

## BXUV.P819

## 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. P819

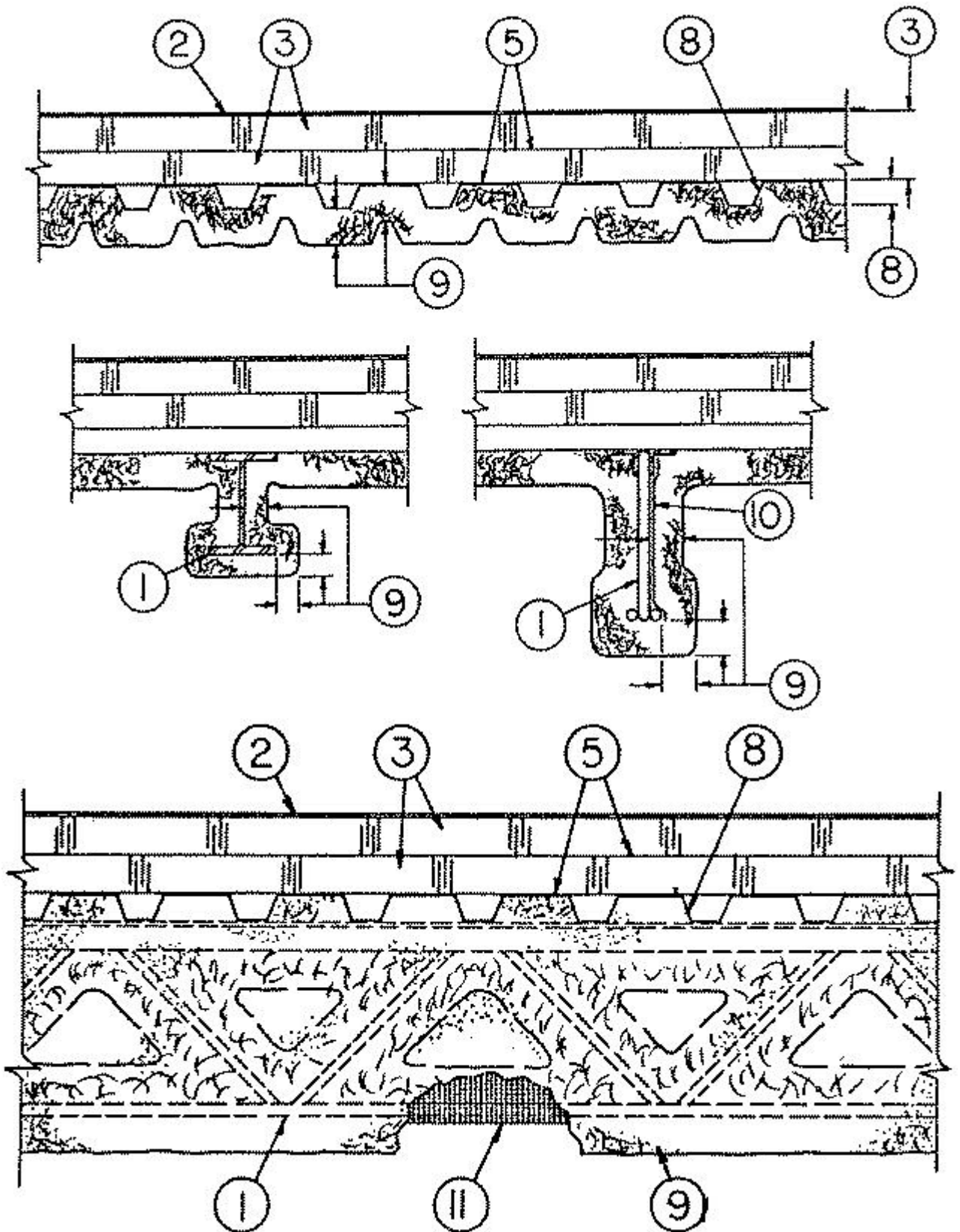
**Restrained Assembly Rating — 1, 1-1/2, 2, or 3 Hr. (See Items 3, 9 and 13)**

