Design No. P929
September 26, 2003

Restrained Assembly Ratings — 1, 1-1/2 or 2 Hr

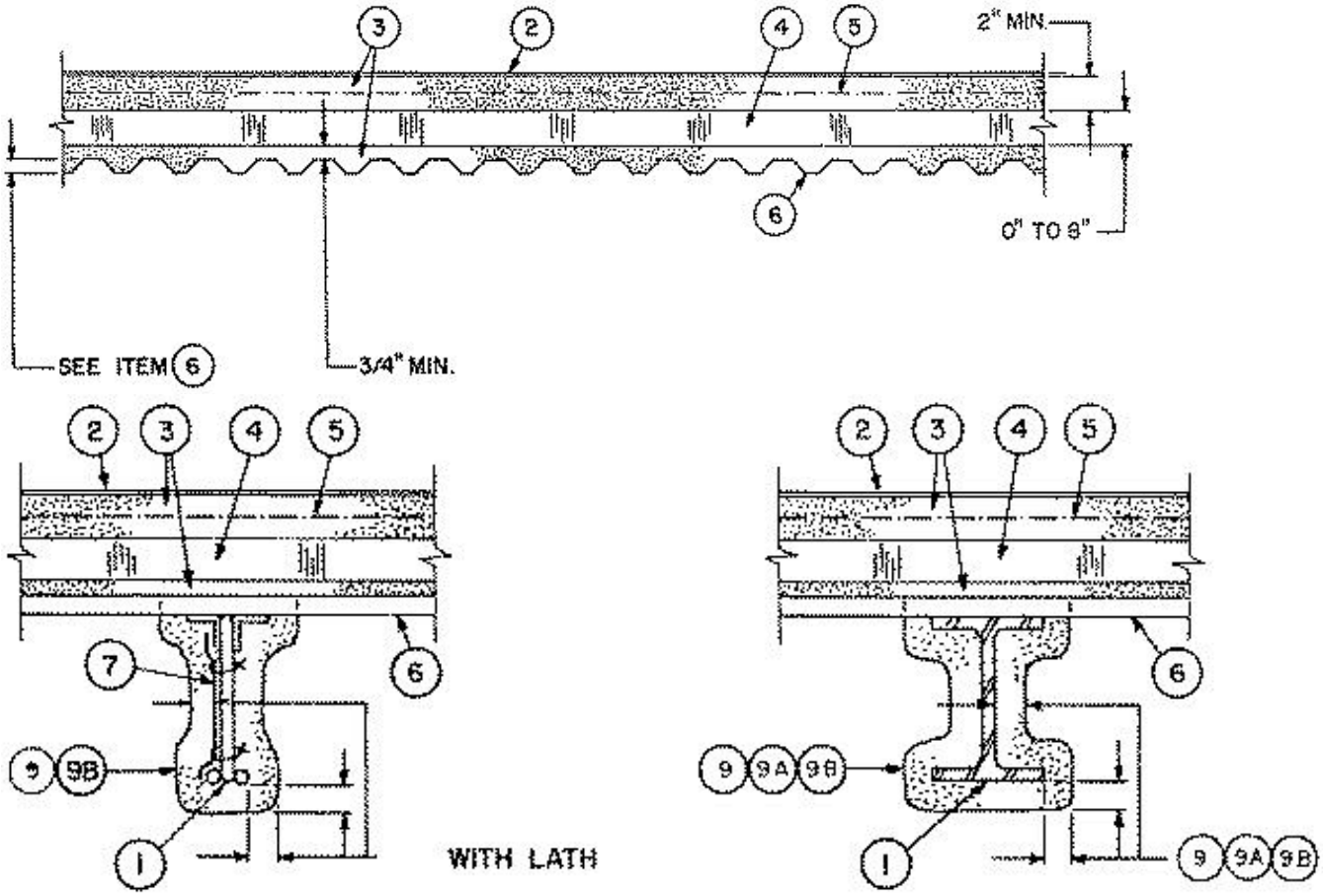
(See Items 6,9, & 9B)

