UL Product iQ™

BXUV.P513

PANEL REY®
Drywall Solutions

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 Certified products, equipment, system, 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 Certified.

BXUV - Fire Resistance Ratings - ANSI/UL 263 Certified for United States
BXUV7 - Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada

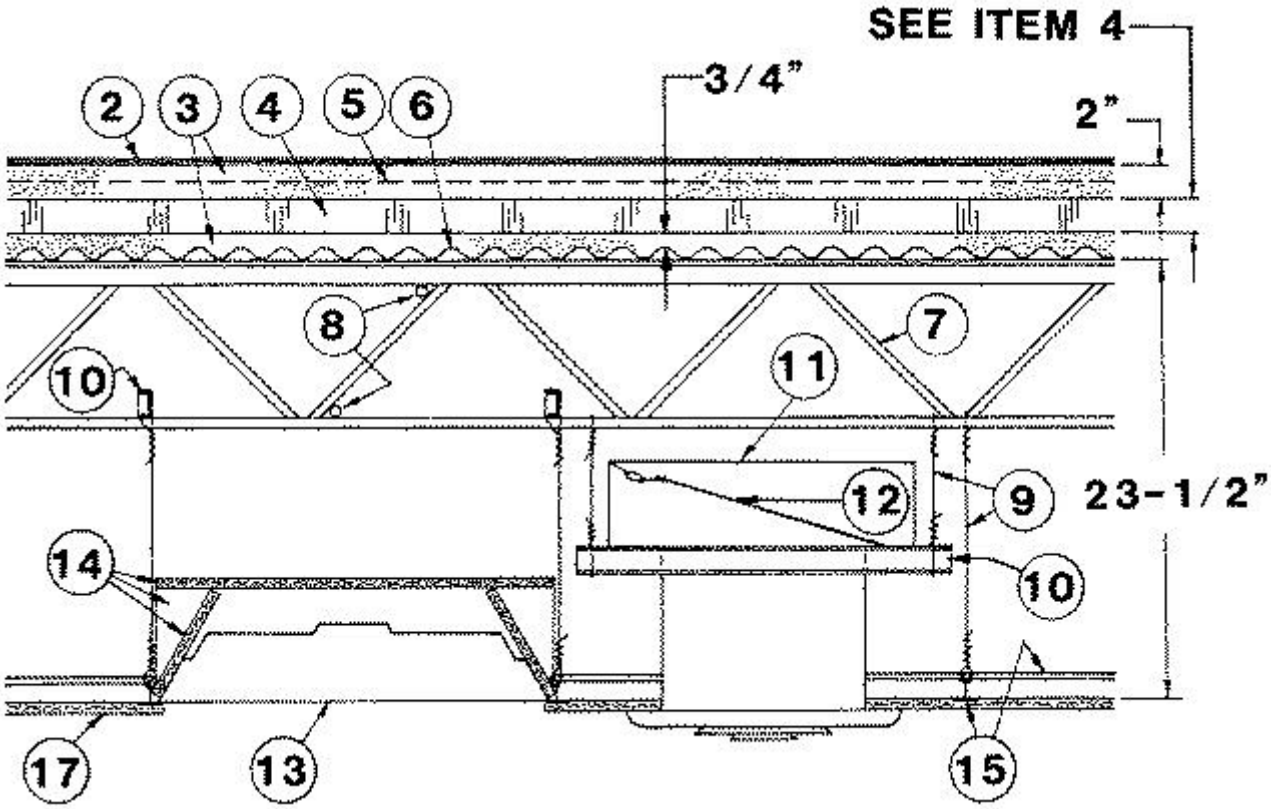
See General Information for Fire-resistance Ratings - ANSI/UL 263 Certified for United States
Design Criteria and Allowable Variances

