

BXUV.G705

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

Design No. G705

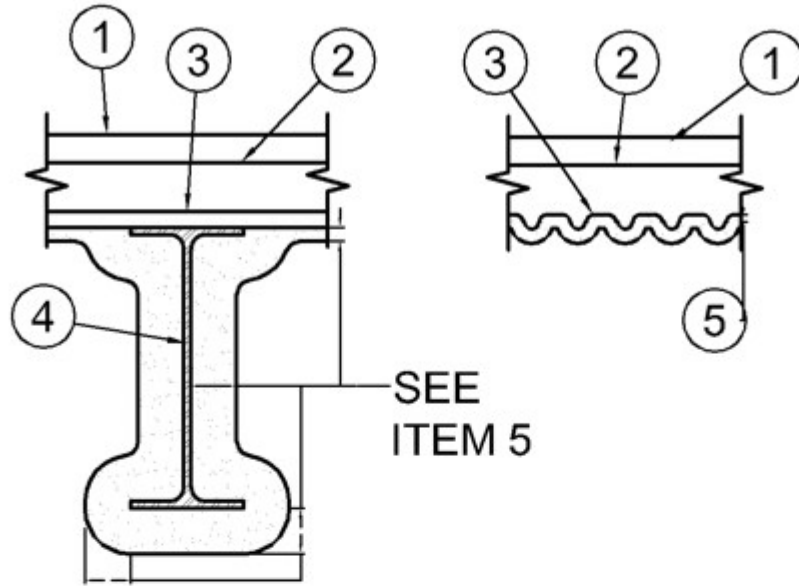
Restrained Assembly Ratings — 1, 1-1/2, 2 or 3 Hr.

Unrestrained Assembly Ratings — 1, 1-1/2, 2 or 3 Hr. (See Item 2 and 5)

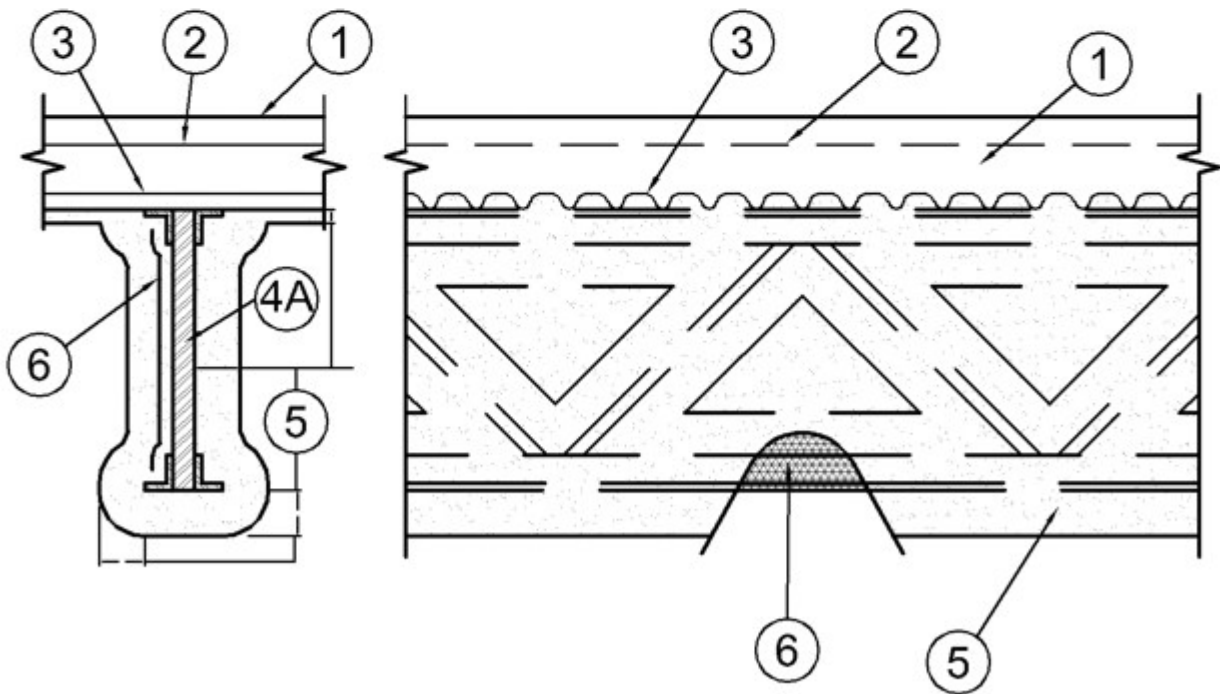
Unrestrained Beam Ratings — 1, 1-1/2, 2 or 3 Hr. (See Items 2 and 5)