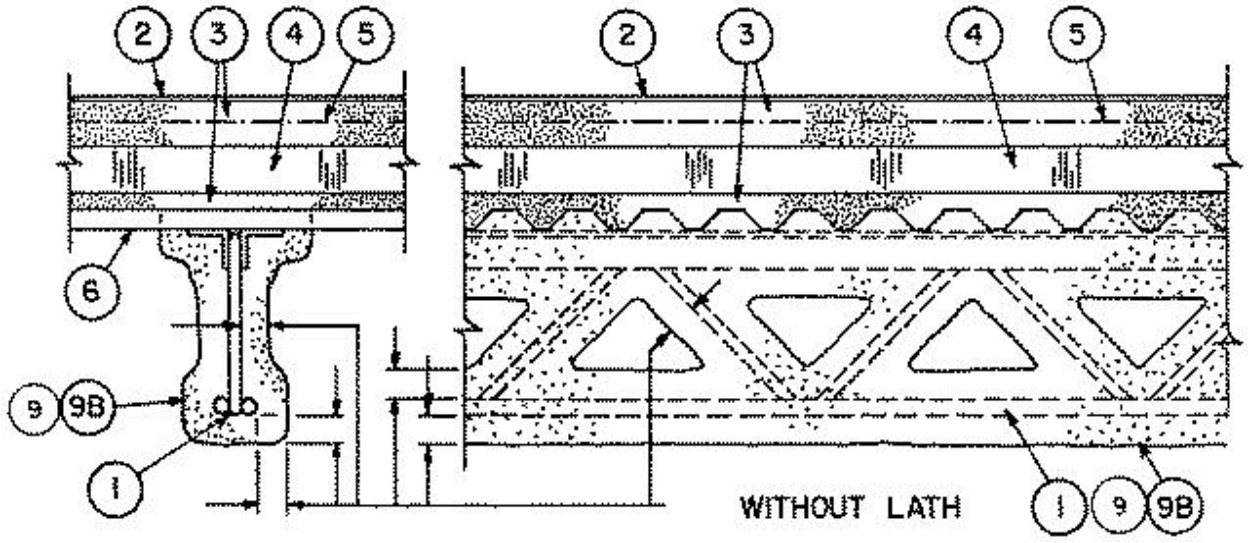
Unrestrained Assembly Rating — 0 Hr

(See Item 6)

Unrestrained Beam Ratings — 1, 1-1/2 or 2 Hr

(See Items 9, 9A & 9B)





1. **Support —** W8X10 or W6X16 beam, or 12J4 or 12K3 joist, min size Or joist girders-(Not shown)-20in. min depth and 13 lb/lin ft min weight.

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 either ballasted, adhered or mechanically attached as permitted under the respective manufacturer' s Classification. See Fire Resistance Directory-Roofing Membranes (CHCI).

3. **Cellular Concrete —** Roof Topping Mixture*-Concentrate mixed with water and Portland cement per manufacturer's specifications. Cast dry density and 28-day min compressive strength of 190 psi as determined per ASTM C495-66 Min thickness of cellular concrete topping between top of deck and bottom of foamed plastic may be reduced to 1/8 in. when 2 in. or more of foamed plastic is used.

CELCORE INC — Cast dry density of 31 (+ or -) 3.0 pcf.

CELLUFOAM CONCRETE SYSTEMS, DIV OF CELLUFOAM CONCRETE OF — Cast dry density of 30 (+ or - 3.0) pcf.

CELLULAR CONCRETE L L C — Cast dry density 37 (+ or -) 3.0 pcf.

ELASTIZELL CORP OF AMERICA — Type II. Mix #1 of cast dry density 39 (+ or -) 3.0 pcf, Mix #2 of cast dry density 40 (+ or -) 3.0 pcf, Mix #3 of cast dry density 47 (+ or -) 3.0 pcf.

LITE-CRETE INC — Cast dry density of 29 (+ or -) 3.0 pcf.

