Rating Hr
1 (25)	1 or 2	0+, 1 or 2
1 (25)	3 or 4	3 or 4
4 (102)	1 or 2	0
6 (152)	3 or 4	0
12 (305)	1 or 2	0

+When copper pipe is used, T Rating is 0 hr.

3M COMPANY — CP 25WB+ or FB-3000 WT.

\*Bearing the UL Classification Mark

## System No. W-L-5001

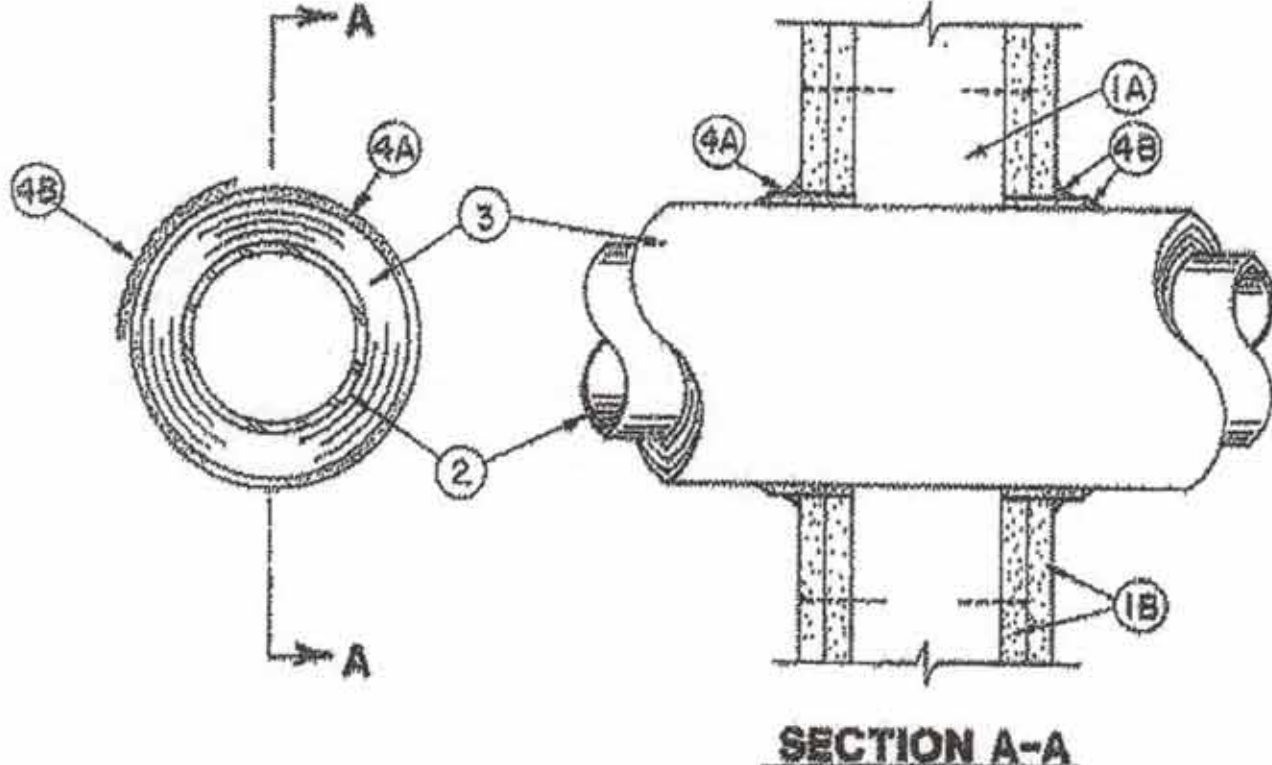
May 19, 2005

F Ratings — 1 and 2 Hr (See Item 1)

T Ratings — 3/4, 1 and 1-1/2 Hr (See Item 3)

L Rating At Ambient — 2 CFM/sq ft

L Rating At 400 F — less than 1 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 U300, U400 or V400 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 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC with nom 2 by 4 in. (51 by 102 mm) lumber and plates and cross braces. Steel studs to be min 3-5/8 in. (92 mm) wide by 1-3/8 in. (36 mm) deep channels spaced max 24 in. (610 mm) OC.

B. **Gypsum Board\*** — Nom 5/8 in. (16 mm) thick, 4 ft (122 cm) wide with square or tapered edges. 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 14-1/2 (368mm) in for wood stud walls and 18 in. (457 mm) for steel stud walls.

The hourly F Rating of the firestop system is 1 hr when installed in a 1 hr fire rated wall and 2 hr when installed in a 2 hr fire rated wall.

2. **Through Penetrants** — One metallic pipe or tubing to be centered within the firestop system. Pipe or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes or tubing may be used:

A. **Steel Pipe** — Nom 12 in. (305 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.

B. **Copper Tubing** — Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.

C. **Copper Pipe** — Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe.

3. **Pipe Covering\*** — Nom 1 or 2 in. (25 or 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. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints sealed with metal fasteners or with butt strip tape supplied with the product. Within 1 in. (25 mm) thick pipe covering is used, the annular space between the pipe covering and the circular cutout in the gypsum wallboard layers on each side of the wall shall be min 1/4 in. (6 mm) to max 3/8 in. (10 mm) When nom 2 in. (51 mm) thick pipe covering is used, the annular space between the pipe covering and the circular cutout in the gypsum board layers on each side of the wall shall be min 1/2 in. (13 mm) to max 3/4 in. (19 mm)

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.

The hourly T Rating of the firestop system is 3/4 hr when nom 1 in. (25 mm) thick pipe covering is used. The hourly T Rating of the firestop system is 1 hr and 1-1/2 hr when nom 2 in. (52 mm) thick pipe covering is used with 1 hr and 2 hr fire rated walls, respectively.

4. **Firestop System** — Installed symmetrically on both sides of wall assembly. The details of the firestop system shall be as follows:

A. **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 2 in. (51 mm) wide strips. Nom 2 in. (51 mm) wide strip tightly wrapped around pipe covering (fill side out) with seam butted. Wrap strip layer securely bound with steel wire or aluminum foil tape and slid into annular space approx 1-1/4 in. (32 mm) such that approx 3/4 in. (19 mm) of the wrap strip width protrudes from the wall surfaces. One layer of wrap strip is required when nom 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.

3M COMPANY — FS-195+

B. **Fill, Void or Cavity Materials\*** — **Caulk or Sealant** — Min 1/4 in. (6 mm) diam continuous bead applied to the wrap strip/wall interface and to the exposed edge of the wrap strip layer approx 3/4 in. (19 mm) from the wall surface.

