

BXUV.P719

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. P719

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

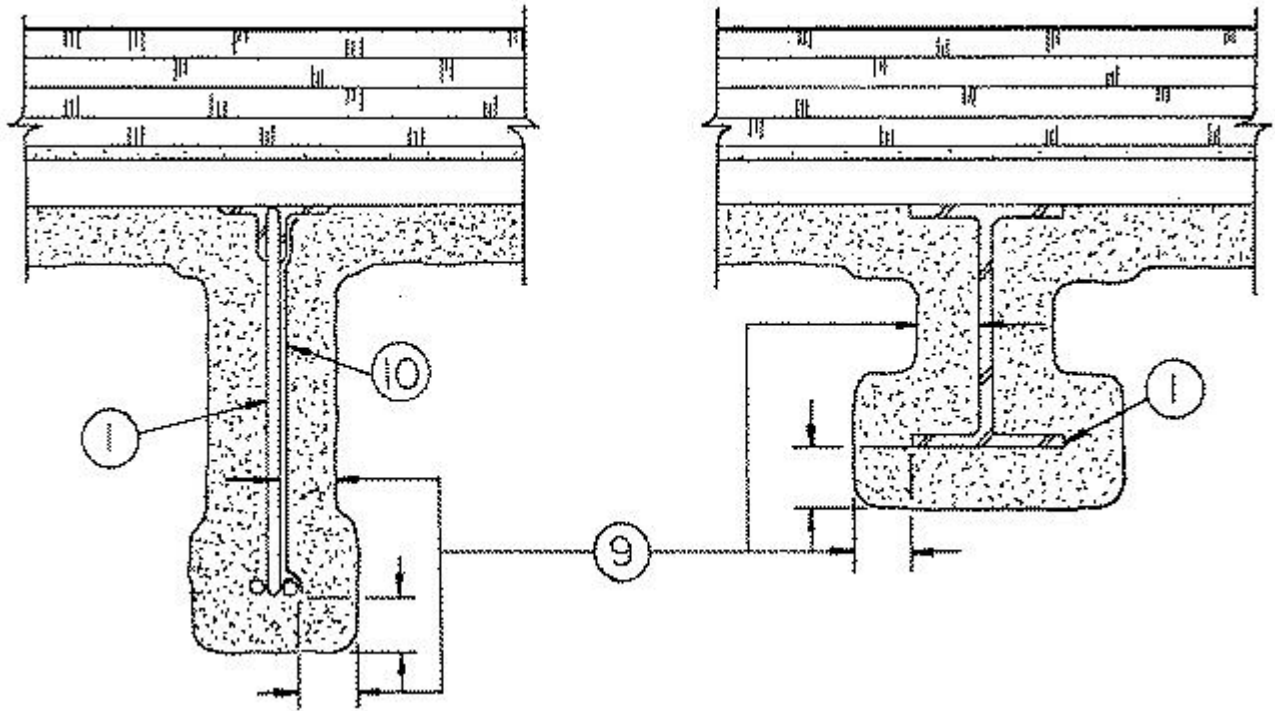
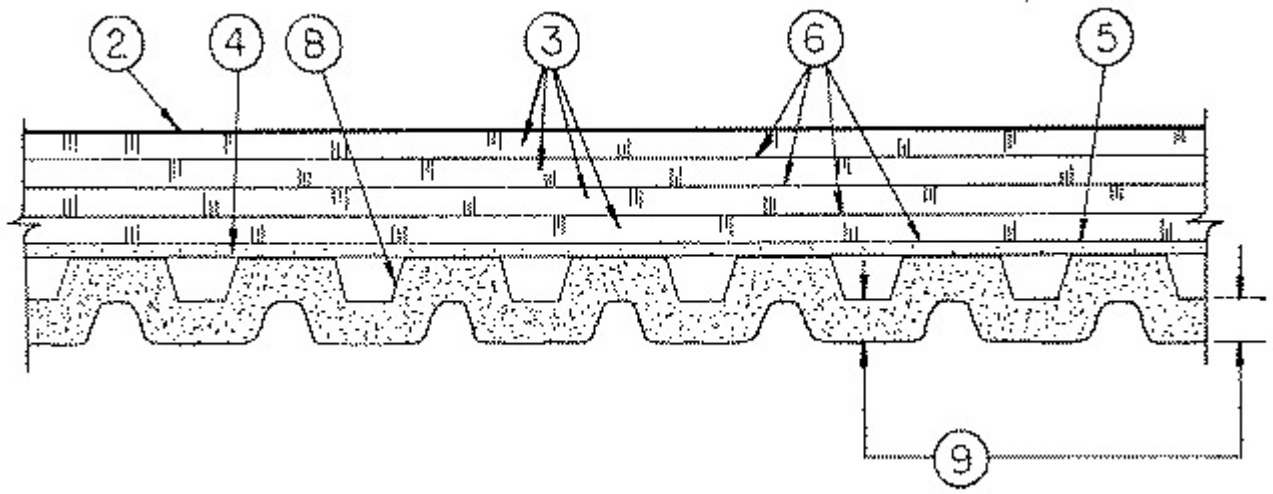
Unrestrained Assembly Rating — 1, 1-1/2 or 2 Hr. (See Items 3 through 3G and 9)

