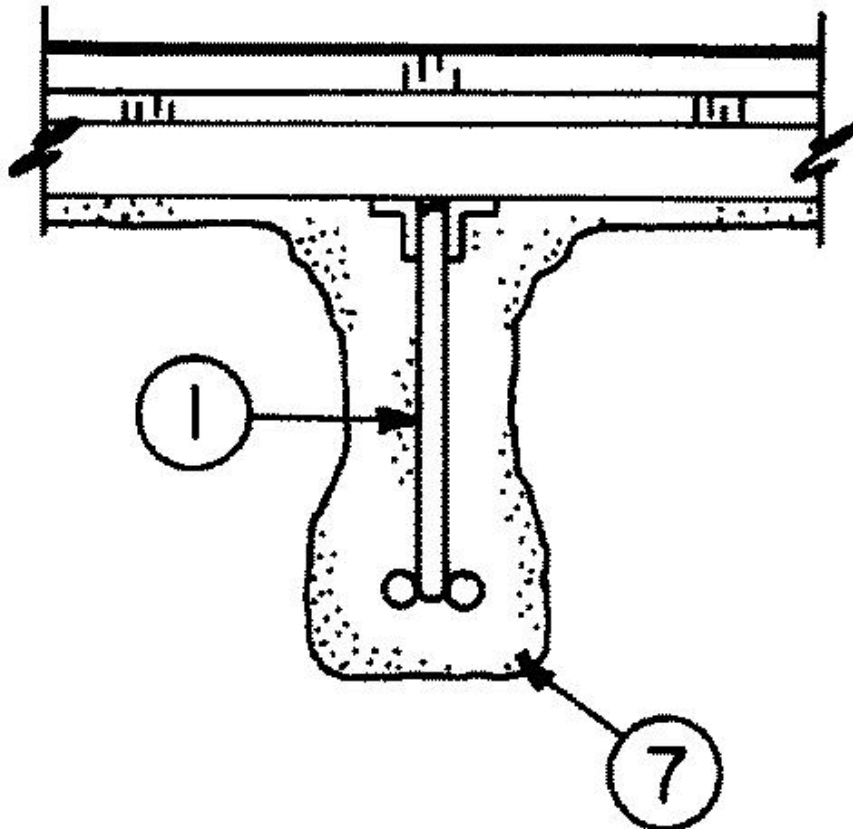
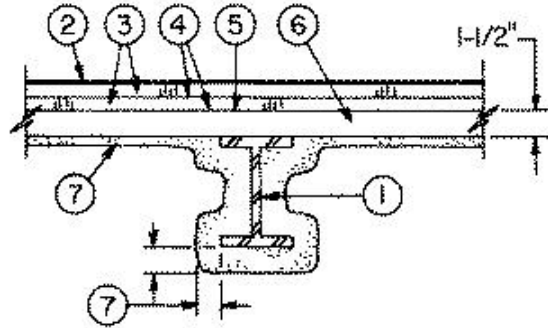
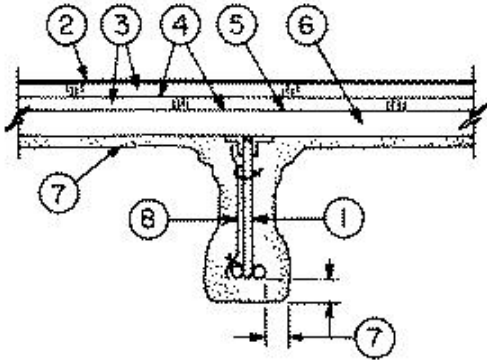
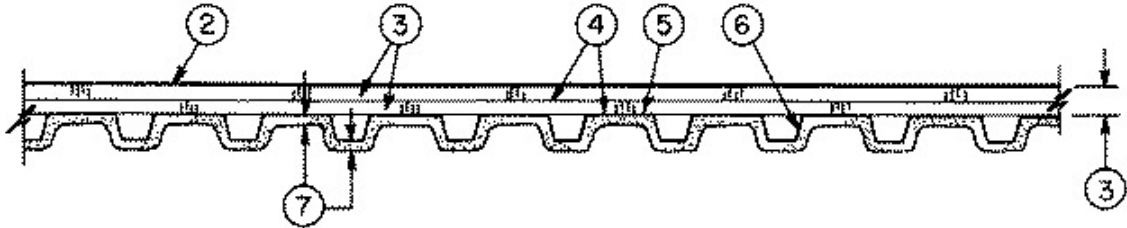