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

\*Bearing the UL Classification Mark

## System No. W-L-5009

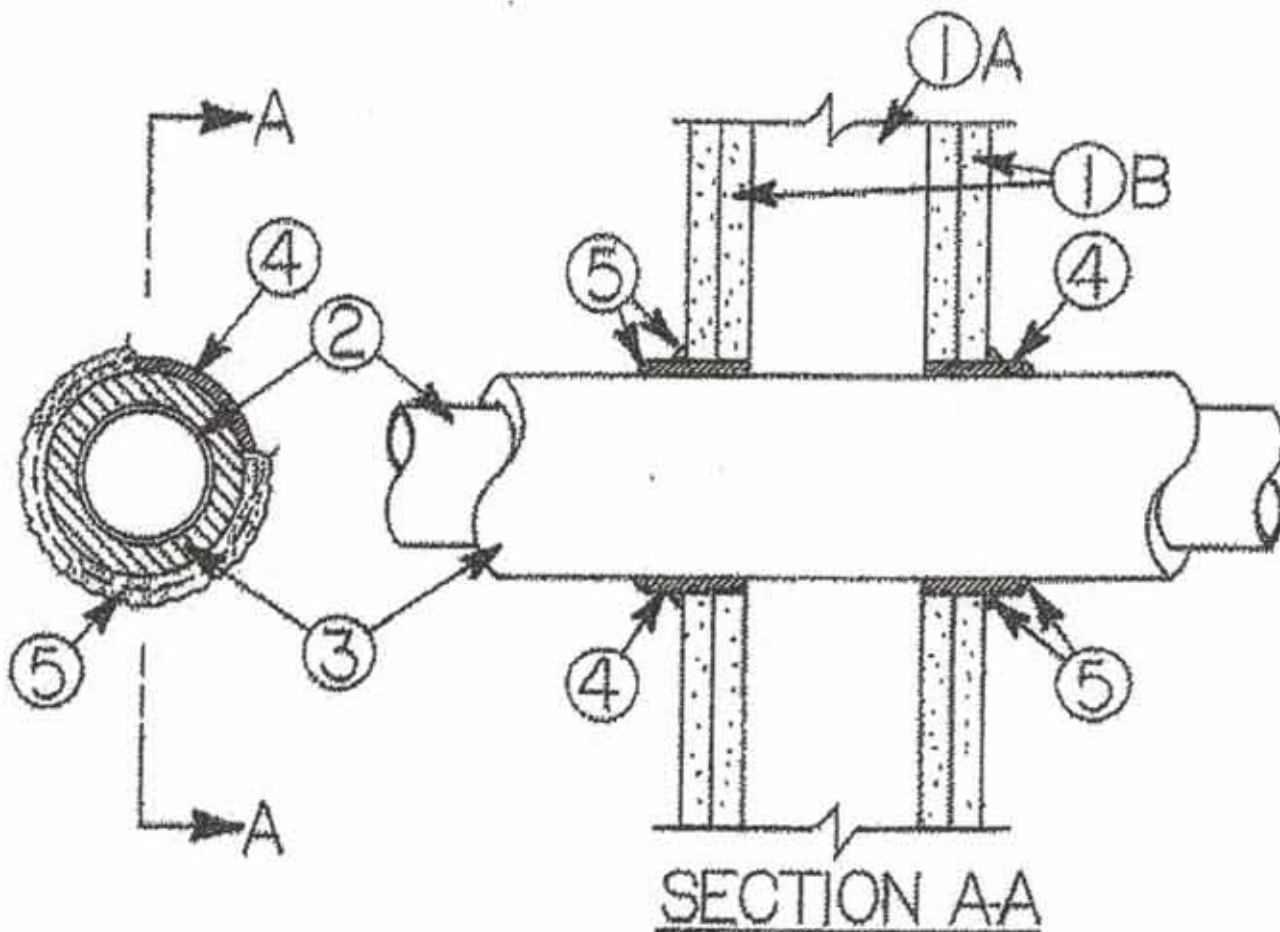
May 19, 2005

F Rating — 2 Hr

T Rating — 1-1/2 Hr

L Rating At Ambient — Less than 1 CFM/sq ft

L Rating At 400 F — Less than 1 CFM/sq ft



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 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.

B. **Gypsum Board\*** — Two layers of nom 5/8 in. (16 mm) thick gypsum board, as specified in the Individual Wall and Partition Design. Diam of opening cut in gypsum board layers on each side of wall assembly (concentric with pipe, item 2) to be 1/2 to 3/4 in. (13 to 19 mm) larger than outside diam of pipe insulation (item 3) such that, when installed, a 1/4 to 3/8 in. (6 to 10 mm) annular space will be present between the pipe insulation and the gypsum board around the entire circumference of the opening. Max diam of opening is 4 in. (102 mm).

2. **Copper Pipe** — Nom 2 in. (51 mm) diam (or smaller) Type L (or heavier) copper pipe. A max of one pipe is permitted in the firestop system. Pipe to be installed near center of stud cavity width and is to be rigidly supported on both sides of wall assembly.

3. **Pipe Insulation** — **Plastic\*** — Nom 5/8 in. (16 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam supplied in the form of tubes with skin. Pipe insulation to be sized to outside diam of copper pipe.

See **Plastics (QMFFZ)** category in the Recognized Component Directory for names of manufacturers. Any Recognized Component pipe insulation material meeting the above specifications and having a UL94 Flammability Classification of 94-BVA may be used.

4. **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 2 in. (51 mm) wide strips. Nom 2 in (51 mm) wide strip tightly wrapped around pipe insulation (fill side out) with seam butted. Wrap strip layer securely bound with steel wire or aluminum foil tape and slid into annular space approx 1-1/4 in. (32 mm) such that approx 3/4 in. (19 mm) of the wrap strip width protrudes from the wall surfaces. Wrap strip installed symmetrically on both sides of wall.

3M COMPANY — FS-195+

5. **Fill, Void or Cavity Materials\*** — **Caulk or Sealant** — Min 1/4 in. (6 mm) diam continuous bead applied to leading edge of wrap strip layer (item 4) prior to insertion of wrap strip layer into annular space. After insertion of wrap strip layer in annular space, a non 1/4 in. (6 mm) diam continuous bead is to be applied to the wrap strip/wall interface and to the exposed edge of the wrap strip layer approx 3/4 in. (19 mm) from the wall surface.

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

\*Bearing the UL Recognized Component Marking.

\*Bearing the UL Classification Mark

## System No. W-L-2005

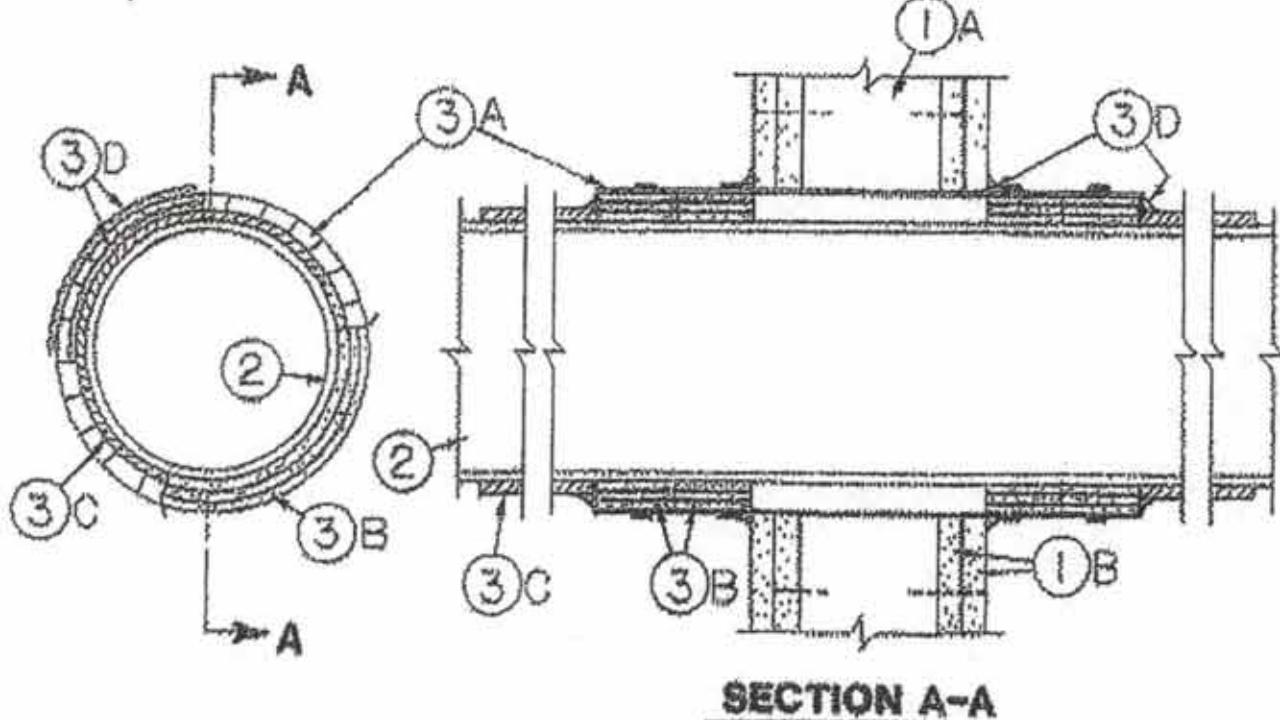
April 11, 2006

F Ratings — 1 and 2 Hr

T Ratings — 0, 3/4, 1, 1-1/2 and 2 Hr

L Rating At Ambient — 7 CFM/sq ft

L Rating At 400 F — less than 1 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 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 with nom 2 by 4 in. (51 by 102 mm) lumber and plates and cross braces. Steel studs to be min 3-5/8 in. (92 mm) wide by 1-3/8 in. (36 mm) deep channels spaced max 24 in. (610 mm) OC.

B. **Gypsum Board\*** — 5/8 in. (16 mm) thick, 4 ft (122 cm) wide with square or tapered edges. 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 13-3/4 in. (349 mm).

2. **Nonmetallic Pipe** — Nom 6, 8 or 10 in. (152, 203 or 254 mm) diam Schedule 40 polyvinyl chloride (PVC) pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems. One pipe to be centered in the firestop system. Pipe to be installed near center of stud cavity width and to be rigidly supported on both sides of wall.