**Unrestrained Assembly Rating — 1, 1-1/2, 2, or 3 Hr. (See Items 3, 9 and 13)**

**Unrestrained Beam Rating — 1, 1-1/2, 2, or 3Hr. (See Items 9 and 13)**

**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** — W6x16 min size, or Steel Joist min size (See Item 9).

2. **Roof Covering** — Consisting of hot mopped or cold application bituminous materials compatible with the 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).

2B. **Metal Roof Deck Panels** — (Not Shown) — In addition to or in lieu of Items 2 or 2A, the roof covering may consist of a mechanically fastened metal roof deck panel assembly. See Fire Resistance Directory — **Metal Roof Deck Panels** (CETW).

3. **Roof Insulation-Foamed Plastic\*** — 36 by 48 in. (min size) polyisocyanurate foamed plastic insulation boards applied in one or more layers. See Item 9 for min thicknesses with or without the use of gypsum wallboard (Item 13). 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, AC Foam Recover Board, ACFoam Recover Board NH

**MULE-HIDE PRODUCTS CO INC** — POLY ISO 2

**CARLISLE SYNTEC SYSTEMS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC** — Types HP, HP-H, HP-N, HP-W, SecurShield CD, InsulBase NH, SecurShield NH, SecurShield HD Composite NH, Polyiso HP-F NH, InsulBase RL, SecurShield RL, Polyiso HP-F.

**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" or "RESISTA", "ISOGARD GL", "ISOGARD CG".

**GAF** — EnergyGuard™ RA

**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 Thermarroof-3, Tapered Thermarroof 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.

**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

3A. **Roof Insulation — Building Units\*** — (Not Shown) — As an alternate to Item 3 — 36 by 48 in. (min size) polyisocyanurate foamed plastic insulation boards, faced on underside (or both sides) with mineral and fiber boards. Min thickness of the

polyisocyanurate core is as is stated for Item 3, Roof Insulation. 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/Perlite, AC Foam Tapered Composite/Perlite

**FIRESTONE BUILDING PRODUCTS CO L L C** — ISO 95+ Composite.

**JOHNS MANVILLE** — Fesco-Foam.

3B. **Building Units\*** — (Not Shown) — As an alternate to Item 3 — 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 as is stated for Item 3, Roof Insulation. 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 Nail Base Insulation, AC Foam Nail Base Insulation NH, Vented-R, AC Foam CrossVent, AC Foam CrossVent NH, AC Foam III Nail Base Insulation, AC Foam III Nail Base Insulation NH, AC Foam III CrossVent, AC Foam 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.

3C. **Building Units\*** — As an alternate to Item 3, polyisocyanurate foamed plastic insulation boards faced on the underside with wood fiber board. Min thickness of the polyisocyanurate core is as is stated for Item 3, Roof Insulation. 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.

3D. **Building Units\*** — (Not Shown) — As an alternate to Item 3 — 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 thickness is as stated in Item 3. There is no limit on the max insulation thickness.

**JOHNS MANVILLE** — Type ISO-VENT.

3E. **Building Units\*** — As an alternate to Item 3 — 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 as is stated for Item 3, Roof Insulation. 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.

3F. **Building Units\*** — As an alternate to Item 3 — Polyisocyanurate foamed plastic insulation boards, nom 48 by 48 by 96 in., faced on the top surface with oriented strand board. Min thickness of the polyisocyanurate core is as stated in Item 3, Roof Insulation. No limit on overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows.

3G. **Foamed Plastic\*** — Optional — (Not Shown) — Used in addition to the foam insulation required to achieve fire rating:

3Ga. **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".

