UL Product iQ™

BXUV.P514

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

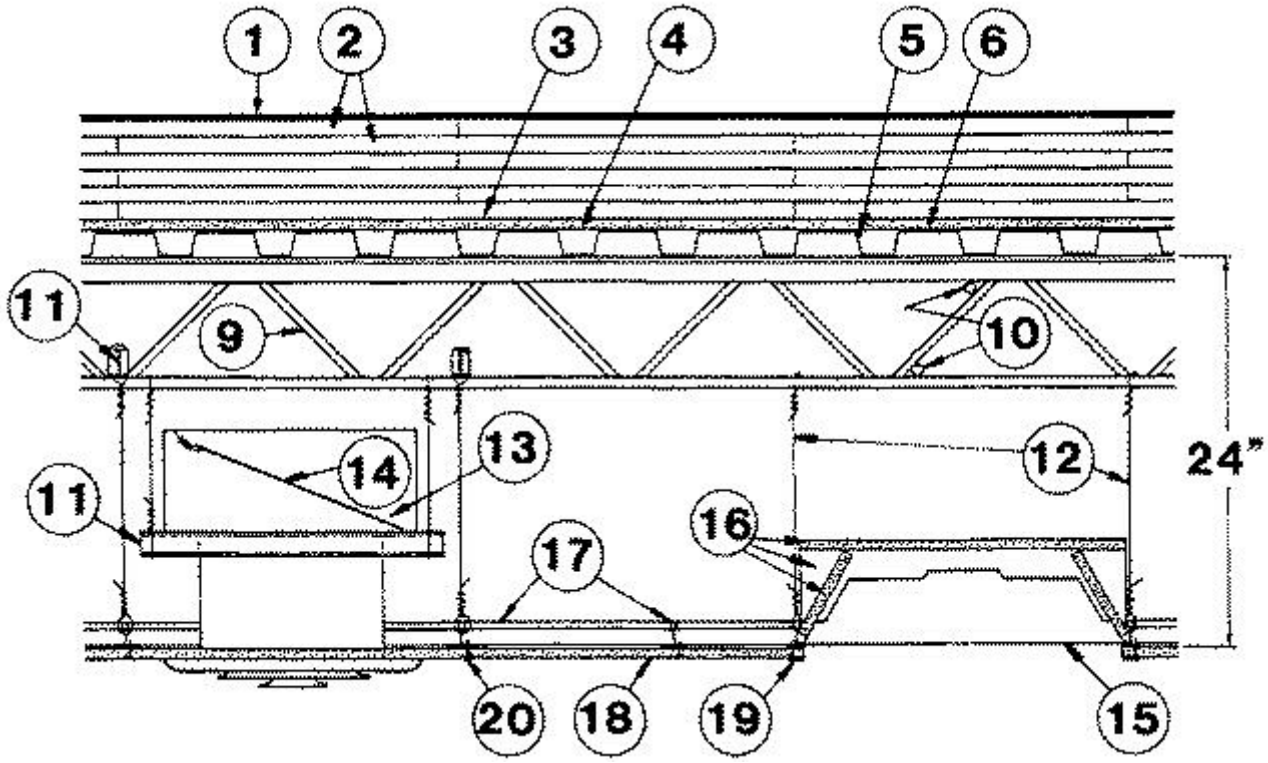
See General Information for Fire-resistance Ratings - ANSI/UL 263 Certified for United States
Design Criteria and Allowable Variances

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

Design No. P514

Restrained Assembly Ratings — 1 and 2 Hr (See Item 24)
Unrestrained Assembly Ratings — 1 and 2 Hr (See Item 24)
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.**



Joist Girders — (Not shown) — Used as primary supports. 20 in. min depth, 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 Items 1 or 1A, the roof covering may consist of a mechanically fastened metal roof deck panel assembly. See Fire Resistance Directory-Metal Roof Deck Panels (CETW).

2. **Roof Insulation — Mineral and Fiber Boards* —** Nom 24 by 48 in. or larger. To be applied in one or more layers as follows:
A. May be loosely laid on top of gypsum board (Item 4).