3. **Firestop System** — Installed symmetrically on both sides of wall assembly. The hourly F and T Ratings for the firestop system are dependent upon the size of nonmetallic pipe and the hourly fire rating of the wall assembly in which it is installed, as tabulated below:

Nom Pipe Diam In.	Annular Space In.	Wall Fire Rating Hr	F Rating Hr	T Rating Hr
6 (152)	3/4 (19)	1	1	1
6 (152)	3/4 (19)	2	2	2
8 (203)	1 (25)	1	1	3/4
8 (203)	1 (25)	2	2	1-1/2
10 (254)	1-1/2 (38)	1	1	3/4
10 (254)	1-1/2 (38)	2	1	3/4

The details of the firestop system shall be as follows.

A. **Steel Sleeve** — Cylindrical sleeve fabricated from min 0.026 in. (0.41 mm) thick (26 gauge) galv sheet steel and having a min 1 in. (25 mm) lap along the longitudinal seam. Length of steel sleeve shall be equal to thickness of wall plus 9-1/2 in. (241 mm), 10 in. (254 mm) or 11 in. (279 mm) for the 6, 8 and 10 in. (152, 203 and 254 mm) diam pipe sizes, respectively. Inside diam of steel sleeve and diam of through opening in the gypsum wallboard layers to be equal to outside diam of wrap strip (item 8) layers on both sides of wall assembly with one band clamp located near the wall surface and another located approx 1 in. (25 mm) from the outer edge of the wrap strip layer. Edges of steel sleeve to be slit approx 1 in. (25 mm) OC around circumference of sleeve on both sides of wall, with length of slits approximately equal to thickness of max wrap layer(s) to form retainer tabs. Retainer tabs bent 90 deg toward pipe to lock wrap strip layer(s) in position.

B. **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 2 in. (51 mm) wide by 24 in. (610 mm) long strips. Two stacks of wrap strip (from 4 in. or 102 mm high stack) tightly-wrapped around nonmetallic pipe on each side of wall and slid into steel sleeve (item A) such that inner edges are flush with or recessed max 1/4 in. (6 mm) into surface of wall. For nom 6 in. (152 mm) diam pipes, three layers of wrap strip are required in each stack. For nom 8 in. (203 mm) diam pipes, four layers of wrap strip are required in each stack. For nom 10 in. (254 mm) diam pipes, six layers of wrap strip are required in each stack. Each layer of wrap strip to be installed with butted seams. With the butted seams in successive layers staggered. Wrap strip temporarily held in position using aluminum foil tape, filament tape, steel wire tie, or equivalent.

3M COMPANY — Type FS-195+

C. **Pipe Covering\*** — Nom 1 in. (25 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. Min 6 in. (152 mm) length of pipe covering installed around PVC pipe at its agress from the wrap strip layers (item B) on both sides of the wall. Pipe covering secured to pipe with steel wire ties spaced max 4 in. (102 mm) OC. Edge of pipe covering abutting wrap strip to be sealed with a min 1/4 in. (6 mm) diam bead of caulk (item D).

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.

D. **Fill, Void or Cavity Materials\*** — **Caulk or Sealant** — Generous bead of caulk to be applied to outer perimeter of steel sleeve at interface with wall surfaces and to perimeter of pipe covering material wrap at its interface with the wrap strip layers.

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

\*Bearing the UL Classification Mark



# System No. W-L-2003

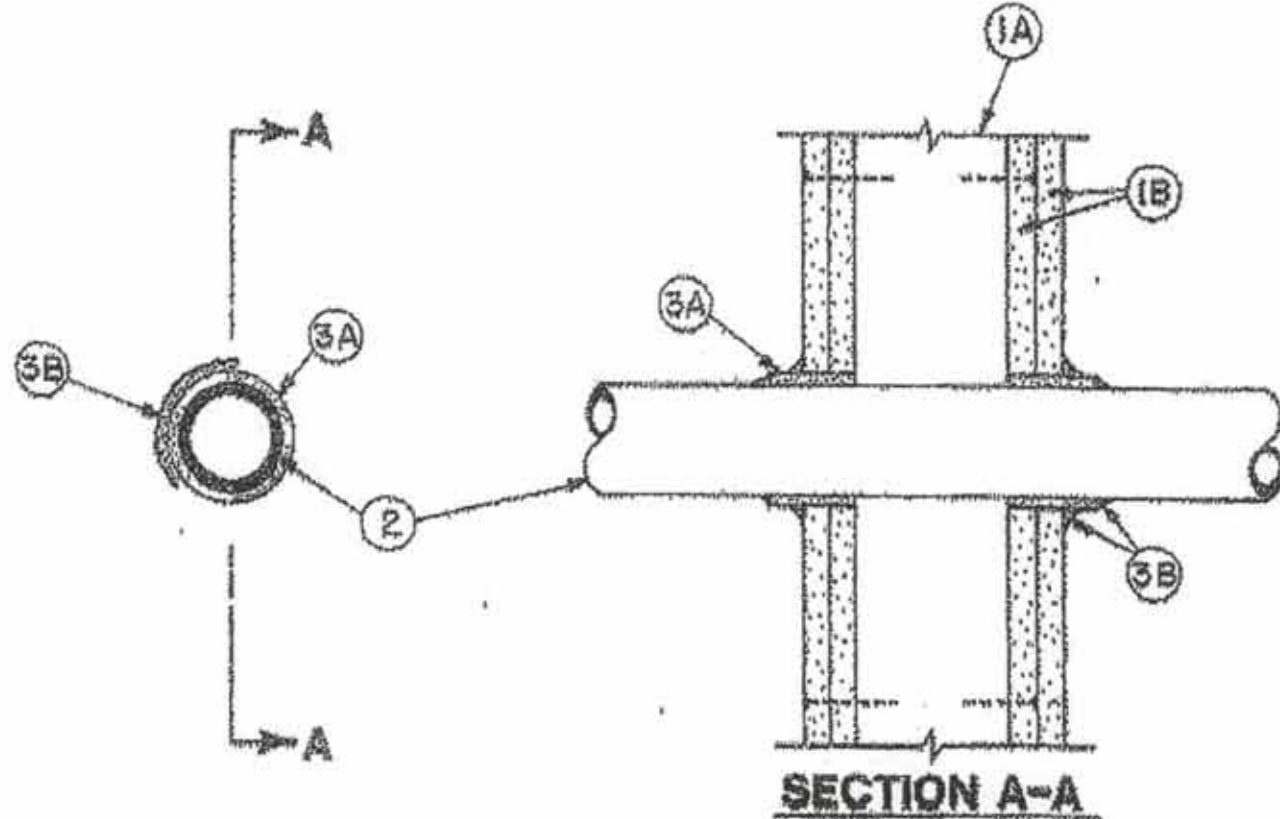
May 23, 2005

F Ratings — 1 and 2 Hr (See Item 3)

T Ratings — 1 and 2 Hr (See Item 3)

L Rating At Ambient — 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 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 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC with nom 2 by 4 in. (51 by 102 mm) lumber and plates and cross braces. Steel studs to be min 3-5/8 in. (92 mm) wide by 1-3/8 in. (38 mm) deep channels spaced max 24 in. (610 mm) OC.

B. **Gypsum Board\*** — 5/8 in. (16 mm) thick, 4 ft (122 cm) wide with square or tapered edges. 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 3-1/8 in. (79 mm).

2. **Through Penetrants** — One nonmetallic pipe or conduit to be centered in the through opening. The annular space between pipe or conduit and periphery of opening shall be min 1/4 in. (6 mm) and max 3/8 in. (10 mm). Pipe or conduit to be rigidly supported on both sides of the floor-ceiling 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 PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.

B. **Rigid Nonmetallic Conduit\*** — Nom 2 in. (51 mm) diam (or smaller) (Schedule 40 or 60) PVC conduit installed in accordance with the National Electric Code (NEC, NFPA No. 70).

C. **Chlorinated Polyvinyl Chloride (CPVC) Pipe** — Nom 2 in. (51 mm) diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.

D. **Cellular Core Polyvinyl Chloride (ccPVC) Pipe** — Nom 2 in. (51 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.

E. **Acrylonitrile Butadiene Styrene (ABS) Pipe** — Nom 2 in. (51 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.

F. **Cellular Core Acrylonitrile Butadiene Styrene (ccABS) Pipe** — Nom 2 in. (51 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.