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.**



SEE
ITEM 5



1. Normal Weight or Light Weight Concrete — Normal weight concrete: carbonate or siliceous aggregate concrete, 147 to 150 pcf unit weight, 3500 psi compressive strength, vibrated. Lightweight concrete: expanded shale, clay, or slate aggregate by rotary-kiln method, 110 to 118 pcf unit weight, 3000 psi compressive strength, vibrated, 2 oz air entrainment per bag of cement.

For 1, 1-1/2 and 2 h assembly ratings, the 2-3/4 in. concrete topping thickness may be reduced to 2-1/2 in. when non-composite joists are used. The Unrestrained Assembly Rating depends on the type of concrete aggregate and joist spacing as shown below.

Unrestrained Assembly Rating

	Max Joist Spacing 3 ft, 6 in.	Joist Spacing Greater Than 3 ft, 6 in. O.C.
Light Weight Aggregate	1-1/2 h	1-1/2 h
Normal Weight Aggregate	2 h	1-1/2 h

2. **Welded Wire Fabric** — 6x6 in.-W2.0xW2.0 or 6x6-8/8 SWG.

3. **Steel Floor and Form Units** — No. 28 MSG galv corrugated sheet steel min, 2-1/2 in. pitch and 1/2 in. depth of corrugations. Units welded to each joist, 36 welds per 100 sq ft of form units, with at least one weld at each joint or **Classified Steel Floor and Form Units*** — min 9/16 in. deep, 28 MSG galv or ptd/ptd corrugated deck. Units welded to each beam or joist with 36 welds per 100 sq ft of units, with min one weld at each side joint of units.

VULCRAFT, DIV OF NUCOR CORP — Types 0.6 C, 1.0 C or 1.3 C.

NEW MILLENNIUM BUILDING SYSTEMS L L C — 24 through 36 in. wide, Types 0.6FD, 1.0FD

3A. **Steel Floor and Form Units** — (Not Shown) As an alternate to Item 3, Composite 1-1/2 in. deep, 30, 35 or 36 in. wide, galv steel units. Min gauge is 22 MSG. Welded to supports 12 in. OC. Adjacent units button-punched, welded or screwed together 36 in. OC max along side joints. The concrete thickness shall be measured to the top plane of the steel deck.

VULCRAFT, DIV OF NUCOR CORP — Types 1.5VL, 1.5VLI.

NEW MILLENNIUM BUILDING SYSTEMS L L C — 24 through 36 in. wide, Types 1.5CD, 1.5CDI units may be ptd.

4. **Steel Beam** — W8x28 min size.

4A. **Steel Joists** — As an alternate to Item 4 — Composite or non-composite min 8k1 or min depth and weight shall be 8 in. and 4.9 lb/ft respectively. May be uncoated or provided with a shop coat of paint. Designed per S.J.I. specifications for a max design stress of 30,000 psi (30 ksi). Welded or bolted to end supports. The top chords shall consist of two angles measuring 1-1/4 by 1-1/4 by 0.127 in. thick. Bottom chords shall consist of two round bars measuring 0.566 in. in diam. or two angles measuring 1 by 1 by 0.125 in. thick. Bearing plates shall consist of two angles measuring 1-1/2 by 2 by 0.188 in. thick and 5-1/16 in. long. Web members shall consist of 0.565 in. diam bars.

4B. **Steel Joists** — As an alternate to Items 4 and 4A, Composite or non-composite min 10k1 or min depth and weight shall be 10 in. and 4.8 lb/ft respectively. May be uncoated or provided with a shop coat of paint. Designed per S.J.I. specifications for a max design yield stress of 50,000 psi (50 ksi). Welded or bolted to end supports. Top chords shall consist of two angles measuring 1-1/4 by 1-1/4 by 0.136 in. thick. Bottom chord shall consist of two angles measuring 1 by 1 by 0.112 in. thick, min. The first diagonal web member at each end shall consist of a min. 0.62 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.

