

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. D798

August 02, 2024

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

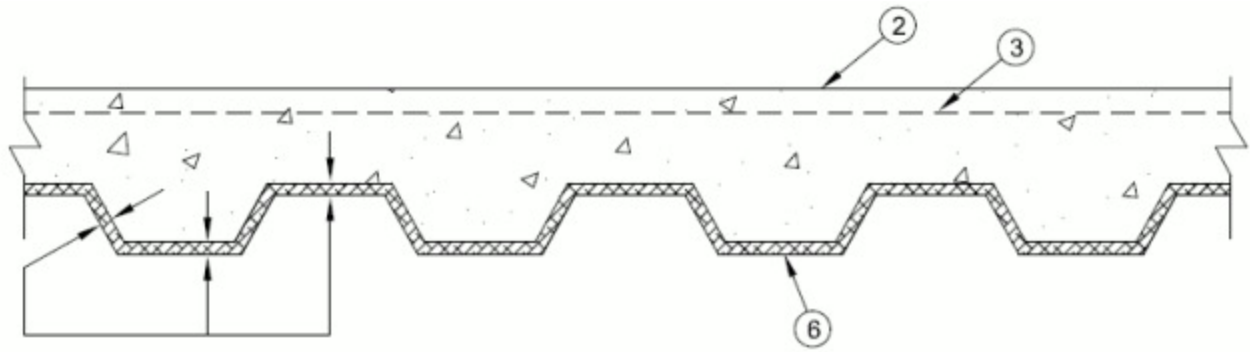
Unrestrained Assembly Ratings — 1, 1-1/2, 2, 3 & 4 Hr.

Unrestrained Beam Ratings — 1, 1-1/2, 2, 3 & 4 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. **Supports** — W8 x 28 or alternate (per Section IV.6 in the front of the Fire Resistance Directory) steel beam or min 10K1 steel joists when joist substitution applied.

Note: Joists from the N series designs may be substituted for the listed beam (Item 1). When joists are substituted, the restrained rating of the joist must be equal to or greater than the restrained rating of the assembly. Additional joist substitution requirements are contained in the front of the Fire Resistance Directory.

2. **Normal Weight or Lightweight Concrete** — Normal weight concrete, carbonate or siliceous aggregate, 145 pcf plus or minus 3 pcf unit weight, 3000 psi compressive strength, vibrated. Lightweight concrete, expanded shale, clay, or slate aggregate by rotary-kiln method 110 pcf plus or minus 3 pcf unit weight, 3000 psi compressive strength. Normal weight concrete is either carbonate or siliceous aggregate. Lightweight concrete is either expanded shale, clay, or slate aggregate by rotary-kiln method. Min thickness as measured to crests of steel floor and form units, 2-1/2 in.

3. **Welded Wire Fabric** — 6 x 6 - 10/10 SWG optional when using beam; 6x6-W1.4 x W1.4 when using joist.

3A. **Fiber Reinforcement** — As an alternate to Item 3, engineered synthetic fibers added to concrete mix to control shrinkage cracks in concrete. See Fiber Reinforcement (CBXQ) category in the Fire Resistance Directory for names of manufacturers and rates of application.

4. **Steel Floor or Form Units** — Composite or non-composite, fluted, 1-1/2, 2, or 3 in. deep galv units welded to beam or joist. Min gauge is 22 MSG.

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, 3WxH-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 GROUP INC — 24 in. wide Type P-2432 composite or 36 in. wide Type P-3623, P-3606 and P-3615; 24 or 36 in. wide Type LF3. Type LF3 may be welded or fastened together with min 1 in. long No. 10 self-drilling, self-tapping steel screws 36 in. OC. Type LF3 may be phos/ptd; 36 in. wide Types 1.5B, 1.5BI, 1.5BL and 1.5BL; 24 in. or 36 in. wide, Type LF2, vented Types LF2 and LF3.

