



# BXUV.D782

## 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. D782

October 04, 2019

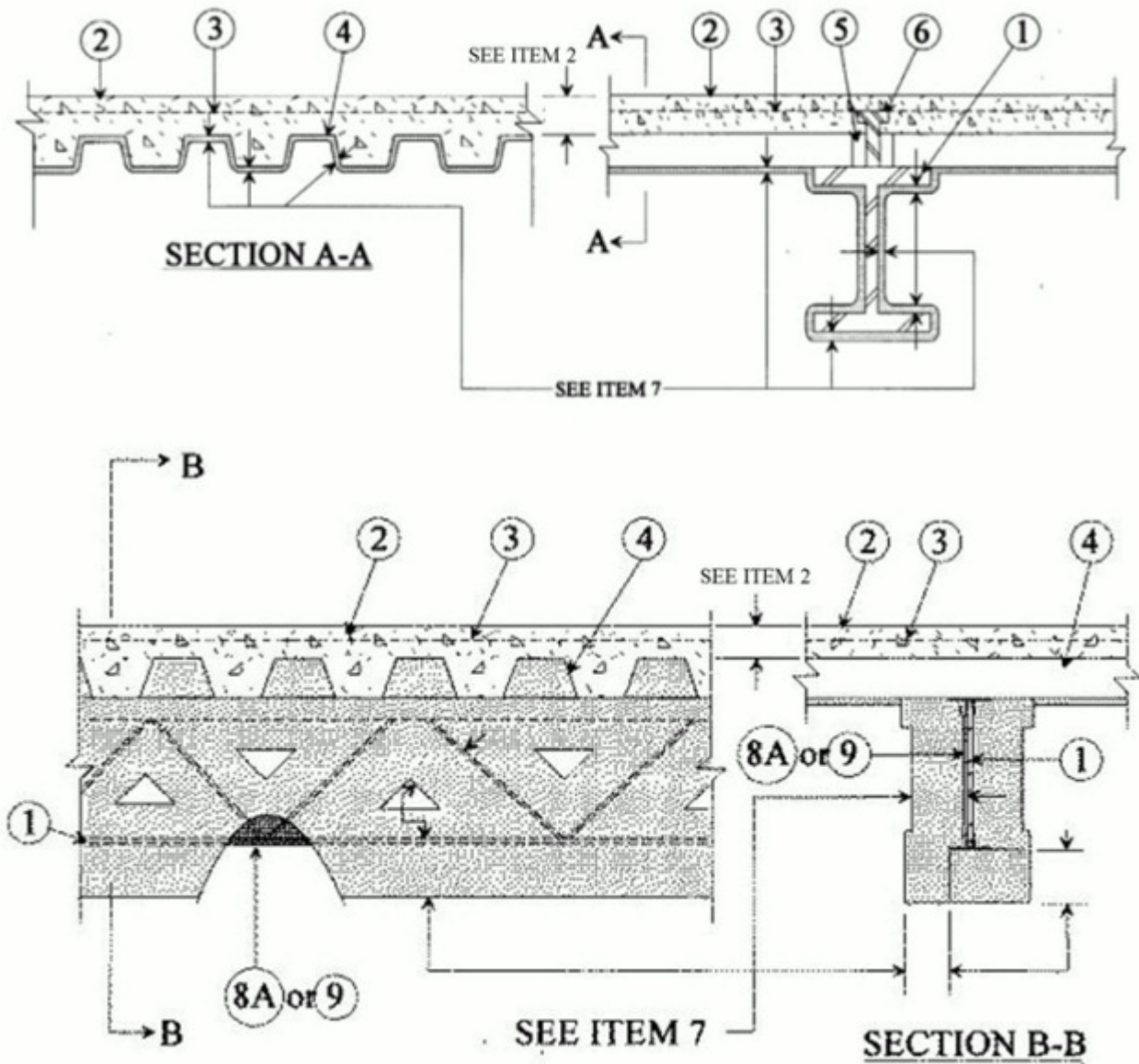
**Restrained Assembly Ratings — 1, 1-1/2, 2, 3 & 4 Hr**

**Unrestrained Assembly Ratings — 1, 1-1/2, 2, 3 & 4 Hr**

**Unrestrained Beam Assembly Ratings — 1-1/2, 2, 3 & 4 Hr**

**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. Supports** — W8x28 steel beam, min size or steel joists, composite or non-composite, 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 0.5 in. diam round bars, min. Bridging per S.J.I. specifications when non-composite joists are used.

