

Design No. P719

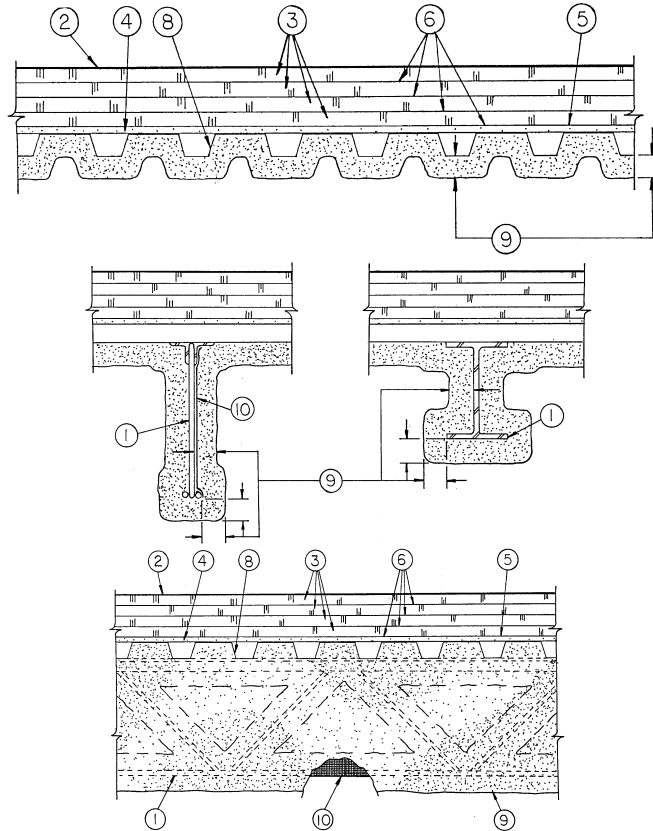
Restrained Assembly Rating — 1, 1-1/2, 2 or 3 Hr.(See Items 3 through 3G and 9)

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

Load Restricted for Canadian Applications — See Guide BXUV7



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, ACFoam III, ACFoam-II SL, ACFoam IV.
 - CARLISLE SYNTEC INCORPORATED —Types HP, HP-H, HP-N, HP-W.
 - 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+ GW", "ISO 300", "ISO 95+ CAN", "ISO 95+ HD Composite Board" or "RESISTA".
 - GAF MATERIALS CORP —EnergyGuard RH, Tapered EnergyGuard RH, EnergyGuard™, Isotherm R.
 - GENFLEX ROOFING SYSTEMS L L C — "GenFlex ISO"
 - HUNTER PANELS —H Shield.
 - JOHNS MANVILLE —ENRGY 3 25 PSI
 - LOADMASTER SYSTEMS INC —Loadmaster Polyisocyanurate Insulation.
 - RMAX OPERATING L L C —Multi-Max-3, Multi-Max FA-3, Ultra-Max, Ultra-Max Plus, Tapered Ultra-Max Plus, Tapered Thermo-3, Tapered Thermo-3 FA-3, Tapered Ultra-Max.
 - SIKA SARNAFIL INC —Sarnatherm r, Sarnatherm r Ultra, Sarnatherm r Tapered, Sarnatherm r Ultra Tapered.
 - SOPREMA INC —Colgrip,SOPRA-ISO s, SOPRA-ISO s Tapered, SOPRA-ISO PLUS s, SOPRA-ISO PLUS s Tapered, SOPRA-ISO H PLUS s and SOPRA-ISO H PLUS s Tapered.
- 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 NailBase Insulation, Vented-R, CrossVent

FIRESTONE BUILDING PRODUCTS CO L L C —Hailgard

GENFLEX ROOFING SYSTEMS L L C — NB1, NB3, NB4

JOHNS MANVILLE —Nailboard

SOPREMA INC —SOPRA-ISO B 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 glaze coat may be omitted when Item 2A. See Foamed Plastic (BRYX) category in the Building Materials Directory or Foamed Plastic (CCVV) 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 OPERATING L L C

- 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” .

GENFLEX ROOFING SYSTEMS L L C — Isofiber 1

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) - 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”

- 3J. **Foamed Plastic*** — As an alternate to Items 3 through 3I - 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 FE 303 2.7, FE-348, FE348-2.5, FE348-2.7, FE348-2.8, FE348-3.0, ELASTOSPRAY 81255, ELASTOSPRAY 81275, ELASTOSPRAY 81285 or ELASTOSPRAY 81305.

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. See **Gypsum Board** (CKNX) category for names of manufacturers.

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 INCORPORATED — 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 or painted fluted steel deck. When unclassified painted roof deck is used, the use of Item 9A, Metal Lath, is required. 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, 30 or 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

2013 FIRE RESISTANCE DIRECTORY - ISOLATEK

INC —24 through 36 in. wide, Types DGB Hi-Form, B Hi-Form, DGB, B, DGN Hi-Form, N Hi-Form, DGN, N, DG2W Hi-Form, DG2W, 2W, DG3W Hi-Form, 3W Hi-Form, DG3W, and 3W. All units may be galvanized or Prime Shield™.
 CANAM STEEL CORP — Type 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.
 CONSOLIDATED SYSTEMS INC —Types B, BI, F, N, NI. Units may be phos/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 —Type B, BI, F, N. Units may be phos/painted or galvanized.
 VERCOR DECKING INC - A NUCOR CO — Types PLB, B, PLN, N, PLW2 or W2 Fromlok. Units may be phos/ptd. Types PLB, HSB, PLN or N. Units may be ptd/ptd.
 VULCRAFT, DIV OF NUCOR CORP —Galv or ptd/ptd Types 1.5B, 1.5BI, 1.5F, 3N, 3NI.

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 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.**	Deck	Protection Thkns In.		
					Beam	Joist (a)	Joist (b)
1	1	1	0	1/2	7/16	1 (3/4*)	1 (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

*The 3/4 in. thickness may be used when the joist is limited to a maximum tensile stress of 26,000 psi.
 ** 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.

BERLIN CO LTD — Types 300, 300ES, 300N or SB.
 ISOLATEK INTERNATIONAL —Types 300, 300AC, 300ES, 300HS, 300N or SB.
 LUCKY CORE INSULATING MATERIALS
 MANUFACTURING L L C —Types 300, 300ES, 300N, or SB.
 NEWKEM PRODUCTS CORP —Types 300, 300ES, 300N or SB.

- 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.**	Deck	Protection Thkns In.		
					Beam	Joist (a)	Joist (b)
1	1	1	0	1/2	7/16	1 (3/4*)	1 (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

*The 3/4 in. thickness may be used when the joist is limited to a maximum tensile stress of 26,000 psi.
 ** 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.

ISOLATEK INTERNATIONAL —Types 300TW, Type 400.
 LUCKY CORE INSULATING MATERIALS
 MANUFACTURING L L C —Type 400.
 NEWKEM PRODUCTS CORP —Type 400.

- 9B. **Metal Lath** — Not Shown — Required on unclassified painted steel roof deck. Rib lath, galv or painted, min 2.5 lb/sq yd, with ribs facing down, fastened to deck using No. 8 by 1/2 in. wafer head self-drilling, self-tapping coated steel screws spaced max 15 in. OC in both directions with lath edges overlapped approx 3 in.
 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.

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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
- *Bearing the UL Classification Mark