

BXUV.N653 -

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

See General Information for Fire-resistance Ratings - ANSI/UL 263

Design No. N653

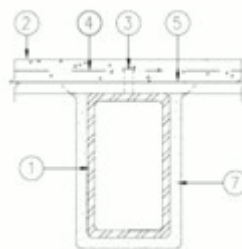
February 03, 2020

Restrained Beam Rating — 1, 1-1/2, 2, 2-1/2 and 3 Hr. (See Item 7 and 7A)

Unrestrained Beam Rating — 1, 1-1/2, 2 and 2-1/2 Hr. (See Item 7 and 7A)

This design was evaluated using loading determined by Allowable Stress Design Method (ASD) and Load and Resistance Factor Design Method (LRFD). 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 Tube Beam — ASTM A500 tube beams (46 or 50 ksi) having an A/P between 0.267 and 0.616. The minimum tube dimension shall be 4 in. and the maximum tube dimension shall be 12 in. Both square and rectangular sections permitted. When rectangular sections are used, tubes shall be installed vertically with one narrow face secured to the steel floor and form units (Item 5).

2. **Normal Weight or Lightweight Concrete** — Normal weight or lightweight concrete, 2-1/2 in. min thickness over the steel floor and form unit crests. Normal weight concrete: carbonate or siliceous aggregate, 4000 psi compressive strength, unit weight 145 ± 3 pcf. Lightweight concrete: expanded shale, clay, or slate aggregate by rotary-kiln method, 4000 psi compressive strength, unit weight 110 ± 3 pcf.

3. **Shear Connector** — Studs, 1/2, 5/8 or 3/4 in. diam headed type or equivalent per AISC specification. Welded to the top flange of beam through the steel floor units. Studs shall provide nominal 50% composite action between the beam and concrete.

4. **Welded Wire Fabric** — (Optional) 6x6, W1.4 x W1.4 or 6x6-10/10 SW.

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

6. **Primer** — (Not shown) - Beams shall be primed with a phenolic modified alkyd resin primer, a metal alkyd primer, an acrylic primer or an epoxy primer at a nominal thickness of 2 mil.

7. **Mastic and Intumescent Coatings*** — Coating spray or brush applied in accordance with the manufacturer's instructions at the min dry thickness as shown in the table below. The thickness shown below includes the primer thickness. Top of the beam where deck crests are located is protected with intumescent coating at the same thickness shown in the table.

Unrestrained Beam Ratings:

HSS Steel Size	A/P	Rating Period (min)			
		60	90	120	150
Required Thickness (mils)					
6x4x1/4	0.267	61	142	N/A	N/A
10x10x1/4	0.297	57	142	N/A	N/A
7x4x5/16	0.322	53	142	N/A	N/A
10x8x5/16	0.352	48	139	N/A	N/A
9x7x3/8	0.411	41	119	196	N/A
12x12x3/8	0.441	39	111	183	N/A
12x4x1/2	0.476	36	103	169	N/A
5x5x1/2	0.516	33	95	156	N/A
7x7x1/2	0.545	31	90	148	206
10x4x5/8	0.577	30	85	140	195
12x6x5/8	0.616	22	76	129	183

HSS Steel Size	A/P	Rating Period (min)			
		60	90	120	150
Required Thickness (mm)					
6x4x1/4	0.267	1.56	3.6	N/A	N/A
10x10x1/4	0.297	1.46	3.6	N/A	N/A
7x4x5/16	0.322	1.34	3.6	N/A	N/A

10x8x5/16	0.352	1.23	3.52	N/A	N/A
9x7x3/8	0.411	1.05	3.02	4.98	N/A
12x12x3/8	0.441	0.98	2.81	4.64	N/A
12x4x1/2	0.476	0.91	2.61	4.30	N/A
5x5x1/2	0.516	0.84	2.4	3.97	N/A
7x7x1/2	0.545	0.79	2.28	3.76	5.24
10x4x5/8	0.577	0.75	2.15	3.55	4.95
12x6x5/8	0.616	0.56	1.92	3.28	4.64