**2. Normal Weight or Light Weight Concrete** — Normal weight concrete, carbonate or siliceous aggregate, 145 pcf plus or minus 3 pcf unit weight, 3000 psi compressive strength, vibrated. Light weight concrete, expanded shale, clay or slate aggregate by rotary kiln method; 118 (+ or -) 3 pcf unit weight, 2500 psi compressive strength, vibrated; 2 to 5 percent entrained air. Min thickness as measured to crests of steel floor and form units, 4-1/2 in. for normal weight concrete and 3-1/4 in. for light weight concrete.

**3. Welded Wire Fabric** — 6 x 6-W1.4 x W1.4.

**4. Steel Floor and Form Units\*** — Composite 1-1/2, 2 or 3 in. deep galv fluted units. Min gauge is No. 22 MSG. Spacing of welds attaching units to supports shall be at each side of joint and not to exceed 12 in. OC between joints. Adjacent units button punched or welded together 36 in. OC at joints.

**ASC STEEL DECK, DIV OF ASC PROFILES L L C** — 32 in. wide Types NH-32, NHN-32; 36 in. wide Types BH-36, BHN-36, BHN-35-1/4, 2WH-36, 2WHS-36, 3WH-36, 3WH-36, 3W-36, DG3W-36. All units may be galvanized or Prime Shield. Non-cellular decks may be vented designated with a "V" suffix to the product name.

**CANAM STEEL CORP** — 36 in. wide Type P-3623, P-3606, and P-3615 composite; 36 in. wide Type P-3606 and P-3615 noncomposite; 24 in. wide Type P-2432 composite.

**CANAM STEEL CORP** — 24 in. wide Types LF2, LF3, LF15; 24 in. wide Type NL. Types LF2, LF3 and NL units may be phos/ptd.

**CHIA TEH CONSTRUCTION MATERIAL CO LTD** — 24 or 36 in. wide Mac-Lok 3; 24 in. wide CFD-3.

**DESIGN ASSISTANCE CONSTRUCTION SYSTEMS INC** — 36 in. wide Type DACS1.5CD, or 24 in. wide Type DACS2.0CD, or DACS3.0CD.

**EPIC METALS CORP** — 24 in. Type EC-366 or 36 in. wide Type EC266

**NEW MILLENNIUM BUILDING SYSTEMS L L C** — 24 or 36 in. wide Types 2.0CD, 3.0CD, 2.0CFD, 3.0CFD, 3.0CFDES; 24, 30 or 36 in. wide Types 1.5CD, 1.5CDI, 1.5CDR, 1.5CFD. Units may be phos/painted or galvanized.

**STEEL MASTERS INTERNATIONAL DEPENDABLE STEEL** — 36 in. wide Types 2WH-36, 3WH-36. Units may be phos/painted or galvanized.

**VERCO DECKING INC - A NUCOR CO** — FORMLOK™ deck types PLB, B, BR, PLN3, N3, PLN, N, PLW2, W2, PLW3, W3. Units are min 24 in. wide and may be galvanized or phos./ptd. Deck may be vented or non-vented.

**VULCRAFT, DIV OF NUCOR CORP** — 24, 30 or 36 in. wide Type 1.5VLI, 1.5PLVLI; 24 or 36 in. wide Types 2VLI, 2.0PLVLI, 3VLI, 3.0PLVLI. Types 1-SVLI, 1.5PLVLI, 2VLI, 2.0PLVLI, 3VLI, 3.0PLVLI units may be phos/ptd. 36 in. wide Types 1.5 SB, 1.5 SBR; 24 or 36 in wide Types 2.0 SB, 3.0 SB; 36 in. wide Type High Strength 1.5 SBI, 36 in. wide Type High Strength 1.5 SBN may be phos/ptd.