3Gb. **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"

3Gc. **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

3Gd. **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

3H. **Foamed Plastic\*** — As an alternate to Item 3-3F — Polyurethane foamed plastic roof insulation. Formed by the simultaneous spraying of two liquid components applied over the gypsum board (Item 13) in accordance with the manufacturer's instructions. Minimum nominal thickness per Item 9 table with no maximum thickness. When used, gypsum board (Item 13) required.

**BASF CORP** — Types FE348-2.5, FE348-2.8, FE348-3.0, ELASTOSPRAY 81255, ELASTOSPRAY 81285, ELASTOSPRAY 81305, SKYTITE C1

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

3I. **Building Units\*** — (Not Shown) — As an alternate to Item 3 — Polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in., faced on the top surface with wood fiber board. Min thickness of the polyisocyanurate core is as is stated for Item 3, Roof Insulation. 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

3J. **Building Units\*** — (Not Shown) — As an alternate to Item 3 — 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 as is stated for Item 3, Roof Insulation. 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

3K. **Building Units\*** — (Not Shown) — As an alternate to Item 3 — Polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in., faced on the top surface with glass mat faced gypsum board. Min thickness of the polyisocyanurate core is as is stated for Item 3, Roof Insulation. 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

4. **Vapor Retarder-Sheathing Material\*** — (Optional — Not shown) — Vinyl film or paper scrim vapor barrier, applied to steel roof deck with adhesive (Item 5), asphalt (Item 6) or laid loosely, overlapped approximately 2 in. on adjacent sheets. See Sheathing Material (CHIZ) category for names of manufacturers.

5. **Adhesive\*** — (Optional) — The vapor retarder or the first layer of roof insulation may be secured with adhesive to the steel crest surfaces. Also used to attach the first layer of insulation to vapor retarder and each additional layer of insulation. Applied in 1/2 in. wide ribbons 6 in. OC at 0.4 gal/100 sq ft. See Adhesives (GYWR) category for name of manufacturers.

5A. **Adhesive\* — (Optional)** — (Bearing the UL Classification Marking for Roof Systems (TGFU)) - The vapor retarder, the gypsum wallboard or the first layer of roof insulation may be secured with adhesive to the steel crest surfaces. Also used to attach the vapor retarder to gypsum wallboard, the first layer of insulation to vapor retarder or gypsum wallboard and each additional layer of insulation. Applied at a max rate of 19.8 g/ft<sup>2</sup>. When FAST 100 adhesive is used, additional **Spray-Applied Fire Resistance Materials\* (CHPX)** is required on the deck for the 1-1/2 and 2 hr Unrestrained Assembly Ratings. The thickness specified for the deck shall be increased by 1/16 in. for 1-1/2 hr Unrestrained Assembly Rating and 1/4 in. for 2 hr Unrestrained Assembly Rating.

**CARLISLE SYNTEC SYSTEMS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC** — FAST 100.

6. **Asphalt or Coal Tar Pitch\*** — (Optional — Not shown) — The vapor retarder or the first layer of roof insulation may be secured with asphalt or coal tar pitch to the steel crest surfaces at a max rate of 15 lbs/100 sq ft. Also used to attach the first layer of insulation to vapor retarder and each additional layer of roof insulation, applied at a max rate of 25 lbs/100 sq ft.

7. **Mechanical Fasteners** — (Optional — Not shown) — Mechanical screw-type fastener with metal or plastic washer designed for the purpose may be used to attach one or more layers of insulation to steel roof deck.

8. **Steel Roof Deck** — (Unclassified) — Min 1-1/2 in. deep and 30 in. wide galv fluted steel deck. Flutes 6 in. OC with crest width ranging from 3-5/8 to 5-1/16 in. Min gauge is 22 MSG. Ends overlapped at supports min 1-1/2 in. and welded to supports at deck laps at a max of 12 in. OC between sides of units. Side laps of adjacent units welded, button-punched or secured together with No. 12 by 3/4 in. long self-drilling, self-tapping steel screws spaced a max of 36 in. OC or **Classified Steel Floor Form Units\*** — Non-composite, 1-1/2 or 3 in. deep galv units, min gauge is 22 MSG. Ends overlapped at supports min 1-1/2 in. and welded to supports at deck laps at a max of 12 in. OC between sides of units. Side laps of adjacent units welded, button-punched or secured together with No. 12 by 3/4 in. long self-drilling, self-tapping steel screws spaced a max of 36 in. OC.