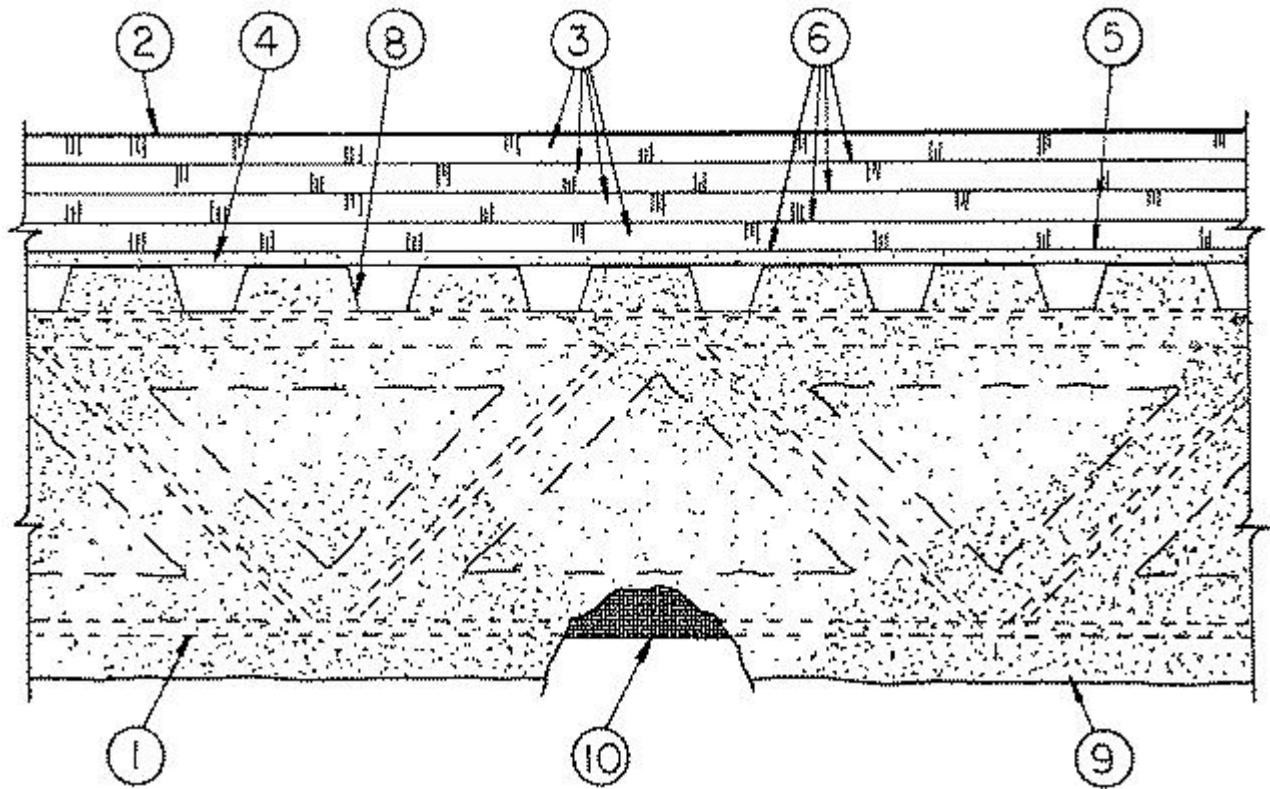
Unrestrained Beam Rating — 1, 1-1/2, 2 or 3 Hr. (See Items 3 through 3G and 9)

Restricted Load Condition — See Item 9

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. **Steel Supports** — W6x16 steel beam min size, 10 K1, min. size steel joist. As alternate to steel beam or steel joist, **joist girders** (Not Shown) — 20 in. min depth and 13 lb/lin ft min weight.