4C. **Steel Joists** — As an alternate to Item 4 through 4B — Composite or non-composite min 12k5 or min depth and weight shall be 12 in. and 7.1 lb/ft respectively. May be uncoated or provided with a shop coat of paint. Designed per S.J.I. specifications for a max design stress of 30,000 psi (30 ksi). Welded or bolted to end supports. Top chords shall consist of two angles measuring 1-1/2 by 1-1/2 by 0.156 in. thick. Bottom chord shall consist of two round bars measuring 0.675 in. in diam. or two angles measuring 1 by 1 0.125 in. thick. The second web member at each end shall consist of a 0.654 in. diam round bar. Primary web members, including the end web members, shall consist of 0.774 in. diam round bars. All remaining non-primary web members shall consist of 0.5 in. diam round bars. Horizontal bridging (Item 7) per S.J.I. specifications is required when non-composite joists are used.

4D. **Composite Joists** — (Not Shown) — As an alternate to Item 4 through 4C, steel joists designed for full composite action with the concrete slab. Min overall depth 13 in. Min area of joist members shall be 0.708 sq in. for top and bottom chord angles and 0.442 sq in for web. Designated in accordance with SJI Specifications for K-Series joists as revised in November 15, 1989.

4E. **Structural Steel Members*** — (Not Shown) As an alternate to 4 through 4D — Composite joists with top chord embedded in concrete slab. Welded to end supports. Min area of joist members shall be 0.708 sq in. for top and bottom chord angles and 0.442 sq in. for web.

5. **Spray-Applied Fire Resistive Materials*** — Applied by mixing with water and spraying in one or more coats to the thicknesses shown below, to steel surfaces which are clean and free of dirt, loose scale, and oil. Use of Type PC-Pre-coat is required on steel floor and form units. Type PC Pre-coat shall be applied to cover approximately 70 percent of the surface. Thickness of Type PC Pre-coat is included in the total thickness of the protection material. Min average and min individual density of 15 and 14 pcf respectively, for Types 300, 300AC, 300ES,, 300N HS, 300N, 3000, 3000 ES and SB. Min average density and min individual density of 47 and 43pcf, respectively for Type M-II/P. For method of density determination, see design Information Section, Sprayed Material.

Min Thkns Spray Applied Resistive Mtl, In.

Restrained Assembly Rating, Hr	Unrestrained Assembly & Beam Rating, Hr	Concrete Type	Min Deck Thkns In.	W8x28 Beam (Item 4)	8k1 Joist (Item 4A)	10k1 Joist (Item 4B)	12k5 Joist	
							(Item 4C)	Joist (Item 4D, 4E)
1	1	NW	1/2	5/16	1	15/16	9/16+	1-1/2
1-1/2	1-1/2	NW	1/2	9/16	1 9/16	1-1/4	1	1-1/2
2	1	NW	1/2	5/16	2 1/16	1-1/8	1-3/8	1-1/2
2	2	NW	1/2	11/16	2 1/16	1-9/16	1-3/8	1-1/2
3	1-1/2	NW	1/2	9/16	—	1-15/16	2-1/4	1-1/2
3	3	NW	1	1- 1/16	—	2-9/16	2-1/4	2-1/4
1	1	LW	1/2	5/16	1-1/8	1-1/16	9/16+	1-1/2
1-1/2	1-1/2	LW	1/2	9/16	1-3/4	1-1/2	1	1-1/2
2	1	LW	1/2	5/16	2-1/4	1-7/16	1-3/8	1-1/2
2	2	LW	1/2	11/16	2-1/4	1-13/16	1-3/8	1-1/2
3	1-1/2	LW	1/2	9/16	—	2-1/2	2-1/4	1-1/2
3	3	LW	1	1- 1/16	—	2-7/8	2-1/4	2-1/4

+ - When bottom chords consist of 1 by 1 by 0.125 in. thick steel angles. The thickness of spray-applied fire resistive material shall be increased by 1/4 in. on the bottom chord only.