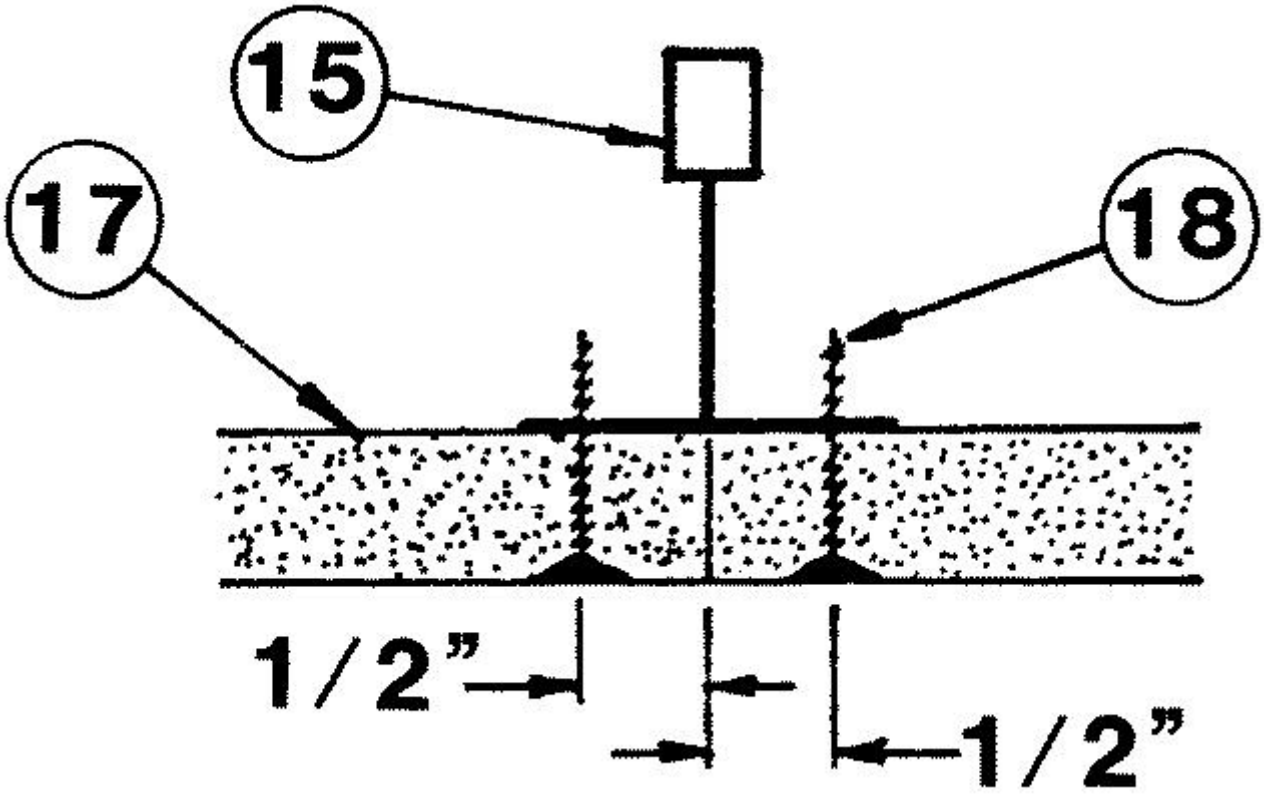
See General Information for Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada
Design Criteria and Allowable Variances

Design No. P513

Restrained Assembly Rating — 1-1/2 Hr.
Unrestrained Assembly Rating — 1-1/2 Hr.
Unrestrained Beam Rating — 1-1/2 Hr.
This design was evaluated using a load design method other than the Limit States Design Method (e.g., Working Stress Design Method). For jurisdictions employing the Limit States Design Method, such as Canada, a load restriction factor shall be used — See Guide BXUV or BXUV7

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**





1. **Beam —** (Not shown) — W8X24, min size.

2. **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).

2A. **In lieu of Item 2, 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).

3. **Insulating Concrete —** Various types of insulating concrete prepared and applied in the thickness indicated:

A. **Cellular Concrete — Roof Topping Mixture* —** Foam concentrate mixed with water and Portland cement per manufacturer's specifications. Cast dry density and 28-day compressive strength of min 190 psi as determined in accordance with ASTM C495-66. Min thickness of cellular concrete topping between top of deck and bottom of foamed plastic may be reduced to 1/8 in. when 2 in. or more of foamed plastic is used.

AERIX INDUSTRIES — Cast dry density 37 (+ or -) 3.0 pcf.

CELCORE INC — Type Celcore with cast dry density of 31 (+ or - 3.0) pcf or Type Celcore MF with cast dry density of 29 (+ or - 3.0) pcf.

ELASTIZELL CORP OF AMERICA — Type II. Mix #1 of cast dry density 39 (+ or -) 3.0 pcf, Mix #2 of cast dry density 40 (+ or -) 3.0 pcf, Mix #3 of cast dry density 47 (+ or -) 3.0 pcf.

SIPLAST INC — Mix #2. Cast dry density of 36 (+ or -) 3.0 pcf.

B. **Vermiculite Concrete —** Concrete slurry consisting of 6 cu ft of Vermiculite Aggregate* to 94 lb of Portland cement and 0.5 lb of air entraining agent.

SIPLAST INC

VERMICULITE PRODUCTS INC

C. **Perlite Concrete —** Mix consists of 6 cu ft of Perlite Aggregate* to 94 lb of Portland cement and 1-1/2 pints of air entraining agent.

See **Perlite Aggregate** (CFFX) category in Fire Resistance Directory for names of Classified companies.

D. **Cellular Concrete — Roof Topping Mixture* —** Foam Concentrate mixed with water, Portland Cement and UL Classified Vermiculite Aggregate per manufacturer's application instructions. Cast dry density of 33 (+ or -) 3.0 pcf and 28-day compressive strength of min 250 psi as determined in accordance with ASTM C495-86. Min thickness of cellular concrete topping between top of deck and bottom of foamed plastic may be reduced to 1/8 in. when 2 in. or more of foamed plastic (Item 4 or 4A) is used.