**ASC STEEL DECK, DIV OF ASC PROFILES L L C** — Types BH-36, BHN-36, BHN-35-1/4, DGB-36, B-36, BN-36, BN-35-1/4, NH-32, NHN-32, DGN-32, N-32, and NN-32. All units may be galvanized or Prime Shield™. Non-cellular decks may be vented designated with a "V" suffix to the product name.

**CANAM GROUP INC** — Type P-3606, P-3615, P-2436, and P-2404 non-composite; 36 in. wide Types 1.5B, 1.5Bl.

**CANAM STEEL CORP** — Type P-3606, P-3615, P-2436, and P-2404, P-2403, and P-2438 non-composite.

**CANAM STEEL CORP** — Types B, N. Units may be phos./ptd or ptd/ptd.

**GOODER HENRICHSEN CO.** — Type B.

**MARLYN STEEL DECKS INC** — Types B, F, N, NV.

**NEW MILLENNIUM BUILDING SYSTEMS L L C** — Types B, BD, BI, F, FD, N, ND, NW32 and NW32I. . Units may be phos/painted or galvanized.

**VERCO DECKING INC - A NUCOR CO** — Deck types PLB, HSB, PLN3, HSN3, PLN, N; FORMLOK™ deck types PLB, B, PLN3, N3, PLN, N. Units may be galvanized or phos./ptd. Deck may be vented or non-vented.

**VULCRAFT, DIV OF NUCOR CORP** — Types 1.5B, 1.5BI, 1.5PLB, 1.5F, 3N, 3NI, 3.0PLN, 3NL-32, 3NI-32, 3PLN-32. Units may be ptd/ptd; Types BW, B High Strength, BW High Strength, N. Units may be ptd/ptd.

9. **Spray-Applied Fire Resistive Materials\*** — Applied by spraying with water to the final thicknesses shown below. Crest areas shall be filled with Spray-Applied Fire Resistive Materials above the beam. Beam surfaces must be clean and free of dirt, loose scale and oil. Min average density of 13 pcf with min. ind density of 11 pcf for Types II, II HS, or DC/F. Min avg and min ind densities of 22 and 19 pcf, respectively, for Type HP. For method of density determination, refer to Design Information Section, Sprayed Material. The protection material on steel deck shall cover screw tips by min 1/2 in.

**Protection Thkns In.**

Restrained Assembly Rating Hr	Un	Un	Min Insulation or Building Unit Core Thkns In.	Wallboard (Item No. 13) Required	Deck#	Beam	10K1 Joist more than 4 ft. OC	10K1 Joist 4 ft. OC or less
	restrained Assembly Rating Hr	restrained Beam Rating Hr						

1	1	1	1	Yes	1/2	7/16	7/8	3/4
1	1	1	2	Yes	1/2	7/16	7/8	3/4
1	1	1	0	Yes	5/8	7/16	7/8	3/4
1	1	1	3	No	13/16	7/16	7/8	3/4
1	1	1	2	No	15/16	7/16	7/8	3/4
1	1	1	1	No	1-1/4	7/16	7/8	3/4
1	1	1	0	No	2- 1/16	7/16	7/8	3/4
1-1/2	1	1	2	Yes	13/16	3/4	1-3/8	1- 1/8
1-1/2	1	1	1	Yes	7/8	3/4	1-3/8	1- 1/8
1-1/2	1	1	3	No	1-3/8	3/4	1-3/8	1- 1/8
1-1/2	1	1	2	No	1-3/4	3/4	1-3/8	1- 1/8
1-1/2	1-1/2	1-1/2	2	Yes	13/16	3/4	1-3/8	1- 1/8