SIPLAST INC — Mix #2. Cast dry density 36 (+ or -) 3.0 pcf.

3A. **As an alternate to the roof topping mixture, —** Item 3 may consist of Perlite Concrete — Mix consists of 6 cu ft of Perlite Aggregate* to 94 lb of Portland cement and 1-1/2 pints of air entraining agent.

See Perlite Aggregate (CFFX) category for names of Classified companies.

3B. **As an alternate to Items 3 and 3A, Cellular Concrete —** Roof Topping Mixture* — Foam Concentrate mixed with water, Portland cement and UL Classified Vermiculite Aggregate per manufacturer's application instructions. Cast dry density of 33 (+ or -) 3.0 pcf and 28-day compressive strength of min 250 psi as determined in accordance with ASTM C495-86. The cellular concrete topping thickness may be reduced to 1/8 in. when 2 in. or more of Foamed Plastic (Item 4) is used.

ELASTIZELL CORP OF AMERICA CELLULAR CONCRETE L L C — Mix #3.

SIPLAST INC — Mix #3.

4. **Foamed Plastic* —** Nom 24 by 48 by max 8 in. thick polystyrene foamed plastic insulation boards of 2.5 pcf max density. Each insulation board shall contain six 3 in. diam holes uniformly spaced. When foamed plastic is not used, the thickness of Roof Topping Mixture shall be a min 2-3/4 in. above the top plane of steel deck.

See **Foamed Plastic*** (BRYX) category in the Building Materials Directory of Foamed Plastic* (CCVW) category in Fire Resistance Directory for list of Classified companies.

5. **Wire Mesh (optional for 1 and 1-1/2 hr. ratings) —** No. 19 SWG galv steel wire twisted to form 2 in. hexagons. In addition, straight No. 16 SWG galv steel wire woven into mesh and spaced 3 in. apart for stiffness. Mesh installed without attachment parallel to supports and overlapped 3 to 6 in. at the sides.

6. **Steel Floor and Form Units* —** Noncomposite design. Units may be fluted or corrugated galv steel. Side laps of adjacent units welded, button-punched or secured together with No. 12 by 1/2 in. long self-drilling, self-tapping steel screws midway between supports but not to exceed 36 in. O.C. For 1-5/16 in. deep min, No. 24 MSG min units, with clear spans not more than 7 ft 6 in., the Unrestrained Assembly Rating is equal to the Restrained Assembly Rating.**Fluted Units —** No. 22 MSG min, 1-1/2, 2 or 3 in deep, 24 to 36 in. wide. Welded, 12 in. O.C. max, to supports. Joint cover shall be 2 in. wide cloth adhesive tape applied following the contour of the units, or equivalent. Supports spaced 8 ft O.C. max. Unless otherwise noted for specific Classified units.**Corrugated Units —** No. 28 MSG min, 9/16 in deep min., nom 26, 28 and 30 to 36 in. wide. Supports spaced 4 ft O.C. max for 9/16 in. deep, No 28 MSG units, 6 ft O.C. max for 15/16 in. deep, No. 26 MSG units and 8 ft O.C. max for 24 MSG min units. Welded 15 in. O.C. max to supports, through welding washers. When 9/16 in. deep units are used, their loadings shall be limited to produce a 75 percent max bending stresses in the steel, and the Restrained Assembly shall not exceed 1-1/2 H. Adjacent units overlapped one corrugation. As an alternate, unclassified steel roof deck units conforming to the same description, installation and steel thickness as described for Classified units may be used.

CONSOLIDATED SYSTEMS INC — Consoliform and Comvent Types EHD, HD, S, SD.

7. **Metal Lath —** (Optional) — Metal lath is used to facilitate the spray application of Spray-Applied Fire Resistive Materials to the steel bar joists and trusses. The diamond mesh, 3/8 in. expanded steel lath, 1.7 to 3.4 lb per sq yd, is secured to one side of each steel joist with 18 SWG galv steel wire at joist web and bottom chord members, spaced 15 in. O.C. max. When used, the metal lath is to be fully covered with Spray-Applied Fire Resistive Materials with no min thickness requirements.