AERIX INDUSTRIES — Mix #3.

SIPLAST INC — Mix #3.

4. **Foamed Plastic* —** Nom 24 by 48 by max 8 in. thick polystyrene foamed plastic insulation boards having a density of 2.5 pcf max, (pcf). Each insulation board shall contain six nom 3 in. diam holes oriented in two rows of three holes each with the holes spaced 12 in. OC, transversely, and 16 in. OC longitudinally. As an alternate, the foamed plastic insulation boards may be omitted provided that a min roof topping mixture thickness of 2-3/4 in. is maintained, as measured from the surface of the roof topping mixture to the top of the steel form unit corrugations.

See Foamed Plastic* (BRYX) category in Building Materials Directory or **Foamed Plastic* (CCVW)** category in Fire Resistance Directory for list of manufacturers.

4A. **Foamed Plastic* —** (Optional) — For use with cellular concrete. Max thickness 8 in. and containing both hole and slot configuration.

SIPLAST INC

4B. **Foamed Plastic* —** Nom 24 by 48 in., 48 by 48 in., 24 by 96 in or 48 by 96 in. by max 8 in. thick polystyrene foamed plastic insulation boards with holes symmetrically placed having a max density of 2.0 pcf. For use only with cellular concrete roof topping mixture.

STARRFOAM MFG INC

5. **Wire Mesh —** No. 19 SWG galvanized steel wire twisted to form 2 in. hexagons. In addition, straight No. 16 SWG galvanized steel wire woven into mesh and spaced 3 in. apart for stiffness. Mesh installed without attachment parallel to supports and overlapped 3 to 6 in. at the sides.

6. **Corrugated Steel Deck —** (Unclassified) - Min 9/16 in. deep, nom 30 to 36 in. wide corrugated units, min 0.016 in. thick (No. 28 gauge) galvanized steel. Welded to all supports with 5/16 in. puddle welds through welding washers, with welds located at each side lap and not over 15 in. OC between side-laps. Adjacent units overlapped along each side. Side-laps of adjacent units welded or secured together with No. 12 by 1/2 in. long self-drilling, self-tapping steel screws midway between steel joists, or **Classified Steel Floor and Form Units*** — Min 9/16 in. deep, 30 to 36 in. wide corrugated units, min 0.016 in. thick, (No. 28 gauge) galvanized steel. Welded to supports with 5/16 in. puddle welds through welding washers, with welds located at each side lap and not over 15 in. OC between side-laps. Adjacent units overlapped along each side. Side-laps of adjacent units welded or secured together with No. 12 by 1/2 in. long self-drilling, self-tapping steel screws midway between steel joists.
CANAM GROUP INC — Type P-3012

CANAM STEEL CORP — Type P-3012

MARLYN STEEL DECKS INC — Types HF, HVF, SF, SVF.

VULCRAFT, DIV OF NUCOR CORP — Types 0.6C, 0.6CPR, 0.6CPRV, 0.6CSV, 1.0C, 1.0CSV, 1.3C, 1.3CSV, 1.5C.

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 end 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 dimension 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 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). Recessed light fixture with 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.

13A. **Alternate Fixtures, Recessed Light —** For Use with Steel Framing Members, Item 15B, 15C, 15D, 15E, or 15F - (Bearing the UL Listing Mark). Recessed light fixture with NEMA Type F steel housing, 1 by 2 ft, 1 by 4 ft, 2 by 2 ft or 2 by 4 ft size. Fixtures provided with swing-out steel support hooks near each corner designed to engage the bulb of the steel framing member cross tees. Size of steel framing member module to be nominally 2 in. wider and longer than the nominal fixture size. Fixtures to be additionally screw-attached to the web of the cross tees near the center of each long side and at both ends using No. 6 by 2-5/8 in. long (sides) and No. 6 by 1-5/8 in. long (ends) steel drywall screws. Fixtures spaced so their area does not exceed 24 sq ft per each 100 sq ft of ceiling area. Wired in conformance with the National Electrical Code.

13B. **Alternate Fixtures, Recessed Light —** For Use with Steel Framing Members, Item 15A- (Bearing the UL Listing Mark). Recessed light fixture with NEMA Type F steel housing, 1 by 2 ft, 1 by 4 ft, 2 by 2 ft or 2 by 4 ft size. Fixtures provided with swing-out steel support hooks near each corner designed to engage the bulb of the steel framing member cross tees. Fixtures to be additionally screw-attached to the cross tees near the center of each long side and at both ends using 2 in. long Type S-12 (sides)

and 3 in. long Type S-12 (ends) steel screws. Fixtures spaced so their area does not exceed 24 sq ft per each 100 sq ft of ceiling area. Wired in conformance with the National Electrical Code.