CANAM STEEL CORP — 24, 30 or 36 in. wide Type BL; 24 or 36 in. wide Types LF1.5, LF2, LF3; 24, 36 in. wide Types LF2, LF3 may be welded or fastened together with min 1 in. long No. 10 self-drilling, self-tapping steel screws 36 in. OC. Types BL, LF2, LF3, N-Lok may be phos/ptd

KAM INDUSTRIES LTD, DBA CORDECK — 24 in. wide, QL-3, 24 or 36 in. wide, 2 or 3 in. deep QL-99. Units may be welded or fastened together with No. 10 self-drilling, self-tapping screws 60 in. OC. The length of the screws shall be sufficient to fully penetrate adjacent floor units

DECK WEST INC — 36 in. Types 2-DW, 3-DW, B-DW or BA-DW. Units may be welded or fastened together with No. 10 self-drilling, self-tapping screws 60 in. OC. The length of the screws shall be sufficient to fully penetrate adjacent floor units

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

EPIC METALS CORP — 24 in. wide Types EC150, EC366, 36 in. wide Type EC266

INTSEL STEEL EAST LLC — 36 in. wide Types 2" COMPOSITE/FLOOR, 3" COMPOSITE/FLOOR.

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

SAMSON METAL LTD — Type 1-1/2" deep SM900FD-CL deck

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.

VICWEST INC. — Types HBS938, HBS938CL and HBS938CL-IN Composite Steel Decks; Types RDS938, RDS938CL and RDS938CL-IN Non-Composite Steel Decks.

VULCRAFT, DIV OF NUCOR CORP — 24, 30 or 36 in. wide Types 1.5VL1, 1.5PLVLI; 24 or 36 in. wide Types 2VL1, 2.0PLVLI, 3VL1, 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; Units may be phos/ptd

5. **Shear Connectors** — (Optional) — Studs, 3/4 in. diam by 3-1/2 in. long, headed type or equivalent per AISC specification. Welded to top flange of the beam, or top chord of the joist, through the deck.

6. **Spray-Applied Fire Resistive Materials** — Applied by mixing with water and spraying 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 shall be filled. Min avg 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/G, Z-106/HY. 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. Application to steel deck requires the installation of expanded metal lath with Types Z-146, Z-146T, Z146PC, Z-156, Z-156T and Z-156PC only. See Item 7. Application to joists requires the installation of expanded metal lath with Types Z-146, Z-146T, Z146PC, Z-156, Z-156T and Z-156PC only. See Item 8. For method of density determination, refer to Design Information Section.

Restrained Assembly Rating Hr	Unrestrained Assembly Rating Hr	Unrestrained Beam Rating Hr	Spray Applied Fire Resistive Mtl Thkns In. on Steel Deck		Concrete Type
			Crests	Valley	
1	0	1	0	0	LW
1	1	1	5/16	5/16	NW or LW
1-1/2	1	1	5/16(a)	5/16(a)	NW or LW
1-1/2	1-1/2	1-1/2	5/16(a)	5/16(a)	NW or LW
2	1	1	3/8(b)	3/8	NW or LW
2	2	2	3/8(b)	3/8	NW or LW
3	1-1/2	1-1/2	11/16	1/2	NW or LW
3	3	3	11/16	1/2	NW or LW
4	2	2	1-1/2	1-1/8	LW
4	4	4	1-1/2	1-1/8	LW



4	2	2	1-7/16	13/16	NW
4	4	4	1-7/16	13/16	NW

(a) Min thickness of 3/8 in. required when 1-1/2 in. deep fluted units are used.

(b) Min thickness of 1/2 in. is required in crests of 1-1/2 in. deep fluted units for the 2 h Restrained Assembly Rating.

Beam Thickness

Restrained Assembly Rating Hr	Unrestrained Assembly Rating Hr	Unrestrained Beam Rating Hr	Light Weight Concrete	Normal Weight Concrete	
			Full flange	Full flange	1/2 flange##
			W8x28 Beam	W8x28 Beam	W8x28 Beam
1	0	1	3/8	5/16	3/8
1	1	1	3/8	5/16	3/8
1-1/2	1	1	3/8	5/16	3/8
1-1/2	1-1/2	1-1/2	5/8	9/16	5/8
2	1	1	3/8	5/16	3/8
2	2	2	15/16	13/16	7/8
3	1-1/2	1-1/2	5/8	9/16	5/8
3	3	3	1-9/16	1-5/16	1-7/16
4	2	2	15/16	13/16	7/8
4	4	4	2-1/8	1-7/8	1-15/16

Applicable when the thickness applied to the beams' lower flange edges is reduced to one-half. Thickness applied to beams' lower flange edges shall be a min of 1/4 in.