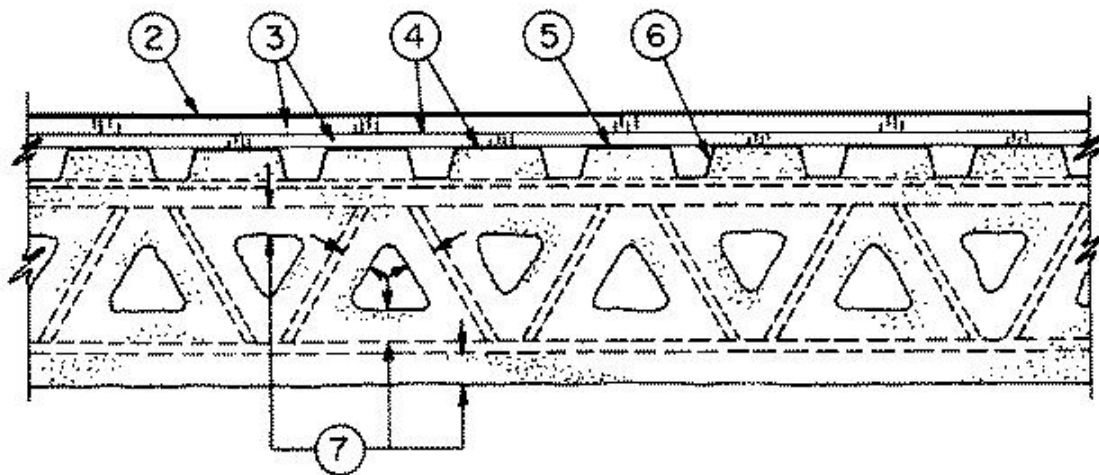
Design No. P711
September 26, 2003

Restrained Assembly Ratings — 1, 1-1/2 or 2 Hr. (See Items 3, 7 and 8A)

Unrestrained Assembly Ratings — 1, 1-1/2 or 2 Hr. (See Items 3, 7 and 8A)

Unrestrained Beam Rating — 1, 1-1/2 or 2 Hr. (See Items 7 and 8A)





1. **Beam** — W6x16 min size. As alternate to steel beams, Joist girders — (Not shown)— 20 in. min depth and 13 lb per lin ft min weight.

1A. **Steel Joists** — Types 10J4, 10H4, 12J4, 14J7 or 14K4 min size.

NOTE: Design load shall stress 10H4 joist to a max tensile stress of 22 KSI.

2. **Roof Covering*** — Consisting of hot mopped or cold application materials compatible with insulation(s) described herein which provide Class A, B or C coverings. See Roofing Materials and Systems Directory-Roof Covering Materials(TEVT).

2A. **In lieu of Item 2, roof covering consisting of single-ply Roofing Membrane*** — that is either ballasted, adhered or mechanically attached as permitted under the respective manufacturer's Classification. See Fire Resistance Directory-Roofing Membranes (CHCI).

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** — May consist of the following:

A. **Mineral and Fiber Boards*** — Min thickness 3/4 in. for the 1 and 1-1/2 hr. assembly ratings and 1-3/4 in. for the 2 hr. assembly rating. Min thickness is 1-3/4 in. when Item 2A or 2B are used. Min thickness is 3/4 in. otherwise. Max thickness 4-7/8 in. To be applied in two or more layers with adhesive applied between layers of boards and to vapor retarder or roof deck if vapor retarder is not used. As an alternate, the first layer of insulation may be attached to the roof deck by self drilling, self tapping steel screws pierced through 3-1/4 in. hexagonal steel plates spaced min. 15 in. O.C. 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. A secondary membrane consisting of Type G1 or G2 mats or Type 15 felt may be used between layers of roof insulation. Secondary membrane secured in place with 25 lb. of hot mopping asphalt per 100 sq ft. Insulation may be installed in a single layer if the Restrained and Unrestrained Assembly Ratings are limited to 1 hr or if a 5/8 in. thick layer of gypsum sheathing is placed on the steel roof deck units. Joints between insulation and sheathing shall be staggered.