B. May be fastened to steel roof deck (through gypsum board) with mechanical fasteners (Item 7). When mechanical fasteners are used, two or more layers of mineral and fiber boards must be used.

C. May be bonded to gypsum board with adhesive.

D. Individual layers of mineral and fiber boards above the mechanical fasteners, if used, may be bonded to the bottom layer and to each other with adhesive or hot asphalt.
First layer to be installed perpendicular to gypsum board direction with end joints staggered 2 ft in adjacent rows. When applied in more than one layer, each layer of boards to be offset in both directions from layer below a min of 12 in. in order to lap all joints.

Min thickness 1 in. when no mechanical fasteners are used. Min thickness 2 in. when mechanical fasteners are used. (No limit on max overall thickness).

GAF

JOHNS MANVILLE

ROCKWOOL — MonoBoard™, MonoBoard™ Plus, "MonoBoard Plus S", TopRock®DD, TopRock® DD Plus or TopRock DD Plus S.

SOPREMA INC — SopraRock®DD and SopraRock®DD Plus.

2A. **Roof Insulation — Foamed Plastic* —** As an alternate to Item 2, nom 4 ft by 8 ft phenolic foam insulation boards applied in one or more layers over the gypsum board (Item 4) with all joints in each insulation layer staggered a min of 6 in. from the layer below. Min thickness 1 in. with no max for overall thickness. The insulation layer(s) shall be covered with one layer of gypsum board (Classified or Unclassified) supplied in sheets nom 4 ft by 12.5 ft by 1/2 in. thick with all joints staggered 6 in. from insulation layer below. Insulation and gypsum board layers shall be fastened to steel deck with min 0.140 diam threaded shank Phillips, bugle or trumpet head, self-drilling, self-tapping steel screws. Screws and fastener spacing per manufacturer's specifications.
LOADMASTER SYSTEMS INC

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 2.0 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.
ATLAS ROOFING CORP — ACFoam II, Tapered ACFoam II, ACFoam II NH, Tapered ACFoam II NH, ACFoam III, ACFoam III NH, Tapered ACFoam III NH, ACFoam IV, ACFoam Supreme, ACFoam Supreme NH, ACFoam Recover Board, ACFoam Recover Board NH

CARLISLE SYNTEC SYSTEMS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — SecurShield CD, InsulBase NH, SecurShield NH, SecurShield HD Composite NH, Polyiso HP-F NH, InsulBase RL, SecurShield RL, Polyiso HP-F

MULE-HIDE PRODUCTS CO INC — POLY ISO 2

DOW ROOFING SYSTEMS L L C — "Dow Termico Polyisocyanurate Insulation", "Dow Termico ISO 3000 Insulation", "Dow Termico ISO HP-FR".

FIRESTONE BUILDING PRODUCTS CO L L C — "ISO 95+ GL", "ISO 95+ FK", "ISO 95+ CAN", "ISO 95+ GL NH", "ISOGARD HD Composite Board", "RESISTA", "ISOGARD GL", "ISOGARD CG".

GAF — EnergyGuard™, EnergyGuard™ RA, EnergyGuard™ NH.

When EnergyGuard™ or EnergyGuard™ NH are used, all ratings are reduced by 1/2 hr.
HUNTER PANELS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — H Shield, H-Shield-F, H-Shield-CG, H-Shield-C, H-Shield Premier, H-Shield HD Composite, H-Shield HD Composite CG, H-Shield RL, H-Shield CG RL, H Shield NH, H-Shield-F NH, H-Shield-CG NH, H-Shield-C NH, H-Shield Premier NH, H-Shield HD Composite CG NH

MULE-HIDE PRODUCTS CO INC — Poly ISO 1, Tapered Poly ISO 1, Poly ISO 1-DWD, Tapered Poly ISO 1-DWD, Poly ISO 1-HD, Poly ISO 1-HD90, Poly ISO 1-HD-Composite

JOHNS MANVILLE — ENRGY 3 25 psi, ENRGY 3, Tapered ENRGY 3, Tapered ENRGY 3 25 psi, ENRGY 3 AGF, Tapered ENRGY 3 AGF, ENRGY 3 25 psi AGF, Tapered ENRGY 3 25 psi AGF, ENRGY 3 CGF, Tapered ENRGY 3 CGF, ENRGY 3 25 psi CGF, Tapered ENRGY 3 25 psi CGF, ISO-3, Tapered ISO-3, ValuTherm, Tapered ValuTherm, ValuTherm 25 psi, Tapered ValuTherm 25 psi, ValuTherm AGF, Tapered ValuTherm AGF, ValuTherm 25 psi AGF, Tapered ValuTherm 25 psi AGF, ValuTherm CGF, Tapered ValuTherm CGF, ValuTherm 25 psi CGF, Tapered ValuTherm 25 psi CGF.