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 Membranes*** — that is either ballasted, adhered or mechanically attached as permitted under the respective manufacturer's Classification.
See **Roofing Membranes** (CHCI) category for names of manufacturers.

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 over the gypsum wallboard (Item 4) in one or more layers. Min thickness is as outlined in Item 9. (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", "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 TherमारooF-3, Tapered TherमारooF FA-3, Tapered Ultra-Max

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

SIPLAST INC — Paratherm G

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-Mineral and Fiber Boards* — (Not Shown) — As an alternate to Item 3 for the 1, 1-1/2 and 2 hr assembly ratings. Min 1 in. thick for the 1 and 1-1/2 hr assembly ratings and 2 in. thick for the 2 hr assembly ratings. No limit on max overall thickness. To be applied in one or more layers over the gypsum wallboard (Item 4) with adhesive (Item 6) between layers of insulation and to vapor retarder (or gypsum wallboard if vapor retarder is not used). As an alternate, the first layer of insulation may be attached through the wallboard to the roof deck with self-drilling, self-tapping steel screws pierced through 3-1/4 in. hexagonal steel plates spaced min 15 in. OC. The min cover of Spray-Applied Fire Resistive Materials to the end of the screw shall be 1/2 in. The second layer of insulation may be secured to the first layer with 30 lb. of hot mopping asphalt per 100 sq ft. Each layer of board to be offset in both directions from layer below a min of 6 in. Between layers of roof insulation, a secondary membrane consisting of Type G1 or G2 mats or Type 15 felt may be used. Secondary membrane secured in place with 25 lb. of hot mopping asphalt per 100 sq ft. Joints between insulation and sheathing shall be staggered.

JOHNS MANVILLE

3B. Building Units* — As an alternate to Items 3 and 3A, 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 outlined in Item 9. No limit on max overall thickness. Boards to be installed over gypsum wallboard 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"

JOHNS MANVILLE — Nailboard

SOPREMA INC — Sopra-ISO CV s

3C. **Roof Insulation — Foamed Plastic*** — (Not Shown) — As an alternate to Items 3 through 3B, polystyrene formed plastic insulation boards, applied in one or more layers over gypsum wallboard. Min. thickness is 1.0 in. with no max overall thickness max density 2.5 pcf. 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. Boards secured to gypsum wallboard (Item 4) with asphalt glaze coat or adhesive (Item 6). Adhesive and/or asphalt glazer coat may be omitted when Item 2A.

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

3D. **Roof Insulation — Foamed Plastic*** — As an alternate to Items 3 through 3C, 36 by 48 in. (min size) polyisocyanurate foamed plastic insulation boards applied over the gypsum wallboard (Item 4) in one or more layers. Min thickness is 3.0 in. with no limit on max overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows. When applied in more than one layer, each layer to be offset in both directions from layer below a min of 6 in. in order to lap all joints.

RMAX, A BUSINESS UNIT OF SIKA CORPORATION

3E. **Building Units*** — As an alternate to Items 3 through 3D, polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in. faced on the underside with mineral and fiber boards. Min thickness of the polyisocyanurate core is as outlined in Item 9. No limit to 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

3F. **Building Units*** — As an alternate to Items 3 through 3E, polyisocyanurate foamed plastic insulation boards faced on the underside with wood fiber board. Min thickness of the polyisocyanurate core is as outlined in Item 9. 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+ Wood Fiberboard Composite"

JOHNS MANVILLE — ENRGY-2 Plus

3G. **Building Units*** — Not Shown — As an alternate to Items 3 through 3F, 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 building units are applied over gypsum wallboard (Item 4). The thickness of the panel depends upon the thinnest portion of the polyisocyanurate insulation. The following dimensions apply to the polyisocyanurate insulation, min is as outlined in Item 9. There is no limit on the max insulation thickness.