14. **Fixture Protection — Gypsum Board* —** 5/8 in. thick, cut from the same gypsum board used in the remainder of the ceiling membrane (See Item 17). The five sided enclosure for the fixture (Item 13) 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.

14A. **Fixture Protection — Gypsum Board* —** For Use with Steel Framing Members, Item 15B, 15C, 15D, 15E, or 15F - 5/8 in. thick, same as Item 17 or 17B. Cut to form a five sided enclosure, rectangular in cross-section, at least 1-1/4 in. higher than the NEMA Type F light fixture housing (Item 13A). The fixture protection enclosure is to be installed in the grid module prior to installation of the NEMA Type F light fixture. The fixture protection side pieces are to be provided with nominal 1-1/4 in. wide by 3-1/2 in. long cutouts to accommodate the swing-out steel support hooks near each corner of the fixture. The fixture protection side and end pieces rest on the flanges of the primary cross tees and are screw-attached to the web of the cross tee with No. 6 by 1-5/8 in. long steel drywall screws. The top piece rests on the top edges of the side and end pieces without mechanical attachment. The dimensions of the fixture protection pieces for the various sizes of NEMA Type F fixtures are tabulated below:

NEMA Type F Fixture Size	1 by 2 ft	1 by 4 ft	2 by 2 ft	2 by 4 ft
Top Piece, in.	13-1/2 x 25-1/2	13-1/2 x 49-1/2	25-1/2 x 25-1/2	25-1/2 x 49-1/2
Side Piece, in.	7 x 25-1/2	7 x 49-1/2	7 x 25-1/2	7 x 49-1/2
End Piece, in.	7 x 12-1/4	7 x 12-1/4	7 x 24-1/4	7 x 24-1/4

14B. **Fixture Protection — Gypsum Board* —** For Use with Steel Framing Members, Item 15A - 5/8 in. thick, same as Item 17 or 17A. Cut to form a five sided enclosure, rectangular in cross section, for the NEMA Type F light fixture (Item 13B). The fixture protection enclosure is installed around the grid module prior to installation of the NEMA Type F light fixture. The end pieces of the light fixture protection rest upon the flanges additional nom 4 ft long cross tees placed at each end of light fixture opening. The pieces of gypsum board are secured to both cross tees with three 1 in. long Type S screws, one at the center of the cross tee and the remaining two screws spaced 12 in. O.C. in both directions. The end clips of the two additional cross tees are removed and the cross tee/gypsum board combinations are placed at each end of the module facing the light fixture opening with the ends of the cross tees resting on the flanges of the main runner. Two side pieces of the gypsum board protection are notched at the bottom with three 1/4 in. wide by 1-9/16 in. long notches to accommodate the cross tee bulbs. On each side the pieces are installed vertically, resting on the three cross tees intersecting the 50 in. long cross tees and placed 1-1/4 in from the edge of the 50 in. cross tees. The four side pieces of the light fixture protection box are secured together with 6d nails, one at mid-height, and one at each of the four corners. The top piece of gypsum board is loosely-laid on top of the four sided box and secured at each of the four corners with 6d nails. Holes are drilled through the top piece of gypsum board for the attachment of the hanger wires specified in Item 9. Two 4 ft long cross tees are placed on top of the fixture protection box, equally spaced and secured from the underside of the fixture protection box with three 1 in. long Type S screws equally spaced. The dimensions of the fixture protection pieces for the various sizes of NEMA Type F fixtures are listed below:

NEMA Type F Fixture Size	1 by 2 ft	1 by 4 ft	2 by 2 ft	2 by 4 ft
Top piece, in.	19 x 31	19 x 55	31 x 31	31 x 55
Side pieces, in	6 x 30	6 x 54	6 x 30	6 x 54
End pieces, in	6 x 19	6 x 19	6 x 31	6 x 31

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 gypsum board end joint and each recessed light fixture.

ROXUL USA INC. D/B/A ROCKFON — Types 650, 650C, 670, 670C. 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* —** Main runners, cross tees, cross channels and wall angle as listed below:
a. **Main Runners —** Nom 10 or 12 ft. long, 15/16 in. or 1-1/2 in. wide face, spaced 4 ft. OC.

