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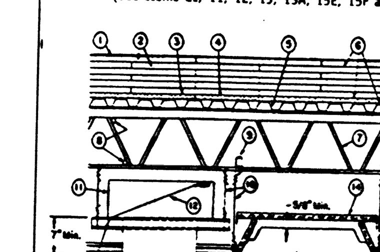
FIRE RESISTANCE RATINGS - ANSI/UL263 (BXUV)—*Continued*

Design No. P225

Restrained Assembly Ratings—1 and 1-1/2 Hr.
(See Items 2I, 11, 12, 15, 15A, 15E, 15F and 16)
Unrestrained Assembly Ratings—1 and 1-1/2 Hr.
(See Items 2I, 11, 12, 15, 15A, 15E, 15F and 16)
Unrestrained Beam Ratings—1 and 1-1/2 Hr.
(See Items 2I, 11, 12, 15, 15A, 15E, 15F and 16)



Beam—(Not Shown)—W6x12, min size. As alternate to steel beam, joist girders -(Not Shown)- 20 in. min depth and 13 lb/lin ft. min weight.

1. **Roof Covering***—Consisting of hot mopped or cold application materials compatible with insulation(s) described herein which provide Class A, B or C coverings. See Roofing Materials and Systems Directory-Roof Covering Materials(TEVT).

1A. In lieu of Item 1, roof covering consisting of single-ply Roofing Membrane* that is either ballasted, adhered or mechanically attached as permitted under the respective manufacturer's Classification. See Fire Resistance Directory—Roofing Membranes (CHCI).

1B. **Metal Roof Deck Panels**—(Not shown)In addition to or in lieu of Item 1, the roof covering may consist of a mechanically fastened metal roof deck panel assembly. See Fire Resistance Directory—Metal Roof Deck Panels (CETW).

2. **Mineral and Fiber Boards***—24 by 48 in. min size, max size 48 by 96 in. to be applied in one or more layers. Boards to be installed perpendicular to gypsum wallboard direction with end joints staggered 2 ft in adjacent rows. When applied in more than one layer, each layer of board to be offset in both directions from layer below a min of 12 in. in order to lap all joints. Min thickness 1 in. (No limit on max overall thickness).

When only one layer is used it may be bonded to gypsum wallboard or laid loosely. When two or more layers are used the insulation may be fastened to steel roof deck (through wallboard) with mechanical fasteners (Item 6A) and/or bonded to wallboard or vapor barrier and/or bonded to additional layers of insulation with adhesive (Item 6) or hot asphalt (Item 6B). Adhesive may be omitted from between components secured together by mechanical fasteners.

BMCA Insulation Products Inc.—Permalite rigid mineral fiber boards.
Fiberglas Canada, Inc.—Rigid glass fiber boards.
GAF Materials Corp.—GAFTEMP Perlite rigid mineral fiber boards.
Owens Corning—Paroc Baseboard and Paroc Capboard.
Owens-Corning Fiberglas Corp.—Rigid glass fiber boards.
Schuller International Inc.—Rigid mineral fiber boards.

2A. In lieu of Item 2, for use with Roofing Membrane* (Item 1B), insulation consisting of:

Foamed Plastic*—Nominal 24 by 48 in. foamed plastic insulation boards to be placed on top of sheathing material Item 1B.
Celfortec, Div. of Celfort Construction Materials Inc.—Min. thickness 2 in., max. thickness 8 in., extruded polystyrene foamed plastic boards, to be placed on top of sheathing material (Item 1B) and covered with crushed stone or concrete pavers at a rate of 10 psf, min.
Dow Chemical USA—Min. thickness 2 in., Max. thickness 8 in., extruded polystyrene foamed plastic boards. The unfaced boards shall be covered with crushed stone or concrete pavers, at a rate of 10 psf, min.
Owens Corning Specialty and Foam Products Div.—Min. thickness 2 in., max. thickness 8 in., extruded polystyrene foamed plastic

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FIRE RESISTANCE RATINGS - ANSI/UL263 (BXUV)—*Continued*

boards, to be placed on top of sheathing material (Item 1B) and covered with crushed stone or concrete pavers at a rate of 10 psf, min.
Versico Inc.—4-3/8 in. thick, concrete mortar faced extruded polystyrene, PMR Insulation Board.
T. Clear Corp.—4-3/8 in. thick, concrete mortar faced extruded polystyrene Lightguard Boards.

2B. **Roof Insulation—Mineral and Fiber Boards* and/or Building Units***—As an alternate to Items 2 and 2A, the roof insulation may consist of one layer of Type PK Building Unit* (composite mineral board and urethane foam) with the mineral board facing down, or Type PK Plus Building Units* bonded to gypsum board (Item 4) or vapor barrier (Item 3) with adhesive (Item 6) or hot asphalt (Item 6B), or fastened to steel deck (through the gypsum board) with mechanical fasteners (Item 6A). As an option, additional one or more layers of any thickness Mineral and Fiber Boards* and/or Building Units* fastened with hot asphalt, adhesive, or mechanical fasteners may be used.
BMCA Insulation Products Inc.—Mineral and Fiber Boards*, Building Units*—Type PK or PK Plus.

2C. **Roof Insulation—Foamed Plastic***—As an alternate to Items 2 through 2B, any thickness polystyrene foamed plastic insulation boards bearing the UL Classification Marking, having a density of 2.5 pcf max, shall be installed on top of min 1 in. thick Mineral and Fiber Boards* (Item 2) and covered with either the Built-Up Roof Covering (Item 1) or single-ply roofing membrane (Item 1A). The 1 in. thick Mineral and Fiber Boards to be installed over the gypsum wallboard (Item 4). See Foamed Plastic* (BRYX) category in the Building Materials Directory or Foamed Plastic* (CCVW) category in the Fire Resistance Directory for list of manufacturers.

2D. **Foamed Plastic***—As an alternate to Items 2 through 2C, polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in., to be applied in one or more layers over the gypsum wallboard (Item 4). Min thickness is 1.3 in. for the 1 hr ratings and 2.0 in. for the 1-1/2 h ratings. No limit on max overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows. When applied in more than one layer, each layer to be offset in both directions from layer below a min of 6 in. in order to lap all joints.
Apache Products Co.—Pyrox.
Atlas Roofing Corp.—ACFoam II.
Carlisle Syntec Systems, Div. of Carlisle Corp.—Types HP, HP-N, HP-W.
Celotex Corp.—Types L, O.
Firestone Building Products Co.—"ISO 95+FK", "ISO 95+GL", "ISO 95+GW", "Rhoflex Isocyanurate FK", "Rhoflex Isocyanurate GL", "Rhoflex Isocyanurate GW".
GAF Materials Corp.—Isotherm R.
Loadmaster System Inc.—Loadmaster Polyisocyanurate Insulation.
NRG Barriers Inc.—E'NRG'Y 2, PSI 25.
Rmax Inc.—Multi-Max FA.
Schuller International Inc.—Types N1, N2.

2E. **Building Units***—As an alternate to Items 2 through 2D, polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in., faced on underside (or both sides) with mineral and fiber boards. Boards to be installed over the gypsum wallboard (Item 4) with end joints staggered a min of 6 in. in adjacent rows.
American Western Mfg.
Manville Sales Corp.

2F. **Building Units**—As an alternate to Item 2 through 2E, polyisocyanurate foamed plastic insulation boards, nom. 48 by 48 or 96 in., faced on the top surface with oriented strand board. Min. thickness of the polyisocyanurate core is 1.3 in. for the 1 hr ratings and 2.0 for the 1-1/2 hr ratings. No limit on max overall thickness. Boards to be installed over the gypsum wallboard (Item 4) with end joints staggered a min. of 6 in. in adjacent rows.
Atlas Roofing Corp.—ACFoam Nailbase Insualtion, Vented—R.
Firestone Building Products Co.—Nailbase
NRG Barriers, Inc.—Type Nailboard

2G. **Building Units***—As an alternate to Items 2 through 2F, phenolic foamed plastic insulation boards, nom 48 by 48 or 96 in., faced on underside (or both sides) with mineral and fiber boards (Min phenolic core thickness is 1.2 in. for the 1 hr. ratings, 2.0 in. for the 1-1/2 hr ratings. No limit on max thickness). Boards to be installed over the gypsum wallboard (Item 4) with end joints staggered a min of 6 in. in adjacent rows.
Manville Sales Corp.

2H. **Foamed Plastic***—As an alternate to Items 2 through 2G (for 1 hr. ratings only). Extruded polystyrene foamed plastic boards to be installed in one or more layers over gypsum wallboard (Item 4). Joints of gypsum wallboard to be covered with 4 in. wide foil tape. Min thickness is 1 in. when a min 1/2 in. thick layer of mineral and fiber board (Item 2) is installed on top of the foamed plastic. Min thickness is 3 in. when the mineral and fiber board (Item 2) is omitted. No limit on max thickness. All joints between layers offset min 6 in.