JOHNS MANVILLE — Type ISO-VENT

3H. **Building Units*** — As an alternate to Items 3 through 3G, polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96., faced on the top surface with gypsum board. Min thickness of the polyisocyanurate core is as outlined in Item 9. No limit on overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows.

JOHNS MANVILLE — ENRGY 2 Gypsum Composite.

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

3Ia. **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"

3Ib. **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"

3Ic. **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

3Id. **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

3J. **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 wood fiber board. Min. thickness of the polyisocyanurate core is as outlined in Item 9. No limit on max overall thickness. Boards to be installed over gypsum wallboard 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

3K. **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 perlite composite board. Min. thickness of the polyisocyanurate core is as outlined in Item 9. No limit on max overall thickness. Boards to be installed over gypsum wallboard 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

3L. **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 glass mat faced gypsum panel. Min. thickness of the polyisocyanurate core is as outlined in Item 9. No limit on max overall thickness. Boards to be installed over gypsum wallboard 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

3M. **Foamed Plastic*** — As an alternate to Items 3 through 3H - Polyurethane foamed plastic roof insulation. Formed by the simultaneous spraying of two liquid components applied over the gypsum wallboard (Item 4) in accordance with the manufacturer's instructions. Min thickness as outlined in Item 9. 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

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

4. **Gypsum Board** — (Classified or unclassified) — Supplied in sheets from 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 6), hot asphalt (Item 6A) or laid loosely. End joints to occur over crests of steel roof and to be staggered 2 ft in adjacent rows.

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

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

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

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

5. **Vapor Retarder-Sheathing Material*** — (Optional) — Vinyl film or paper scrim vapor barrier, applied to steel roof deck with adhesive (Item 6), asphalt (Item 6A) or laid loosely, overlapped approximately 2 in. on adjacent sheets. See **Sheathing Material** (CHIZ) category for names of manufacturers.

6. **Adhesive*** — (Optional) — May be applied between crests of steel roof deck and gypsum wallboard, between gypsum wallboard and vapor retarder, between vapor retarder and first layer of insulation, and between layers of insulation. Applied in 1/2 in. wide ribbons 6 in. OC at 0.4 gal/100 sq ft. See **Adhesives** (BYWR) category for names of manufacturers.

6A. **Asphalt or Coal Tar Pitch*** — (Optional — Not Shown) — In lieu of Item 6, 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.

6B. **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/ft². 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

7. **Mechanical Fasteners** — (Optional — Not Shown) — Mechanical screw-type fastener with metal 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 or 36 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 and 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. **Classified Steel Floor and Form Units** — 1-1/2, 2 or 3 in. deep, 24 - 36 in. wide 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, 2WH-36, 2WHS-36, 3WXH-36, 3WH-36. 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 — Types P-3606, P-3615, P-2436, and P-2404 noncomposite; 36 in. wide Types 1.5B, 1.5BI

CANAM STEEL CORP — Types P-3606, P-3615, P-2436, P-2404, P-2403, and P-2438 noncomposite

CANAM STEEL CORP — Types BS, F, NS, NI. Units may be phos/ptd or ptd/ptd

DECK WEST INC — 24 in. wide Type NDW or 36 in. wide Types B-DW and 2-DW

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

STEEL MASTERS INTERNATIONAL DEPENDABLE STEEL — 36 in. wide Types 2WH-36, 3WH-36. 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 — Galv or ptd/ptd Types 1.5B, 1.5BI, 1.5PLB, 1.5F, 3N, 3NI, 3.0PLN, 3NL-32, 3NI-32, 3PLN-32; Types BW, B High Strength, BW High Strength, N. Types BW and N may be ptd/ptd.

9. **Spray-Applied Fire Resistive Materials*** — Applied by mixing with water and spraying in one or more coats to the thicknesses shown below, to steel surfaces which are clean and free of dirt, loose scale, and oil. Min average and min individual density of 15 and 14 pcf, respectively, for Types 300, 300AC, 300ES, 300HS, 300N, 3000, 3000ES and SB. For Types 400AC and 400ES min average and min individual density of 22 and 19 pcf, respectively. 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. Spray-Applied Fire Resistive Materials on steel deck shall cover screw tips by 1/2 in. min. Use of adhesive (Item 12) is required.

