

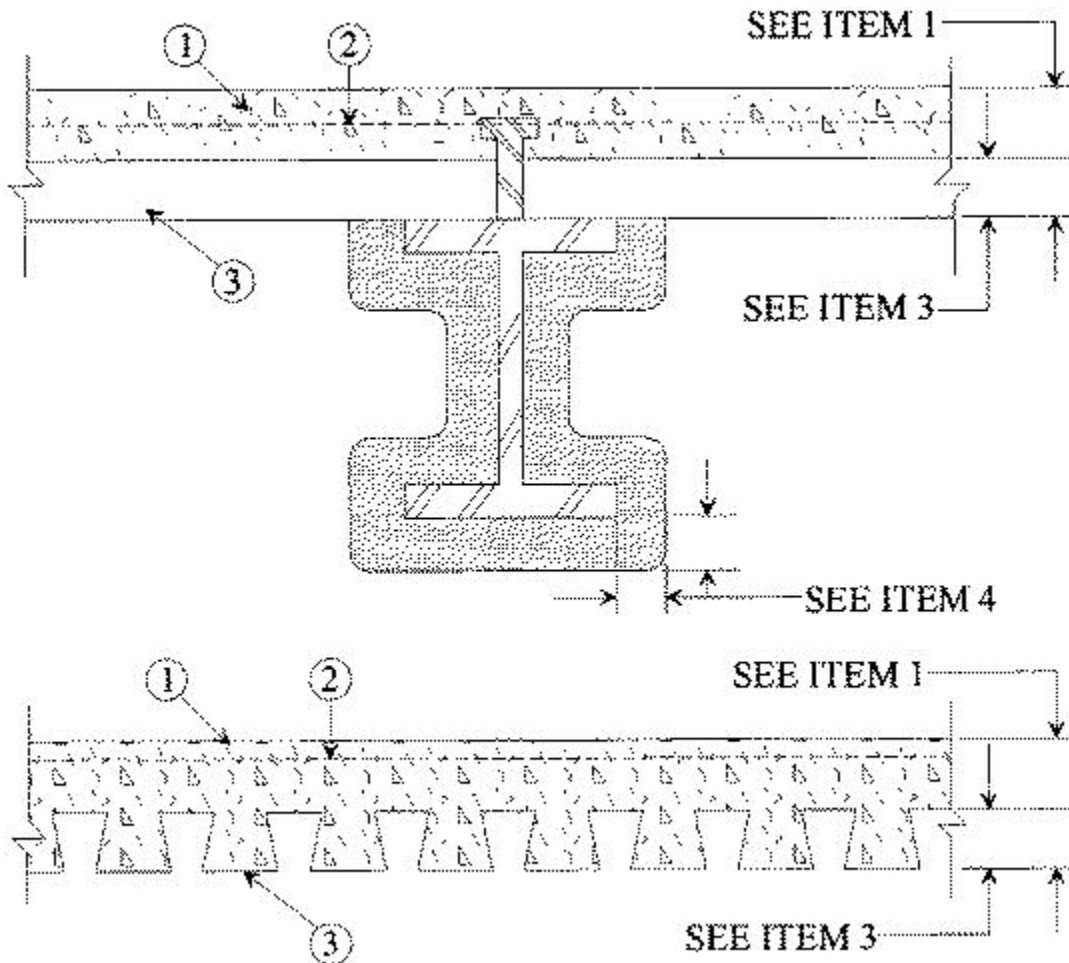
Design No. D928

June 22, 2000

Restrained Assembly Ratings — 1-1/2, 2 & 3 Hr

Unrestrained Assembly Rating — 3/4 Hr

Unrestrained Beam Ratings — 1 & 1-1/2 Hr



Beam — W10X29, min size.

1. Normal Weight or Lightweight Concrete or Semi-Lightweight — Normal weight concrete carbonate or siliceous aggregate, 150 + or - 3 pcf unit weight, 3500 psi compressive strength. Lightweight concrete, expanded shale, clay or slate aggregate by rotary-kiln method or expanded clay or flyash aggregate by sintered-grate method 110 + or - 3 pcf unit weight, 4000 psi compressive strength. Semi-Lightweight concrete, consisting of lightweight aggregate as described above and carbonate or siliceous normal weight aggregate, 130 pcf, 3500 psi concrete strength.

Restrained Assembly Rating Hr	Concrete (Type)	Total Slab Thkns In.
1-1/2	Normal Weight	4-3/4
2	Normal Weight	5-1/4
2	Semi Lightweight	5
2	Lightweight	4-1/2
3	Lightweight	5-1/4
3	Normal Weight	6-3/4
3	Semi Lightweight	6

2. **Welded Wire Fabric** — 6X6 — 6/6 SWG.

3. **Steel Floor and Form Units*** — Composite. 2 in. deep, 24 in. wide, 22 MSG min galv fluted units. Welded to supports 12 in. O.C. max. Adjacent units welded 36 in. O.C. at joints.