LOADMASTER SYSTEMS INC — Loadmaster Polyisocyanurate Insulation.

MARTIN FIREPROOFING CORP — "Perform-A-Deck I"

RMAX, A BUSINESS UNIT OF SIKA CORPORATION — Multi-Max-3, Multi-Max FA-3, Ultra-Max, Ultra-Max Plus, Tapered Ultra-Max Plus, Tapered Thermaroof-3, Tapered Thermaroof FA-3, Tapered Ultra-Max.

SIKA SARNAFIL INC — Sarnatherm-R Insulation, Sarnatherm-R CG Insulation, Sarnatherm-R Tapered Insulation, Sarnatherm-R CG Tapered Insulation.

SOPREMA INC — Sopra-ISO s, Sopra-ISO s Tapered, Sopra-ISO+ s, Sopra-ISO+ s Tapered, Sopra-ISO H+ s, Sopra-ISO H+ s Tapered.

TREMCO INC — Trisotech G, Trisotech CGF

VERSICO INC — — SecurShield HD Composite, WeatherBond XFP HD Composite, VersiCore MP-H NH, WeatherBond XP NH, SecurShield NH, WeatherBond XFP NH, VersiCore RL, SecurShield RL, Polyiso MP-HF NH

2C. **Building Units* —** As an alternate to Items 2, 2A and 2B, min 2.0 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 — AC Foam II Composite/Perlite, ACFoam Tapered Composite/Perlite

SOPREMA INC

2D. **Roof Insulation-Foamed Plastic* —** Alternate to Items 2, 2A, 2B and 2C. Any thickness polystyrene foamed plastic insulation boards bearing the UL Classification Marking, having a density of 2.5 pcf max, may 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, nom. 48 by 48 or 96 in., faced on the top surface with oriented strand board or plywood. Min. thickness of the polyisocyanurate core is 2.0 in. No limit on max overall thickness. Boards to be installed with end joints staggered a min. of 6 in. in adjacent rows.
ATLAS ROOFING CORP — ACFoam Nail Base Insulation, ACFoam Nail Base Insulation NH, Vented-R, ACFoam CrossVent, ACFoam CrossVent NH, ACFoam III Nail Base Insulation, ACFoam III Nail Base Insulation NH, ACFoam III CrossVent, ACFoam III CrossVent NH

FIRESTONE BUILDING PRODUCTS CO L L C — Hailgard, "ISOGARD HG".

HUNTER PANELS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — H-Shield-NB, H-Shield-NB NH

JOHNS MANVILLE — Nailboard.

SOPREMA INC — Sopra-ISO CV s.

2F. **Building Units* —** As an alternate to Items 2 through 2E, polyisocyanurate foamed plastic insulation boards faced on the underside with wood fiber board. Min thickness of the polyisocyanurate core is 2.0 in. No limit on max overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows.
ATLAS ROOFING CORP — AC Foam II Composite/Wood Fiber

FIRESTONE BUILDING PRODUCTS CO L L C — "ISO 95+ Wood fiberboard Composite".

JOHNS MANVILLE — ENRGY 2 Plus.

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 2.0 in. 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 L L C — "ISO 95+ Composite".

JOHNS MANVILLE — Fesco-Foam.

2H. **Building Units* —** Not Shown — As an alternate to Items 2 through 2G, composite polyisocyanurate foamed plastic insulation board with an adhered nailing surface, nom 48 by 48 or 96 in. may be used with the following limitations. These composite building units have ventilation slots internal to the panels. The thickness of the panel depends upon the thinnest portion of the polyisocyanurate insulation. The following dimensions apply to the polyisocyanurate insulation; min. 2.0 in. thick. There is no limit on the maximum insulation thickness.
JOHNS MANVILLE — 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 2.0 in. No limit on overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows.
ATLAS ROOFING CORP — AC Foam II Composite/GB

JOHNS MANVILLE — ENRGY 2 Gypsum Composite.

