

FIRE RESISTANCE DIRECTORY
GCP APPLIED TECHNOLOGIES UL DESIGNS

Fire-resistance Ratings - ANSI/UL 263

Design No. N777

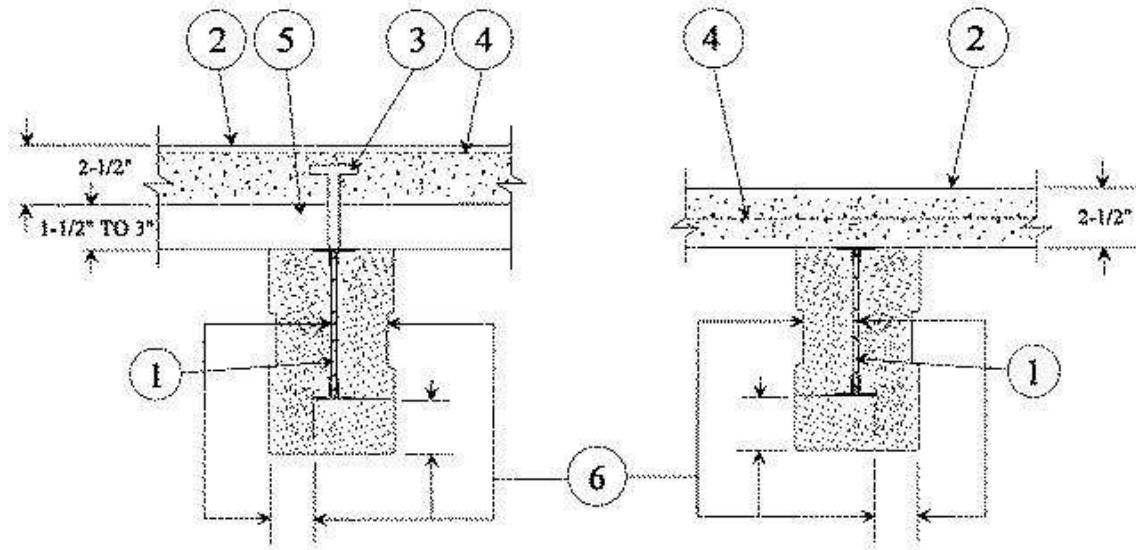
February 05, 2014

Restrained Beam Ratings — 1, 1-1/2, 2 or 3 Hr (See Items 6 & 7)

Unrestrained Beam Ratings — 1, 1-1/2, 2 or 3 Hr (See Items 6 & 7)

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

* I 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 Joist** — Composite or non-composite min 10K1, min 10 in. deep, welded or bolted to end supports. May be uncoated or provided with a shop coat of paint. Designed per S.J.I specifications for a max tensile stress of 30,000 psi. Top chords shall consist of two angles measuring 1-1/4 by 1-1/4 by 0.135 in. thick, min. Bottom chords shall consist of two angles measuring 1 by 1 by 0.115 in. thick, min. The first diagonal web member at each end shall consist of a min 0.595 in. diam round bar. All remaining web members shall consist of 0.50 in. diam round bars, min. Bridging per S.J.I specifications when non-composite joists are used.

2. **Normal Weight or Lightweight Concrete** — Min compressive strength of 3000 psi. For normal weight concrete, either carbonate or siliceous aggregate may be used. Unit weight, 145 +/- 3 pcf. For lightweight concrete, unit weight may range from 104 to 120 pcf.

3. **Shear Connector** — (Optional) — Studs, min 1/2 in. diam headed type or equivalent per A.I.S.C. specifications. Welded to the top chord of joist through the steel floor units. Stud welding, as recommended by the stud manufacturer, should be followed.

4. **Welded Wire Fabric** — Min 6x6-W1.4xW1.4.

5. **Steel Floor and Form Units** — 1-1/2 to 3 in. deep fluted or cellular units, welded to joist.