**Alternate Construction** — Non-Composite units of the same type listed above may be used provided allowable loading is calculated on the basis of non-composite design.

For unprotected floor assemblies with a max restrained assembly rating of 1-1/2 hr, the unrestrained assembly rating is equal to the unrestrained beam rating and is limited to the following floor units and spans:

- (a) 1-1/2, 2 and 3 in. deep, 24 or 36 in. wide, No. 22 MSG fluted clear spans not more than 9 ft, 6 in.
- (b) 2 and 3 in. deep, 24 or 36 in. wide No. 20 MSG fluted with clear spans not more than 10 ft, 0 in.
- (c) 3 in. deep, 24 in. wide, No. 20 MSG fluted with clear spans not more than 13 ft, 2 in.

5. **Joint Cover** — 2 in. wide, pressure-sensitive cloth tape, applied following the contour of floor units.

6. **Shear Connector** — (Optional) — Studs, 3/4 in. diam by 3-3/8 in. long, headed-type or equivalent per AISC specifications. Welded to the top flange of beam through the steel floor units.

7. **Spray-Applied Fire Resistive Matrials\*** — Applied by mixing with water spraying in one coat to a final thickness as shown above, to steel surfaces which must be clean and free of dirt, loose scale and oil. Min avg and min ind density of 15/14 pcf respectively. For Types MK-6/CBF, MK-6/ED, MK-6/HY, MK-6/HB, MK-6s, MK-10 HB, RG. Min avg and min ind density of 22/19 pcf respectively for Types Z-106 and Z-106/G. For method of density determination see Design Information Section.

Restrained Assembly Rating Hr	Unrestrained Assembly Rating Hr	Unrestrained Beam Rating Hr	Protection Mtl Thkns In.			
			Crests	Valley/ Side	Beam	Joist
1	1	1	0	0	7/16++	1-1/8
1-1/2	1	1	0	0	7/16++	1-5/16

1-1/2	1-1/2	1-1/2	0	0	3/4	1-5/8
2	1	1	5/16	5/16	7/16++	1-7/16
2	2	2	5/16	5/16	1	2-3/16
3	1-1/2	1-1/2	3/8	3/8	3/4	3-1/2
3	2	2	3/8	3/8	1	3-1/2
3	3	3	11/16	1/2	1-5/16	3-1/2
4	2	2	11/16	1/2	1	—
4	3	3	11/16	1/2	1-5/16	—
4	4	4	1-1/2	1-1/8	1-5/8	—

**ARABIAN VERMICULITE INDUSTRIES** — Types MK-6/CBF, -6/ED, -6/HY, -6HY Extended Set, -6/HB, -6s, MK-10 HB, MK-10 HB Extended Set, Sonophone 1, Sonophone 5, Z-106, Z-106/G.

**GCP KOREA INC** — Types MK-6/CBF, MK-6/ED, MK-6HY, MK-6HY Extended Set, MK-6/HB, MK-6s, MK-10 HB, MK-10 HB Extended Set, Monokote Acoustic 1, Monokote Acoustic 5, Z-106, Z-106/G.

**GCP APPLIED TECHNOLOGIES INC** — Types MK-6/HY, MK-6HY Extended Set, MK-6/HB, MK-6s, MK-10 HB, MK-10 HB Extended Set, Monokote Acoustic 1, Monokote Acoustic 5, RG, Z-106, Z-106/G.

++Thickness on lower flange tips may be reduced to 1/4 in.

**7A. Alternate Spray-Applied Fire Resistive Materials\*** — Applied by mixing with water and spraying in one or more coats to final thicknesses as shown in the table below to steel surfaces which must be clean and free of dirt, loose scale and oil. When steel deck is used the area between the steel deck and the beams top flange or the joist upper angles shall be filled. Min avg and min ind density of 22/19 pcf respectively. For method of density determination, refer to Design Information Section.