2J. **Foamed Plastic* —** Optional - (Not Shown) - Used in addition to the foam insulation required to achieve fire rating:

2Ja. **Foamed Plastic* —** Optional - (Not Shown) - Maximum 1 in. thick polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in. Boards may be applied as the top layer in addition to the specified minimum thickness of any roofing system described herein, as long as the roofing system states that there is no limit on maximum thickness. Joints offset in both directions from layer below.
FIRESTONE BUILDING PRODUCTS CO L L C — "ISOGARD HD"

2Jb. **Foamed Plastic* —** Optional — (Not Shown) — Maximum 5/8 inch thick polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in. Boards may be applied as the top layer in addition to the specified minimum thickness of any roofing system described herein, as long as the roofing system states that there is no limit on maximum thickness. Joints offset in both directions from layer below.
RMAX, A BUSINESS UNIT OF SIKA CORPORATION — "Ultra-Max HD"

SIKA SARNAFIL INC — "Sarnatherm Roof Board-R"

2Jc. **Foamed Plastic* —** Optional — (Not Shown) — Maximum 1/2 inch thick polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in. Boards may be applied as the top layer in addition to the specified minimum thickness of any roofing system described herein, as long as the roofing system states that there is no limit on maximum thickness. Joints offset in both directions from layer below.
CARLISLE SYNTEC SYSTEMS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — SecurShield HD, SecurShield HD Plus, SecurShield HD NH, SecurShield HD Plus NH, SecurShield HD RL

HUNTER PANELS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — H-Shield HD, H-Shield HD90, H-Shield HD RL, H-Shield HD NH, H-Shield HD90 NH

VERSICO INC — SecurShield HD Plus, WeatherBond XFP HD Plus Cover Board, SecurShield HD NH, WeatherBond XFP HD NH Cover Board, SecurShield HD Plus NH, WeatherBond XFP HD Plus NH Cover Board, SecurShield HD RL

2Jd. **Foamed Plastic* —** Optional — (Not Shown) — Maximum 1 inch thick polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in. Boards may be applied as the top layer in addition to the specified minimum thickness of any roofing system described herein, as long as the roofing system states that there is no limit on maximum thickness. Joints offset in both directions from layer below.
ATLAS ROOFING CORP — ACFoam HD CoverBoard and ACFoam CoverBoard FR

2K. **Building Units* —** As an alternate to Item 2, polyisocyanurate foamed plastic insulation boards, nom 48 by 48 by 96 in. faced on the top surface with wood fiber board. Min thickness of the polyisocyanurate core is 2.0 in. No limit on max overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows.
CARLISLE SYNTEC SYSTEMS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — Polyiso HP-H Composite NH

HUNTER PANELS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — H-Shield-WF, H-Shield-WF NH

VERSICO INC — MP-HWF NH, WeatherBond XP-WF NH

2L. **Building Units* —** As an alternate to Item 2, polyisocyanurate foamed plastic insulation boards , nom. 48 by 48 or 96 in. faced on the top surface with perlite composite board. Min thickness of the polyisocyanurate core is 2.0 in. No limit on max overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows
HUNTER PANELS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — H-Shield-p, H-Shield-RP, H-Shield-P NH, H-Shield-RP NH

2M. **Building Units* —** — As an alternate to Item 2, polyisocyanurate foamed plastic insulation boards, nom. 48 by 48 or 96 in., faced on the top surface with glass mat faced gypsum panel. Min. thickness of the polyisocyanurate core is 2.0 in. No limit on max overall thickness. Boards to be installed with end joints staggered a min. of 6 in. in adjacent rows.