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FIRE RESISTANCE RATINGS - ANSI/UL263 (BXUV)—*Continued*

Dow Chemical USA.
UC Industries Inc.

2I. **Building units***—As an alternate to Items 2 through 2H. Polyisocyanurate foamed plastic insulation boards faced on the underside (or both sides) with mineral fiber board. Min thickness of the polyisocyanurate core is 1.3 in. for 1 hr ratings and 2.0 in. for 1-1/2 hr ratings. No limit on max overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows. Adhesive (Item 3) may be applied between the building units and the vapor retarder (or gypsum wallboard if vapor retarder is not used).
NRG Barriers, Inc.—E'NRG'Y 2 Composite, Barrier Board Plus, ISO-ROC.
Firestone Building Products Co.—"ISO 95+ Composite", "Rhoflex Isocyanurate Composite.

2J. **Building Units***—As an alternate to Items 2 through 2I, polyisocyanurate foamed plastic insulation boards faced on the underside with wood fiber board. Min thickness of the polyisocyanurate core is 1.3 in. for the 1 hr ratings and 2.0 in. for the 1-1/2 hr ratings. No limit on max overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows.
Firestone Building Products Co.—ISO 95+ Wood Fiberboard Composite
NRG Barriers, Inc.—E'NRG'Y-2 Plus

2K. **Foamed Plastic***—Not Shown—As an alternate to Items 2 through 2J, polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in., with formed channels on the top side and a flat bottom face, to be applied in one layer over gypsum wallboard (Item 4). Min thickness (as measured at thinnest section of board) is 1.3 in. for the 1 hr ratings and 2.0 in. for the 1-1/2 hr ratings. No limit on max thickness (as measured at the thickest section of the board). Insulation covered with field applied 3/8 min thick nonveneer APA rated sheathing for use with Class A or C asphalt glass-mat or asphalt organic shingles. Sheathing installed with all joints offset min 6 in. from joints of insulation boards.
GAF Materials Corp.—Type INSUL-AIR.
NRG Barriers, Inc.—Type ISO-VENT.

2L. **Building Units***—As an alternate to Items 2 through 2K, polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in., faced on the top surface with gypsum board. Min thickness of the polyisocyanurate core is 1.3 in. for 1 hr ratings and 2.0 in. for the 1-1/2 hr ratings. No limit on overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows. Adhesive (Item 3) may be applied between the building units and the vapor retarder (or gypsum wallboard if vapor retarder is not used).
NRG Barriers, Inc.—E'NRG'Y 2 Gypsum Composite.

3. **Sheathing Material***—(Optional)—Vinyl film vapor barrier, applied with adhesive to gypsum wallboard. Adjacent sheets overlapped 2 in.
BMCA Insulation Products Inc.

3A. In lieu of Item 3, for use only with Foamed Plastic insulation (Item 2A), Roofing Membrane* loosely laid over gypsum wallboard.
American Hydrotech Co., Inc.—Type Hydro-Seal.
Carlisle Syntec Systems.
Firestone Building Products Co.
W. R. Grace & Co., Construction Prods. Div—Type GRM350.

3B. **Sheathing Material***—(Optional)—In lieu of Item 3 or 3A, a self-adhered rubberized asphalt roofing underlayment membrane which may be placed on top of the gypsum wallboard (Item 4) or on the roof insulation (Item 2 or any nonpolystyrene foamed plastic insulation covered as an alternate to Item 2).
W. R. Grace & Co., Conn Construction Products Div.—Grace Ice & Water Shield.

3C. **Sheathing Material***—(Optional)—In lieu of Items 3, 3A and 3B, a self-adhered rubberized asphalt roofing underlayment membrane which may be placed on top of gypsum wallboard or on the roof insulation.
Carlisle Coatings & Waterproofing Inc.—CCW-707.

4. **Gypsum Wallboard**—(Classified or unclassified)—Supplied in sheets nom 2 by 4 ft to 4 by 12 ft, by nom 5/8 in. thick. Min weight 2.0 psf. Applied perpendicular to steel roof deck direction with adhesive or laid loosely. End joints to occur over crests of steel roof deck with end joints staggered 2 ft in adjacent rows.
See Wallboard, Gypsum (CKNX) category for names of manufacturers.

5. **Steel Roof Deck**—Min 1 in. deep, min 25 in. wide, fluted painted or galv steel deck. Min 0.019 in. thick (26 gauge). Flutes approx 4 in. OC, crests approx 2-3/4 in. wide. As an alternate, 1-1/2 in. deep, min 18 in. wide fluted galv steel deck. Min 0.029 in. thick (22 gauge), flutes 6 in. OC, crest width ranging from 3-1/2 to 5 in. Welded to supports with welding washers 12 in. OC. Side lap joints of adjacent units welded or secured together with No. 12 by 1/2 in. self-drilling, self-tapping steel screws midway between steel joists.
Classified Steel Floor and Form Units*—Noncomposite fluted or corrugated, min 0.023 in. thick (24 gauge), 27 to 36 in. wide, 1-5/16, 1-1/2, 2 or 3 in. deep painted or galv steel units. Spacing of welds attaching units to supports shall not exceed 12 in. OC Adjacent units

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FIRE RESISTANCE RATINGS - ANSI/UL263 (BXUV)—*Continued*

welded together 36 in. O.C. along side joints.
Bowman Metal Deck Div., Armco Inc.—Type B.
Consolidated Systems, Inc.—Types A, B, BI, F.
Epic Metals Corp—Type B30.
Loadmaster Systems Inc.—Types ED, HD, PS, SS-200. Type PS units may be ptd/ptd.
Marlyn Steel Decks, Inc.—Types B, F.
Roof Deck, Inc.—Types A, B-1, B-2, EHD Multi-Rib or F.
United Steel Deck, Inc.—Type B.
Verco Mfg., Inc.—Types B or N.
Vulcraft, Div. of Nucor Corp.—Types 1.5A, 1.5B, 1.5BI, 1.5F.
Wheeling Corrugating Co., Div of Wheeling-Pittsburgh Steel Corp.—Types B, BW, E, F, TF-75, -125, -200. Type 1.5A, 1.5B, 1.5BI, 1.5F, B, BW, E, F units may be galv or phos/ptd.

6. **Adhesive***—Optional—May be applied between crests of steel roof deck and gypsum wallboard in 1/2 in. wide ribbons 8 in. OC at 0.4 gal per 100 sq ft. May also be applied in 1/2 in. wide ribbons 6 in. OC, at 0.4 gal per 100 sq ft, between gypsum wallboard and vapor barrier, and between vapor barrier and mineral and fiber boards, or directly between gypsum boards and roof insulation when vapor barrier is omitted. May also be applied at the same rate between layers of roof insulation.
BMCA Insulation Products Inc.

6A. **Mechanical Fasteners**—(Not shown)—Any steel nail or steel clip type fastener designed for the purpose may be used to attach one or more layers of insulation to steel roof deck (through gypsum board). As an alternate, the gypsum wallboard may be attached directly to the steel roof deck with the mechanical fasteners.

6B. **Hot Asphalt or Coal Tar Pitch**—(Not shown)—May be used as an alternate to adhesive between layers of roof insulation at a rate not to exceed 35 lb per 100 sq ft.

7. **Steel Joists**—Type 10J4 or 12K1 min size. 10K1 size may be used for a limited span of 12 ft-0 in. max. As alternate, any LH-Series steel joist spanning no greater than 60 ft may be used. For spans greater than 60 ft., LH-Series joists may be used provided that their vertical deflection under published total load shall not be greater than 1/244 of the joist span. Joist may be spaced a max 72 in. OC and welded to end supports.

7A. **Structural Steel Members**—(Not shown)—As alternate structural support, Castelite steel beams may be used for 1 hr. Restrained and Unrestrained Assembly and 1 hr. Unrestrained Beam ratings. Beams may be spaced max 72 in. OC and welded to end supports. Beams shall have lateral bracing in accordance with Item 8A. Cold rolled channels used in conjunction with Castelite beams are specified in item 9A.
Castelite Steel Products, Inc.—CB12X6.5, min size.

8. **Bridging**—Steel bars, 1/2 in. diam welded to top and bottom chords of each joist.

8A. **Lateral Bracing**—(Not shown)—Castelite beams shall be braced top and bottom with min 1-1/4X1-1/4X1/8 in. angles, approximately located at third points of the span.

9. **Cold Rolled Channels**—No. 16 MSG cold-rolled steel channels, 1-1/2 in. deep with 9/16 in. flanges. Placed on lower chord of joists and secured with 18 SWG galv steel wire. Installed perpendicular to joists, located as required to provide hanger wire attachment points.
When steel joists are spaced more than 5 ft. OC, two cold-rolled channels placed back to back and tied together with double strand of 18 SWG galv steel wire at 24 in. OC The double channels installed perpendicular to the joists and spaced a max of 48 in. OC may be placed on top of the joists' bottom chord and tied to each joist with a double strand of 18 SWG galv steel wire or suspended below the joists with 12 SWG galv steel wire wrapped around the cold-rolled channels and with the other end wrapped around the bottom chord of the joists.