3. **Firestop System** — Installed symmetrically on both sides of wall assembly. The hourly F and T Ratings for the firestop system are equal to the hourly fire rating of the wall assembly in which it is installed. The details of the firestop system shall be as follows:

A. **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 2 in. (51 mm) wide strips, nom 2 in. (51 mm) wide strip tightly wrapped around nonmetallic pipe (foil side out) with seam butted. Wrap strip layer securely bound with steel wire or aluminum foil tape and laid into annular space approx 1-1/4 in. (32 mm) such that approx 3/4 in. (19 mm) of the wrap strip protrudes from the wall surface.

3M COMPANY — PS-195+

B. **Fill, Void or Cavity Materials\*** — **Caulk, Sealant or Putty** — Min 5/8 in. (16 mm) thickness of caulk or putty applied into annular space between wrap strip and periphery of opening. A nom 1/4 in. (6 mm) diam bead of caulk or putty to be applied to the wrap strip/wall interface and to the exposed edge of the wrap strip layer approx 3/4 in. (19 mm) from the wall surface.

3M COMPANY — CP 25WB+ caulk or MP+ Stix putty, IC 15WB+ caulk, FireDam 180+ caulk or FS-3000 WT sealant. (Notes: L Ratings apply only when Type CP 25WB+ caulk or FS-3000 WT sealant is used. CP 25WB+ not suitable for use with CPVC pipes.)

C. **Foil Tape** — (not shown) — Nom 4 in. (102 mm) wide, 3 mil thick aluminum tape wrapped around pipe prior to the installation of the wrap strip (Item 3A). Min of one wrap, flush with both sides of wall and proceeding outward. Tape is not required for pipes shown in Items 2A, 2B and 2C.

\*Bearing the UL Classification Mark

# System No. W-L-3001

September 07, 2004

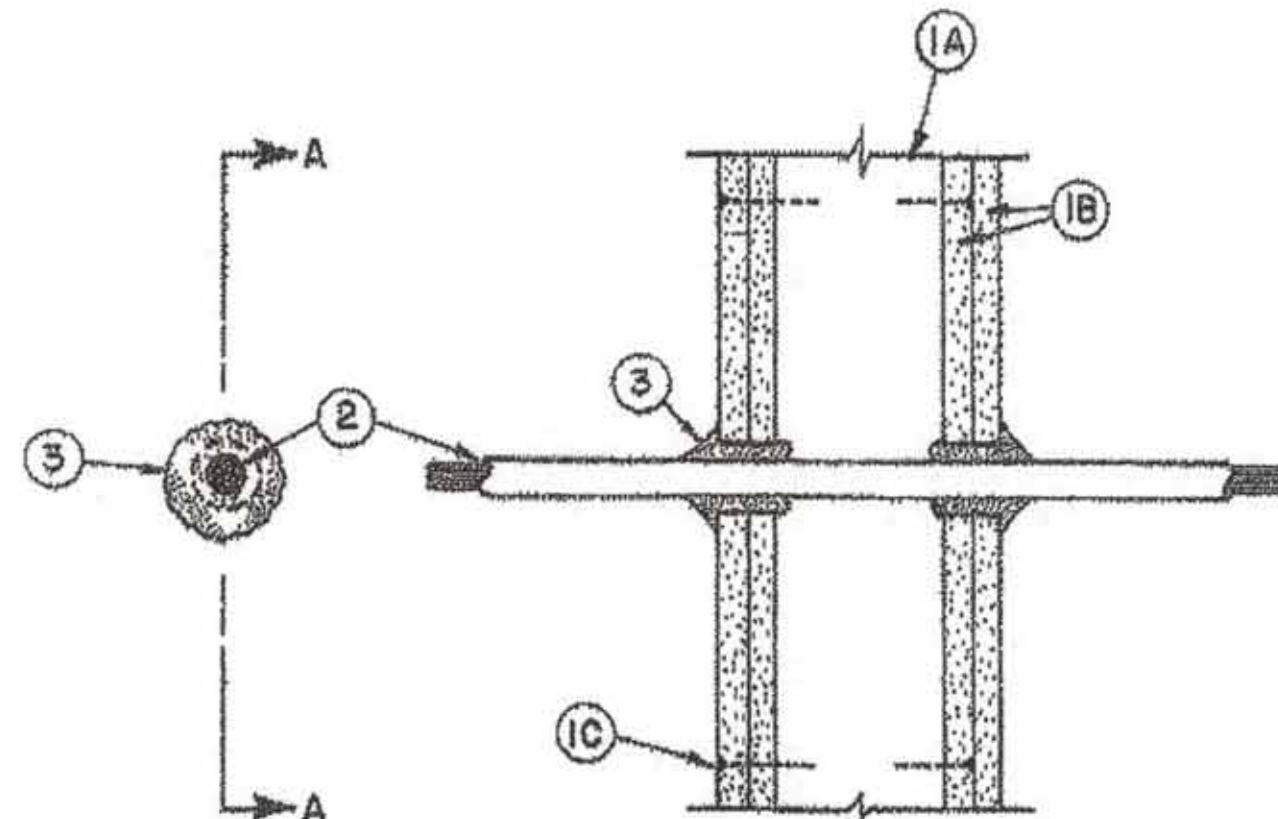
(Formerly System No. 149)

F Ratings — 1 and 2 Hr (See Item 1)

T Ratings — 3/4, 1, 1-1/2 and 2 Hr (See Item 2)

L Rating At Ambient — 18 CFM/sq ft (See Item 3)

L Rating At 400 F — less than 1 CFM/sq ft (See Item 3)



1. **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 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. OC with nom 2 by 4 in. (51 by 102 mm) lumber and plates and cross braces. Steel studs to be min 3-5/8 in. wide by 1-3/8 in. deep channels spaced max 24 in. OC.

B. **Gypsum Board\*** — Nom 1/2 or 5/8 in. thick, 4 ft wide with square or tapered edges. The gypsum wallboard type, thickness, number of layers and sheet orientation shall be as specified in the individual Wall or Partition Design. Diam of circular through opening to be 3/8 in. to 5/8 in. larger than outside diam of cable or cable bundle.

C. **Fasteners** — When wood stud framing is employed gypsum wallboard layers attached to studs with cement coated nails as specified in the individual Wall or Partition Design. When steel channel stud framing is employed, gypsum wallboard attached to studs with Type S self-drilling, self-tapping bugle-head steel screws as specified in the individual Wall or Partition Design.

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** — Individual cable or max 1 in. diam cable bundle installed in through opening with an annular space of min 2 in. (point contact) to max 3/4 in. Cable to be rigidly supported on both sides of wall assembly. The following types and sizes of cables may be used:

A. Max 180 pair No. 24 AWG copper conductor telephone cable with polyvinyl chloride (PVC) insulation and jacket materials. When max 25 pair telephone cable is used, T Rating is 2 hr. When 50 to 180 pair telephone cable is used in 1 hr fire rated wall, T Rating is 3/4 hr. When 50 to 180 pair telephone cable is used in 2 hr fire rated wall, T Rating is 1 hr.

B. Max No. 10 AWG multiple copper conductor Type NM ("Romex") nonmetallic sheathed cable with PVC insulation and jacket materials. When Type NM cable is used, max T Rating is 1-1/2 hr.

C. Multiple fiber optical communication cable jacketed with PVC and having a max outside diam of 5/8 in. When fiber optic cable is used, max T Rating is 2 hr.

D. Max 12 AWG multiconductor (max seven conductors) power/control cable with cross-linked polyethylene (XLPE) insulation and XLPE or PVC jacket materials. When multiconductor power/control cable is used, max T Rating is 2 hr.

E. Max four conductor with ground No. 2 AWG (or smaller) aluminum SER cables with polyvinyl chloride insulation and jacket materials.

3. **Fill, Void or Cavity Materials\*** — **Caulk, Sealant or Putty** — Caulk or putty fill material installed to completely fill annular space between cable and gypsum wallboard on both sides of wall and with a min 1/4 in. diam bead of caulk or putty applied to perimeter of cable(s) at its ingress from each side of the wall.

3M COMPANY — MP+ putty, CP 25WB+ caulk or FS-3000 WT sealant. (Notes: L Ratings apply only when Type CP 25WB+ caulk or FS-3000 WT sealant is used.)