CARLISLE SYNTEC SYSTEMS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — Polyiso HP-HDD, Polyiso HP-HDD NH

HUNTER PANELS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — H-Shield-DD, H-Shield DD NH

VERSICO INC — MP-HDD, MP-HDD NH

2N. **Roof Insulation — Foamed Plastic* — As an alternate to Items 2 - 2I —** Polyurethane foamed plastic roof insulation. Formed by the simultaneous spraying of two liquid components applied over gypsum wallboard (item 4) in accordance with the manufacturer's instructions. Min thickness is 2.0 in. No limit on max overall thickness.
BASF CORP — Types FE348-2.5, FE348-2.8, FE348-3.0, ELASTOSPRAY 81255, ELASTOSPRAY 81285, ELASTOSPRAY 81305, SKYTITE C1, SKYTITE C2, CKYTITE C3

BASF CORP — Elastospray 5100-2.0, Elastospray 5100-2.5, Elastospray 81302, Elastospray 81272, Elastospray Alpha System, Elastospray 81252

3. **Sheathing Material —** (Optional) — Vinyl film or paper scrim vapor barrier, applied with adhesive to the gypsum board. Adjacent sheets overlapped 2 in. See Sheathing Material (CHIZ) category for names of manufacturers.
GCP APPLIED TECHNOLOGIES INC — Grace Ice and Water Shield, Grace Ice and Water Shield-HT®, Grace Select, Grace Ultra, and Grace Basik.

4. **Gypsum Board* —** 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 the steel roof deck direction with or without adhesive or mechanical fasteners through the insulation. End joints to occur over crests of steel roof deck with end joints staggered 1 ft or more in adjacent rows.
See Gypsum Board (CKNX) category for names of manufacturers.

5. **Steel Roof Deck —** Min 1-1/2 in. deep, nom 36 in. wide fluted units, min 0.029 in. thick (No. 22 gauge) galv steel. Welded to supports with 1/2 in. puddle welds, through welding washers. Side lap joints of adjacent units welded or secured together with No. 8 by 3/4 in. long self-drilling, self-tapping steel screws midway between steel joists; or **Classified Steel Floor and Form Units*** — 1-1/2 in. deep, 24, 30 or 36 in. wide, galv steel units. Min. gauge is 22 MSG. Welded to supports with 1/2 in. puddle welds through welding washers. Side laps of adjacent units welded or secured together with No. 8 by 3/4 in. long self-drilling, self-tapping, steel screws midway between steel joists.
CANAM GROUP INC — Type P-3606 or P-3615; 36 in. wide Types 1.5B, 1.5BI

CANAM STEEL CORP — Type P-3606 or P-3615

VULCRAFT, DIV OF NUCOR CORP — Types 1.5A, 1.5B, 1.5BI, 1.5PLB, 1.5F; Types BW, B High Strength, BW High Strength, N.

6. **Adhesive* —** (Optional) — Applied to the crest of the steel roof deck in 1/2 in. wide ribbons at a rate of 0.4 gal per 100 sq. ft (approx 6 in. OC). Applied in 1/2 in. wide ribbons at 0.4 gal per 100 sq. ft between the vapor barrier and the gypsum board, and between the gypsum board and the first layer of roof insulation.
See Adhesives (BYWR) category for names of manufacturers.

7. **Mechanical Fasteners —** (Optional, Not shown) — Insulation clips with discs, may be used to secure roof insulation to the steel roof deck (through gypsum wall). Clips 3-1/4 in. long, having a shank diam of 0.203 in. Clips designed so that their tips "lock" against the underside of the steel roof deck. Steel disc 2-1/8 in. diam, 0.030 in. thick. Fasteners spacing is per manufacturer's specifications.

8. **Hot Asphalt or Coal Tar Pitch —** (Optional, Not shown) — May be applied between layers of roof insulation when applied at a rate not exceeding 25 lbs/100 sq ft.

9. **Steel Joists —** Type 8H3 or 10K1, min size; spaced 48 in. O.C., welded to end supports. As an 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. Joists may be spaced a maximum of 72 in. OC and welded to end supports.
NOTE: Design load shall stress 8H3 joists to max bending stress of 22,000 psi.

10. **Bridging —** Min 1/2 in. diam steel rods welded to top and bottom chords of each joist.