9A. **Cold Rolled Channels**—(Not shown)—For use with items 7A-No. 16 MSG cold-rolled channels, 1-1/2 in. deep with 9/16 in. flanges, suspended by hanger wire from beams. Installed perpendicular to beams, located as required to provide hanger wire attachment points. When beams are spaced greater than 5 ft. OC, two cold-rolled channels placed back to back and tied together with double strand of 18 SWG galv steel wire at 24 in. OC, oriented perpendicular to, and suspended from the beams, spaced a max of 48 in. OC are used to provide the hanger wire attachment points.

10. **Hanger Wire**—No. 12 SWG galv steel wire twist-tied to steel joists or cold-rolled steel channels. When the ceiling consists of nom 24 by 24 or 24 by 48 in. panels, hanger wires spaced max of 48 in. OC on main runners adjacent to cross tee intersections. Hanger wires to occur at all four corners of light fixtures, at midspan of cross tees adjacent to 4 ft light fixtures, air duct outlets, and adjacent to each main runner splice. When the ceiling consists of nom 20 by 60 in. panels, hanger wires shall be spaced 40 in. OC along main runners, one wire shall occur at each corner of light fixtures at midspan of all cross tees, and adjacent to each main runner splice.

11. **Air Duct**—Min 0.019 in. thick (26 gauge) galv steel. Total area of duct openings not to exceed 255 sq in. per each 100 sq ft of ceiling area. Area of ind duct opening not to exceed 255 sq in. Max dimension of opening

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18 in. Inside and outside faces of duct throat protected with 1/16 in. thick ceramic fiber paper laminated to the metal. For the 1 hr Assembly and Beam Ratings only, the ceramic fiber paper laminated to the inside and outside faces of the duct throat may be omitted. For the 1 hr Assembly and Beam Ratings only, the total area of duct openings per 100 sq ft of ceiling area may be increased to 576 sq in., with the area of ind duct opening not to exceed 576 sq in. Max dimension of opening 30 in. Duct supported by 1-1/2 in. deep, min 0.053 in. thick (16 gauge) cold-rolled steel channels spaced not over 48 in. OC suspended by 12 SWG galv steel wire.
As an alternate to the galv steel duct, air ducts fabricated from rigid Air Duct Materials* may be used in lieu of steel ducts. Total area of duct openings not to exceed 57 sq in. per each 100 sq ft of ceiling area. Area of individual duct opening not to exceed 113 sq in. Max dimension of opening 12 in. The sheet steel duct drop or outlet is positioned at the center of a 24 in. long min 0.029 in. thick (22 gauge) sheet steel duct liner. The sheet steel duct drop is insulated with a nom 1 in. thick, 5 pcf density rigid glass fiber material. The ducts are supported by min 0.053 in. thick (16 gauge) 1-1/2 in. cold-rolled steel channels suspended from the joists with 12 SWG galv hanger wire. Channels are located directly below the sheet steel duct liner, one on each side of the duct drop and are spaced between duct drops at 72 in. OC for ducts up to 36 in. wide and 48 in. OC for ducts between 36 and 60 in. wide.
Certain Teed Corp.—Rigid, Class I.
Knauf Fiber Glass GmbH—Rigid, Class I.

12. **Damper**—Min 0.056 in. thick (16 gauge) galv steel, sized to overlap duct opening 2 in. min. Protected on both sides with 1/16 in. thick ceramic fiber paper laminated to the metal and held open with a Fusible Link (Bearing the UL Listing Mark). For the 1 hr Assembly and Beam Ratings only, Duct Outlet Protection System A, as described in the Design Information Section, may be used in lieu of the damper described above.

12A. **Air Terminal Units***—(Not shown)—May be used as an alternate to air duct outlets with surface mounted diffusers (Item 11) for the 1 Hr. Assembly Ratings Only. A max of 16 lin ft of diffuser slot is allowed for each 100 sq ft of ceiling area. Units must be supported from the structural steel or from cold-rolled steel channels tied to the structural steel and installed in accordance with accompanying installation instructions.

13. **Fixtures, Recessed Light**—(Bearing the UL Listing Mark). Fluorescent lamp type, steel housing, nom 2 by 4 ft or 20 by 60 in. size. Fixtures spaced so their area does not exceed 24 sq ft per 100 sq ft of ceiling area. When 20 by 60 in. fixtures are used, fixture stabilizers (Item 13A) shall be used in addition to the hanger wires at midspan of the cross tees. Wired in conformance with the National Electrical Code. Fixture and ballasts must be considered for these ambient temperature conditions before installation.

13A. **Fixture Stabilizer**—(Not shown)—Required for 2 by 4 ft and 20 by 60 in. size light fixtures when metal pans (Item 15B) are used and only for 20 by 60 in. size fixtures when metal pans are not used. One 16 MSG painted steel channel formed as a yoke, secured to the web at midspan of cross tee on each side of fixture.

13B. **Fixtures, Recessed Light**—(Bearing the UL Listing Mark)—(Not Shown)—As an alternate to Item 13, incandescent lamp type, steel housing, nom 6-1/2 in. diam by 7-1/2 in. high. Each fixture provided with a nom 6-1/2 in. by 10 in. painted steel base plate screw-attached to the "high hat" fixture with four steel screws. Base plate to be provided with steel bar hangers designed to span across nom 24 in. spacing of cross tees for fixture support. Fixture supported from roof structure or from cold-rolled steel channel, independent of ceiling cross tees, with steel hanger wires secured to steel bar hangers near each corner of the base plate. A max of two "high hat" fixtures may be substituted for each nom 24 by 48 in. fixture permitted in the ceiling (max six "high hat" fixtures per 100 square ft of ceiling area). Wired in conformance with the National Electrical Code.

14. **Fixture Protection—Acoustical Material***—5/8 in. thick, cut to form a five sided enclosure, trapezoidal in cross-section, approx 1/2 in. longer and wider and 5/8 in. higher than the light fixture housing. For 2 by 4 ft fixture the protection consists of a 23-3/4 by 47-3/4 in. top piece, two 5-7/8 by 47-3/4 in. side pieces, and two 4-1/2 by 23-3/4 in. end pieces. For 20 by 60 in. fixture the protection consists of a nom 20 by 60 in. top piece, two nom 6 by 60 in. side pieces, and two nom 4-1/2 by 20 in. end pieces. The top edge of each fixture protection side piece may be provided with a 1 in. deep by max 20 in. long notch near its midpoint. The side and top pieces are laid in place and the end pieces are held in place with three 8d nails spaced 8 in. OC. (S)-Surface perforations.
Armstrong World Industries, Inc.—Type 5/8 in. P (S); 5/8 in. PC (S).

14A. **Fixture Protection—Acoustical Material***—For use with "high hat" light fixtures (Item 13B). Five sided enclosure, rectangular in cross section, approx 1 in. longer and wider than fixture with sufficient depth to provide 1 in. clearance to the top of the fixture. Pieces cut from same acoustical material used in the ceiling (Item 16) and assembled using

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Type 8d nails. One side of the fixture protection enclosure may be cut 1 in. shorter than the height of the enclosure such that a 1 in. high clearance is maintained between its top and the top of the enclosure.

15. **Steel Framing Members***—Main runners and cross tees in combinations listed below.
A. Main runners nom 12 ft long, spaced 4 ft OC. Cross tees nom 4 ft long, installed perpendicular to main runners and spaced 2 ft OC. Cross tees nom 2 ft long, installed perpendicular to 4 ft cross tees and spaced 4 ft OC. For nom 24x24 and 24x48 in. panels.
Armstrong World Industries, Inc.—Types AFG, AFG-A, FG, FST-6000, -8000. For the 1 hr Assembly and Beam Ratings only, Type AFG-A, FST-6000A or -8000A may be used. Type GLBP (consisting of main runners, 4 ft cross tees and steel straps) for use with 24 by 48 in. Type P or PC lay-in panels.
CGC Interiors—Type DXL.
Chicago Metallic Corp.—Types 250, 260, 1250, 1260, 1850, 1860. When Types 260, 1260, 1860 steel framing members are used, the Assembly and Beam Ratings are 1 hr.
USG Interiors, Inc.—Type DXL.
B. Main runners nom 10 ft long spaced 60 in. OC. Cross tees nom 5 ft long, installed perpendicular to main runners and spaced 20 in. OC. For nom 20x60 in panels.
Chicago Metallic Corp.—Types 250, 260, 1250, 1260, 1850, 1860.

15A. **Steel Framing Members***—For use with metric size panels described under Item 16. Main runners nom 3600 mm long, spaced 1200 mm OC. Cross tees nom 1200 mm long, installed perpendicular to main runners and spaced 600 mm OC. Cross tees nom 600 mm long, installed perpendicular to 1200 mm cross tees (midway between main runners) spaced 1200 mm OC. For 600 by 600 or 1200 mm lay-in panels.
CGC Interiors—Type DXL.
USG Interiors, Inc.—Type DXL.