Restrained Assembly Rating Hr	Unrestrained Assembly Rating Hr	Unrestrained Beam Rating Hr	Protection Mtl Thkns In.			
			Crests	Valley/ Side	Beam	Joist
1	1	1	0	0	1/2++	1-1/8
1-1/2	1	1	0	0	1/2++	1-5/16
1-1/2	1-1/2	1-1/2	0	0	13/16	1-5/8
2	1	1	3/8	3/8	1/2++	1-7/16
2	2	2	3/8	3/8	1	2-3/16
3	1-1/2	1-1/2	3/8	3/8	3/4	3-1/2
3	2	2	7/16	7/16	1	3-1/2
3	3	3	11/16	9/16	1-5/16	3-1/2
4	2	2	11/16	9/16	1	—
4	3	3	11/16	9/16	1-5/16	—
4	4	4	1-1/2	1-1/8	1-5/8	—

**ARABIAN VERMICULITE INDUSTRIES** — Type Z-106/HY.

**GCP APPLIED TECHNOLOGIES INC** — Type Z-106/HY.

**GCP KOREA INC** — Type Z-106/HY.

++Thickness on lower flange tips may be reduced by one half.

**7B. Alternate Spray-Applied Fire Resistive Materials\*** — Applied by mixing with water and spraying in one or more coats to final thicknesses as shown in the table below to steel surfaces which must be clean and free of dirt, loose scale and oil. The area between the steel deck and the beams top flange or the joist upper angle shall be filled. Application of protection material to steel floor units requires the installation of expanded metal lath. See Item 8B . Min avg and min ind density of 40/36 pcf, respectively. Min avg and min ind density of 40/36 pcf respectively for Types Z-146, Z-146PC and Z-146T cementitious mixture. 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 Assembly Rating Hr	Unrestrained Assembly Rating Hr	Unrestrained Beam Rating Hr	Protection Mtl Thkns In.		
			Beneath Floor	Beam	Joist
1	1	1	0	7/16++	1-1/8
1-1/2	1	1	0	7/16++	1-5/16
1-1/2	1-1/2	1-1/2	0	3/4	1-5/8
2	1	1	5/16	7/16++	1-7/16
2	2	2	5/16	1	2-3/16
3	1-1/2	1-1/2	3/8	3/4	3-1/2
3	2	2	3/8	1	3-1/2
3	3	3	11/16	1-5/16	3-1/2
4	2	2	11/16	1	—
4	3	3	11/16	1-5/16	—
4	4	4	1-1/2	1-5/8	—

**ARABIAN VERMICULITE INDUSTRIES** — Types Z-146 investigated for exterior use, Sonophone 35.

**GCP KOREA INC** — Types Z-146 investigated for exterior use, Monokote Acoustic 35.

**GCP APPLIED TECHNOLOGIES INC** — Types Z-146, Z-146T, Z146PC, Z-156, Z-156T and Z-156PC investigated for exterior use, Monokote Acoustic 35.

++Thickness on lower beam flange tips may be reduced to 1/4 in.

**8. Metal Lath** — (Not Shown) — Metal lath shall be 3/8 in. expanded diamond mesh, weighing 2.5 lb per sq yd. Secured to underside of steel deck with No. 12 by 3/8 in. pan head self-drilling, self-tapping screws and steel washers with an outside diam of 1/2 in. screws spaced 12 in. OC in both directions with lath edges overlapped approx 3 in.

8A. **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 Fire Resistive Materials on steel bar joist 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 No. 18 SWG galv steel wire at joist web and bottom chord members spaced 15 in. OC max. When used, the metal lath is to be fully covered with Spray-Applied Fire Resistive.

8B. **Metal Lath** — (Not shown) — (Required with Z-146, Sonophone 35, and Monokote Acoustic 35 Item 7B, otherwise optional) — Metal lath shall be 3/8 in. expanded diamond mesh, weighing 2.5 lb per sq yd. Secured to underside of steel deck with No. 12 by 3/8 in. pan head self-drilling, self-tapping screws and steel washers with an outside diam of 1/2 in. screws spaced 12 in. OC in both directions with lath edges overlapped approx 3 in.

9. **Nonmetallic Fabric Mesh** — (Optional) — As an alternate to metal lath, (Item 8A) glass fiber fabric mesh, weighing approx 2.5 oz per sq yd, polypropylene fabric mesh, weighing approx 1.25 oz per 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 in place during application until it has cured.

**\* 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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