\*Bearing the UL Classification Mark

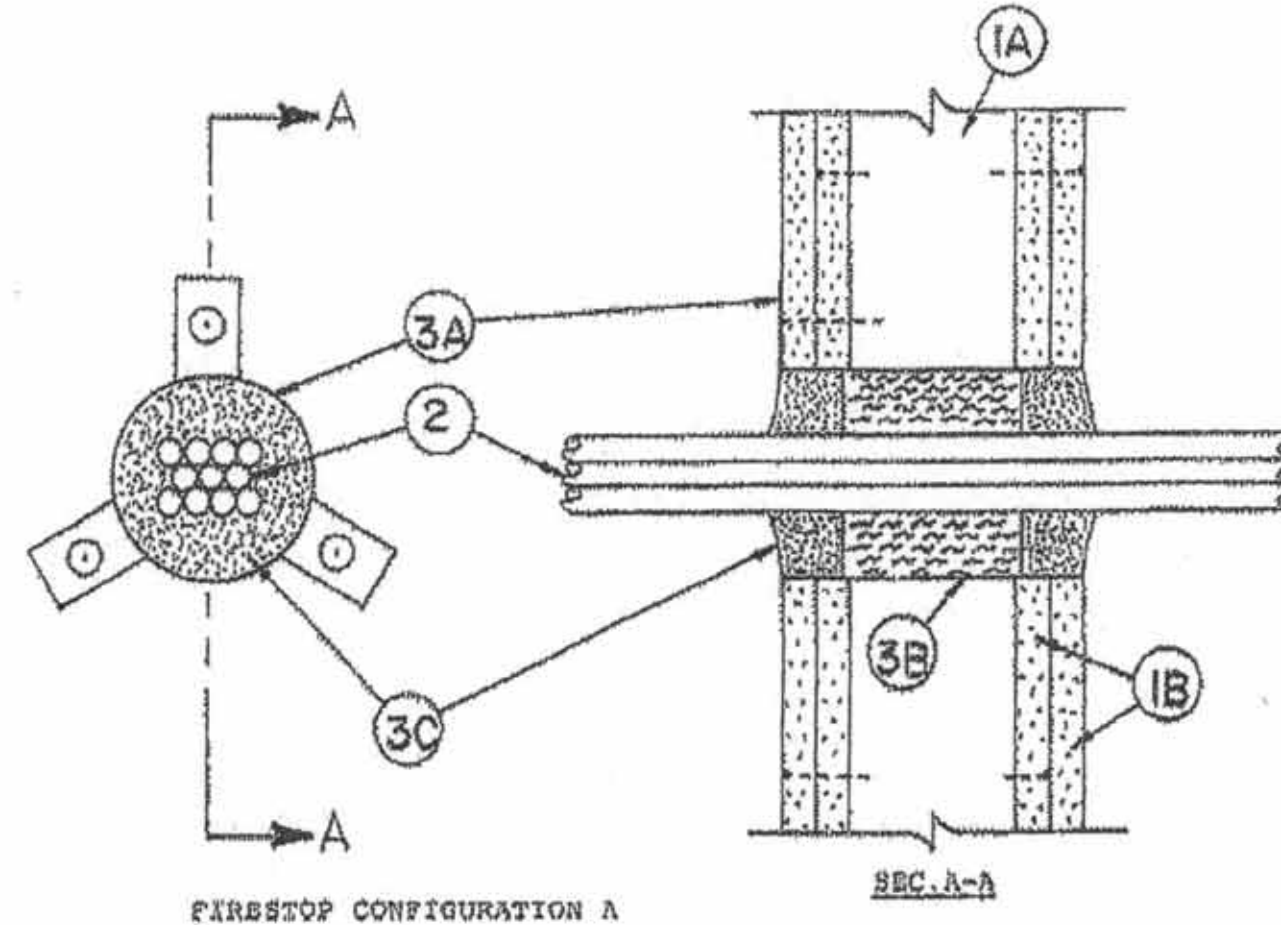
# System No. W-L-3005

June 23, 2000

(Formerly System No. 235)

F Ratings — 1 and 2 Hr (See Item 1)

T Ratings — 1/2 Hr



1. **Wall Assembly** — The 1 or 2 hr 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 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 by 4 in. (51 by 102 mm) lumber spaced 16 in. OC. In 2 hr fire-rated assemblies, steel studs to be min 2-1/2 in. wide and spaced max 24 in. OC. In 1 hr fire-rated assemblies, steel studs to be min 2-5/8 in. wide and spaced max 24 in. OC.

B. **Gypsum Board\*** — 5/8 in. thick, 4 ft wide with square or tapered edges. The gypsum wallboard type, thickness, number of layers, fastener type and 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 3 in.

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** — Aggregate cross-sectional area of cable in opening to be max 40 percent of the aggregate cross-sectional of the opening. Cables to be centered and rigidly supported on both sides of floor or wall assembly. The following types and sizes of copper conductor cables may be used:

A. Max 50 pair No. 24 AWG (or smaller) copper conductor telephone cables with polyvinyl chloride (PVC) insulation and jacket materials.

B. Max 2/C (with ground) — 12 AWG (or smaller) PVC insulated and jacketed nonmetallic sheathed cable.

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

A. **Steel Sleeve** — Cylindrical sleeve friction fitted into the opening with nom 1 in.

by 1 in. long mounting flanges and secured to gypsum wallboard with 2 in. long Type 3 self-drilling, self-tapping steel screws and fender washers. Sleeve may be field fabricated from min 0.016 in. thick (No. 30 gauge) galv sheet metal in accordance with the manufacturer's installation instructions.

B. **Packing Material** — In 2 hr fire-rated assemblies, min 2-1/2 in. thickness of min 4 pcf mineral wool insulation firmly packed into opening as a permanent form. In 1 hr fire-rated assemblies, min 2-5/8 in. thickness of min 4 pcf mineral wool 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\*** — **Caulk or Putty** — Min 1-1/4 in. thickness of fill material applied within annulus flush with both surfaces of wall. Fill material to be forced into interstices of cable bundle max extent possible. Additional fill material to be installed such that a min 1/2 in. crown is formed around the penetrating item.

W R GRACE & CO - CONN — FS900, FS901, FS903, FS903OC, FS905, FS905OC, FS929, FS901, FS903 or FS905 Sealant or FSP 1000 Putty

# System No. W-J-1010

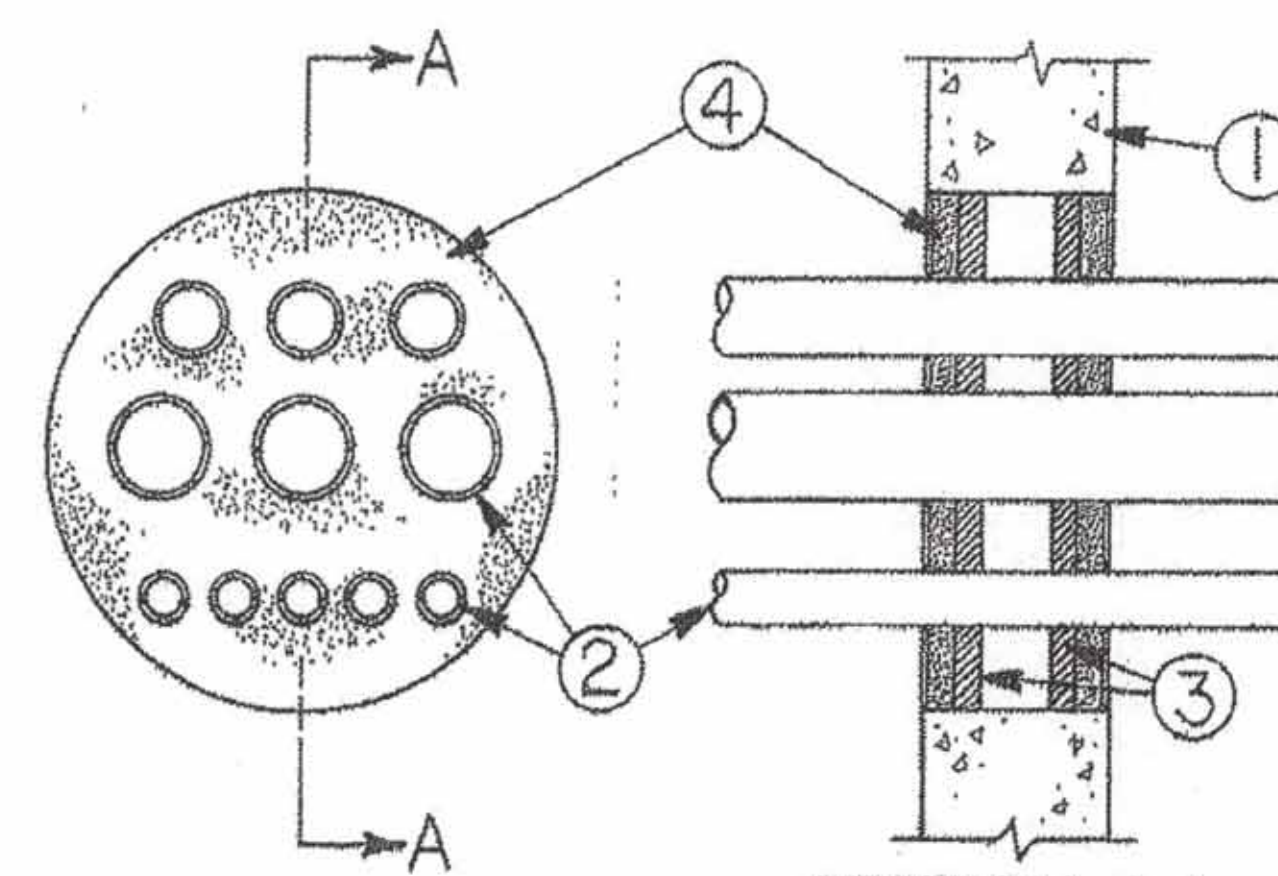
June 15, 2005

F Rating — 3 Hr

T Ratings — 1, 1-1/2 and 2 Hr (See Item 2)

