UL Product iQ™

BXUV.S736

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. S736

March 11, 2020

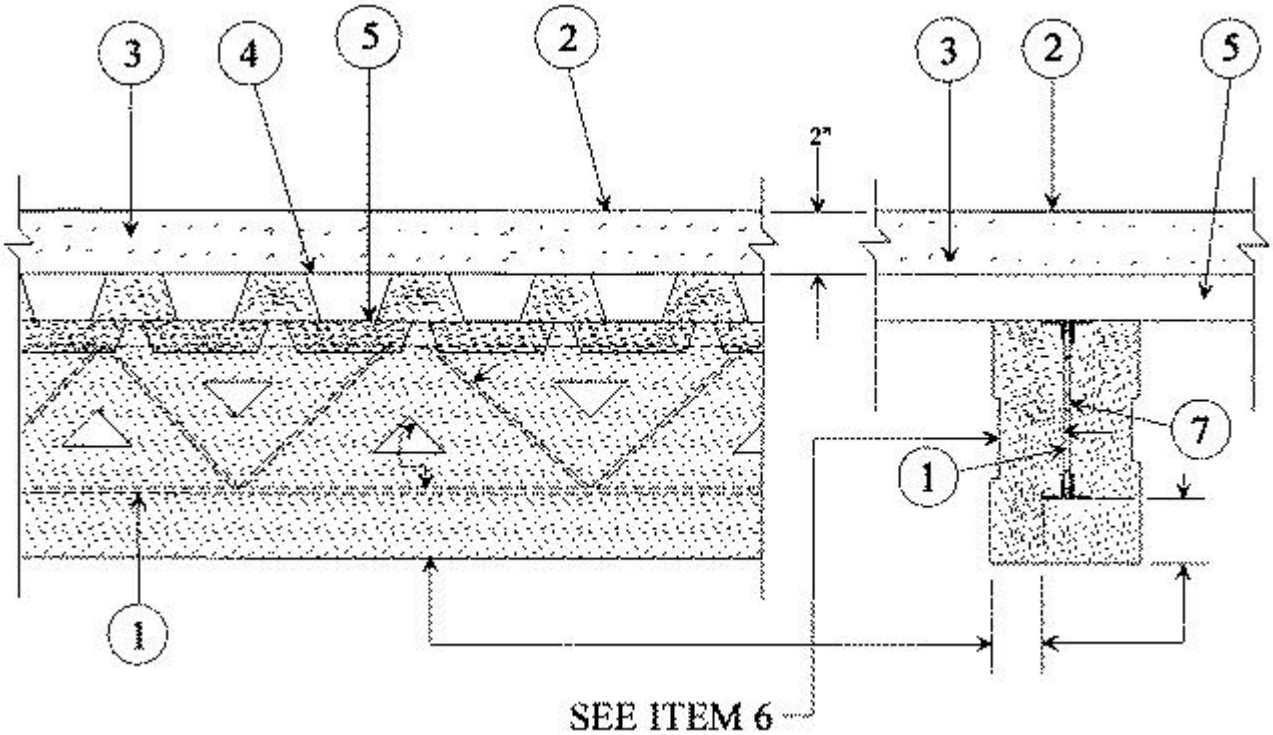
Restrained Beam Ratings — 1, 1-1/2, 2 and 3 Hr (See Item 6)

Unrestrained Beam Ratings — 1, 1-1/2, 2 and 3 Hr (See Item 6)

Restricted Load Condition — See Items 1 and 6C

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

*** 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 Joists —** 10K1 or 16K2 min size with a max tensile stress of 30,000 psi or 12K3 or 12K5 min size with a max tensile stress of 24,000 psi.

2. **Roof Covering* —** Consisting of hot mopped, cold application or single-ply 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).

3. **Roof Insulation* —** Consisting of building units, foamed plastic or mineral and fiber boards, applied in one or more layers. When multiple layers are used, end and side joints shall be offset a min of 12 in. in both directions in order to lap all joints. See category for names of companies providing Classified products — Building Units (BZXX), Foamed Plastic (CCVW) or Mineral and Fiber Boards (CERZ). Roof insulation shall be compatible with roof covering materials Class A, B or C system. See Roofing Materials and Systems Directory-Roof Covering Materials (TEVT).