15B. **Steel Framing Members*—Metal pans**—(Not shown) (Optional)—Channel-shaped metal pans in various colors and finishes, installed perpendicular to cross tees or main runners and spaced 4 or 6 in. O.C. The flange edges of the metal pans engage and interlock with the vertical tabs of the corresponding grid adapters with tabs 4 or 6 in. O.C. (See Item 15C). End laps joints of the metal pans shall occur adjacent to main runners or cross tees. The metal pans shall each be supported by at least two main runners or cross tees.
Chicago Metallic Corp.—Type 1650.

15C. **Steel Framing Members*—Grid adapter**—(Not shown) (Optional)—For use with Type 1650 metal pans (See Item 15B). Angle shaped adapter with a looped return flange; installed parallel to cross tees or main runners by engaging return flange of adapter to the flange of the cross tee or main runner. The 48 or 24 in. long adapters are intended for use with cross tees or main runners, respectively.
Chicago Metallic Corp—Type 1650.

15D. **Steel Framing Members*—Filler strips**—(Not shown) (Optional)—For use with Type 1650 metal pans. Filler strips are 0.018 to 0.024 in. thick, steel or aluminum, 13/32 or 5/8 in. deep by 3/4 in. wide, placed between the metal pans.
Chicago Metallic Corp.—Type 1650.

15E. **Steel Framing Members***—9/16 in. wide narrow flange grid may be used as an alternate to 15/16 in. wide flange grid systems. Main runners, nom 12 ft long spaced 4 ft OC. Cross tees, nom 4 ft long, installed perpendicular to main runners and spaced 2 ft OC. Cross tees, nom 2 ft long, installed perpendicular to 4 ft cross tees and spaced 4 ft OC. Type FSLK for use with Type P, nom 24 by 24 in. square edge or tegular edge lay-in panels. Type FSL for use with Type P, nom 24 by 24 in. tegular edge lay-in panels. Grid modules containing light fixtures must employ a fixture centering clip at each corner. The 24 gauge electrogalvanized steel clip is nested on the flange of the intersecting grid tees, has two 1-7/16 in. high legs with their sides perpendicular to each other and a U-shaped return at the top of each leg for engaging over the bulb of the intersecting grid tees. When 9/16 in. wide flange grid is used, max Assembly and Beam Ratings are 1 hr.
Armstrong World Industries, Inc.—Types FSL, FSLK for 1 hr assembly and beam ratings only.

15F. **Steel Framing Members***—9/16 in. wide narrow flange grid may be used as an alternate to 15/16 in. wide flange grid systems. Main runners, nom 12 ft long, spaced 4 ft OC. Cross tees, nom 4 ft long, installed perpendicular to main runners and spaced 2 ft OC. Cross tees, nom 2 ft long, installed perpendicular to 4 ft cross tees and spaced 4 ft OC. For use with Type P, nom 24 by 24 in. square edge lay-in panels.
Chicago Metallic Corp.—Type 4050 for 1 hr assembly and beam ratings only.

16. **Acoustical Material***—Nom 24 by 24 or 48 in. lay-in panels. Border panels supported at walls by min 0.016 in. thick (26 gauge) painted steel angle with 7/8 in. legs; or, min 0.016 in. thick (26 gauge) painted steel channel, 1-5/8 in. deep with 7/8 in. flanges. (S)-Surface perforations.

LOOK FOR MA...

FIRE RESISTANCE DIRECTORY (BXRH)

FIRE RESISTANCE RATINGS - ANSI/UL263 (BXUV)—*Continued*

Nominal Panel Size	Restrained Assembly Rating	Unrestrained Assembly and Beam Ratings	Acoustical Material Type
24 x 24	1 hr.	1 hr.	BF, P or PC
24 x 48 or 20 x 60	1-1/2 hr.	1 hr.	PC
24 x 48 or 20 x 60	1-1/2 hr.	1-1/2 hr.	P

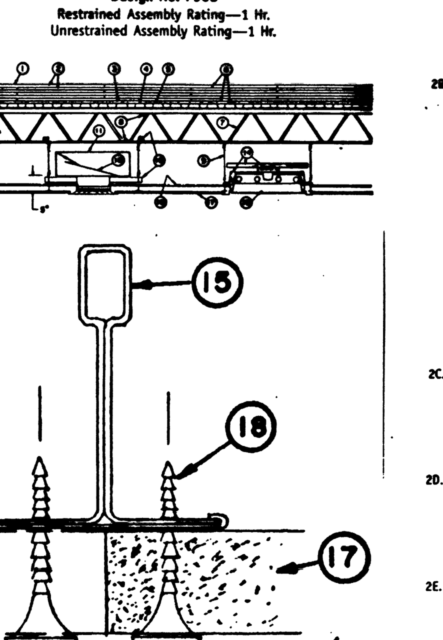
Armstrong World Industries, Inc.—Type 5/8 in. P (S); 5/8 in. PC (S); 3/4 in. BF (S).
Type P or PC (S, P) 15 mm thick 600x600 or 1200 mm. These metric size panels may only be used with metric size grid described under item 15A. Hourly ratings shown for 24x24 in. size panels apply to 600x600 mm size panels while ratings shown for 24x48 in. panels apply to 600x1200 mm size panels.

17. **Hold-Down Clips**—(not shown)—No. 24 MSG spring steel, places over cross-tees 2 ft. O.C.

*Bearing the UL Classification Marking

Design No. P508

Restrained Assembly Rating—1 Hr.
Unrestrained Assembly Rating—1 Hr.



1. **Roof Covering***—Consisting of hot mopped or cold application materials compatible with insulation(s) described herein which provide Class A, B or C coverings. See Roofing Materials and Systems Directory-Roof Covering Materials(TEVT).

1A. In lieu of Item 1, roof covering consisting of single-ply Roofing Membrane* that is either ballasted, adhered or mechanically attached as permitted under the respective Classified company's Classification. See Fire Resistance Directory-Roofing Membranes (CHCI).

1B. **Metal Roof Deck Panels***—(Not shown)—In addition to or in lieu of Items 1 or 1A, the roof covering may consi.t of a mechanically fastened

518 FIRE RESISTANCE DIRECTORY (BXRH)

FIRE RESISTANCE RATINGS - ANSI/UL263 (BXUV)—*Continued*

metal roof deck panel assembly. See Fire Resistance Directory-Metal Roof Deck Panels* (CETW).

2. **Mineral and Fiber Boards***—24 by 48 in. to 48 by 96 in. incl., to be applied in one or more layers with adhesive between layers or laid loosely. Boards to be installed perpendicular to gypsum wallboard direction with end joints staggered 2 ft in adjacent rows. When applied in more than one layer, each layer of board to be offset in both directions from layer below by a min of 12 in. in order to lap all joints. Min thickness 1 in. (No limit on max overall thickness).
BMCA Insulation Products Inc.—Permalite.
Fiberglas Canada, Inc.
GAF Materials Corp.—GAFTEMP Perlite.
Owens Corning—Paroc Baseboard and Paroc Capboard.
Owens-Corning Fiberglas Corp.
Schuller International Inc.

2A. **Building Units***—(Not shown)—As an alternate to the mineral and fiber boards (Item 2). Nom 12 by 18 in. or 18 by 24 in. flat or tapered cellular glass blocks may be applied in one or more layers with adhesive between layers or laid loosely. Blocks to be installed perpendicular to gypsum wallboard direction with end joints staggered 7-1/2 in. in adjacent rows. When applied in more than one layer, additional layers to be installed parallel to previous layer with each row centered over joint of previous layer. End joints staggered 7-1/2 in. in adjacent rows. Min thickness 1-1/2 in. (No limit on max overall thickness).

2B. **Foamed Plastic***—As an alternate to Items 2 and 2A. Polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in., to be applied in one or more layers. Min thickness is 1.3 in. No limit on max overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows. When applied in more than one layer, each layer to be offset in both directions from layer below a min of 6 in. in order to lap all joints.
Apache Products Co.—ACFoam II
Apache Products Co.—Pyrox
Atlas Roofing Corp.—ACFoam II
Carlisle Syntec Systems, Div. of Carlisle Corp.—Types HP, HP-N, HP-W
Celotex Corp.—Types L, O
Firestone Building Products Co.—"ISO 95+FK", "ISO 95+GL", ISO 95+GW", "Rhoflex Isocyanurate FK", "Rhoflex Isocyanurate GL", "Rhoflex Isocyanurate GW".
GAF Materials Corp.—Isotherm R
Loadmaster Systems Inc.—Loadmaster Polyisocyanurate Insulation
NRG Barriers Inc.—E'NRG'Y 2, PSI 25
Rmax Inc.—Multi-Max FA
Schuller International Inc.—Types N1, N2
Tremco Inc.—Trisotech G.