1-1/2	1-1/2	1-1/2	1	Yes	7/8	3/4	1-3/8	1-1/8
1-1/2	1-1/2	1-1/2	0	Yes	1	3/4	1-3/8	1-1/8
1-1/2	1-1/2	1-1/2	3	No	1-3/8	3/4	1-3/8	1-1/8
1-1/2	1-1/2	1-1/2	2	No	1-3/4	3/4	1-3/8	1-1/8
1-1/2	1-1/2	1-1/2	0	No	2-5/8	3/4	1-3/8	1-1/8
2	1	1	2	Yes	1-3/16	1	1-5/8	1-3/8
2	1	1	1	Yes	1-3/8	1	1-5/8	1-3/8
2	1	1	3	No	2-1/8	1	1-5/8	1-3/8
2	1	1	2	No	2-5/16	1	1-5/8	1-3/8
2	2	2	2	Yes	1-3/16	1	1-11/16	1-9/16
2	2	2	1	Yes	1-3/8	1	1-11/16	1-9/16
2	2	2	0	Yes	1-9/16	1	1-11/16	1-9/16
2	2	2	3	No	2-1/8	1	1-11/16	1-9/16
2	2	2	2	No	2-5/16	1	1-11/16	1-9/16
2	2	2	0	No	3-1/4	1	1-11/16	1-9/16
3	2##	3	2	Yes	2-1/2	1-1/2	2-7/8	2-7/8

# The required minimum thickness of Spray-Applied Fire Resistive Materials on the steel deck is increased by 1/16 in. for 1-1/2 hr Unrestrained Assembly Rating and 1/4 in. for 2 hr Unrestrained Assembly Rating when Item 5A is used.

## The Unrestrained Assembly Rating is 3 Hr when minimum 1-1/2 in. deep, 22 MSG or thicker fluted deck with clear spans of not more than 6 ft 8 in. is used.

NR = No Rating

**ISOLATEK INTERNATIONAL** — Type D-C/F, HP, II, or II HS. Investigated for exterior use. Type EBS or Type X adhesive/sealer.

9A. **Spray-Applied Fire Resistive Material\*** — Prepared by mixing with water. Spray-applied in one or more coats to beam surfaces to a min final thickness as shown in the tables below. Beam surfaces must be clean and free of dirt, loose scale and oil. Crest areas of



deck above the beams shall be filled with Spray-Applied Fire Resistive Materials.. Min avg density of 44 pcf with min ind value of 40 pcf for Types M-II and TG. Min avg density of 47 pcf, with min individual value of 43 pcf for Type M-II/P. For method of density determination, see Design Information Section, Sprayed Material.

Restrained Assembly Rating Hr	Unrestrained Assembly Rating Hr	Unrestrained Beam Rating Hr	Min Insulation or Building Unit Core Thkns In.	Wallboard (Item No. 13) Required	Protection Thkns In.		
					Deck#	W6x16 Beam	10K1 Joist
1	1	1	1	Yes	9/16	1/2	3/4
1	1	1	2	Yes	9/16	1/2	3/4
1	1	1	0	Yes	11/16	1/2	3/4
1	1	1	3	No	13/16	1/2	3/4
1	1	1	2	No	15/16	1/2	3/4
1	1	1	1	No	1-1/4	1/2	3/4
1	1	1	0	No	2- 1/16	1/2	3/4
1-1/2	1	1	2	Yes	13/16	3/4	1-3/16
1-1/2	1	1	1	Yes	7/8	3/4	1-3/16
1-1/2	1	1	3	No	1-3/8	3/4	1-3/16
1-1/2	1	1	2	No	1-3/4	3/4	1-3/16
1-1/2	1-1/2	1-1/2	2	Yes	13/16	3/4	1-1/4
1-1/2	1-1/2	1-1/2	1	Yes	7/8	3/4	1-1/4
1-1/2	1-1/2	1-1/2	0	Yes	1	3/4	1-1/4
1-1/2	1-1/2	1-1/2	3	No	1-3/8	3/4	1-1/4
1-1/2	1-1/2	1-1/2	2	No	1-3/4	3/4	1-1/4
1-1/2	1-1/2	1-1/2	0	No	2-5/8	3/4	1-1/4
2	1	1	2	Yes	1- 3/16	1	1-5/8
2	1	1	1	Yes	1-3/8	1	1-5/8
2	1	1	3	No	2-1/8	1	1-5/8
2	1	1	2	No	2- 5/16	1	1-5/8
2	2	2	2	Yes	1- 3/16	1	1-11/16
2	2	2	1	Yes	1-3/8	1	1-11/16
2	2	2	0	Yes	1- 9/16	1	1-11/16