b. **Cross Tees —** Nom 4 ft. long, 1-1/2 in. wide face or 15/16 in. wide face installed at sides of light fixtures (Item 13), installed perpendicular to the main runners, spaced 24 in. OC. When Batts and Blankets* (Item 21) are used, cross tees spaced 16 in. OC. Additional cross tees or cross channels used at 8 in. from each side of butted gypsum board end joints. The cross tees or cross channels may be riveted or screw attached to the wall angle or channel to facilitate the ceiling installation. When NEMA Type F (Item 13B) light fixtures are used, nom 4ft long cross tees, 1-1/2 in wide face, installed perpendicular to main runners and spaced nom 50 in. O.C. Two nom 50 in. long cross tees, 1-1/2 inch wide face, spaced nom 14 in. O.C. to accommodate nom 1 by 2 ft or 1 by 4 ft NEMA Type F fixture or spaced 26 in. O.C. to accommodate nom 2 by 2 ft NEMA or 2 by 4 ft NEMA Type F fixture. When nom 2 by 2 ft NEMA Type F fixture is used, nom 26 in. long cross tees to be used to form nom 26 in. module at the center of the nom 50 in. long cross tees. Two additional nom 4 ft cross tees, 1-1/2 in. wide face are installed perpendicular to the main runners outside each end of fixture opening to support the end pieces of drywall fixture protection. Small cutoff pieces of cross tees were installed at the center of the nom 50 in. long cross tees and main runners by inserting the dip end into a cross tee slot on the main runner and securing the other end with a pop rivet to the nom 50 in. long cross tee.

c. **Cross Channels —** Nom 4 ft. long, installed perpendicular to main runners, spaced 24 in. OC. When Batts and Blankets* (Item 21) are used, cross channels spaced 16 in. OC.

d. **Wall Angle or Channel —** Painted or galv steel angle with 1 in. legs or 1-9/16 in. deep painted or galv steel channel with 1 in. legs attached to walls at perimeter of ceiling with fasteners 16 in. OC. to support steel framing member ends and for screw-attachment of the gypsum board.
CGC INC — Type DGL or RX.

USG INTERIORS LLC — Type DGL or RX.

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 (1-1/2 in. wide across flange) or cross channels, nom 4 ft long, installed perpendicular to main runners and spaced 24 in. OC. Additional primary cross tees or cross channels required at each gypsum board end joint, 8 in. from and on each side of gypsum board end joint, and 8 in. from each side of NEMA Type G (Item 13) light fixtures. Secondary cross tees (15/16 in. wide across flange), nom 4 ft long, installed at sides of NEMA Type G light fixtures. When NEMA Type F (Item 13A) light fixtures are used, nom 4 ft long primary cross tees installed perpendicular to main runners and spaced nom 50 in. OC. Two nom 50 in. long primary cross tees installed perpendicular to nom 4 ft long primary cross tees and spaced nom 14 in. OC to accommodate nom 1 by 2 ft or 1 by 4 ft NEMA Type F fixture or spaced 26 in. OC to accommodate nom 2 by 2 ft or 2 by 4 ft NEMA Type F fixture. When nom 1 by 2 ft or 2 by 2 ft NEMA Type F fixtures are used, nom 14 in. or 26 in. long primary cross tees to be used to form nom 26 in. long modules at the center of the nom 50 in. long primary cross tees. Additional lengths of primary cross tee to be installed at each end of each nominal 50 in. long primary cross tee to create a nominal 14 or 26 in. by 22 or 24 in. module at each end of light fixture module. Ends of these additional lengths of primary cross tee are to engage cross tee routs at end of fixture and are to be riveted to nom 4 ft long cross tee at opposite end. Additional short lengths of primary cross tee to be installed perpendicular to main runners near center of nom 50 in. long cross tee on each side of light fixture. Ends of these additional short lengths of cross tee are to engage rout of main runner at one end and are to be riveted to nom 50 in. long primary cross tee at opposite end. The main runners, cross tees or cross channels may be riveted or screw-attached to the wall angle or channel to facilitate the ceiling installation.
ARMSTRONG WORLD INDUSTRIES INC — Type DFR-8000.

15C. **Alternate Steel Framing Members* —** (Not Shown) — As an alternate to Items 15, 15A and 15B. For use in corridors or rooms having a maximum width dimension of 14 ft. Steel framing members consist of grid runners, locking angle wall molding and hanger bars. Locking angle wall molding secured to walls with steel nails or screws spaced max 24 in. OC. Slots of locking angle wall molding parallel with hanger bars to be aligned with tabbed cutouts in bottom edge of hanger bars. Hanger bars spaced max 50 in. OC and suspended with No. 12 AWG steel hanger wires spaced max 48 in. OC. Adjoining lengths of hanger bar to overlap 12 in. and to be secured together and suspended by a shared hanger wire. A min clearance of 1/4 in. shall be maintained between the ends of the hanger bars and the walls. Grid runners cut-to-length and installed perpendicular to hanger bars and spaced max 24 in. OC with additional grid runners installed 8 in. OC at gypsum board end joints and adjacent to each side of nom 2 by 2 ft or nom 2 by 4 ft