11. **Cold Rolled Channels —** Min 0.060 in. thick (No. 16 gauge) cold-rolled steel channels, 1-1/2 in. deep with 9/16 in. flanges. Two channels tied together back to back with 16 SWG galv steel wire placed on and wire-tied to top of joist lower chord with min 16 SWG galv steel wire, spaced as required to provide attachment provision for ceiling hanger wires between steel joists.

12. **Hanger Wire —** No. 12 SWG galv steel wire, twist-tied to bottom chord of joists or cold-rolled steel channels. Hanger wires spaced 48 in. OC along main runners (at every other main runner/cross tee intersection). Hanger wires also to occur at all four corners of light fixtures, at midspan of cross tees adjacent to light fixtures and air duct outlets, and adjacent to each main runner splice.

13. **Air Duct —** No. 22 MSG min galv steel. Total area of duct opening not to exceed 255 sq. in per each 100 sq. ft of ceiling area. Area of end duct opening not to exceed 255 sq. in. Max dimension of opening 18 in. Inside and outside faces of duct throat protected with 1/16 in. thick ceramic fiber paper laminated to the metal. Duct supported by 1-1/2 in. deep, No. 16 MSG cold-rolled steel channels spaced not over 48 in. O.C., suspended by No. 12 SWG galv steel wire.

14. **Damper —** No. 16 MSG min 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).

15. **Fixtures, Recessed Light —** (Bearing the UL Listing Mark). Recessed light fixture with steel housing, 2 by 4 ft size. 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.

15A. **Alternate Fixtures, Recessed Light —** For Use with Steel Framing Members, Item 17, 17C, 17D, 17E, or 17F - (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.

15B. **Alternate Fixtures, Recessed Light —** For Use with Steel Framing Members, Item 17B- (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.

16. **Fixture Protection — Gypsum Board* —** 5/8 in. thick, same as Item 18. Cut to form a five sided enclosure, trapezoidal in cross-section, at least 1-1/4 in. higher than the light fixture housing (Item 15). The fixture protection consists of a 23-3/4 by 49 in. top piece, two 47-3/4 in. long side pieces and two 23-3/4 in. long end pieces. The top edge of each fixture protection side piece may be notched 1 in. deep by 10 in. long near its midpoint.

16A. **Fixture Protection — Gypsum Board* —** For Use with Steel Framing Members, Item 17, 17C, 17D, 17E, or 17F - 5/8 in. thick, same as Item 18 or 18B. 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 15A). 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

16B. **Fixture Protection — Gypsum Board* —** For Use with Steel Framing Members, Item 17B - 5/8 in. thick, same as Item 18 or 18A. Cut to form a five sided enclosure, rectangular in cross section, for the NEMA Type F light fixture (Item 15B). 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

17. **Steel Framing Members* —** 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 15) 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 15A) 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.

17A. **Alternate Steel Framing Members* —** (Not Shown) — As an alternate to Item 17. 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 each side of gypsum board end joints and 8 in. from each side of light fixtures.
ROXUL USA INC. D/B/A ROCKFON — Types 650, 650C, 670, 670C.

17B. **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 16), installed perpendicular to the main runners, spaced 24 in. OC. When Batts and Blankets* (Item 24) 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 16B) 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 24) 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.

17C. **Alternate Steel Framing Members* —** (Not Shown) — As an alternate to Items 17, 17A and 17B. 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 15A). 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

17D. **Alternate Steel Framing Members* —** (Not Shown) — As an alternate to Items 17, 17A, 17B and 17C. 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 15A) 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

17E. **Alternate Steel Framing Members* —** (Not Shown) — As an alternate to Items 17 through 17D- 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 15A) 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

17F. **Alternate Steel Framing Members* —** (Not Shown) — As an alternate to Items 17 through 17E - 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 15A) 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 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

17G. **Alternate Framing Members* —** (Not Shown) — As an alternate to Items 17 through 17F. 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

18. **Gypsum Board* —** 5/8 in. thick, 4 ft wide, installed with long dimension perpendicular to cross tees with side joints centered underneath main runners. Gypsum board fastened to each cross tee with 1 in. long Type S drywall screws, located 1/2 in. from end joints and 3/4 in. from side joints, and spaced 12 in. OC. End joints of adjacent gypsum board sheets shall be staggered not less than 4 ft OC. Gypsum board fastened to leg of wall angle with drywall screws spaced 12 in. OC.

