

## Design/System/Construction/Assembly Usage Disclaimer

- Authorities Having Jurisdiction should be consulted in all cases as to the particular requirements covering the installation and use of UL Certified products, equipment, system, devices, and materials.
- Authorities Having Jurisdiction should be consulted before construction.
- Fire resistance assemblies and products are developed by the design submitter and have been investigated by UL for compliance with applicable requirements. The published information cannot always address every construction nuance encountered in the field.
- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
- Only products which bear UL's Mark are considered Certified.

## BXUV - Fire Resistance Ratings - ANSI/UL 263 Certified for United States

## BXUV7 - Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada

[See General Information for Fire-resistance Ratings - ANSI/UL 263 Certified for United States](#)

[Design Criteria and Allowable Variances](#)

[See General Information for Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada](#)

[Design Criteria and Allowable Variances](#)

**Design No. N854**

November 16, 2015

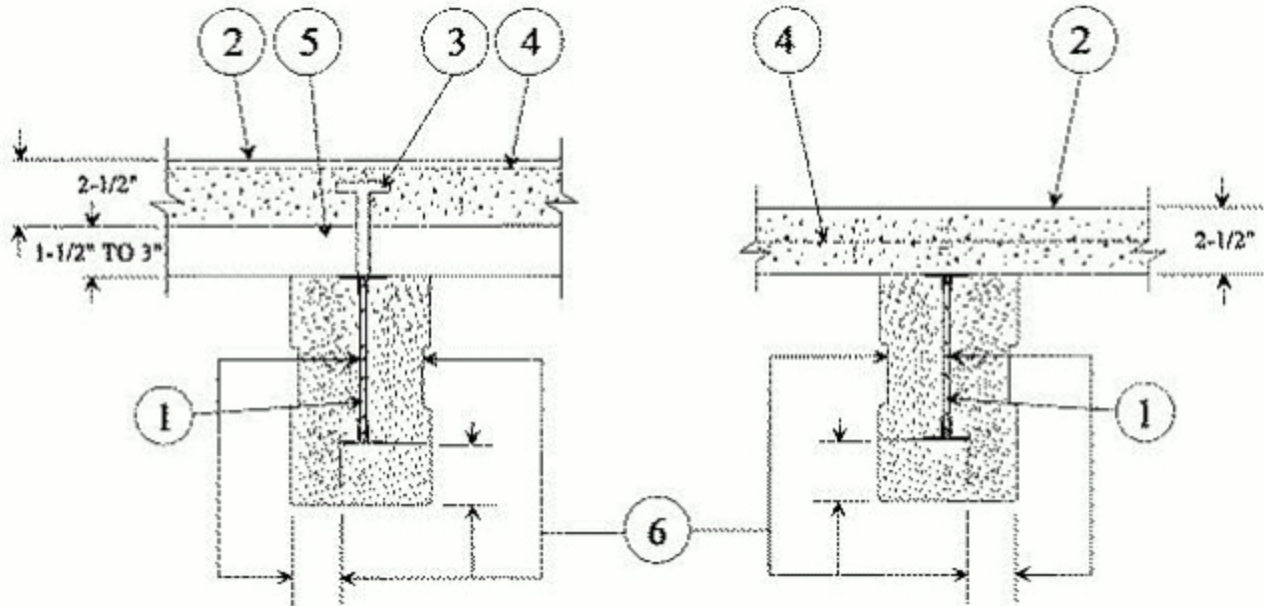
**Restrained Beam Ratings — 1, 1-1/2, 2 and 3 Hr**

**Unrestrained Beam Ratings — 1, 1-1/2, 2 and 3 Hr**

**Loading Determined by Allowable Stress Design Method or Load and Resistance Factor Design Method published by the American Institute of Steel Construction, or in accordance with the relevant Limit State Design provisions of Part 4 of the National Building Code of Canada**

**\* 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. Designed per S.J.I specifications for a yield strength of 50,000 psi. Top chords shall consist of two angles measuring 1-1/2 by 1-1/2 by 0.169 in. thick, min. Bottom chords shall consist of two angles measuring 1 by 1 by 0.109 in. thick, min. The first diagonal web member at each end shall consist of a min 0.625 in. dia. round bar. All remaining web members shall consist of 0.50 in. dia. 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, expanded shale, clay or slate aggregate by rotary-kiln method may be used. Unit weight 110 +/- 3 pcf.

**3. Shear Connector** — (Optional) — Studs, min 1/2 in. dia. 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** — 1-5/16 in. deep corrugated units; or 1-1/2 to 3 in. deep fluted or cellular units, welded to joist.

**6. Spray-Applied Fire Resistive Materials\*** — Applied by mixing with water and spraying in more than one coat to the joist to the final thicknesses shown below. Crest areas above the joist shall be filled with Spray-Applied Fire Resistive Materials. Joist surfaces must be clean and free of dirt, loose scale and oil. Thickness of protection on bridging bars or bridging angles same as on joist chords or webs. Min average and min ind density of 15/14 pcf respectively. Min avg and min ind density of 22/19 pcf respectively for Types Z-106, Z-106/HY, Z-106/G. Min avg and min ind density of 40/36 pcf respectively for Types AV650, Z-146, Z-146PC and Z-146T cementitious mixture. Min avg and min ind density of 50/45 pcf respectively for Types AV800, Z-156, Z-156T and Z-156PC. For method of density determination, see Design Information Section.

The thickness of Spray-Applied Fire Resistive Materials shown in the table below are only applicable when joists are supporting floor assemblies containing only fluted floor and form units, topped with normal weight or lightweight concrete



**Min Thkns In. Joist Space More Than 4 ft on center**

Rating Hr	Restrained Beam	Unrestrained Beam
1	7/8	7/8
1-1/2	7/8	1-5/16
2	7/8	1-3/4
3	1-7/16	2-9/16

**Min Thkns In. Joist Space 4 ft or less on center**

Rating Hr	Restrained Beam	Unrestrained Beam
1	3/4	3/4
1-1/2	3/4	1-1/8
2	3/4	1-1/2
3	1-7/16	2-5/16

The thickness of Spray-Applied Fire Resistive Materials shown in the table below are only applicable when joists are supporting floor assemblies containing cellular or corrugated floor and form units, topped with normal weight or lightweight concrete

**Min Thkns In. Joist Space More Than 4 ft on center**

Rating Hr	Restrained Beam	Unrestrained Beam
1	1-1/16	1-1/16
1-1/2	1-1/8	1-5/8
2	1-1/8	2-3/16
3	1-7/8	3-5/16

**Min Thkns In. Joist Space 4 ft or less on center**

Rating Hr	Restrained Beam	Unrestrained Beam
1	15/16	15/16
1-1/2	15/16	1-3/8
2	15/16	1-7/8
3	1-7/8	3

**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, Z-106, Z-106/G, Z-146 investigated for exterior use. Types AV650 and AV800 investigated for external use.

**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, Z-106, Z-106/G, Z-106/HY, Z-146 investigated for exterior use.

**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, MK-1000/HB, MK-1000/HB Extended Set, RG, Z-106, Z-106/G, Z-106/HY, Z-146, Z-146T, Z146PC, Z-156T and 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.

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.

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