L Rating At Ambient — 2 CFM/sq ft

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



1. **Wall Assembly** — Min 6 in. (152 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Max diam of opening is 12 in. (305 mm).

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

2. **Steel Pipe or Conduit** — Nom 3 in. (76 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe, steel conduit or steel electrical metallic tubing. Multiple pipes and/or conduit permitted in opening provided a min separation of 1/4 in. (6 mm) is maintained between pipes or conduits. Pipes and/or conduits to be rigidly supported on both sides of the wall assembly. The T Rating of the firestop system is dependent upon the max diam of the pipes or conduits, as tabulated below:

Max Pipe or Conduit Diam In.	T Rating Hr
3 (76)	1
4 (102)	1-1/2
6 (152)	2

3. **Packing Material** — Min 1 in. (25 mm) thick rigid glass fiber insulation or mineral wool batt insulation firmly packed into opening on both sides of wall assembly as a permanent form. Packing material to be recessed min 1 in. (25 mm) from surface of wall on both sides of wall assembly.

4. **Fill, Void or Cavity Materials\*** — **Caulk or Sealant** — Applied to fill the through opening to a min depth of 1 in. (25 mm) on both sides of wall assembly.

3M COMPANY — CP 25WB+ or FS-3000 WT

\*Bearing the UL Classification Mark



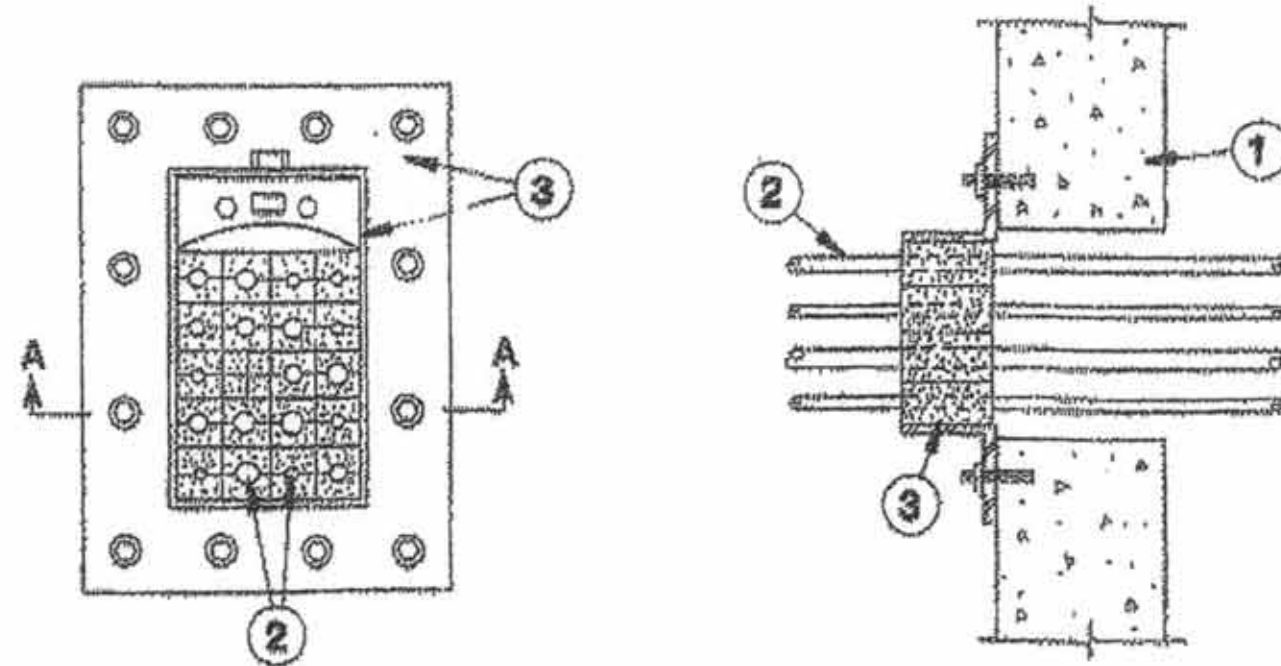
# System No. W-J-1016

December 05, 1996

(Formerly System No. 497)

F Rating — 3 Hr

T Rating — 0 Hr



SECTION A-A

1. Wall Assembly — Min 4 in. thick reinforced normal weight (140-160) concrete. Wall assembly may also be constructed of any UL Classified Concrete Blocks\*. Max area of opening is 72.2 sq in. with max dimension of 10-17/64 in.

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

2. Through Penetrants — One metallic pipe or conduit to be positioned within the firestop device. Pipe or conduit to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes or conduits may be used:

A. Steel Pipe — Nom 2 in. diam (or smaller) Schedule 40 (or heavier) steel pipe.

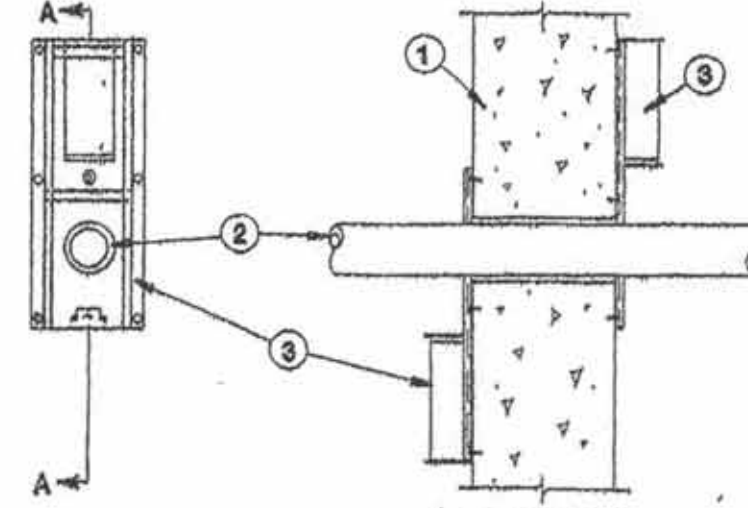
B. Conduit — Nom 2 in. diam (or smaller) rigid galv steel conduit.