Joist Thickness

Restrained Assembly Rating Hr	Unrestrained Assembly Rating Hr	Unrestrained Beam Rating Hr	Joist Spacing More than 4 ft	Joist Spacing 4 ft or less
			Full flange	Full flange
			10K1 Joist	10K1 Joist
1	0	1	7/8	3/4
1	1	1	7/8	3/4
1-1/2	1	1	7/8	3/4
1-1/2	1-1/2	1-1/2	1-5/16	1-1/8
2	1	1	7/8	3/4
2	2	2	1-3/4	1-1/2
3	1-1/2	1-1/2	1-7/16	1-7/16

3	3	3	2-9/16	2-5/16
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ARABIAN VERMICULITE INDUSTRIES — Types MK-6/HY, MK-6/HY Extended Set, MK-6/HB, MK-10 HB, MK-10 HB Extended Set, 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 KOREA INC — Types MK-6/HY, MK-6/HY Extended Set, MK-6/HB, MK-10 HB, MK-10 HB Extended Set, 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-6/HB, MK-10 HB, MK-10 HB Extended Set, 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-156, Z-156T and Z-156PC investigated for exterior use

6A. **Sprayed Fiber*** — (Optional, Not Shown) Spray Fiber, Classified for Surface Burning Characteristics (BNST), having a maximum applied density of 3.5 pcf applied over Spray-Applied Fire Resistive Material (Item 6) on both Steel Floor and Form Units (Item 4) and Supports (Item 1) in accordance with the following tables:

Allowable Sprayed Fiber Thickness over SFRM applied to Steel Deck (Item 4)

Installed SFRM Thickness (in.) on Deck	SFRM Density (lb/ft ³)			
	15	22	40	50
Sprayed Fiber Thickness (in.)				
5/16	5-3/8	7-7/8	8	8
3/8	5-1/16	7-7/16	8	8
11/16	3-3/4	5-1/2	8	8
1-7/16	9/16	13/16	8	8
1-1/2	1/4	3/8	8	8

Note: Installed SFRM thickness on deck refers to thickness applied to crests of steel deck.

Allowable Sprayed Fiber Thickness over SFRM applied to Beams (Item 1)

Installed SFRM Thickness (in.) on Beam	SFRM Density (lb/ft ³)			
	15	22	40	50
Sprayed Fiber Thickness (in.)				
5/16	8	8	8	8
3/8	8	8	8	8
9/16	8	8	8	8
5/8	8	8	8	8
13/16	8	8	8	8
7/8	8	8	8	8
15/16	8	8	8	8
1-5/16	7-3/4	8	8	8



1-7/16	7-1/4	8	8	8
1-9/16	6-11/16	8	8	8
1-7/8	5-3/8	7-7/8	5	6-1/4
1-15/16	5-1/16	7-7/16	4-5/16	5-3/8
2-1/8	4-5/16	6-5/16	2-1/8	2-11/16

Allowable Sprayed Fiber Thickness over SFRM applied to Joists (Item 1)

Installed SFRM Thickness (in.) on Joist	SFRM Density (lb/ft ³)			
	15	22	40	50
	Sprayed Fiber Thickness (in.)			
3/4	7-3/4	8	8	8
7/8	7-1/4	8	8	8
1-1/8	6-3/16	8	8	8
1-5/16	5-3/4	7-7/8	8	8
1-7/16	4-13/16	7-1/16	8	8
1-3/4	3-1/2	5-1/8	8	8
2-5/16	1-1/16	1-9/16	8	8
2-9/16	0	0	7-7/8	8

INTERNATIONAL CELLULOSE CORP — Types K13, URE-K, or SonaSpray FC

6B. **Sprayed Fiber*** — (Optional, Not Shown) Spray Fiber, Classified for Surface Burning Characteristics (BNST), having a maximum applied density of 2.8 pcf applied over Spray-Applied Fire Resistive Material (Item 6) on both Steel Floor and Form Units (Item 4) and Supports (Item 1) in accordance with the following tables:

Allowable Sprayed Fiber Thickness over SFRM applied to Steel Deck (Item 4)

Installed SFRM Thickness (in.) on Deck	SFRM Density (lb/ft ³)			
	15	22	40	50
	Sprayed Fiber Thickness (in.)			
5/16	5	5	5	5
3/8	5	5	5	5
11/16	4 11/16	5	5	5
1-7/16	11/16	13/16	5	5
1-1/2	5/16	3/8	5	5



Note: Installed SFRM thickness on deck refers to thickness applied to crests of steel deck.