FIBREX INSULATIONS INC — FBX Baseboard and FBX Capboard.

OWENS CORNING HT INC, DIV OF OWENS CORNING

ROXUL INC — Toprock.

SIPLAST INC

B. Gypsum Board — (Classified or Unclassified, not shown) — 5/8 in. thick gypsum wallboard, min weight 2.0 psf, may be used with the above insulation to obtain various Unrestrained and Restrained Assembly Ratings as described in Item 7. Installed perpendicular to the steel roof deck with joints staggered and occurring over the crests of the roof deck. Secured to the roof deck with adhesive (Item 4) or with asphalt applied to a min of 50 percent of the crest surface at a rate of 12 to 15 lbs per 100 sq ft or with mechanical fasteners. If mechanical fasteners are used, the end of the fastener shall be covered with a min 1/2 in. of Spray-Applied Fire Resistive Materials.

4. Adhesive* — Optional — Adhesive may be used to attach each layer of roof insulation. The adhesive may be applied in 1/2 in. wide ribbons approx. 6 in. OC at 0.4 gal/100 sq ft. In lieu of adhesive, the first layer of roof insulation may be secured with asphalt applied to a min of 50 percent of the crests surface at a rate of 12 to 15 lbs. per 100 sq ft or with mechanical fasteners. If mechanical fasteners are used, the fastener shall not penetrate through the Spray-Applied Fire Resistive Materials.

See Adhesives (BYWR) category for names of Classified companies

5. Sheathing Material* — Optional. Vinyl film or paper scrim vapor barrier applied with adhesive or laid loosely on the steel roof deck, overlapped approx 2 in. at sides.

See Sheathing Material (CHIZ) category for names of Classified companies.

5A. Sheathing Material* — (Optional) — A self-adhered rubberized asphalt roofing underlayment membrane which may be placed on top of the gypsum wallboard (Item 3B) or on the roof insulation (Item 3A).

W R GRACE & CO - CONN

CONSTRUCTION PRODUCTS DIV — Grace Ice and Water Shield, Grace Select, Grace Ultra, and Grace Basik.

5B. Sheathing Material* — (Optional) — In lieu of Items 5 and 5A, a self-adhered rubberized asphalt roofing underlayment membrane which may be placed on top of gypsum wallboard or on the roof insulation (Item 3A).

CARLISLE COATINGS & WATERPROOFING INC — CCW-707.

6. Steel Roof Deck — Unclassified - Min 1-1/2 in. deep and 18 in. wide, galv fluted steel deck. Min gauge is 22 MSG. Ends overlapped at supports min 1-1/2 in. and welded to supports min 12 in. OC. Adjacent units button-punched or welded together at midspan along side joints; or

Classified Steel Floor and Form Units* — Noncomposite 1-1/2 in. deep, 36 in. wide, galv fluted steel deck. Min gauge is 22 MSG. Ends overlapped at supports min 1-1/2 in. and welded to supports a max 12 in. OC. Adjacent units button-punched or welded together at midspan along side joints.

CONSOLIDATED SYSTEMS INC — Types B, BI, F, N, NI. Units may be phos/ptd.

7. Spray-Applied Fire Resistive Materials* — Applied by mixing with water and spraying in more than one coat to a final thickness as shown above and in the table below, to steel surfaces which must be clean and free of dirt, loose scale and oil. Min avg and min ind density of 15/14 pcf respectively.

For method of density determination, refer to Design Information Section.

For the W6x16 wide flange beams, the thickness of Spray-Applied Fire Resistive Materials shall be 7/8 in. for the 1 hr Unrestrained Beam Rating, 1-3/8 in. for the 1-1/2 hr Unrestrained Beam Rating, and 1-1/2 in. for the 2 hr Unrestrained Beam Rating.

The joist protection shall be applied in the manner and at the thicknesses shown below:

Note: When metal lath is required, as indicated below, full thickness of Spray-Applied Fire Resistive Materials is to be applied over the entire support including lath.