3A. **Insulating Concrete* —** As an alternate to Item 3, Consisting of Cellular Concrete-Floor- or Roof Topping Mixture, Vermiculite Concrete or Perlite Concrete. See category for names of companies providing Classified products- Floor- or Roof Topping Mixture (CCOX), Vermiculite Aggregate (CJZZ) or Perlite Aggregate (CFFX). Insulating Concrete shall be compatible with roof covering materials Class A, B or C system. See Roofing Materials and Systems Directory-Roof Covering Materials (TEVT).

4. **Adhesive —** (Optional) — May be applied to steel roof deck units or between insulation layers at a max application rate of 0.4 gal/100 sq ft. See Adhesives (BYWR) category for names of manufacturers.

5. **Steel Roof Deck —** (Unclassified) — Fluted, No. 22 MSG min galv 1-1/2 in. deep with 3-1/2 in. wide flutes spaced 6 in. OC. Ends overlapped a min 1-1/2 in. and welded to supports, 12 in. OC max. Adjacent units button-punched, welded or fastened with No. 12 by 1/2 in. long self-drilling, self-tapping steel screws.

6. **Spray-Applied Fire Resistive Materials* —** Applied by mixing with water and spraying to the beam and deck surfaces to the final min thicknesses shown below. Crest areas above the beam shall be filled with the Spray-Applied Fire Resistive Materials. Surfaces must be clean and free of dirt, loose scale and oil. Min avg and min ind density of 15/14 pcf. For method of density determination see Design Information Section.

Restrained Beam Rating Hr	Unrestrained Beam Rating Hr	10K1 more than 4 ft OC	10K1 less than 4 ft OC	16K2 more than 4 ft OC	16K2 less than 4 ft OC

1	1	1-1/8	1	15/16	15/16
1-1/2	1	1-7/16	1-7/16	1-1/2	1-3/8
1-1/2	1-1/2	1-5/8	1-7/16	1-1/2	1-3/8
2	1	1-7/8	1-7/8	2-1/16	1-7/8
2	2	2-3/16	1-7/8	2-1/16	1-7/8
3	3	3-1/2	2-13/16	3-1/2	2-13/16

ARABIAN VERMICULITE INDUSTRIES — MK-6/CBF, -6/ED, -6/HY, -6/HY Extended Set, -6s.

GCP KOREA INC — Types MK-6/CBF, MK-6/ED, MK-6/HY, MK-6/HY Extended Set, MK-6s.

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

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. Crest areas above the beam shall be filled with the Spray-Applied Fire Resistive Materials. Min avg and min ind density of 22/19 pcf, respectively. For method of density determination, refer to Design Information Section.

Restrained Beam Rating Hr	Unrestrained Beam Rating Hr	10K1 more than 4 ft OC	10K1 less than 4 ft OC	16K2 more than 4 ft OC	16K2 less than 4 ft OC
1	1	1-1/8	1	15/16	15/16
1-1/2	1	1-7/16	1-7/16	1-1/2	1-3/8
1-1/2	1-1/2	1-5/8	1-7/16	1-1/2	1-3/8
2	1	1-7/8	1-7/8	2-1/16	1-7/8
2	2	2-3/16	1-7/8	2-1/16	1-7/8
3	3	3-1/2	2-13/16	3-1/2	2-13/16

ARABIAN VERMICULITE INDUSTRIES — Types Z-106, Z-106/G, Z-106/HY.

GCP KOREA INC — Types Z-106, Z-106/G, Z-106/HY.

GCP APPLIED TECHNOLOGIES INC — Types KM-601, Z-106, Z-106/G, Z-106/HY.

6B. **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 table below to steel beam surfaces which must be clean and free of dirt, loose scale and oil. Crest areas above the beam shall be filled with Spray-Applied Fire Resistive Materials. Min avg and min ind density of 40/36 pcf, respectively. For method of density determination, refer to Design Information Section.