2C. **Building Units***—As an alternate to Items 2, 2A and 2B, min 1 in. thick polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in., faced on underside (or both sides) with mineral and fiber boards. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows.
Atlas Roofing Corp.
Schuller International Inc.
Tremco Inc.

2D. **Roof Insulation-Foamed Plastic***—Alternate to Items 2, 2A, 2B, 2C. Any thickness polystyrene foamed plastic insulation boards bearing the UL Classification Marking, having a density of 2.5 pcf max, shall be installed on top of min 1 in. thick Mineral and Fiber Boards* (Item 2) and covered with either the Built-Up Roof Covering (Item 1) or single-ply roofing membrane (Item 1A). See Foamed Plastic* (BRYX) category in the Building Materials Directory or Foamed Plastic* (CCVW) category in the Fire Resistance Directory for list of Classified companies.

2E. **Building Units***—As an alternate to Items 2 through 2D, polyisocyanurate foamed plastic insulation boards faced on the underside with wood fiber board. Min thickness of the polyisocyanurate core is 1.3 in. No limit on max overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows.
NRG Barriers, Inc.—E'NRG'Y 2 Plus.

2F. **Building Units***—As an alternate to Items 2 through 2E, polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in., faced on the top surface with oriented strand board. Min thickness of the polyisocyanurate core is 1.3 in. No limit on max overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows.
NRG Barriers, Inc.—Type Nailboard.

2G. **Building Units***—As an alternate to Items 2 through 2F, polyisocyanurate foamed plastic insulation boards faced on the underside (or both sides) with mineral fiber board. Min thickness of the polyisocyanurate core is 1.3 in. No limit on max overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows.
NRG Barriers, Inc.—E'NRG'Y 2 Composite, Barrier Board Plus, ISO-ROC.

2H. **Foamed Plastic***—Not Shown—As an alternate to Items 2 through 2G,

LOOK FOR MA...

TABLE 7-B—RATED FIRE-RESISTIVE PERIODS FOR VARIOUS WALLS AND PARTITIONS[a,1]—(Continued)

MATERIAL	ITEM NUMBER	CONSTRUCTION	MINIMUM FINISHED THICKNESS FACE-TO-FACE[2] (inches) × 25.4 for mm: 4 Hr.	3 Hr.	2 Hr.	1 Hr.
4. Hollow structural clay tile, load bearing (cont.)	4-1.10	Two units and four cells in wall thickness, units at least 43 percent solid.	16			
	4-1.11	Two or three units and four or five cells in wall thickness, units at least 40 percent solid.	16			
5. Combination of clay brick and load-bearing hollow clay tile	5.1.1	4" (100 mm) solid brick and 4" (100 mm) tile (at least 40 percent solid).		8		
	5.1.2	4" (100 mm) solid brick and 8" (200 mm) tile (at least 40 percent solid).	12			
6. Concrete masonry units	6-1.1[16,17]	Expanded slag or pumice.	4.7	4.0	3.2	2.1
	6-1.2[16,17]	Expanded clay, shale or slate.	5.1	4.4	3.6	2.6
	6-1.3[16]	Limestone, cinders or air-cooled slag.	5.9	5.0	4.0	2.7
	6-1.4[16,17]	Calcareous or siliceous gravel.	6.2	5.3	4.2	2.8
7. Solid concrete[11,18]	7-1.1	Siliceous aggregate concrete.	7.0	6.2	5.0	3.5
		Carbonate aggregate concrete.	6.6	5.7	4.6	3.2
		Sand-lightweight concrete.	5.4	4.6	3.8	2.7
		Lightweight concrete.	5.1	4.4	3.6	2.5
8. Glazed or unglazed facing tile, nonload-bearing	8-1.1	One 2" (50 mm) unit cored 15 percent maximum and one 4" (100 mm) unit cored 25 percent maximum with 3/4" (19 mm) mortar-filled collar joint. Unit positions reversed in alternate courses.		6 3/8		
	8-1.2	One 2" (50 mm) unit cored 15 percent maximum and one 4" (100 mm) unit cored 40 percent maximum with 3/8" (10 mm) mortar-filled collar joint. Plastered one side with 3/4" (19 mm) gypsum plaster. Two wythes tied together every fourth course with No. 22 gage corrugated metal ties.		6 3/4		
	8-1.3	One unit with three cells in wall thickness, cored 29 percent maximum.			6	
	8-1.4	One 2" (50 mm) unit cored 22 percent maximum and one 4" (100 mm) unit cored 41 percent maximum with 1/4" (6 mm) mortar-filled collar joint. Two wythes tied together every third course with 0.030 inch (0.76 mm) (No. 22 galvanized sheet steel gage) corrugated metal ties.			6	
	8-1.5	One 4" (100 mm) unit cored 25 percent maximum with 3/4" (19 mm) gypsum plaster on one side.			4 3/4	
	8-1.6	One 4" (100 mm) unit with two cells in wall thickness, cored 22 percent maximum.				4

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FIRE RESISTANCE RATINGS - ANSI/UL263 (BXUV)—*Continued*

self-tapping, 1 in. long. Screw heads may be either exposed or covered with joint cement.

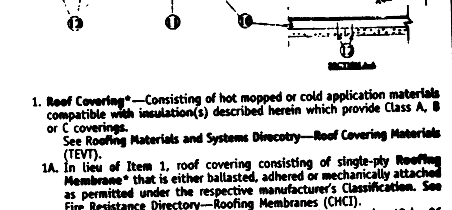
19. **Alternate Finishing System**—(Not shown)—Wallboard joints may be either exposed or covered with paper tape and joint compound. As an alternate, nom 3/32 in. thick gypsum veneer plaster may be applied to the entire surface of the Classified gypsum wallboard.

19A. **Alternate Finishing System—Acoustical Material***—(Not shown)—Optional, acoustical tile may be laminated to the entire surface of the Classified gypsum wallboard.
Any Manufacturer—Any UL Classified acoustical material and adhesive with a flame spread of 25 or less (See Building Materials Directory).

*Bearing the UL Classification Marking

Design No. P519

Restrained Assembly Rating—1 H
Unrestrained Assembly Rating—1 H



1. **Roof Covering***—Consisting of hot mopped or cold application materials compatible with insulation(s) described herein which provide Class A, B or C coverings.
See Roofing Materials and Systems Direcotry—Roof Covering Materials (TEVT).

1A. In lieu of Item 1, roof covering consisting of single-ply Roofing Membrane* that is either ballasted, adhered or mechanically attached as permitted under the respective manufacturer's Classification. See Fire Resistance Directory—Roofing Membranes (CHCI).

2. **Mineral and Fiber Boards***—24 by 48 in. min size, max size 48 by 96 in. to be applied in one or more layers. Boards to be installed perpendicular to gypsum wallboard direction with end joints staggered 2 ft in adjacent rows. When applied in more than one layer, each layer of board to be offset in both directions from layer below a min of 12 in. in order to lap all joints. Min thickness 1 in. (no limit on max overall thickness).
When only one layer is used, it may be bonded to gypsum wallboard or laid loosely. When two or more layers are used, the insulation may be fastened to steel roof deck (through wallboard) with mechanical fasteners (Item 7) and/or bonded to wallboard or vapor barrier and/or bonded to additional layers of insulation with adhesive (Item 6) or hot asphalt (Item 6A). Adhesive may be omitted from between components secured together by mechanical fasteners.
BMCA Insulation Products Inc.—Rigid mineral fiber boards
Fiberglas Canada, Inc.—Rigid glass fiber boards
GAF Materials Corp.—Rigid mineral fiber boards
Owens-Corning Fiberglas Corp.—Rigid glass fiber boards
Partek Insulations, Inc.—Paroc Baseboard and Paroc Capboard

2A. **Roof Insulation—Foamed Plastic***—As an alternate to Item 2, any thickness polystyrene foamed plastic insulation boards bearing the UL Classification Marking, having a density of 2.5 pcf max, shall be installed on top of min 1 in. thick Mineral and Fiber Boards* (Item 2) and covered with either the Built-Up Roof Covering (Item 1) or single-ply Roofing Membrane (Item 1A). The 1 in. thick Mineral and Fiber boards to be installed over the gypsum wallboard (Item 4). See Foamed Plastic* (BRYX) category in the Building Materials Directory or Foamed Plastic* (CCVW) category in the Fire Resistance Directory for list of manufacturers.

2B. **Foamed Plastic***—As an alternate to Item 2 or 2A, polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in., to be applied in one or more layers over the gypsum wallboard (Item 4). Min thickness is 1.3 in. with no limit on max overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows. When applied in more than one layer, each layer to be offset in both directions from layer below a min of 6 in. in order to lap all joints.
Apache Products Co.—Pyrox
Atlas Roofing Corp.—AC Foam II
Carlisle Syntec Systems, Div. of Carlisle Corp.—Type HP, HP-N, HP-W
Celotex Corp.—Type L, O
Firestone Building Products Co.—"ISO 95+FK", "ISO 95+GL", "ISO 95+GW", "Rhoflex Isocyanurate FK", "Rhoflex Isocyanurate GL", "Rhoflex Isocyanurate GW"
GAF Materials Corp.,—Isotherm R
Loadmaster System Inc.—Loadmaster Polyisocyanurate Insulation
NRG Barriers Inc.—E'NRG'Y 2, PSI 25
Rmax Inc.—Multi-Max FA

3. **Sheating Material***—(Optional)—Vinyl film vapor barrier, applied with adhesive to gypsum wallboard. Adjacent sheets overlapped 2 in.
BMCA Insulation Products Inc.