The min thickness of Spray-Applied Fire Resistive Materials required for various fire resistance ratings are shown in the table below:

			Min Insulation		
Restrained	Unrestrained	Unrestrained	or Building	Protection Thkns In.	

Assembly Rating Hr	Assembly Rating Hr	Beam Rating Hr	Unit Core Thkns In.**	Deck	Beam	Joist (a)	Joist (b)
1	1	1	0	1/2	7/16	3/4	3/4
1-1/2	1-1/2	1-1/2	0	13/16	9/16	15/16	1-3/16
1-1/2	1-1/2	1-1/2	1	3/4	9/16	15/16	1-3/16
2	2	2	0	1-1/8	13/16	1-3/16	1-3/16
2	2	2	1	1-1/16	13/16	1-3/16	1-3/16
2	2	2	2	15/16	13/16	1-3/16	1-3/16
3	2	3	1	1-11/16	1-1/4	1-5/8	1-5/8
3	2	3	2	1-1/2	1-1/4	1-5/8	1-5/8

** Refers to Item Nos. 3, 3B, 3E, 3F, 3G, and 3H. For Item Nos. 3A, 3C, 3D or 3K, refer to individual description for min thickness.

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 6B is used.

(a) Metal lath (Item 10A) or nonmetallic fabric mesh (Item 10) secured to one side of joist. Spray-Applied Fire Resistive Materials thickness applied to each side of lath or mesh shall be equal to thickness required on steel joist.

(b) Spray-Applied Fire Resistive Materials directly applied to joist contours. As an alternate, metal lath (Item 10A) or nonmetallic mesh (Item 10) secured to one side of joist to catch overspray when spraying following joist contours. Metal lath to be fully covered with Spray-Applied Fire Resistive Materials but with no min thickness requirements.

BERLIN CO LTD — Types 300, 300ES, 300N, SB, M-II, TG and M-II/P

GREENTECH ASIA PACIFIC SDN BDH — Types 300, 300ES, 300HS, M-II, or M-II/P

GREENTECH THERMAL INSULATION PRODUCTS MFG CO L L C — Types 300, 300AC, 400AC, M-II, TG and M-II/P

ISOLATEK INTERNATIONAL — Types 300, 300AC, 300ES, 300HS, 300N, SB, 400AC, 400ES, 3000, 3000ES, M-II, TG and M-II/P

NEWKEM PRODUCTS CORP — Types 300, 300ES, 300N, SB, M-II, TG and M-II/P

9A. (As an alternate to Item 9) **Spray-Applied Fire Resistive Materials*** — Applied by mixing with water and spraying in one or more coats to the thicknesses shown below, to steel surfaces which are clean and free of dirt, loose scale, and oil. Min average and min individual density of 17.5 and 16 pcf, respectively, for Type 300TW. Min average and min individual density of 22 and 19 pcf, respectively, for Type 400. For method of density determination, see Design Information Section, Sprayed Material. Spray-Applied Fire Resistive Materials on steel deck shall cover screw tips by 1/2 in. min. Use of adhesive (Item 12) is required.

The min thickness of Spray-Applied Fire Resistive Materials required for various fire resistance ratings are shown in the table below:

Restrained Assembly Rating Hr	Unrestrained Assembly Rating Hr	Unrestrained Beam Rating Hr	Min Insulation or Building Unit Core Thkns In.**	Protection Thkns In.			
				Deck	Beam	Joist (a)	Joist (b)
1	1	1	0	1/2	7/16	3/4	3/4
1-1/2	1-1/2	1-1/2	0	13/16	9/16	15/16	1-3/16
1-1/2	1-1/2	1-1/2	1	3/4	9/16	15/16	1-3/16

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

** Refers to Item Nos. 3, 3B, 3E, 3F, 3G, and 3H. For Item Nos. 3A, 3C, or 3D, refer to individual description for min thickness.

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 6B is used.

(a) Metal lath (Item 10A) or nonmetallic fabric mesh (Item 10) secured to one side of joist. Spray-Applied Fire Resistive Materials thickness applied to each side of lath or mesh shall be equal to thickness required on steel joist.