When the alternate **Steel Framing Members*** (Item 17A) are used, gypsum board 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 five drywall screws with one screw located at the mid span 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 1/2 in. from side joints, midway between intersections with cross tees (24 in. OC). End joint of adjacent sheets shall be staggered as described above. Joints to be covered with joint tape and joint compound.

When alternate **Steel Framing Members*** (Item 17C) 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 17D) 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 17E and 17G) 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.

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, DAPC, TG-C.

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

PABCO BUILDING PRODUCTS L L C, DBA PABCO GYPSUM — Type C.

PANEL REY S A — Type PRC

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.

18A. **Gypsum Board* —** For use when **Batts and Blankets*** (Item 24) and **Steel Framing Members*** (Item 17B) 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.

18B. **Gypsum Board* —** For use when **Steel Framing Members*** (Item 17F) 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

19. **Metal Trim Molding —** No. 25 MSG galv steel, measuring 5/8 in. deep with 1/2 and 1 in. long legs. Placed over and against gypsum board edges around light fixtures with the 1 in. leg facing down and fastened to the cross tees and main runners with 1-5/16 in. long screws. Spacing of screws approximately 8 in. OC along 4 ft side and 10 in. OC along 2 ft side of light fixtures.

20. **Drywall Screw —** Type S, 1 and 1-5/16 in. long, self-drilling and self-tapping.

21. **Finishing System —** (Not shown) — Paper tape embedded in joint compound over joints and covered with additional compound with edges feathered out. Drywall screw heads covered with two layers of compound.

22. **Wall Angle —** (Not shown) — No. 24 MSG painted steel with 1-7/16 in. legs. Nailed to walls around perimeter of ceiling to support steel framing member ends and for screw-attachment of the gypsum board.

23. In lieu of Items 2 thru 2I, 4 and 5 —
A) **Cellular Concrete-Roof Topping Mixture* —** (Not shown) — Foam concentrate mixed with water and Portland cement per manufacturer's specifications.
Cast dry density and 28 day compressive strength of min 190 psi 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. Thickness of cellular concrete above foamed plastic, shall be 2 in.

AERIX INDUSTRIES — Cast dry density of 37 (+ 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 and Mix #3 of cast dry density 47 (+or-) 3.0 pcf.

B) **Foamed Plastic* —** (Not Shown) — Nominal 24 by 48 by max 8 in. thick polystyrene form plastic insulation boards having a density of 2.5 pcf max, (pcf). Boards placed on a 1/2 in. thick layer of cellular concrete slurry coat over the crest of the steel deck. Each insulation board shall contain six nominal 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 2-1/2 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.

Foamed Plastic* (CCVW) category in Fire Resistance Directory for list of manufacturers.

C. **Wire Mesh —** (Not Shown) — No. 19 SWG galv steel wire twisted to form 2 in. hexagons. In addition, straight No. 16 SWG galv steel wire woven into mesh and spaced 3 in. apart for stiffness. Mesh installed at mid height of cellular concrete layer above the foamed plastic or layer above the deck if foamed plastic is omitted with attachment parallel to supports and overlapped 3 to 6 in. at the sides.

D. **Corrugated Steel Deck — (Unclassified)— (Not Shown) —** Min 9/16 in. deep, nom 30 to 36 in. wide corrugated units, min 0.016 in. thick (No. 28 gauge) galv 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 28 MSG units welded or secured together with No. 12 by 1/2 in. long self drilling, self-tapping steel screws midway between steel joists. Side lap fastening not required for 26 MSG or heavier steel deck.

24. **Batts and Blankets* —** (Optional, Not Shown) - For use with **Steel Framing Members*** (specifically Item 17B) and **Gypsum Board*** (specifically Item 18A) - 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. **When Batts and Blankets insulation is used, Restrained and Unrestrained Assembly Ratings are 1 hr.**

25. **Discrete Products Installed in Air-handling Spaces* —** Automatic Balancing Valve/Damper (Not Shown - Optional) — For use with item 14. 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.**