4. **Gypsum Wallboard**—(Classified or unclassified)—Supplied in sheets nom 2 by 4 ft to 4 by 12 ft by nom 5/8 in. thick. Min weight 2.0 psf. Applied perpendicular to steel roof deck directly with adhesive or laid loosely. End joints to occur over crests of steel roof deck with end joints staggered 2 ft in adjacent rows.
See Wallboard, Gypsum (CKNX) category for names of manufacturers.
Steel Floor and Form Units*—Noncomposite fluted or corrugated, min 0.034 in. thick (22 gauge), 1-1/2 in. deep painted or galv steel units. Spacing of welds attaching units to supports shall not exceed 12 in. OC. Adjacent units welded or secured together with No. 12 by 1/2 in. self-drilling, self-tapping steel screws, 36 in. OC along side joints.
Bowman Metal Deck/Wheeling Corrugating Co.—Type B
Vulcraft, Div of Nucor Corp—Types 1.5A, 1.5B, 1.5BI, 1.5F

6. **Adhesive**—Optional—May be applied between crests of steel roof deck and gypsum wallboard in 1/2 in. wide ribbons, 6 in. OC at 0.4 gal per 100 sq ft. May also be applied in 1/2 in. wide ribbons 6 in. OC, at 0.4 gal per 100 sq ft between gypsum wallboard and vapor barrier, and between vapor barrier and mineral and fiber boards, or directly between gypsum boards and roof insulation when vapor barrier is omitted. May also be applied at the same rate between layers of roof insulation.
BMCA Insulation Products Inc.

7. **Mechanical Fasteners**—(Not Shown)—Any steel nail or steel clip type fastener designed for the purpose may be used to attach one or more layers of insulation to steel roof deck (through gypsum board). As an alternate, the gypsum wallboard may be attached directly to the steel roof deck with the mechanical fasteners.

7A. **Hot Asphalt or Coal Tar Pitch**—(Not Shown)—May be used as an alternate to adhesive between layers of roof insulation at a rate not to exceed 35 lb per 100 sq ft.

8. **Steel Joists**—Type 10k, min size, spaced a max 48 in. OC.

9. **Bridging**—Steel bars, 1/2 in. diam welded to top and bottom chords of each joist.

10. **Furring Channels**—No. 26 MSG galv steel 2-5/8 in. wide by 7/8 in. deep; spaced 24 in. OC, perpendicular to joists. Two courses of furring channel positioned 6 in. OC, 3 in. from each end of wallboard. Channels secured to each joist with No. 18 SWG galv steel wire double strand saddle ties. Channels spliced below joists with adjoining pieces overalpped 6 in. Channels tied together with double strand No. 18 SWG galv steel wire at each end of overlap.

11. **Wallboard, Gypsum***—5/8 in. thick, 4 ft wide, installed with long dimension perpendicular to furring channels with side joists located 1 ft from center lines of joists. Wallboard fastened to furring channels with 1 in. wallboard screws spaced 12 in. OC, 3/4 and 3 in. from butted side and end joints, respectively. End joints attached to double channels and protected above with 3 in. wide strips of 5/8 in. thick wallboard. Wallboard joints may be either exposed or covered with joint system. As an alternate, nom 3/32 in. thick gypsum veneer plaster may be applied to the entire surface of Classified veneer baseboard. Joints reinforced.
Canadian Gypsum Company—Type C.
Celotex Corp.—Type FRP
Domtar Gypsum—Type 5
Georgia Pacific Corp., Gypsum Div.—Type GPFS-C
Pabco Gypsum Co.—Type C
United States Gypsum Co.—Type C
Yeso Panamericano SA de CV—Type C.

12. **Screw, Wallboard**—Case hardened steel, 1 in. long, 0.150 diam shank, self-drilling and self-tapping 0.335 in. diam Phillips type head. Screw heads may be either exposed or covered with joint cement.

*Bearing the UL Classification Marking

FIRE RESISTANCE DIRECTORY (BXRH)

FIRE RESISTANCE RATINGS - ANSI/UL263 (BXUV)—*Continued*

polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in., with formed channels on the top side and a flat bottom face, to be applied in one layer. Min thickness (as measured at thinnest section of board) is 1.3 in. No limit on max thickness (as measured at the thickest section of the board). Insulation covered with field applied 3/8 min thick nonveneer APA rated sheathing for use with Class A or C asphalt glass-mat or asphalt organic shingles. Sheathing installed with all joints offset min 6 in. from joints of insulation boards.
GAF Materials Corp.—Type INSUL-AIR.
NRG Barriers, Inc.—Type ISO-VENT.

2I. **Building Units***—As an alternate to Items 2 through 2H, polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in., faced on the top surface with gypsum board. Min thickness of the polyisocyanurate core is 1.3 in. No limit on overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows.
NRG Barriesrs, Inc.—E'NRG'Y 2 Gypsum Composite.

3. **Sheathing Material***—(Optional)—Vinyl-film vapor barrier, applied with adhesive or laid loosely on gypsum wallboard. Adjacent sheets overlapped 2 in. See Sheathing Material (CHIZ) category for names of Classified companies.

3A. **Sheathing Material***—(Optional)—In lieu of Item 3, a self-adhered rubberized asphalt roofing underlayment membrane which may be placed on top of the gypsum wallboard (Item 4) or on roof insulation (Item 2 or any non-polystyrene foamed plastic insulation covered as an alternate for Item 2).
W. R. Grace & Co., Conn Construction Products Div.—Grace Ice & Water Shield.

3B. **Sheathing Material***—(Optional)—In lieu of Items 3 and 3A, a self-adhered rubberized asphalt roofing underlayment membrane which may be placed on top of gypsum wallboard or on the roof insulation (Item 2).
Carlisle Coatings & Waterproofing Inc.—CCW-707.

4. **Gypsum Wallboard**—Supplied in sheets nom 2 by 4 ft to 4 by 12 ft, by nom 5/8 in. thick. Min weight 2.0 psf. Applied perpendicular to steel roof deck direction with adhesive or laid loosely. End joints to occur over crests of steel roof deck with end joints staggered 2 ft in adjacent rows. See Wallboard, Gypsum (CKNX) category for names of manufacturers.

5. **Steel Roof Deck**—(Unclassified)—Min 1 in. deep, min 25 in. wide fluted galv steel deck. Min 24 MSG. Flutes approx 4 in. OC, crests approx 2-3/4 in. wide. As an alternate, 1-1/2 in. deep, min 18 in. wide fluted galv steel deck. Min 0.029 in. thick (22 gauge), flutes 6 in. OC, crest width ranging from 3-1/2 to 5 in. Welded to supports with welding washers 12 in. OC Side lap joints of adjacent units welded or secured together with No. 12 by 1/2 in. self-drilling, self-tapping steel screws midway between steel joists, or
Classified Steel Floor and Form Unit*—1-1/2 in. deep fluted galv steel deck. Min. 0.029 in. thick (22 gauge). Welded to supports with welding washers 12 in. OC. Side lap joints of adjacent units welded or secured together with No. 12 by 1/2 in. self-drilling, self-tapping steel screws midway between steel joists.
Wheeling Corrugating Co., Div of Wheeling-Pittsburgh Steel Corp.—Type A, B, BW or F.

6. **Adhesive***—Optional—May be applied between crests of steel roof deck and gypsum wallboard in 1/2 in. wide ribbons 8 in. OC at 0.4 gal per 100 sq. ft. May also be applied in 1/2 in. wide ribbons 6 in. OC, at 0.4 gal per 100 sq. ft., between gypsum wallboard and vapor barrier, between vapor barrier and mineral and fiber boards or building units, and between layers of mineral and fiber boards or building units.
BMCA Insulation Products Inc.

7. **Steel Joists**—Type 10J4 min size, spaced 48 in. OC and welded to end supports.

8. **Bridging**—Steel bars, 1/2 in. diam welded to top and bottom chords of each joist.

9. **Hanger Wire**—No. 12 SWG galv steel wire, twist-tied to lower chord of joists or cold-rolled steel channels. Located 48 in. OC along main runners with additional hanger wires to occur at all four corners of light fixtures, at the midspan of cross tees adjacent to light fixtures, and at the cut ends of cross tees longer than 23 in. which abut walls.

10. **Cold Rolled Channels**—Min. 0.053 in. thick (16 gauge) painted cold-rolled steel channels, 1-1/2 in. deep with 9/16 in. flanges. Two channels tied back to back with 18 SWG galv steel wire 48 in. OC and wire-tied to top of joist lower chords. Channels spaced as required to provide attachment provision for ceiling hanger wires.