2	2	2	3	No	2-1/8	1	1-11/16
2	2	2	2	No	2-5/16	1	1-11/16
2	2	2	0	No	3-1/4	1	1-11/16
3	2##	3	2	Yes	2-1/2	1-1/2	2-7/8

# The required minimum thickness of Spray-Applied Fire Resistive Materials on the steel deck is increased by 1/16 in. for 1-1/2 hr Unrestrained Assembly Rating and 1/4 in. for 2 hr Unrestrained Assembly Rating when Item 5A is used.

## The Unrestrained Assembly Rating is 3 Hr when minimum 1-1/2 in. deep, 22 MSG or thicker fluted deck with clear spans of not more than 6 ft 8 in. is used.

NR = No Rating

**BERLIN CO LTD** — Types M-II, TG and M-II/P Investigated for exterior use.

**GREENTECH ASIA PACIFIC SDN BDH** — Types M-II or M-II/P, investigated for exterior use.

**GREENTECH THERMAL INSULATION PRODUCTS MFG CO L L C** — Types M-II, TG and M-II/P Investigated for exterior use.

**ISOLATEK INTERNATIONAL** — Types 800, M-II, TG, and M-II/P Investigated for exterior use.

**NEWKEM PRODUCTS CORP** — Types M-II, TG, and M-II/P Investigated for exterior use.

9B. **Sprayed Fiber Insulation\*** — (Optional, Not Shown) — Spray applied fiber insulation applied over Spray-Applied Fire Resistive Material (Item 9) on both steel floor and form units (Item 8) and supports (Item 1). Sprayed fiber insulation may be over Spray-Applied Fire Resistive Material (Item 9) according to the following tables:

**Allowable Spray-Applied Fiber Insulation Thickness Over Steel Deck**

Installed SFRM Thickness (in.) on Deck	SFRM Density (pcf)			
	13	22	44	47
1/2	8	8	8	8
5/8	8	8	8	8
13/16	8	8	8	8
7/8	8	8	8	8
15/16	8	8	8	8
1	8	8	8	8
1-3/16	7-11/16	8	8	8
1-1/4	7-7/16	8	8	8
1-3/8	6-15/16	8	8	8
1-9/16	6-1/4	8	8	8
1-3/4	5-9/16	8	8	8
2-1/16	4-7/16	7-7/16	8	8

2-1/8	4-3/16	7-1/16	8	8
2-1/8	4-3/16	7-1/16	8	8
2-5/16	3-1/2	5-7/8	8	8
2-1/2	2-13/16	4-11/16	8	8
2-5/8	2-5/16	3-15/16	7-7/8	8
3-1/4	0	0	0	0

**Allowable Spray-Applied Fiber Insulation Thickness Over Beam**

Installed SFRM Thickness (in.) on Beam	SFRM Density (pcf)			
	13	22	44	47
7/16	6-1/2	8	8	8
3/4	5-5/16	8	8	8
1	4-7/16	7-7/16	6-5/16	6-11/16
1-1/2	2-9/16	4-5/16	0	0

