

FIRE RESISTANCE DIRECTORY
GCP APPLIED TECHNOLOGIES UL DESIGNS

Fire-resistance Ratings - ANSI/UL 263

Design No. D798

December 19, 2016

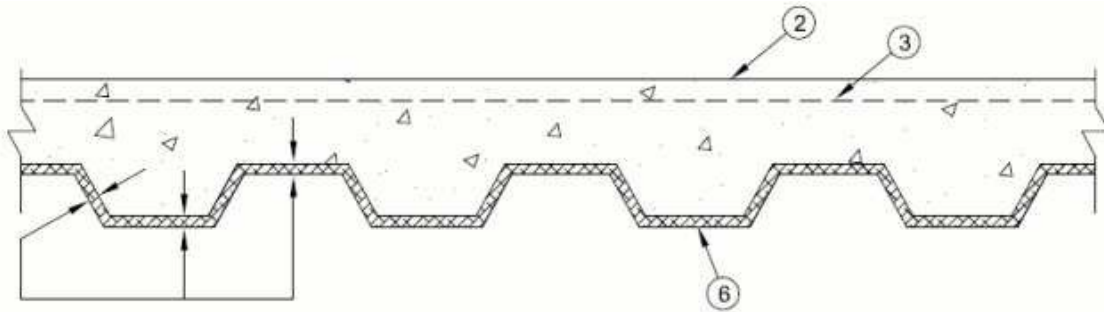
Restrained Assembly Ratings — 1, 1-1/2, 2, 3 & 4 Hr.

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, 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, 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 — 24 in. wide Type P-2432 composite or 36 in. wide Type P-3623, P-3606 and P-3615

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

NEW MILLENNIUM BUILDING SYSTEMS L L C — 24 in. wide Types CFD-2, 3, 24, 30, or 36 in. wide Type CFD-1.5. Units may be phos/ptd

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

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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

NEW MILLENNIUM BUILDING SYSTEMS L L C — Types 1.5CD, 1.5CDI, 1.5CDR, 2.0CD, or 3.0CD. 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 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. 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.

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Restrained Assembly Rating Hr	Unrestrained Assembly Rating Hr	Unrestrained Beam Rating Hr	Beam Thickness		
			Light Weight Concrete		Normal Weight Concrete
			Full flange	Full flange	1/2 flange##
			W8x28	W8x28	W8x28
			Beam	Beam	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.

Restrained Assembly Rating Hr	Unrestrained Assembly Rating Hr	Unrestrained Beam Rating Hr	Joist Thickness	
			Joist Spacing More than 4 ft	Joist Spacing 4 ft or less
			Full flange	Full flange
			10K1	10K1
			Joist	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

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

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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.

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