11. **Air Duct**—Min 0.029 in. thick (22 gauge) galv steel. Total area of duct openings not to exceed 144 sq. in. per each 100 sq. ft. of ceiling area. Area of individual duct opening not to exceed 144 sq. in. Max dimensions ~~of opening 12 in.~~ Duct supported by 1-1/2 in. deep, min 0.053 in. thick (16 gauge) cold-rolled steel channels suspended by 12 SWG galv steel wire. Duct support channels located 6 in. from and on each side of duct drop and max 48 in. O.C. away from duct drop.

12. **Damper**—Min. 0.070 in. thick (14 gauge) galv steel, sized to overlap duct opening 2 in. min. Protected on both sides with 1/16 in. thick

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FIRE RESISTANCE DIRECTORY (BXRH)

FIRE RESISTANCE RATINGS - ANSI/UL263 (BXUV)—*Continued*

ceramic fiber paper laminated to the steel and held open with a Fusible Link (Bearing the UL Listing Mark).

13. **Fixtures, Recessed Light**—(Bearing the UL Listing Mark). Fluorescent lamp type, steel housing, 2 by 4 ft size, provided with detachable spring-loaded trim flange or with adjustable mounting brackets. Fixtures spaced so their area does not exceed 24 sq ft per 100 sq ft of ceiling area. Wired in conformance with the National Electrical Code.

14. **Fixture Protection—Wallboard, Gypsum***—5/8 in. thick, cut from the same gypsum wallboard used in the remainder of the ceiling membrane (See Item 17). The five sided enclosure consists of a 24 by 48 in. top piece, two 4-1/2 (or wider) by 48 in. side pieces, two 6 (or wider) by 24 in. end pieces, and two 6 by 6 in. spacers to maintain a 5/8 in. clearance between the light fixture housing and the top piece. The spacers are placed on top of the fixture housing, with care taken not to locate the spacers over the light fixture ballasts. The top and side pieces are laid in place, and the end pieces are secured to the edges of the side and end pieces with 6d nails at each corner. When fixtures are installed end to end, no end pieces are used where the fixtures abut. Instead, a 6 by 24 in. piece is placed on top of and centered over the gap between the top pieces.

15. **Steel Framing Members***—Main runners nom 12 ft long spaced 48 in. OC. Cross tees nom 4 ft long installed perpendicular to main runners and spaced 24 in. OC. Additional cross tees located 8 in. from and on both sides of each wallboard end joint and each recessed light fixture.
Chicago Metallic Corp.—Types 650, 670. When Type 650 steel framing members are used, the main runner ends may be riveted to the wall molding along one wall and the cross tee ends may be riveted to the wall molding along both adjacent walls. The rivets are intended to facilitate the ceiling installation, not to replace hanger wires.

15A. **Alternate Steel Framing Members***—(Not shown)—Main runners 12 ft long spaced 4 ft OC. Cross channels, nom. 4 ft long installed perpendicular to the main runners, spaced 24 in. OC. Additional channels used at 8 in. from each side of light fixtures and from butted end joints. Channels clipped into main runner slots. At walls channels secured to wall angle with 1/2 in. long self-drilling and self-tapping screws having a thread diam of 0.138 in. and 5/16 in. diam heads. Nom 4 ft long cross tees installed perpendicular to main runners to support 4 ft sides of recessed light fixtures. When the alternate steel framing members are used, only non-air handling recessed light fixtures may be used.
CGC Interiors—Type RX main runner and cross channel. Types DXL or DXLG cross tee.
USG Interiors, Inc.—Type RX main runner and cross channel. Type DXL or DXLG cross tee.

15B. **Steel Framing Members***—(Not shown)—as an alternate to Items 15 and 15A. Main runners nom 12 ft long, spaced 48 in. OC. Primary cross tees, measuring 1-1/2 in. across the flange and nom 4 ft long, installed perpendicular to main runners and spaced 24 in. OC. Additional primary cross tees required at each wallboard end joint, 4 in. from and on each side of wallboard end joint and 8 in. from each side of light fixtures. Secondary cross tees, measuring 15/16 in. across the flange, and nominally 4 ft long installed at sides of light fixtures.
Armstrong World Industries, Inc.—Type DFR-8000.

16. **Wall Molding**—(Not shown)—Min 0.019 in. thick (26 gauge) painted or galv steel channel, 1-11/16 in. deep with 15/16 in. flanges, nailed to walls along perimeter of ceiling with 8d nails spaced 16 in. O.C.

17. **Wallboard, Gypsum***—5/8 in. thick, 4 ft wide; installed with long dimension perpendicular to cross tees with end joints centered along cross tees and with side joints centered along main runners. Wallboard fastened to each cross tee with five wallboard screws (Item 18) with one screw located at the midspan of the cross tee, one screw located 12 in. from and on each side of the cross tee midspan and one screw located 1-1/2 in. from each wallboard side joint. Except at wallboard end joints, wallboard screws shall be located on alternating sides of cross tee flange. At wallboard end joints, wallboard screws shall be located 1/2 in. from the joint. Wallboard fastened to main runners with wallboard screws, 1/2 in. from side joints, midway between intersections with cross tees (24 in. O.C.). End joints of adjacent wallboard sheets shall be staggered not less than 4 ft O.C. Wallboard sheets screw-attached to flange of wall channel with wallboard screws spaced 12 in. O.C.
Boral Gypsum Inc.—Type BG-C or DDDG3.
Celotex Corp.—Type C, FRP or SF3.
Continental Gypsum Company—Types CG-3 or CG-C.
Eagle-Gypsum Products—Type EG-C.
G-P Gypsum Corp.—Types 5, C, GPFS3, GPFS-C.
National Gypsum Co., Charlotte, NC—Types FSW-4, FSW-G.
Pabco Gypsum Co.—Type C, PG-3 or PG-C.
Republic Gypsum Co.—Type RG-3 or RG-C.
Standard Gypsum Corp.—Type SG-C or SGC-G.
Temple-Inland Forest Products Corp.—Type TP-5.

18. **Screw, Wallboard**—No. 6 Phillips-type, Type S self-drilling and

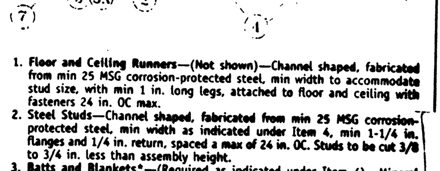
LOOK FOR MA...

686 FIRE RESISTANCE DIRECTORY (BXRH)

FIRE RESISTANCE RATINGS - ANSI/UL263 (BXUV)—*Continued*

Design No. U419

Non Bearing Wall Ratings—1, 2, 3 or 4 Hr (See Items 3 & 4)



1. **Floor and Ceiling Runners**—(Not shown)—Channel shaped, fabricated from min 25 MSG corrosion-protected steel, min width to accommodate stud size, with min 1 in. long legs, attached to floor and ceiling with fasteners 24 in. OC max.

2. **Steel Studs**—Channel shaped, fabricated from min 25 MSG corrosion-protected steel, min width as indicated under Item 4, min 1-1/4 in. flanges and 1/4 in. return, spaced a max of 24 in. OC. Studs to be cut 3/8 to 3/4 in. less than assembly height.

3. **Batts and Blankets***—(Required as indicated under Item 4)—Mineral wool batts, friction fitted between studs and runners. Min nom thickness as indicated under Item 4. See Batts and Blankets (BKNV or BZJZ) Categories for names of Classified companies.

3A. **Batts and Blankets***—(Optional)—Placed in stud cavities, any glass fiber or mineral wool insulation bearing the UL Classification Marking as to Surface Burning Characteristics and/or Fire Resistance. See Batts and Blankets (BKNV or BZJZ) Categories for names of Classified companies.

4. **Wallboard, Gypsum***—Gypsum panels with beveled, square or tapered edges, applied vertically or horizontally. Vertical joints centered over studs and staggered one stud cavity on opposite sides of studs. Vertical joints in adjacent layers (multilayer systems) staggered one stud cavity. Horizontal edge joints and horizontal butt joints on opposite sides of studs staggered a min of 12 in. Horizontal edge joints and horizontal butt joints in adjacent layers (multilayer systems) staggered a min of 12 in. The thickness and number of layers for the 1 hr, 2 hr, 3 hr and 4 hr ratings are as follows:

Wallboard Protection on Each Side of Wall

Rating	Min Stud Depth	No. Of Layers And Thickness Of Panels	Min Thickness Of Insulation (Item 3B)
1	3-1/2	1 layer, 5/8 in. thick	Optional
1	2-1/2	1 layer, 1/2 in. thick	1-1/2 in.
2	1-5/8	2 layers, 1/2 in. thick	Optional
2	1-5/8	2 layers, 5/8 in. thick	Optional
2	3-1/2	1 layer, 3/4 in. thick	3 in.
3	1-5/8	3 layers, 1/2 in. thick	Optional
3	1-5/8	2 layers, 3/4 in. thick	Optional
4	1-5/8	4 layers, 1/2 in. thick	Optional
4	2-1/2	2 layers, 3/4 in. thick	2 in.