3. Firestop Device — Firestop device shall be installed in accordance with the accompanying installation instructions. Firestop device consists of a steel frame, compression unit, stay plates and elastomeric insert blocks. The firestop device may be installed on either side of a solid concrete wall assembly. When wall is constructed of concrete blocks, devices are to be installed symmetrically on both sides of wall assembly. Device secured by means of 3/8 in. diam by 1-7/8 in. long steel expansion anchors spaced a max 4 in. OC. The annular space between the through-penetrants and the periphery of the steel frame shall be filled with elastomeric insert blocks and a compression unit sized to fit the specific penetrating items and steel frame. During the installation of the insert blocks within the steel frame, thin metal stay plates shall be used to separate each row of insert blocks and retain the insert blocks within the steel frame. After installation of the blocks, the bolts of the compression unit are tightened to form an effective seal around the through-penetrants and elastomeric insert blocks. The size of device is dependent upon the thickness of the wall and the size of the opening as indicated below:

Thick- ness of Wall In.	Opening Size In.	Size of Device
8	4-11/32 x 5-1/2	RGB-2
8	7-1/32 x 5-1/2	RGB-4
8	9-11/32 x 5-1/2	RGB-6
8	7-1/32 x 10-17/64	RGB-4x2
4	4-11/32 x 5-1/2	RGB-2
4	7-1/32 x 5-1/2	RGB-4
4	9-11/32 x 5-1/2	RGB-6
4	7-1/31 x 10-17/64	RGB-4x2

EGS NELSON FIRESTOP — Types RGB-2, RGB-4, RGB-4x2, RGB-6

# System No. WJ2009 (Formerly System No. 527) F Ratings—1, 2 and 3 Hr (See Item 3) T Ratings—1, 2 and 3 Hr (See Item 3)



WALL ASSEMBLY

1. Wall Assembly—Min 7-5/8 in. thick wall assembly constructed of any UL Classified Concrete Blocks\* or common bricks, laid up with mortar. Max diam of opening is 7 in. See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. Through Penetrants—One nonmetallic pipe or conduit to be centered within the firestop system. Pipe to be rigidly supported on both sides of wall assembly. A nom annular space of 1/4 to 3/8 in. is required within the firestop system. Pipe or conduit to be rigidly supported on both sides of the wall assembly. The following types of nonmetallic pipes or conduits may be used:

A. Polyvinyl Chloride (PVC) Pipe—Nom 8 in. diam (or smaller) Schedule 40 PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.  
B. Polyethylene (PE) Pipe—Nom 8 in. diam (or smaller) Schedule 40 PE pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.  
C. Chlorinated Polyvinyl Chloride (CPVC) Pipe—Nom 8 in. diam (or smaller) Schedule 40 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.  
D. Polypropylene (PP) Pipe—Nom 8 in. diam (or smaller) Schedule 40 PP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems. Pipe to be rigidly supported on both sides of wall assembly.

3. Firestop Device—Devices consist of rectangular metal frame with a spring-loaded guillotine blade mechanism installed around outer circumference of opening. Devices to be mounted to each surface of wall assembly using 1-5/8 in. long steel masonry anchors in accordance with accompanying installation instructions. The hourly F and T ratings of the devices are dependent upon the type, size and schedule of the penetrating item, as shown in the following table:

Max Device Size (in.)	Type Of Pipe	Nom Pipe Diam In.	Pipe Schedule	F Rating, Hr	T Rating, Hr
4	PE	4	Sch 40	1	1
3	PP	3	Sch 40	2	2
2	CPVC	2	Sch 80	3	2
1-1/2	PVC	1-1/2	Sch 80	3	2
3	PVC	3	Sch 40	3	3
6	PVC	6	Sch 40	3	2

Orlon Industries Inc.—Types 1-1/2, 2, 3, 4 and 8 in.

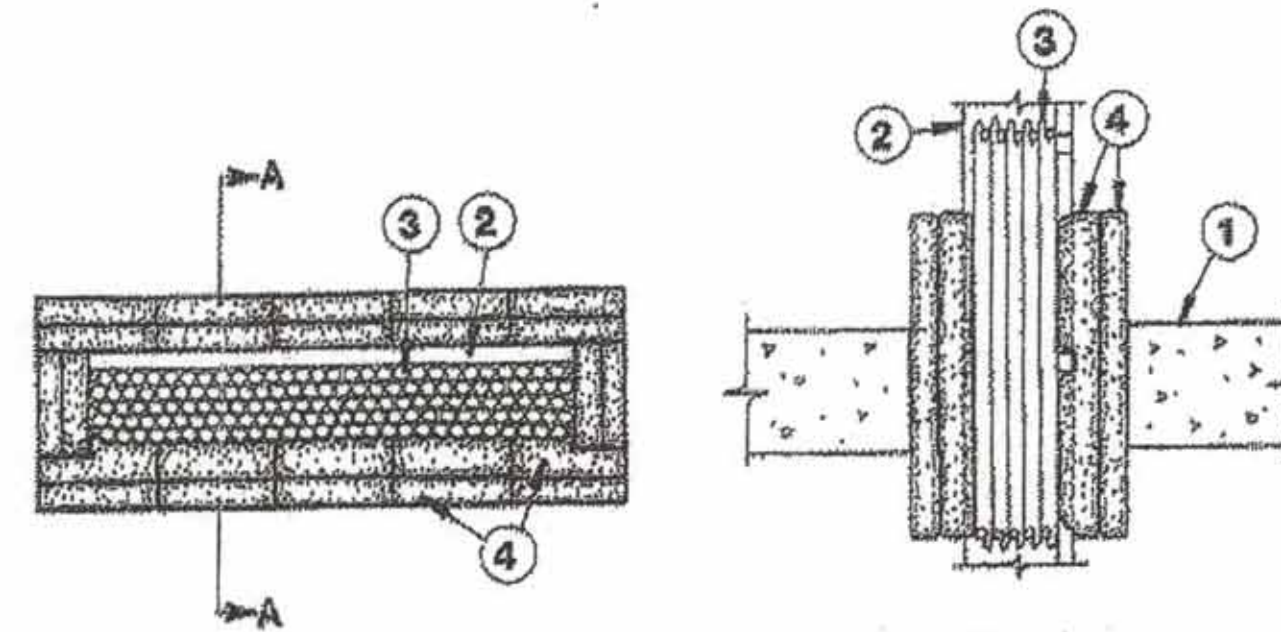
\*Bearing the UL Classification Marking

# System No. W-J-4005

January 08, 1993

F Rating — 3 Hr

T Rating — 0 Hr



SECTION A-A

1. 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 area of opening is 176 sq in. with max dimension of 22 in.

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

2. Cable Tray — Max 18 in. wide by 4 in. deep open ladder cable tray with channel-shaped side-rails formed of min 0.064 in. thick steel and with 1 in. deep rungs spaced 9 in. OC. 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 2 in. 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 40 percent of the cross-sectional area of the cable tray based on a max 3 in. cable loading depth within the cable tray. Any combination of the following types and sizes of copper conductor cables may be used:

A. Max 100 pair No. 24 AWG copper conductor communication cables with polyvinyl chloride (PVC) insulation and jacket materials.

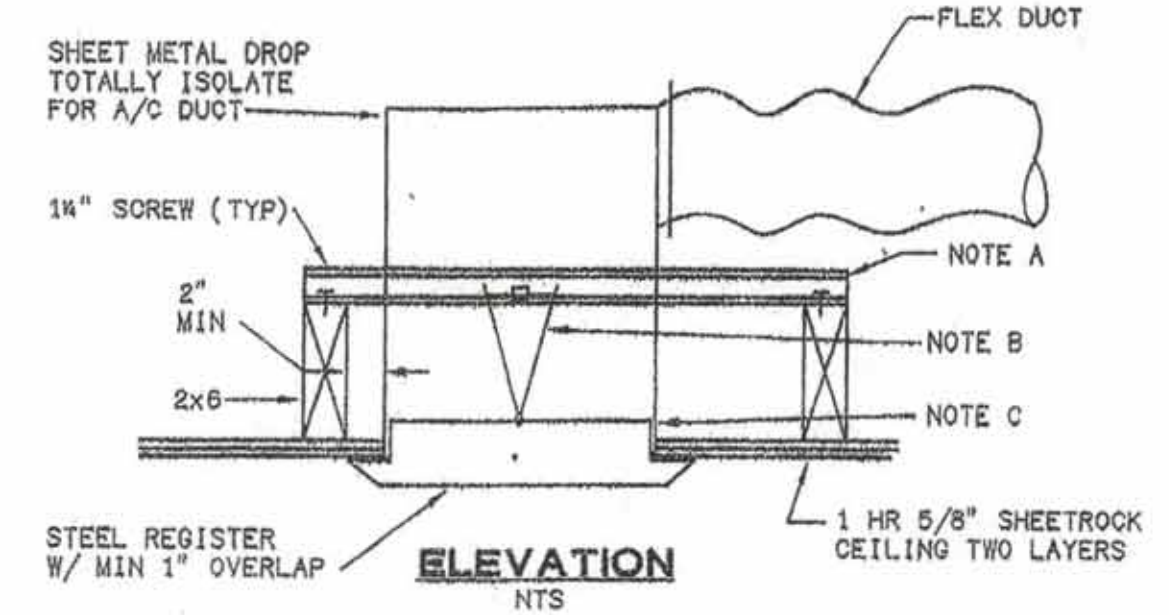
B. Max 7/C No. 12 AWG copper conductor control cables with polyvinyl chloride (PVC) insulation and jacket materials.