CONSOLIDATED SYSTEMS INC — 24 in. wide Type Versa-Dek® S, LS, XLS. Units may be phos/ptd.

4. **Spray-Applied Fire Resistive Materials** — * — Applied by mixing with water and spraying in one or more coats to a final thickness as shown below, to steel beam surface which 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 22/18 pcf, respectively for the Type 22. For method of density determination, refer to Design Information Section, Sprayed Material. The Spray-Applied Fire Resistive Materials shall be applied to the steel deck a min of 2 in. beyond each side of the beam's to flange at the beam thickness. Crest areas above the beam need not be filled with Spray-Applied Fire Resistive Materials.

Restrained Assembly Rating Hr	Unrestrained Beam Rating Hr	Min Thkns In. (Beam)
1-1/2, 2	1	1/2
3	1-1/2	3/4

CARBOLINE CO — Types 15, 15-HY, 22.

CARBOLINE KOREA LTD — Types 15, 15-HY, 22.

STONCOR MIDDLE EAST L L C — Types 15, 15-HY, 22.

CARBOLINE SOUTHEAST ASIA PTE LTD — Types 15, 15-HY, 22.

CDC CARBOLINE (INDIA) PVT LTD — Types 15, 15-HY, 22, CDC Crete 15, CDC Crete 15-HY, CDC Crete 22.

CENTRAL PAINTS IND INC LTD — Types 15, 15HY, 22.

4A. **Spray-Applied Fire Resistive Materials*** — See table below for appropriate thicknesses. Where metal lath is present, thicknesses are measured to surface of metal lath, all other thicknesses are measured to steel surface. Prepared by mixing with water according to instructions on each bag of material. Mixture can be spray or trowel applied on beam surfaces and over lath, as shown. When fluted or corrugated steel floor units are used, crest areas above the beam shall be sealed with Spray-Applied Fire Resistive Materials. Avg density of 44.50 pcf with min ind value

of 42 pcf. For method of density determination, see Design Information Section, Sprayed Material. Surface of material may be lightly finished with a trowel. The thicknesses shown in the following table are for normal weight or lightweight concrete. Metal lath, Item 6, is required.

	Min Thkns In.	
Rating Hr	Restrained Beam Rating Hr	Unrestrained Beam Rating Hr
1	7/16	7/16
1-1/2	1/2	1/2
2	3/4	13/16
3	1-1/8	1-1/4
4	1-9/16	1-13/16

The thicknesses shown on the following table are for normal weight or lightweight concrete. Metal lath, Item 6, is optional.

	Min Thkns In.	
Rating Hr	Restrained Beam Rating Hr	Unrestrained Beam Rating Hr
1	11/16	11/16
1-1/2	3/4	3/4
2	1	1-1/16
3	1-3/8	1-1/2

CARBOLINE CO — Type 240HY. Investigated for exterior use.

CARBOLINE KOREA LTD — Type 240HY. Investigated for exterior use.

STONCOR MIDDLE EAST L L C — Type 240HY. Investigated for exterior use.

CARBOLINE SOUTHEAST ASIA PTE LTD — Type 240HY. Investigated for exterior use.

CDC CARBOLINE (INDIA) PVT LTD — Type 240HY, CDC Crete 240HY. Investigated for exterior use.

CENTRAL PAINTS IND INC LTD — Types 240HY.

4B. **Spray** — Applied Fire Resistive Materials* — Prepared by mixing with water according to instructions on each bag of material. Mixture is spray or trowel applied in one or more coats onto beam to a final minimum thickness as shown below. Crest areas above the beam shall be sealed with Spray — Applied Fire Resistive Materials. Surface of material may be lightly finished with a trowel.

Beam surfaces must be free of dirt, oil or loose scale. The minimum average density shall be 28 pcf with a minimum individual density of 25 pcf for the Type 239. The min average density of 40 pcf with a min individual density of 37 pcf for the Type 40. For method of density determination, see design information section. The thicknesses shown on the following table are for normal weight or lightweight concrete. Metal lath, Item 6, is required.

	Min Thkns In.	
Rating Hr	Unrestrained Beam Rating Hr	Restrained Beam Rating Hr
1	9/16	9/16
1-1/2	3/4	3/4
2	1-1/16	1
3	1-9/16	1-1/2
4	2-13/16	2

The thicknesses shown on the following table are for normal weight concrete. Metal lath, Item 6, is optional.

	Min Thkns In.	
Rating Hr	Unrestrained Beam Rating Hr	Restrained Beam Rating Hr
1	15/16	15/16
1-1/2	1-1/8	1-1/8
2	1-7/16	1-3/8
3	1-15/16	1-7/8

The thicknesses shown on the following table are for lightweight concrete. Metal lath, Item 6, is optional.