NEMA Type F light fixtures (Item 13A). Grid runners parallel with walls to be spaced max 16 in. from wall. Ends of grid runners to rest on and engage slots of locking angle wall molding with a clearance of 3/8 in. to 1/2 in. maintained between each end of the grid runner and the wall. Bulb of grid runner to be captured by tabbed cutouts in bottom edge of hanger bars. When NEMA Type F light fixtures are used, flange of grid runner on each side of fixture module is to be slit and bent upward 90 deg along the length dimension of the fixture. Nom 24 in. long cross tees with tabbed ends bent 90 deg are to be formed from lengths of grid runner and are to be secured to the grid runner at each end of the fixture module using steel screws or rivets. Additional cross tees, nom 8 in. long with tabbed ends bent 90 deg, are to be formed from lengths of grid runner and are to be secured to the grid runners at the corners and center of each side of the fixture module using steel screws or rivets.
ARMSTRONG WORLD INDUSTRIES INC — Type DFR-8000-SS

15D. **Alternate Steel Framing Members* —** (Not Shown) — As an alternate to Items 15, 15A, 15B and 15C. Main runners nom 12 ft long, spaced 72 in. OC. Cross tees, nom 6 ft long, installed perpendicular to main runners and spaced 24 in. OC. Additional 6 ft long cross tees required at each gypsum board end joint with butted gypsum board end joints centered between cross tees spaced 8 in. OC. When NEMA Type F (Item 13A) light fixtures are used, nom 6 ft long cross tees installed perpendicular to main runners and spaced nom 14 in., 26 in. or 50 in. OC, dependent upon fixture size and orientation. Nominal 14 in., 26 in. and/or 50 in. cross tees used in combination with the 6 ft long cross tees to create modules to accommodate nom 1 by 2 ft, 1 by 4 ft, 2 by 2 ft and 2 by 4 ft NEMA Type F fixtures. Additional lengths of cross tee to be installed between the 6 ft long cross tees at each end of each nominal 14 in., 26 in. or 50 in. long cross tee forming a light fixture module. Ends of these additional lengths of cross tee are to engage cross tee routs at end of fixture and are to be riveted to nom 6 ft long cross tee at opposite end. Additional short lengths of cross tee to be installed perpendicular to main runners near center of nom 50 in. long cross tee on each side of 1 by 4 ft or 2 by 4 ft light fixture which is installed with its long dimension parallel with the main runners. Ends of these additional short lengths of cross tee are to engage rout of main runner at one end and are to be riveted to nom 50 in. long cross tee at opposite end. The main runners and cross tees may be riveted or screw-attached to the wall angle or channel to facilitate the ceiling installation.
ARMSTRONG WORLD INDUSTRIES INC — Type DFR-8000

15E. **Alternate Steel Framing Members* —** (Not Shown) - As an alternate to Items 15 through 15D- Main runners nom 12 ft long, spaced 72 in. OC. Cross tees, nom 6 ft long, installed perpendicular to main runners and spaced 24 in. OC. Additional 6 ft long cross tees required at each gypsum board end joint with butted gypsum board end joints centered between cross tees spaced 8 in. OC. When NEMA Type F (Item 13A) light fixtures are used, nom 6 ft long cross tees installed perpendicular to main runners and spaced nom 14 in., 26 in. or 50 in. OC, dependent upon fixture size and orientation. Nominal 14 in., 26 in. and/or 50 in. cross tees used in combination with the 6 ft long cross tees to create modules to accommodate nom 1 by 2 ft, 1 by 4 ft, 2 by 2 ft and 2 by 4 ft NEMA Type F fixtures. Additional lengths of cross tee to be installed between the 6 ft long cross tees at each end of each nominal 14 in., 26 in. or 50 in. long cross tee forming a light fixture module. Ends of these additional lengths of cross tee are to engage cross tee routs at end of fixture and are to be riveted to nom 6 ft long cross tee at opposite end. Additional short lengths of cross tee to be installed perpendicular to main runners near center of nom 50 in. long cross tee on each side of 1 by 4 ft or 2 by 4 ft light fixture which is installed with its long dimension parallel with the main runners. Ends of these additional short lengths of cross tee are to engage rout of main runner at one end and are to be riveted to nom 50 in. long cross tee at opposite end. The main runners and cross tees may be riveted or screw-attached to the wall angle or channel to facilitate the ceiling installation.
USG INTERIORS LLC — Type DGL or RX