**Allowable Spray-Applied Fiber Insulation Thickness Over Joist**

Installed SFRM Thickness (in.) on Beam	SFRM Density (pcf)			
	13	22	44	47
3/4	8	8	8	8
7/8	8	8	8	8
1-1/8	8	8	8	8
1-3/8	8	8	8	8
1-9/16	7-7/8	8	8	8
1-11/16	7-7/16	8	8	8
2-7/8	3	5-1/8	0	0

**INTERNATIONAL CELLULOSE CORP** — Type K13, URE-K, or Sonospray FC

9C. **Sprayed Fiber Insulation\*** — (Optional, Not Shown) — Spray applied fiber insulation Classified for Noncombustible Building Materials (BICW), having a maximum applied density of 3.5 pcf, applied over Spray-Applied Fire Resistive Material (Item 9) on both steel floor and form units (Item 8) and supports (Item 1). Sprayed fiber insulation may be over Spray-Applied Fire Resistive Material (Item 9) according to the following tables:

**Allowable Spray-Applied Fiber Insulation Thickness Over Steel Deck**

Installed SFRM Thickness (in.) on Deck	SFRM Density (pcf)
--	--------------------

	13	22	44	47
1/2	5	5	5	5
5/8	5	5	5	5
13/16	5	5	5	5
7/8	5	5	5	5
15/16	5	5	5	5
1	5	5	5	5
1 3/16	5	5	5	5
1 1/4	5	5	5	5
1 3/8	5	5	5	5
1 9/16	5	5	5	5
1 3/4	5	5	5	5
2 1/16	5	5	5	5
2 1/8	5	5	5	5
2 1/8	5	5	5	5
2 5/16	4 7/16	5	5	5
2 1/2	3 11/16	5	5	5
2 5/8	3 1/4	5	5	5
3 1/4	15/16	1 9/16	3 1/8	3 3/8

### Allowable Spray-Applied Fiber Insulation Thickness Over Beam

Installed SFRM Thickness (in.) on Beam	SFRM Density (pcf)			
	13	22	44	47
7/16	5	5	5	5
3/4	5	5	5	5
1	4 7/8	5	5	5
1 1/2	3	5	0	0

### Allowable Spray-Applied Fiber Insulation Thickness Over Joist

Installed SFRM Thickness (in.) on Beam	SFRM Density (pcf)			
	<b>13</b>	<b>22</b>	<b>44</b>	<b>47</b>
3/4	5	5	5	5

7/8	5	5	5	5
1 1/8	5	5	5	5
1 3/8	5	5	5	5
1 9/16	5	5	5	5
1 11/16	5	5	5	5
2 7/8	3	5	0	0

**THERMACOUSTICS IND** — Type TC-417

10. **Glass Fiber Mesh** — (Optional) — May be used to facilitate the spray application of the protection material to the steel bar joists. Min 3/32 in. sq. mesh, coated fiberglass scrim fabric, weighing a min of 1.9 oz. per sq. yd. or, polypropylene fabric mesh, weighing approximately 1.25 oz. per sq. yd. or equivalent may be used to facilitate spray application. The mesh shall be attached to one side of each joist web member. The method of attachment must be sufficient to hold the mesh and fire protection material during application and curing of the material. Suitable methods of attachment include hairpins, 18 SWG galv. steel tie wire or hot melted glue. Hairpin clips are nom 1-1/4 in. long by 1/2 in. wide made of 0.064 in. diam. steel wire. Hairpin clips or tie wire located near top and bottom and at intermediate points along each web member to firmly secure the fabric to the joist.