	Min Thkns In.	
Rating Hr	Unrestrained Beam Rating Hr	Restrained Beam Rating Hr
1	1-1/16	1-1/16
1-1/2	1-1/4	1-1/4
2	1-9/16	1-1/2
3	2-1/16	2

CARBOLINE CO — Types 40 and 239. Investigated for exterior use.

CARBOLINE KOREA LTD — Types 40 and 239. Investigated for exterior use.

STONCOR MIDDLE EAST L L C — Types 40 and 239. Investigated for exterior use.

CARBOLINE SOUTHEAST ASIA PTE LTD — Types 40 and 239. Investigated for exterior use.

CDC CARBOLINE (INDIA) PVT LTD — Types 40 and 239, CDC Crete 239. Investigated for exterior use.

CENTRAL PAINTS IND INC LTD — Types 40 and 239.

4C. **Spray** — Applied Fire Resistive Material — Prepared by mixing with water according to instructions on each bag of material. Mixture is spray or trowel applied in one or more coats onto beam to a final minimum thickness as shown below. Crest areas above the beam shall be sealed with spray-applied resistive material. Beam surfaces must be free of dirt, oil or loose scale. Surface of material may be lightly finished with a trowel.

The minimum average density shall be 50 pcf with a minimum individual density of 45 pcf. For method of density determination, see design information section. The thicknesses shown on the following table are for normal weight or lightweight concrete. Metal lath, Item 6, is required.

	Min Thkns In.	
Rating Hr	Restrained Beam Rating Hr	Unrestrained Beam Rating Hr
1	5/16	5/16
1-1/2	3/8	1/2
2	9/16	3/4
3	1-1/16	1-1/2
4	1-7/8	2-13/16

The thicknesses shown on the following table are for normal weight or lightweight concrete. Metal lath, Item 6, is optional.

	Min Thkns In.	
Rating Hr	Restrained Beam Rating Hr	Unrestrained Beam Rating Hr
1	9/16	9/16
1-1/2	5/8	3/4
2	13/16	1
3	1-5/16	1-3/4

CARBOLINE CO — Type 240. Investigated for exterior use.

CARBOLINE KOREA LTD — Type 240. Investigated for exterior use.

STONCOR MIDDLE EAST L L C — Type 240. Investigated for exterior use.

CARBOLINE SOUTHEAST ASIA PTE LTD — Type 240. Investigated for exterior use.

CDC CARBOLINE (INDIA) PVT LTD — Type 240, CDC Crete 240. Investigated for exterior use.

CENTRAL PAINTS IND INC LTD — Type 240.

4D. **Spray-Applied Fire Resistive Materials*** — See table below for appropriate thicknesses. Where metal lath is present, thicknesses are measured to surface of metal lath, all other thicknesses are measured to steel surface. Prepared by mixing with water according to instructions on each bag of material.

Mixture can be spray or trowel applied on beam surfaces and over lath, as shown. When fluted or corrugated steel floor units are used, crest areas above the beam shall be sealed with Spray-Applied Fire Resistive Materials. Min avg density of 55 pcf with min ind value of 50 pcf. For method of density determination, see Design Information Section, Sprayed Material. Surface of material may be lightly finished with a trowel. The thicknesses shown in the following table are for normal weight or lightweight concrete. Metal lath, Item 6, is required.

	Min Thkns In.	
Rating Hr	Restrained Beam Rating Hr	Unrestrained Beam Rating Hr
1	7/16	7/16
1-1/2	1/2	1/2
2	3/4	13/16
3	1-1/8	1-1/4
4	1-9/16	1-13/16

The thicknesses shown on the following table are for normal weight or lightweight concrete. Metal lath, Item 6, is optional.

	Min Thkns In.	
Rating Hr	Restrained Beam Rating Hr	Unrestrained Beam Rating Hr
1	11/16	11/16
1-1/2	3/4	3/4
2	1	1-1/16
3	1-3/8	1-1/2

CARBOLINE CO — Type 241. Investigated for exterior use.

CARBOLINE KOREA LTD — Type 241. Investigated for exterior use.

STONCOR MIDDLE EAST L L C — Type 241. Investigated for exterior use.

CARBOLINE SOUTHEAST ASIA PTE LTD — Type 241. Investigated for exterior use.

CDC CARBOLINE (INDIA) PVT LTD — Type 241, CDC Crete 241. Investigated for exterior use.

CENTRAL PAINTS IND INC LTD — Type 241.

5. **Shear Connector Studs — Optional** — Studs, 3/4 in. diam by 3 in. long headed type or equivalent per AISC specifications. Welded to the top flange of the beam through the steel form units.

6. **Metal Lath (not shown)** — 3.4 lbs/sq yd galv or painted expanded steel. Secure to beam by bending tight around bottom flange a min. of 1-1/2 in. toward web of beam.

*Bearing the UL Classification Mark

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