15F. **Alternate Steel Framing Members* —** (Not Shown) — As an alternate to Items 15 through 15E - Main runners nom 12 ft. long, 1-1/2 in. wide face, spaced 4 ft. OC. Cross tees, nom 4 ft. long, installed perpendicular to the main runners, spaced 24 in. OC. Additional cross tees used at 6 in. from each side of butted gypsum board end joints. The cross tees shall be riveted with 1/8 in. dia. rivets to the wall angle and to the main tee where the cross tee does not align with slow in the main tee. When NEMA Type F (Item 13A) light fixtures are used, nom 4 ft long cross tees, 1-1/2 in wide face, installed perpendicular to main runners and spaced nom 50 in. O.C. Two nom 50 in. long cross tees, 1-1/2 inch wide face, spaced nom 14 in. O.C. to accommodate nom 1 by 2 ft or 1 by 4 ft NEMA Type F fixture or spaced 26 in. O.C. to accommodate nom 2 by 2 ft NEMA or 2 by 4 ft NEMA Type F fixture. When nom 2 by 2 ft NEMA Type F fixture is used, nom 26 in. long cross tees to be used to form nom 26 in. module at the center of the nom 50 in. long cross tees. Two additional nom 4 ft cross tees, 1-1/2 in. wide face are installed perpendicular to the main runners outside each end of fixture opening to support the end pieces of drywall fixture protection. Small cutoff pieces of cross tees are installed at the center of the nom 50 in. long cross tees and main runners by inserting the dip end into a cross tee slot on the main runner and securing the other end with a pop rivet to the nom 50 in. long cross tee. Wall angle is a galvanized steel angle with 1-1/2 in. legs attached to walls at perimeter of ceiling with fasteners at 16 in. OC to support steel framing member ends and for screw-attachment of the gypsum board.
CERTAINTEED CORP — Types DWS12-13-20, DWS4.16-13-20, DWS4-13-20, DWS2-13-20, DWS2.16-13-20 and DWA1.5-1.5

15G. **Alternate Framing Members* —** (Not Shown) — As an alternate to Items 15 through 15F. Main runners nom 12 ft long, spaced 72 in. OC. Main runners suspended by min 12 SWG galv steel hanger wires spaced 48 in. OC. Cross tees, nom 6 ft long, installed perpendicular to main runners and spaced 24 in. OC. Additional 6 ft long cross tees required at each gypsum board end joint with butted gypsum board end joints centered between cross tees spaced 8 in. OC. The main runners and cross tees may be riveted or screw attached to the wall angle or channel to facilitate the ceiling installation.

ROXUL USA INC. D/B/A ROCKFON — Type 670C

16. **Wall Molding —** (Not shown) — Min 0.019 in. thick 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. OC.

17. **Gypsum Board* —** 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. Gypsum board fastened to each cross tee with five drywall 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 gypsum board side joint. Except at gypsum board end joints, drywall screws shall be located on alternating sides of cross tee flange. At gypsum board end joints, drywall screws shall be located 1/2 in. from the joint. Gypsum board fastened to main runners with drywall screws, 3/8 to 1/2 in. from side joints, midway between intersections with cross tees (24 in. OC). End joints of adjacent gypsum board sheets shall be staggered not less than 4 ft OC. Gypsum board sheets screw-attached to flange of wall channel with drywall screws spaced 12 in. OC.

When alternate **Steel Framing Members*** (Item 15C) are used, gypsum board sheets installed with long dimension (side joints) perpendicular to the grid runners with the end joints staggered min 4 ft and centered between grid runners which are spaced 8 in. OC. Prior to installation of the gypsum board sheets, backer strips consisting of nom 7-3/4 in. wide by 48 in. long pieces of gypsum board are to be laid atop the grid runner flanges and centered over each butted end joint location. The backer strips are to be secured to the flanges of the grid runners at opposite corners of the backer strip to prevent the backer strips from being uplifted during screw-attachment of the gypsum board sheets. Gypsum board fastened to grid runners with drywall screws spaced 1 in. and 4 in. from the side joints and max 8 in. OC in the field of the board. The butted end joints are to be secured to the backer strip with No. 10 by 1-1/2 in. long Type G laminating screws located 1 in. from each side of the butted end joint and spaced 1 in. and 4 in. from the side joints and max 8 in. OC in the field of the board. Joints to be covered with paper tape and joint compound.

When alternate **Steel Framing Members*** (Item 15D) are used, gypsum board sheets installed with long dimension (side joints) perpendicular to the 6 ft long cross tees with the end joints staggered min 4 ft and centered between cross tees which are spaced 8 in. OC. Gypsum board side joints may occur beneath or between main runners. Prior to installation of the gypsum board sheets, backer strips consisting of nom 7-3/4 in. wide pieces of gypsum board are to be laid atop the cross tee flanges and centered over each butted end joint location. The backer strips are to be secured to the flanges of the cross tees at opposite corners of the backer strip to prevent the backer strips from being uplifted during screw-attachment of the gypsum board sheets. Gypsum board fastened to cross tees with drywall screws spaced 1 in. and 4 in. from the side joints and max 8 in. OC in the field of the board. The butted end joints are to be secured to the backer strip with No. 10 by 1-1/2 in. long Type G laminating screws located 1 in. from each side of the butted end joint and spaced 1 in. and 4 in. from the side joints and max 8 in. OC in the field of the board. Joints to be covered with paper tape and joint compound.