11. **Metal Lath** — (Optional) — As an alternate to Item 10 — Metal lath used to facilitate the spray application of the Spray-Applied Fire Resistive Material to the steel joists. Diamond mesh, 3/8 in. expanded steel, min 1.7 lb/sq yd fastened to one side of joists using No. 18 SWG steel wire, located at mid-height of every other member or 18 in. OC whichever is less. Both sides of lath must be completely coated with Spray-Applied Fire Resistive Material, but with no min thickness requirements.

12. **Bridging** — (Not shown) — Min 1-1/4 by 1-1/4 by 1/8 in. thick steel angles welded to top and bottom chords of each joist. Number and spacing of bridging angles per Steel Joist Institute specification. Bridging coated with the same thickness of Spray-Applied Fire Resistive Materials (Item 9) as the joist.

13. **Gypsum Board** — (Not shown — Classified or Unclassified) — May be used to obtain various Restrained and Unrestrained Assembly Ratings as described in (Item 9). Supplied in sheets nom 2 by 4 ft to 4 by 12 ft, by nom 5/8 in. thick. Min weight 2.2 psf. Applied perpendicular to steel roof deck direction with adhesive (Item 5), hot asphalt (Item 6) or laid loosely. End joints to occur over crests of steel roof and to be staggered 2 ft in adjacent rows.

**AMERICAN GYPSUM CO** ([View Classification](#)) — CKNX.R14196

**BEIJING NEW BUILDING MATERIALS PUBLIC LTD CO** ([View Classification](#)) — CKNX.R19374

**CABOT MANUFACTURING ULC** ([View Classification](#)) — CKNX.R25370

**CERTAINTED GYPSUM INC** ([View Classification](#)) — CKNX.R3660

**CGC INC** ([View Classification](#)) — CKNX.R19751

**CERTAINTED GYPSUM INC** ([View Classification](#)) — CKNX.R18482

**GEORGIA-PACIFIC GYPSUM L L C** ([View Classification](#)) — CKNX.R2717

**LOADMASTER SYSTEMS INC** ([View Classification](#)) — CKNX.R11809

**NATIONAL GYPSUM CO** ([View Classification](#)) — CKNX.R3501

**PABCO BUILDING PRODUCTS L L C, DBA PABCO GYPSUM** ([View Classification](#)) — CKNX.R7094

**PANEL REY S A** ([View Classification](#)) — CKNX.R21796

**SIAM GYPSUM INDUSTRY (SARABURI) CO LTD** ([View Classification](#)) — CKNX.R19262

**THAI GYPSUM PRODUCTS PCL** ([View Classification](#)) — CKNX.R27517

**UNITED STATES GYPSUM CO** ([View Classification](#)) — CKNX.R1319

**USG BORAL DRYWALL SFZ LLC** ([View Classification](#)) — CKNX.R38438

**USG MEXICO S A DE C V** ([View Classification](#)) — CKNX.R16089

14. **Building Units\*** — (Optional — Not shown) — Nominal 18 by 24 in. flat or tapered cellular glass blocks or 24 by 48 in. flat or tapered cellular glass boards, applied over the roof insulation (Item 3 or 3A) with asphalt (or coal tar pitch). Joints to be offset from joints of roof insulation.

**PITTSBURGH CORNING LLC** — FOAMGLAS® T3+ Block, FOAMGLAS® T4+ Block, FOAMGLAS® S3 Block, FOAMGLAS® F Block

15. **Metal Lath** — (For use on steel roof deck with Item 9A) 3/8 in. diamond mesh, min 2.5 lbs per sq yd painted or galv expanded steel. Fastened to steel roof deck with ribs (if any) facing down using. No. 8 by 1/2 in. wafer head self-drilling, self-tapping, coated steel screws spaced max 15 in OC in both directions for 1 and 1-1/2 hr ratings. Spaced a max 12 in. OC in both directions for 2 hr ratings. Lath edges overlapped approx 3 in.

16. **Adhesive\*** — (Not Shown) — Applied to steel roof deck in accordance with manufacturer's instructions.

**ISOLATEK INTERNATIONAL** — Type EBS or Type X.

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

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