(b) Spray-Applied Fire Resistive Materials directly applied to joist contours. As an alternate, metal lath (Item 10A) or nonmetallic mesh (Item 10) secured to one side of joist to catch overspray when spraying following joist contours. Metal lath to be fully covered with Spray-Applied Fire Resistive Materials but with no min thickness requirements.

GREENTECH ASIA PACIFIC SDN BDH — Type 400

GREENTECH THERMAL INSULATION PRODUCTS MFG CO L L C — Type 400

ISOLATEK INTERNATIONAL — Type 300TW, Type 400

NEWKEM PRODUCTS CORP — Type 400

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)				
	15	17.5	22	44	47
1/2	8	8	8	8	8
3/4	8	8	8	8	8
13/16	8	8	8	8	8
15/16	8	8	8	8	8
1-1/16	7-3/4	8	8	8	8
1-1/8	7-1/2	8	8	8	8
1-1/2	5-7/8	6-7/8	8	8	8
1-11/16	5-1/16	5-15/16	7-7/16	8	8

Allowable Spray-Applied Fiber Insulation Thickness Over Beam

Installed SFRM Thickness (in.) on Deck	SFRM Density (pcf)				
	15	17.5	22	44	47

	15	17.5	22	44	47
7/16	3-3/4	4-3/8	5-1/2	8	8
9/16	3-3/16	3-3/4	4-11/16	8	8
13/16	2-1/8	2-1/2	3-1/8	8	8
1-1/4	1/4	5/16	3/8	3-1/8	3-3/8

Allowable Spray-Applied Fiber Insulation Thickness Over Joist

Installed SFRM Thickness (in.) on Deck	SFRM Density (pcf)				
	15	17.5	22	44	47
3/4	8	8	8	8	8
15/16	8	8	8	8	8
1	8	8	8	8	8
1-3/16	7-1/4	8	8	8	8
1-5/8	5-3/8	6-1/4	7-7/8	8	8

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

9d. **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)				
	15	17.5	22	44	47
1/2	5	5	5	5	5
3/4	5	5	5	5	5
13/16	5	5	5	5	5
15/16	5	5	5	5	5
1 1/16	5	5	5	5	5
1 1/8	5	5	5	5	5
1 1/2	5	5	5	5	5
1 11/16	5	5	5	5	5

Allowable Spray-Applied Fiber Insulation Thickness Over Beam

Installed SFRM Thickness (in.) on Deck	SFRM Density (pcf)				
	15	17.5	22	44	47
7/16	5	5	5	5	5
9/16	5	5	5	5	5
13/16	4 9/16	5	5	5	5
1 1/4	2 11/16	3 1/8	3 15/16	5	5

Allowable Spray-Applied Fiber Insulation Thickness Over Joist

Installed SFRM Thickness (in.) on Deck	SFRM Density (pcf)				
	15	17.5	22	44	47
3/4	5	5	5	5	5
15/16	5	5	5	5	5
1	5	5	5	5	5
1 3/16	4 9/16	5	5	5	5
1 5/8	2 11/16	3 1/8	3 15/16	5	5

THERMACOUSTICS IND — Type TC-417

10. **Glass Fiber Mesh** — (Optional) — Min 3/32 in. sq mesh, coated fiberglass scrim fabric, weighing a min of 1.9 oz/sq yd 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. An acceptable method of attaching the mesh is by embedding the mesh in min 1/4 in. long beads of hot melted glue.

The beads of glue shall be spaced min 12 in. OC along the top chord of the bar joists. Another method of attachment is the use of 1-1/4 in. long, 1/2 in. wide hairpin clips formed from 0.064 in. diam steel wire, alternating from top to bottom of the joist web member.

10A. **Metal Lath** — (Optional — Not Shown) — In lieu of Item 10, diamond mesh, 3/8 in. expanded steel, min 1.7 lb/sq yd fastened to one side of joists using No. 18 SWG steel tie wire, located at the midheight of every other web member or 18 in. OC whichever is less. Both sides of lath must be completely coated with Spray-Applied Fire Resistive Materials.

10B. **Metal Lath** — (For use on steel roof deck with Types M-II, TG, and M-II/P Spray Applied Fire Resistive Material) - 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.

11. **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 as the joist(s) — See Item 9.

12. **Adhesive*** — 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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