Min Joist Size	Type of Application	Restrained Assembly Rating Hr	Unrestrained Assembly Rating Hr	Unrestrained Beam Rating Hr	Thkns of Spray Applied Fire Resistive Mtl In.
14J7	Direct	1	1	1	1-1/2
10J4, 10H4	Direct	1	1	1	1-3/4
10J4, 10H4	Direct	1-1/2	1-1/2	1-1/2	2-1/4
10J4, 10H4	Direct	2	2	2	2-7/16
12J4, 14K4	Direct	1	1	1	2
12J4, 14K4	Direct	1-1/2	1-1/2	1-1/2	2-1/4
12J4, 14K4	Direct	2	2	2	2-7/16
12J4, 14K4	Lath	1-1/2	1 1/2	1-1/2	1-3/4
12J4, 14K4	Lath	2	2	2	1-7/8

When W6x16 beams and min size 12J4, 14J7 or 14K4 joists are used, thickness of the spray-applied resistive material applied to the roof deck units shall be:

Restrained or Unrestrained Assembly Rating Hr	Thk of Spray Applied Fire Resistive Mtl Applied to Deck	
	w/Gypsum Sheathing	w/o Gypsum Sheathing
1	1-3/16	1-1/4
1-1/2	1-3/16	1-1/2
2	1-7/16	1-3/4

When min size 10J4 or 10H4 joists are used, thickness of spray-applied resistive material applied to the roof deck units, with or without gypsum sheathing, shall be:

Restrained or	Thkns of
---------------	----------

Unrestrained Assembly Rating Hr	Spray Applied Fire Resistive Mtl on Steel Deck In.
1	1-3/8
1-1/2	1-5/8
2	1-7/8

ARABIAN VERMICULITE INDUSTRIES — Type MK-5.

GRACE CANADA INC — Types MK-4, MK-5.

GRACE KOREA INC — Types MK-6/CBF, MK-6/ED, MK-6/HY, MK-6s, Monokote Acoustic 1.

PYROK INC — Type LD.

SOUTHWEST VERMICULITE CO — Types 4, 5, 5EF, 5GP, 5MD, 8EF, 8GP, 8MD, 9EF, 9GP, 9MD.

VERMICULITE PRODUCTS INC — Types MK-4, MK-5, VP4, VP5.

W R GRACE & CO - CONN

CONSTRUCTION PRODUCTS DIV — Types MK-4, MK-5, MK-6/HY, MK-6s, Monokote Acoustic 1, RG.

8. **Metal Lath** — (Optional) — Where required, the diamond mesh, 3/8 in. expanded steel lath, 1.7 to 3.4 lb/sq yd is secured to one side of each steel joist with No. 18 SWG galv steel wire at joist web and bottom chord members, spaced 15 in. OC max. Where not required, the optional use of metal lath described and fastened as above, may be used to facilitate the spray application of Spray-Applied Fire Resistive Materials on steel bar joists and trusses. In this application, the metal lath is to be fully covered with Spray-Applied Fire Resistive Materials with no minimum thickness required.

8A. **Nonmetallic fabric mesh** — (Optional, not shown) — As an alternate to metal lath, glass fiber fabric mesh weighing approximately 2.5 oz/sq yd, polypropylene fabric mesh weighing approximately 1.25 oz/sq yd or equivalent, may be used to facilitate the spray application. The mesh is secured to one side of each joist web member. The method of attaching the mesh must be sufficient to hold the mesh and the spray-applied resistive materials in place during application until it has cured. 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 a max of 12 in. O.C. along the top chord of the bar joist. Another method to secure the mesh is by 1-1/4 in. long by 1/2 in. wide hairpin clips formed from No. 18 SWG or heavier steel wire.

9. **Bridging** — (Not shown) — In accordance with AISC current specifications. Continuous steel angles, min. size 1-1/4 by 1-1/4 by 1/8 in. welded to top and bottom chords. Bridging coated with 2-1/4 in. thickness of spray-applied resistive materials for the 1 or 1-1/2 h Assembly and Beam Rating and 2-7/16 in. for the 2 h Assembly and Beam Ratings.

*Bearing the UL Classification Mark

Reprinted from the Online Certifications Directory with permission from Underwriters Laboratories Inc.

Copyright © 2005 Underwriters Laboratories Inc.®