Restrained Beam Rating Hr	Unrestrained Beam Rating Hr	10K1 more than 4 ft OC	10K1 less than 4 ft OC	16K2 more than 4 ft OC	16K2 less than 4 ft OC

1	1	1-1/8	1	15/16	15/16
1-1/2	1	1-7/16	1-7/16	1-1/2	1-3/8
1-1/2	1-1/2	1-5/8	1-7/16	1-1/2	1-3/8
2	1	1-7/8	1-7/8	2-1/16	1-7/8
2	2	2-3/16	1-7/8	2-1/16	1-7/8
3	3	3-1/2	2-13/16	3-1/2	2-13/16

ARABIAN VERMICULITE INDUSTRIES — Types Z-146, investigated for exterior use.

GCP KOREA INC — Type Z-146 investigated for exterior use.

GCP APPLIED TECHNOLOGIES INC — Type Z-146, investigated for exterior use.

6C. **Alternate Spray-Applied Fire Resistive Materials* —** Applied by mixing with water and spraying in more than one coat to final thicknesses as shown in the illustration above and in the table below to steel surfaces which must be clean and free of dirt, loose scale and oil. For min and max density of: Types MK-6/CBF, -6/ED, -6/HY, -6/HY Extended Set, -6s see Item 6; Types Z-106, Z-106/G, Z-106/HY see Item 6A; Type Z-146, investigated for exterior use, see Item 6B.

		Joist thickness		
Restrained & Unrestrained Assembly Rating Hr	**Unrestrained Beam Rating Hr**	**12K3** more than 4 ft OC**	**12K3** less than 4 ft OC**	**12K5****
1	1	15/16	15/16	NR
1-1/2	1-1/2	1-1/2	1-3/8	NR
2	2	2-1/16	1-7/8	NR
3	3	3-1/2	2-13/16	3-1/16

**Design load shall stress the 12K3 joist to a max tensile strength of 24,000 psi, which represents 80% of the max allowable design loading. Based on the Steel Joist Institute (SJI) Publication, "Catalog of Standard Specifications and Load Tables for Steel Joists and Joist Girders" for guidance on how to increase the design loading accordingly.

ARABIAN VERMICULITE INDUSTRIES — MK-6/CBF, -6/ED, -6/HY, -6/HY Extended Set, -6s, Z-106, Z-106/G, Z-106/HY, Z-146, investigated for exterior use.

GCP KOREA INC — Types MK-6/CBF, MK-6/ED, MK-6/HY, MK-6/HY Extended Set, MK-6s, 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-6s, RG, KM-601, Z-106, Z-106/G, Z-106/HY, Z-146, investigated for exterior use.

7. **Metal Lath —** (Not Shown) — (Required on both sides of joists with Z-146, otherwise optional) — Metal lath may be used to facilitate the spray application of Spray-Applied Fire Resistive Materials 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

Fire Resistive Materials 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 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 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.

8. **Gypsum Board —** (Optional) — (Not Shown) —**Any 5/8 in. thick UL Classified Gypsum Board that is eligible for use in Design Nos. L501, G512 or U305.** Min 5/8 in. thick gypsum wallboard supplied in 4 ft wide sheets. Installed perpendicular to the steel roof deck with joints staggered and occurring over the crest of the roof deck.

CABOT MANUFACTURING ULC (View Classification) — CKNX.R25370

AMERICAN GYPSUM CO (View Classification) — CKNX.R14196

BEIJING NEW BUILDING MATERIALS PUBLIC LTD CO (View Classification) — CKNX.R19374

CERTAINTEED GYPSUM INC (View Classification) — CKNX.R3660

CGC INC (View Classification) — CKNX.R19751

CONTINENTAL BUILDING PRODUCTS OPERATING CO, L L C (View Classification) — CKNX.R18482

GEORGIA-PACIFIC GYPSUM L L C (View Classification) — CKNX.R2717

LOADMASTER SYSTEMS INC (View Classification) — CKNX.R11809

NATIONAL GYPSUM CO (View Classification) — CKNX.R3501

PABCO BUILDING PRODUCTS L L C, DBA PABCO GYPSUM (View Classification) — CKNX.R7094

PANEL REY S A (View Classification) — CKNX.R21796

SIAM GYPSUM INDUSTRY (SARABURI) CO LTD (View Classification) — CKNX.R19262

THAI GYPSUM PRODUCTS PCL (View Classification) — CKNX.R27517

UNITED STATES GYPSUM CO (View Classification) — CKNX.R1319

USG MEXICO S A DE C V (View Classification) — CKNX.R16089

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

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