Allowable Sprayed Fiber Thickness over SFRM applied to Beams (Item 1)

Installed SFRM Thickness (in.) on Beam	SFRM Density (lb/ft ³)			
	15	22	40	50
	Sprayed Fiber Thickness (in.)			
5/16	5	5	5	5
3/8	5	5	5	5
9/16	5	5	5	5
5/8	5	5	5	5
13/16	5	5	5	5
7/8	5	5	5	5
15/16	5	5	5	5
1-5/16	5	5	5	5
1-7/16	5	5	5	5
1-9/16	5	5	5	5
1-7/8	5	5	5	5
1-15/16	5	5	5	5
2-1/8	5	5	2 11/16	3 3/8

Allowable Sprayed Fiber Thickness over SFRM applied to Joists (Item 1)

Installed SFRM Thickness (in.) on Joist	SFRM Density (lb/ft ³)			
	15	22	40	50
	Sprayed Fiber Thickness (in.)			
3/4	5	5	5	5
7/8	5	5	5	5
1-1/8	5	5	5	5
1-5/16	5	5	5	5
1-7/16	5	5	5	5
1-3/4	4 3/8	5	5	5
2-5/16	1 5/16	1 15/16	5	5
2-9/16	0	0	5	5



MONOGLASS INC — Type Monoglass

6C. **Sprayed Fiber*** — (Optional, Not Shown) Spray Fiber, Classified for Noncombustible Building Materials (BICW), having a maximum applied density of 3.5 pcf applied over Spray-Applied Fire Resistive Material (Item 6) on both Steel Floor and Form Units (Item 4) and Supports (Item 1) in accordance with the following tables:

Allowable Sprayed Fiber Thickness over SFRM applied to Steel Deck (Item 4)

Installed SFRM Thickness (in.) on Deck	SFRM Density (lb/ft ³)			
	15	22	40	50
	Sprayed Fiber Thickness (in.)			
5/16	5	5	5	5
3/8	5	5	5	5
11/16	3 3/4	5	5	5
1-7/16	9/16	13/16	5	5
1-1/2	1/4	3/8	5	5

Note: Installed SFRM thickness on deck refers to thickness applied to crests of steel deck.

Allowable Sprayed Fiber Thickness over SFRM applied to Beams (Item 1)

Installed SFRM Thickness (in.) on Beam	SFRM Density (lb/ft ³)			
	15	22	40	50
	Sprayed Fiber Thickness (in.)			
5/16	5	5	5	5
3/8	5	5	5	5
9/16	5	5	5	5
5/8	5	5	5	5
13/16	5	5	5	5
7/8	5	5	5	5
15/16	5	5	5	5
1-5/16	5	5	5	5
1-7/16	5	5	5	5
1-9/16	5	5	5	5
1-7/8	5	5	5	5
1-15/16	5	5	4 5/16	5



2-1/8	4 5/16	5	2 1/8	2 11/16
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Allowable Sprayed Fiber Thickness over SFRM applied to Joists (Item 1)

Installed SFRM Thickness (in.) on Joist	SFRM Density (lb/ft ³)			
	15	22	40	50
	Sprayed Fiber Thickness (in.)			
3/4	5	5	5	5
7/8	5	5	5	5
1-1/8	5	5	5	5
1-5/16	5	5	5	5
1-7/16	4 13/16	5	5	5
1-3/4	3 1/2	5	5	5
2-5/16	1 1/16	1 9/16	5	5
2-9/16	0	0	5	5

THERMACOUSTIC IND. — Type TC-417

7. **Metal Lath** — (Not Shown) — (Required with Z-146, Z-146T, Z146PC, Z-156, Z-156T and Z-156PC, 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.

8. **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 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. OC max. When used, the metal lath is to be fully covered with Spray-Applied Fire Resistive Materials with no min thickness requirements.

*** 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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