BERLIN CO LTD — Types 300, 300ES, 300N, 400 or SB; Types M-II, TG or M-II/P

GREENTECH ASIA PACIFIC SDN BDH — Types 300, 300ES, 300HS, or 400; Types M-II or M-II/P

GREENTECH THERMAL INSULATION PRODUCTS MFG CO L L C — Types 300, 300AC, 400, or 400AC; Types M-II, TG or M-II/P

ISOLATEK INTERNATIONAL — Types 300, 300AC, 300ES, 300HS, 300N, SB, 400, 400AC, 400ES, 3000, 3000ES; Types M-II, TG or M-II/P

NEWKEM PRODUCTS CORP — Types 300, 300ES, 300N, 400, or SB; Types M-II, TG or M-II/P

2-1/16	3-1/2	5-1/8	8	8
2-1/4	2-11/16	3-15/16	7-7/8	8
2-1/2	1-5/8	2-3/8	4-11/16	5-1/16
2-9/16	1-5/16	1-15/16	3-15/16	4-3/16
2-7/8	0	0	0	0

INTERNATIONAL CELLULOSE CORP — Type K13, URE-K, or Sonospray FC

5B. **Sprayed Fiber Insulation*** — (Optional, Not Shown) — Spray applied fiber insulation, Classified for Noncombustible Building Materials (BICW), having a maximum applied density of 3.5 pcf, applied over Spray-Applied Fire Resistive Material (Item 5) on both steel floor and form units (Item 3) and supports (Item 4). Sprayed fiber insulation may be over Spray-Applied Fire Resistive Material (Item 5) according to the following tables:

Allowable Spray-Applied Fiber Insulation Thickness Over Steel Deck

Installed SFRM Thickness (in.) on Deck	SFRM Density (pcf)			
	15	22	44	47
1/2	5	5	5	5
1	5	5	5	5

Allowable Spray-Applied Fiber Insulation Thickness Over Beam

Installed SFRM Thickness (in.) on Beam	SFRM Density (pcf)			
	15	22	44	47
5/16	5	5	5	5
9/16	5	5	5	5
11/16	5	5	5	5
1-1/16	3 1/2	5	5	5

Allowable Spray-Applied Fiber Insulation Thickness Over Joist

Installed SFRM Thickness (in.) on Joist	SFRM Density (pcf)			
	15	22	44	47
9/16	5	5	5	5
13/16	5	5	5	5
15/16	5	5	5	5
1-1/12	5	5	5	5
1-1/8	5	5	5	5

1-1/4	5	5	5	5
1-3/8	5	5	5	5
1-7/16	5	5	5	5
1-1/2	5	5	5	5
1-9/16	5	5	5	5
1-3/4	4 13/16	5	5	5
1-13/16	4 9/16	5	5	5
1-15/16	4	5	5	5
2-1/16	3 1/2	5	5	5
2-1/4	2 11/16	3 15/16	5	5
2-1/2	1 5/8	2 3/8	4 11/16	5
2-9/16	1 5/16	1 15/16	3 15/16	4 3/16
2-7/8	0	0	0	0

THERMACOUSTICS IND — Type TC-417

6. Metal Lath — (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.

6A. Glass Fiber Mesh — (Optional, Not Shown) — As an alternate to metal lath (Item 6), min 3/32 in. sq mesh, coated fiberglass scrim fabric, weighing a min of 1.9 oz per sq yd or, polypropylene fabric mesh, weighing approximately 1.25 oz per sq yd or equivalent may be used to facilitate spray application. The mesh shall be attached to one side of each joist web member. The method of attachment must be sufficient to hold the mesh and fire protection material during application and curing of the material. Suitable methods of attachment include hairpins, 18 SWG galv steel tie wire or hot melted glue. Hairpin clips are nom 1-1/4 in. long by 1/2 in. wide made of 0.064 in. diam steel wire. Hairpin clips or tie wire located near top and bottom and at intermediate points along each web member to firmly secure the fabric to the joist.

6B. Metal Lath — (Not Shown) — Required with Types M-II, TG and M-II/P. 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.

7. Horizontal Bridging — (Not Shown) — Min 1-1/4x1-1/4x1/8 in. thick steel angles for use with non-composite joists (Item 4 and 4A). Number and spacing per Steel Joist Institute specifications. Welded to top and bottom chord of the joists. Min thickness of spray-applied resistive material on bridging angles is min thickness on steel joist.

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

Last Updated on 2021-05-11

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