When alternate **Steel Framing Members*** (Item 15E and 15F) are used, gypsum board sheets installed with long dimension (side joints) perpendicular to the 6 ft long cross tees with the end joints staggered min 4 ft and centered between cross tees which are spaced 8 in. OC. Gypsum board side joints may occur beneath or between main runners. Prior to installation of the gypsum board sheets, backer strips consisting of nom 7-3/4 in. wide pieces of gypsum board are to be laid atop the cross tee flanges and centered over each butted end joint location. The backer strips are to be secured to the flanges of the cross tees at opposite corners of the backer strip with hold down clips to prevent the backer strips from being uplifted during screw-attachment of the gypsum board sheets. Gypsum board fastened to cross tees with 1 in. drywall screws spaced 1 in. and 4 in. from the side joints and max 8 in. OC in the field of the board. The butted end joints are to be secured to the backer strip with No. 10 by 1-1/2 in. long Type G laminating screws located 1 in. from each side of the butted end joint and spaced 1 in. and 4 in. from the side joints and max 8 in. OC in the field of the board. Joints to be covered with paper tape and joint compound.

AMERICAN GYPSUM CO — Type AG-C

CERTAINTEED GYPSUM INC — Type C

CGC INC — Type C, IP-X2, ULIX.

CERTAINTEED GYPSUM INC — Type LGFC-C/A.

GEORGIA-PACIFIC GYPSUM L L C — Types 5, C, DAPC, TG-C.

NATIONAL GYPSUM CO — Types FSK-C, FSK-G, FSW-C, FSW-G.

PABCO BUILDING PRODUCTS L L C, DBA PABCO GYPSUM — Type C or PG-C.

THAI GYPSUM PRODUCTS PCL — Type C.

UNITED STATES GYPSUM CO — Type C, IP-X2, ULIX.

USG BORAL DRYWALL SFZ LLC — Type C

USG MEXICO S A DE C V — Type C, IP-X2

17A. **Gypsum Board* —** For use when **Batts and Blankets*** (Item 21) and **Steel Framing Members*** (Item 15A) are used - 5/8 in. thick, 4 ft wide; installed with long dimension perpendicular to cross tees with side joints centered along main runners and end joints centered along cross tees. Fastened to cross tees with 1 in. long steel drywall screws spaced 8 in. OC in the field and 8 in. OC along end joints. Fastened to main runners with 1 in. long drywall screws spaced midway between cross tees. Screws along sides and ends of boards spaced 3/8 to 1/2 in. from board edge. End joints of the sheets shall be staggered with spacing between joints on adjacent boards not less than 4 ft OC.
CGC INC — Type C, IP-X2, ULIX.

UNITED STATES GYPSUM CO — Type C, IP-X2, ULIX

USG BORAL DRYWALL SFZ LLC — Type C

USG MEXICO S A DE C V — Type C, IP-X2.

17B. **Gypsum Board* —** For use when **Steel Framing Members*** (Item 15F) are used - 5/8 in. thick, 4 ft. wide by 10 ft. long; installed with the long dimension parallel to the main runners. Sheets fastened to cross tees with screws spaced 8 in. OC adjacent to end joints, and 8 in. OC along each cross tee in the field. At the side and end joints, screw shall be located 1-1/2 in. from the board edges. End joints to be staggered 4 ft. and to occur over cross tees. Additional cross tees to be located 6 in. from and on each side of the end joints. Joints to be covered with joint tape and joint compound.
CERTAINTEED GYPSUM INC — Type C

18. **Drywall Screw —** No. 6 Phillips-type, Type S self-drilling and self-tapping 1 in. long screw heads may be either exposed or covered with joint cement.

19. **Alternate Finishing System —** (Not shown) — Gypsum board joints may be either exposed (unless noted under Gypsum Board*) 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 board.

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

20. **Roof Insulation —** (Not Shown) — May only be employed when **Foamed Plastic** (Item 4) is not used. Rigid **Foamed Plastic*** insulation boards, 1 to 4 in. thick placed on top of roof covering. May either be embedded into asphalt glaze coat, bonded to the single-ply membrane with adhesive or loosely laid. Covered with 10 psf stone or masonry ballast. (When used, stone ballast described in Item 2A may be omitted.)

DUPONT DE NEMOURS, INC.

21. **Batts and Blankets* —** (Optional, Not Shown) - When used, ratings are limited to 1 Hr. - For use with **Steel Framing Members*** (specifically Item 15A) and **Gypsum Board*** (specifically Item 17A) - Any thickness mineral wool or glass fiber insulation bearing the UL Classification Marking for Surface Burning Characteristics, having a flame spread value of 25 or less and a smoke spread value of 50 or less. Insulation fitted in the concealed space, draped over steel framing members/gypsum board ceiling membrane.

22. **Discrete Products Installed in Air-handling Spaces* —** Automatic Balancing Valve/Damper (Not Shown - Optional) — For use with item 12. Valve/Damper to be provided with ducted installation with steel duct per damper manufacturer's instructions. Automatic Balancing Valve/Damper shall be installed within duct such that it is not directly above the ceiling radiation damper.
METAL INDUSTRIES INC — Model ABV-4, ABV-5, ABV-6

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**