Restrained Beam Ratings:

HSS Steel Size	A/P	Rating Period (min)				
		60	90	120	150	180
		Required Thickness (mils)				
6x4x1/4	0.267	61	95	N/A	N/A	N/A
10x10x1/4	0.297	57	95	200	N/A	N/A
7x4x5/16	0.322	53	89	184	N/A	N/A
10x8x5/16	0.352	48	81	168	N/A	N/A
9x7x3/8	0.411	41	70	144	N/A	N/A
12x12x3/8	0.441	39	65	134	204	N/A
12x4x1/2	0.476	36	60	124	189	N/A
5x5x1/2	0.516	33	56	115	174	N/A
7x7x1/2	0.545	31	53	109	165	N/A
10x4x5/8	0.577	30	50	103	156	209
12x6x5/8	0.616	22	46	96	146	195

HSS Steel Size	A/P	Rating Period (min)				
		60	90	120	150	180
		Required Thickness (mm)				
6x4x1/4	0.267	1.56	2.42	N/A	N/A	N/A
10x10x1/4	0.297	1.46	2.42	5.07	N/A	N/A
7x4x5/16	0.322	1.34	2.26	4.67	N/A	N/A
10x8x5/16	0.352	1.23	2.07	4.28	N/A	N/A
9x7x3/8	0.411	1.05	1.77	3.66	N/A	N/A

12x12x3/8	0.441	0.98	1.65	3.41	5.17	N/A
12x4x1/2	0.476	0.91	1.53	3.16	4.79	N/A
5x5x1/2	0.516	0.84	1.41	2.92	4.42	N/A
7x7x1/2	0.545	0.79	1.34	2.76	4.19	N/A
10x4x5/8	0.577	0.75	1.26	2.61	3.95	5.30
12x6x5/8	0.616	0.56	1.18	2.44	3.7	4.96

7A. **Mastic and Intumescent Coatings*** — Coating spray or brush applied in accordance with the manufacturer's instructions at the min dry thickness as shown in the table below. The thickness shown below includes the primer thickness. Deck flutes above the beam to be stuffed with mineral wool insulation (Item 8).

Unrestrained Beam Ratings:

HSS Steel Size	A/P	Rating Period (min)			
		60	90	120	150
Required Thickness (mils)					
6x4x1/4	0.267	68	143	N/A	N/A
10x10x1/4	0.297	66	143	N/A	N/A
7x4x5/16	0.322	61	143	N/A	N/A
10x8x5/16	0.352	56	138	N/A	N/A
9x7x3/8	0.411	48	118	188	N/A
12x12x3/8	0.441	45	110	176	N/A
12x4x1/2	0.476	41	102	163	N/A
5x5x1/2	0.516	38	94	150	206
7x7x1/2	0.545	36	89	142	195
10x4x5/8	0.577	34	84	134	184
12x6x5/8	0.616	26	75	124	172

HSS Steel Size	A/P	Rating Period (min)			
		60	90	120	150
Required Thickness (mm)					
6x4x1/4	0.267	1.73	3.63	N/A	N/A
10x10x1/4	0.297	1.69	3.63	N/A	N/A
7x4x5/16	0.322	1.56	3.63	N/A	N/A
10x8x5/16	0.352	1.42	3.5	N/A	N/A
9x7x3/8	0.411	1.22	3	4.78	N/A
12x12x3/8	0.441	1.14	2.8	4.46	N/A

12x4x1/2	0.476	1.05	2.59	4.13	N/A
5x5x1/2	0.516	0.97	2.39	3.81	5.23
7x7x1/2	0.545	0.92	2.26	3.61	4.95
10x4x5/8	0.577	0.87	2.14	3.41	4.68
12x6x5/8	0.616	0.67	1.9	3.14	4.37

Restrained Beam Ratings:

HSS Steel Size	A/P	Rating Period (min)				
		60	90	120	150	180
		Required Thickness (mils)				
6x4x1/4	0.267	68	95	N/A	N/A	N/A
10x10x1/4	0.297	66	95	200	N/A	N/A
7x4x5/16	0.322	61	89	184	N/A	N/A
10x8x5/16	0.352	56	81	168	N/A	N/A
9x7x3/8	0.411	48	70	144	N/A	N/A
12x12x3/8	0.441	45	65	134	204	N/A
12x4x1/2	0.476	41	60	124	189	N/A
5x5x1/2	0.516	38	56	115	174	N/A
7x7x1/2	0.545	36	53	109	165	N/A
10x4x5/8	0.577	34	50	103	156	209
12x6x5/8	0.616	26	46	96	146	195

HSS Steel Size	A/P	Rating Period (min)				
		60	90	120	150	180
		Required Thickness (mm)				
6x4x1/4	0.267	1.73	2.42	N/A	N/A	N/A
10x10x1/4	0.297	1.69	2.42	5.07	N/A	N/A
7x4x5/16	0.322	1.56	2.26	4.67	N/A	N/A
10x8x5/16	0.352	1.42	2.07	4.28	N/A	N/A
9x7x3/8	0.411	1.22	1.77	3.66	N/A	N/A
12x12x3/8	0.441	1.14	1.65	3.41	5.17	N/A
12x4x1/2	0.476	1.05	1.53	3.16	4.79	N/A
5x5x1/2	0.516	0.97	1.41	2.92	4.42	N/A

7x7x1/2	0.545	0.92	1.34	2.76	4.19	N/A
10x4x5/8	0.577	0.87	1.26	2.61	3.95	5.30
12x6x5/8	0.616	0.67	1.18	2.44	3.7	4.96

BERLIN CO LTD — Type WB3, Investigated for Interior General Purpose. Type WB4, Investigated for Interior General Purpose. Type WB4, Investigated for Exterior Use with top coat as described in Item 9

GREENTECH THERMAL INSULATION PRODUCTS MFG CO L L C — Type WB3, Investigated for Interior General Purpose. Type WB4, Investigated for Interior General Purpose. Type WB4, Investigated for Exterior Use with top coat as described in Item 9

ISOLATEK INTERNATIONAL — Type SprayFilm-WB 3 and Type WB3, Investigated for Interior General Purpose. Type SprayFilm-WB 4 and Type WB4, Investigated for Interior General Purpose. Type SprayFilm-WB 4 and Type WB4, Investigated for Exterior Use with top coat as described in Item 9

NEWKEM PRODUCTS CORP — Type WB3, Investigated for Interior General Purpose. Type WB4, Investigated for Interior General Purpose. Type WB4, Investigated for Exterior Use with top coat as described in Item 9

8. Mineral Wool Insulation — (Not Shown) — Min 6 pcf mineral wool insulation cut into pieces and firmly packed into, and completely filling the spaces between the flutes of the steel floor and form units and the top flange of the beam. Mineral wool is not required when the top flange of the beam is protected with intumescent coating at the same thickness shown in the table in Item 7.

9. Top Coat — (Not Shown) - Type SprayFilm — TOPSEAL and Type TOPSEAL required for Exterior Use, applied at a minimum dry thickness of 14 mils (0.34 mm) over the intumescent material.

*** 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 2020-02-03

The appearance of a company's name or product in this database does not in itself assure that products so identified have been manufactured under UL's Follow-Up Service. Only those products bearing the UL Mark should be considered to be Certified and covered under UL's Follow-Up Service. Always look for the Mark on the product.

UL permits the reproduction of the material contained in the Online Certification Directory subject to the following conditions: 1. The Guide Information, Assemblies, Constructions, Designs, Systems, and/or Certifications (files) must be presented in their entirety and in a non-misleading manner, without any manipulation of the data (or drawings). 2. The statement "Reprinted from the Online Certifications Directory with permission from UL" must appear adjacent to the extracted material. In addition, the reprinted material must include a copyright notice in the following format: "© 2020 UL LLC"