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6. Spray-Applied Fire Resistive Materials* — Applied by mixing and spraying in more than one coat to joist surfaces which must be clean and free of dirt, loose scale and oil. When fluted steel floor units are used, crest areas shall be filled with Spray-Applied Fire Resistive Materials above the joist. Thickness of protection on bridging bars or bridging angles same as on joist chords or webs. Min avg and min ind density of 15/14 pcf respectively. For method of density determination, refer to Design Information Section.

Restrained Beam Rating Hr	Unrestrained Beam Rating Hr	Spray Applied Fire Resistive Mtl Thkns In. For Joist Spaced	
		More Than 4 Ft OC	4 Ft or Less OC
1	1	7/8	7/8
1-1/2	1	1-3/16	1-3/16
1-1/2	1-1/2	1-5/16	1-5/16
2	1	1-7/8	1-7/8
2	2	2-3/16	1-7/8
3	3	3-1/2	2-13/16

ARABIAN VERMICULITE INDUSTRIES — Types MK-6/HY, MK-6/HY Extended Set, MK-10 HB, MK-10 HB Extended Set, MK-6/HB, MK-6s, MK-6 GF, MK-6 GF Extended Set, MK-1000/HB, MK-1000/HB Extended Set.

GCP KOREA INC — Types MK-6/HY, MK-6/HY Extended Set, MK-10 HB, MK-10 HB Extended Set, MK-6/HB, MK-6s, MK-6 GF, MK-6 GF Extended Set, MK-1000/HB, MK-1000/HB Extended Set.

GCP APPLIED TECHNOLOGIES INC — Types MK-6/HY, MK-6/HY Extended Set, MK-10 HB, MK-10 HB Extended Set, MK-6/HB, MK-6s, MK-6 GF, MK-6 GF Extended Set, RG, MK-1000/HB, MK-1000/HB Extended Set.

6A. Alternate Spray-Applied Fire Resistive Materials* — Applied by mixing with water and spraying in one or more coats to a final thickness as shown in the tables below to steel beam surfaces which must be clean and free of dirt, loose scale and oil. When fluted steel floor units are used, crest areas shall be filled with Spray-Applied Fire Resistive Materials above the joist. Min avg and min ind density of 22/19 pcf, respectively. Min avg and min individual density of 40/36 pcf respectively for Types Z-146, Z-146T, and Z-146PC. Min avg and min ind density of 50/45 pcf respectively for Types Z-156, Z-156T, and Z-156PC. For method of density determination, refer to Design Information Section.

Restrained Beam RatingHr	Unrestrained Beam RatingHr	Spray Applied Fire Resistive Mtl Thkns In. For Joist Spaced	
		More Than 4 Ft OC	4 Ft or LessOC
1	1	7/8	7/8
1-1/2	1	1-3/16	1-3/16
1-1/2	1-1/2	1-5/16	1-5/16
2	1	1-7/8	1-7/8
2	2	2-3/16	1-7/8
3	3	3-1/2	2-13/16

ARABIAN VERMICULITE INDUSTRIES — Types Z-106, Z-106/G, Z-106/HY, Types Z-146, Z-146T, Z-146PC, Z-156, Z-156T, Z-156PC investigated for exterior use.

GCP KOREA INC — Types Z-106, Z-106/G, Z-106/HY, Types Z-146, Z-146T, Z-146PC, Z-156, Z-156T, Z-156PC investigated for exterior use.

GCP APPLIED TECHNOLOGIES INC — Types Z-106, Z-106/G, Z-106/HY, Types Z-146, Z-146T, Z-146PC, Z-156, Z-156T, Z-156PC investigated for exterior use.

7. Metal Lath — (Not Shown) — (Required on both sides of joists with Z-146, Z-146T, Z146PC, Z-156, Z-156T and Z-156PC, otherwise optional) — Metal lath may be used to facilitate the spray application of spray-applied resistive material on steel bar joists and trusses. 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. O.C. max. When used, the metal lath is to be fully covered with spray-applied resistive material with no min thickness requirements for material applied onto the lath between chords and between web members.

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7A. Non-Metallic Fabric Mesh — (Optional) — 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 material in place during application until it has cured. An acceptable method to attach 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.

*** I ndicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada) , respectively.**