C. Max 250 kcmil single conductor power cables with polyvinyl chloride (PVC) insulation.

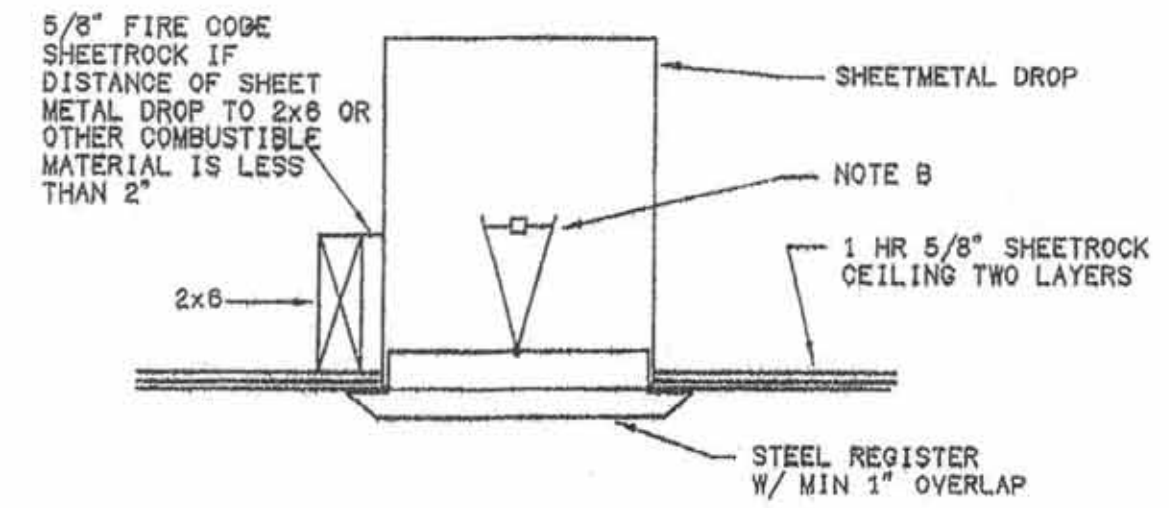
4. Fill, Void or Cavity Materials\* — Cushions — Nominal 13 in. long by 4-1/2 or 7-1/2 in. wide by 1 in. thick fabric covered intumescent cushions. Cushions installed flat with nominal 13 in. length of each cushion passing through the wall spanning with its ends projecting equally beyond the wall surface on each side of the wall assembly. Cushions tightly-packed into through opening between cables, cables and cable tray and cable tray and periphery of opening.

TREMCO INC — TREMatop-PS

\*Bearing the UL Classification Mark



NOTES:  
A. SUPPORT EACH SIDE WITH 16 GA. x 1x1x1/4 GALVANIZED CHANNEL. SIZE & SPACE SHALL BE PER MFG. RECOMMENDATIONS. SCREW POINTS SHALL NOT INTERFERE W/DAMPER OPERATION.  
B. USE 1-1/2 HR. RADIATION DAMPER.  
C. CONTRACTOR SHALL FOLLOW MFG'S INSTRUCTIONS FULLY INSTALLING BOTH RADIATION DAMPER & REGISTER.

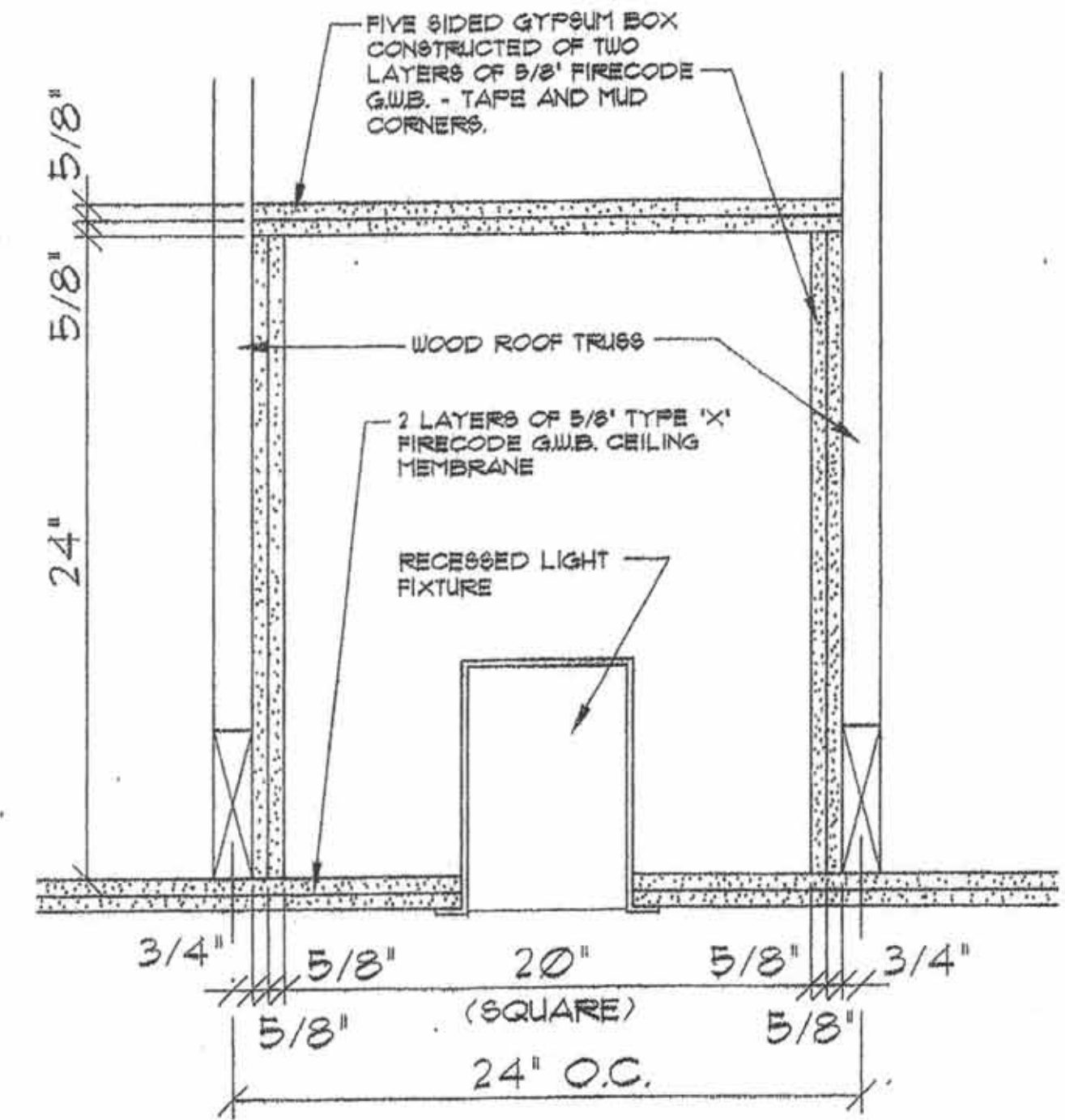


BOX NEXT TO  
2x6 JOIST

PROVIDE FLEXIBLE SEALANT SEAL ON ALL SIDES OF DUCT DROP AND ADJACENT G.W.B.

# 19 DETAIL SCALE: N.T.S. RADIATION DAMPER AT CEILING LOCATION

FIVE SIDED G.W.B. TO BE AIR TIGHT, IC RATED AND SEALED TO DRYWALL CEILING.



# RECESSED LIGHTING CEILING PROTECTION FIVE SIDED G.W.B. BOX

SCALE: 2" = 1'-0"

# 16 DETAIL SCALE: N.T.S. PENETRATION FIRESTOP FOR 2" MAX. DIAMETER STEEL PIPE OR CONDUIT THROUGH 4-HR. RATED ASSEMBLY

# 17 DETAIL SCALE: N.T.S. PENETRATION FIRESTOP FOR 6" MAX. DIAMETER P.V.C. PIPE, P.E. PIPE, OR C.P.V.C. PIPE THROUGH 4-HR. RATED ASSEMBLY

# 18 DETAIL SCALE: N.T.S. PENETRATION FIRESTOP FOR INSULATED CABLES THROUGH 4-HR. RATED ASSEMBLY

# 20 DETAIL SCALE: N.T.S. FIVE SIDED G.W.B. BOX FOR FIRE PROTECTION AT CEILING CAN LIGHTS

PRUITTHEALTH  
CRYSTAL COAST  
Beaufort, North Carolina

David R. Polston - Architect  
3806 Park Ave. Suite 2-L, Wilmington, NC 28403  
Architecture Planning Design

104 BED  
NURSING FACILITY

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