7A. **Non-Metallic Fabric Mesh —** (Optional, Not Shown) — As an alternate to metal lath, glass fiber fabric mesh, weighing approximately 2.5 oz per sq yd, polypropylene fabric mesh, weighing approximately 1.25 oz per sq yd or equivalent, is 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 Spray-Applied Fire Resistive Materials material in place during application until it has cured. An acceptable method to attach the mesh is by embedding the mesh in minimum 1/4 in. long beads of hot melted glue. The beads of glue shall be spaced a maximum 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 of heavier steel wire.

8. **Bridging Angles —** (Not shown)-1-1/4 by 1 1/4 by 1/8 in. thick steel angles (or heavier), for use with steel joists. Angles welded to top and bottom chords of the joists. Size and spacing of bridging angles per Steel Joist Institute specifications. Min thickness of Spray-Applied Fire Resistive Materials or Spray-Applied Fire Resistive Materials on bridging angles shall be 1 3/4 in.

9. **Spray-Applied Fire Resistive Materials* —** Spray-applied to joist only in one or more coats to final thicknesses shown in tables below. Steel surfaces must be clean and free of dirt, loose scale and oil. Min avg and min ind density of 15/14 pcf respectively for the Type 15 and 15-High Yield , 22/18 pcf, respectively for the Type 22, 40/37 respectively for the Type 40, 28/25 respectively for the Type 239,

44.5/42 respectively for the Type 240-High Yield and 55/50 respectively for the Type 241 . For method of density determination refer to Design Information Section.

Restrained Assembly Rating Hr	Unrestrained Beam Rating Hr	Spray Applied Fire Resistive Mtl Thkns In.	
		W6x16	W8x10
1	1	1	1-3/8
1-1/2	1-1/2	1-1/4	1-3/4
2	1-1/2	—	1-3/4

For Type 12J4 steel joists, the joist protection shall consist of the above Spray-Applied Fire Resistive Materials applied in a manner and at the thickness shown below. When metal lath (Item 7) is used, lath secured to one side of joist with 18 SWG galv steel wire at joist web and bottom chord, spaced 15 in. OC.

Restrained Assembly Rating Hr	Unrestrained Assembly Rating Hr	Thkns on Joist In.	
		w/Lath	w/o Lath
1-1/2	1-1/2	1-7/8	—
2	1-1/2	1-7/8	2-1/4
2	2	1-7/8	2-7/16

CARBOLINE CO — Types 15, 15-High Yield, 22, 40, 239, 240-High Yield, 241 .

CARBOLINE KOREA LTD — Types 15, 15-High Yield, 22, 40, 239, 240-High Yield, 241 .

STONCOR MIDDLE EAST L L C — Types 15, 15-High Yield, 22, 40, 239, 240-High Yield, 241 .

CARBOLINE SOUTHEAST ASIA PTE LTD — Types 15, 15-High Yield, 22, 40, 239, 240-High Yield, 241 .

CDC CARBOLINE (INDIA) PVT LTD — Types 15, 15-High Yield, 22, 40, 239, 240-High Yield, 241 , CDC Crete 15, CDC Crete 15-High Yield, CDC Crete 22, CDC Crete 40, CDC Crete 239, CDC Crete 240 High Yield, CDC Crete 241

CENTRAL PAINTS IND INC LTD — Types 15, 15HY, 22, 40, 239, 240-High Yield, 241 .

10. **Roof insulation — (Not Shown) —** May only be employed when Foamed Plastic (Item 4) is not used. Rigid Foamed Plastic* insulation boards, 1 to 4 in. thick placed on top of roof covering. May either be embedded into asphalt glaze coat, bonded to the single-ply membrane with adhesive or loosely laid. Covered with 10 psf stone or masonry ballast. (When used, stone ballast described in Items 2A and 2B may be omitted).

THE DOW CHEMICAL CO

*Bearing the UL Classification Mark