Canadian Gypsum Co.—1/2 in. thick Type C, WRC or IP-X2; 5/8 in. thick Type SCX, SHX, WRX, IP-X1, AR, C, WRC or IP-X2; 3/4 in. thick ULTRACODE or Type IP-X3
United States Gypsum Co.—1/2 in. thick Type C, WRC or IP-X2; 5/8 in. thick Type SCX, SHX, WRX, IP-X1, AR, C, WRC or IP-X2; 3/4 in. thick ULTRACODE or Type IP-X3
Yeso Panamericano SA de CV—1/2 in. thick Type C, WRC or IP-X2; 5/8 in. thick Type SCX, SHX, WRX, IP-X1, AR, C, WRC or IP-X2; 3/4 in. thick ULTRACODE or Type IP-X3.

5. **Fasteners**—(Not shown)—Type S or S-12 self-drilling, self-tapping steel screws used to attach panels to studs (Item 2) or furring channels (Item 6). Single layer systems: 1 in. long for 1/2 and 5/8 in. thick panels or 1-1/4 in. long for 3/4 in. thick panels, spaced 8 in. OC when panels are applied horizontally, or 12 in. OC when panels are applied vertically. Two layer systems: First layer- 1 in. long for 1/2 and 5/8 in. thick panels or 1-1/4 in. long for 3/4 in. thick panels, spaced 16 in. OC. Second layer- 1-5/8 in. long for 1/2 in. thick panels or 2-1/4 in. long for 3/4 in. thick panels, spaced 16 in. OC with screws offset 8 in. from first layer. Three-layer systems: First layer- 1 in. long for 1/2 in. thick panels, spaced 24 in. OC. Second layer- 1-5/8 in. long for 1/2 in. thick panels, spaced 24 in. OC. Third layer- 2-1/4 in. long for 1/2 in. thick panels, spaced 12 in. OC. Screws offset min 6 in. from layer below. Four-layer systems: First layer- 1 in. long for 1/2 in. thick panels, spaced 24 in. OC. Second layer- 1-5/8 in. long for 1/2 in. thick panels, spaced 24 in. OC.

LOOK FOR MA...

FIRE RESISTANCE DIRECTORY (BXRH)

FIRE RESISTANCE RATINGS - ANSI/UL263 (BXUV)—*Continued*

Third layer- 2-1/4 in. long for 1/2 in. thick panels, spaced 24 in. O.C. Fourth layer- 2-5/8 in. long for 1/2 in. thick panels, spaced 12 in. O.C. Screws offset min 6 in. from layer below.

6. **Furring Channels**—(Optional, not shown, for single or double layer systems)—Resilient furring channels fabricated from min 25 MSG corrosion-protected steel, spaced vertically a max of 24 in. OC. Flange portion attached to each intersecting stud with 1/2 in. long Type S-12 panhead steel screws.

7. **Joint Tape and Compound**—Vinyl or casein, dry or premixed joint compound applied in two coats to joints and screw heads of outer layers. Paper tape, nom 2 in. wide, embedded in first layer of compound over joints of outer panels.

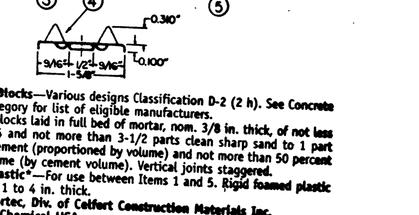
8. **Siding, Brick or Stucco**—(Optional, not shown) —Aluminum, vinyl steel siding, brick veneer or stucco, meeting the requirements of local code agencies, installed over gypsum panels. Brick veneer attached studs with corrugated metal wall ties attached to each stud with steel screws, not more than each sixth course of brick.

9. **Caulking and Sealants***—(Optional, not shown)—A bead of acoustical sealant applied around the partition perimeter for sound control.
United States Gypsum Co.—Type AS

*Bearing the UL Classification Marking

Design No. U912

Bearing Wall Rating—3 HR.
Nonbearing Wall Rating—3 HR.



1. **Concrete Blocks**—Various designs Classification D-2 (2 h). See Concrete Blocks category for list 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 clean sharp sand to 1 part Portland cement (proportioned by volume) and not more than 50 percent hydrated lime (by cement volume). Vertical joints staggered.

3. **Foamed Plastic***—For use between Items 1 and 5. Rigid foamed plastic insulation, 1 to 4 in. thick.
Celfortec, Div. of Celfort Construction Materials Inc.
Dow Chemical USA
Owens Corning Specialty and Foam Products Div.—Type 150 or Type 250.

4. **Furring Strip**—Min 0.020 in. thick (26 gauge) galv steel, 1-5/8 in. wide, 0.1 in. deep spaced 24 in. OC. Fastened to concrete blocks (Item 1) through foamed plastic (Item 3) using any steel screws penetrating concrete blocks (Item 1) min of 1 in. and spaced 16 in. OC.

5. **Wallboard Gypsum***—Min 1/2 in. thick wallboard with beveled, square or tapered edges. One layer of wallboard to be used. Applied vertically with joint centered over furring strips (Item 4). Fastened to strips with 1-1/4 in. long, Type S, self-tapping, self-drilling, wallboard screws spaced 8 in. OC at the joints, 12 in. OC in the field and penetrating furring strip.
Boral Gypsum Inc.—Type BG-C.
Canadian Gypsum Company—Type C.
Continental Gypsum Company—Type CG-C.
Eagle-Gypsum Products—Type EG-C.
G-P Gypsum Corp.—Types 5, GPFS-C.
Pabco Gypsum Co.—Type PG-C.
Republic Gypsum Co.—Type RG-C.
Standard Gypsum Corp.—Type SG-C.
Temple-Inland Forest Products Corp.—Type TP-5.
United States Gypsum Co.—Type C.
Yeso Panamericano SA de CV—Type C.

6. **Joint Tape and Compound** (not shown)—Vinyl or casein, dry or premixed joint compound applied in two coats to joints and screw heads.

FIRE RESISTANCE RATINGS - ANSI/UL263 (BXUV)—

Paper tape, 2 in. wide, embedded in first layer of con joints.

*Bearing the UL Classification Marking

RECORD DRAWINGS

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650.59

1994 UBC
CODE ANALYSIS FOR
DURANGO RECREATION / POOL COMPLEX

COMMUNITY RECREATION BUILDING

Occupancy Classification A2.1
Type of Construction .... Type II-1 Hour
Fire Protection .... Sprinkled
Height ....
Stories .... Single
Gross Area .... 45,329 SF
Allowable Area .... 63,000 SF
Occupant Load 1,742
Required Exits .... Four
Provided Exits .... Fifteen
Required Exit Width .... 29.033'
Provided Exit Width .... 72.000'
Exterior Wall Fire Protection .... One Hour UL Design U912
Roof/Ceiling Fire Protection .... One Hour UL Design P225
Corridor Wall Fire Protection .... UBC Table 7-B, 6-1.3 Masonry
Gymnasium Roof Structure Protection Exception 602.5
Special Inspections .... Are required

BATH HOUSE

Occupancy Classification .... B
Type of Construction .... Type II-N
Fire Protection .... None
Height .... 25'-0"
Stories .... Single
Gross Area .... 3,917 SF
Allowable Area .... 12,000 SF(basic)
Occupant Load 80
Required Exits .... Two
Provided Exits .... Four
Required Exit Width .... 6.00'
Provided Exit Width .... 24.00'
Special Inspections .... Are required

The code analysis has been revised to reflect the following:
A2.1 allowable of 13,500 increased to 27,000 for separation all sides,
A3 allowable of 13,500 increased to 27,000 for separation all sides,
B allowable of 18,000 increased to unlimited by 505.2,
M allowable of 18,000 increased to unlimited by 505.2,
Actual A2.1 area 13,324 / 27,000 = .493
Actual A3 area 8,332 / 27,000 = .308
Actual B area 23,726 / unlimited = .000
Actual M area 576 / unlimited = .000
.493 + .308 + .000 + .000 = 0.801 sum of ratios less than one
Concession building changed to M Type II - 1hr / sprinkled.

REVISION	DESCRIPTION	DATE

WAYNE SCHREINER AIA
THOMAS M. SILVA AIA

1525 WEST OAKEY BLVD.
LAS VEGAS, NV. 89102
(702) 383-0077
FAX (702) 383-0057

HSA ARCHITECTS

Sheet Title: PLAN EXAMINER INFO

Job Title: CITY OF LAS VEGAS DEPARTMENT OF PARK AND LEISURE ACTIVITIES DURANGO RECREATION FACILITY

Verify all Dimensions and Conditions at the Site

Job: 960901
Date: 20 FEB. 1998
Drawn By: CRL
Check: WPS
Sheet: ER1

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650.59

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