UL Product iQ®

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

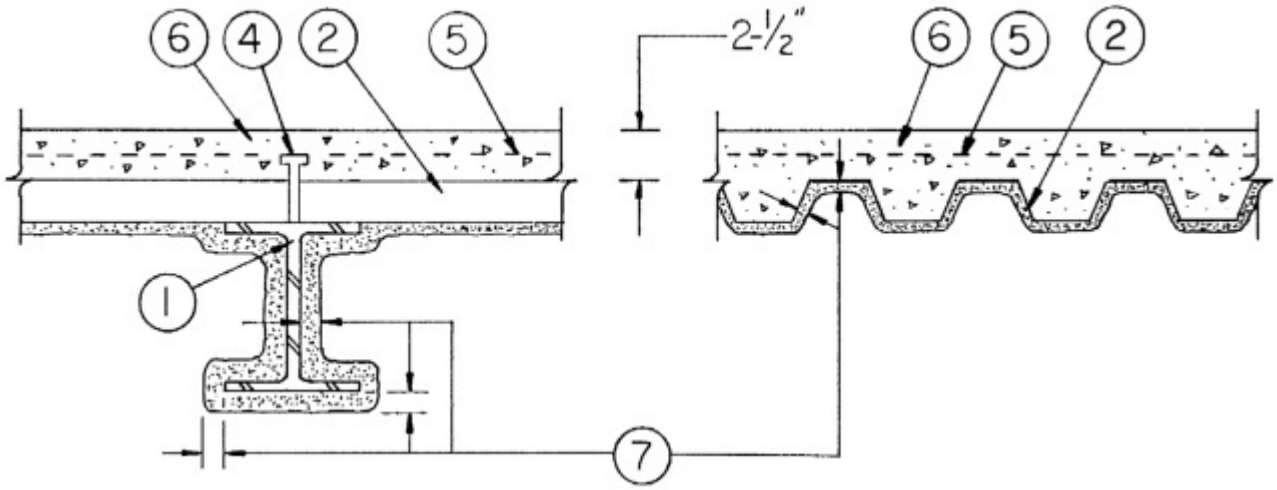
See General Information for Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada
Design Criteria and Allowable Variances

Design No. D759

May 16, 2023

Restrained Assembly Rating — 1, 1-1/2, 2 and 3 Hr.
(See Items 2, 7, 7A, 9, 9A and 12).
Unrestrained Assembly Rating — 1, 1-1/2, 2 and 3 Hr.
(See Items 2, 7, 7A, 9, 9A and 12).
Unrestrained Beam Rating — 1, 1-1/2, 2, 3 Hr. (See Item 7 and 7A).
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. **Steel Beam —** W8x28 steel beam min size.

1A. **Steel Joist —** (Not Shown) 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 by 0.125 in. thick. The second web member at each end shall consist of a 0.654 in. diam round bar. All remaining web members, including the end web members, shall consist of 0.774 in. diam round bars. Bridging per S.J.I. specifications is required when non-composite joists are used.

Note: Additional beams or joists from the N series designs may be substituted for the listed beam (Item 1) or joist (Item 1A) respectively. When joists are substituted, the restrained rating of the joist must be equal to or greater than the restrained rating of the assembly. Additional beam and joist substitution requirements are in the front of the Fire Resistance Directory - III. FLOOR-CEILINGS AND ROOF-CEILINGS, Item 7 - Steel Joists or IV. BEAMS.

2. **Steel Floor And Form Units* —** Composite or non-composite, 1-1/2, 2 or 3 in. deep galv units. Min gauges are 22 MSG for the fluted and 20/20 MSG for the cellular units. The units may be blended alternating one cellular unit to one or more fluted units.
ASC STEEL DECK, DIV OF ASC PROFILES L L C — 32 in wide Types NH-32, NHN-32, NHF-32; 36 in. wide Types BH-36, BHN-36, BHN-35-1/4, BHF-36,BHF-36A, 2WH-36, 2WHS-36, 2WHF-36, 2WHF-36A, 3WxH-36, 3WxHF-36, 3WxHF-36A, 3WH-36, 3WHF-36,3WHF-36A, 3W-36, 3WF-36, DG3W-36, DG3WF-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 — 36 in. wide Type P-3623, P-3606, and P-3615 composite; 24 in wide Type P-2432 composite; 36 in. wide Type P-3606 and P-3615 noncomposite; 24 in. wide Type P-2436; 24 or 36 in. wide Type LF3 fluted units. Type LF3 unit may be phos/painted; 36 in. wide Types 1.5B, 1.5BI, 1.5BL and 1.5BL.

CANAM STEEL CORP — 24 in. wide Types LF15 and NL, 24, 30 or 36 in. wide Type BL, 24 or 36 in. wide Types LF2 and LF3 fluted units; 24 in. wide Types AWC2, AWC3, LFC15, and NLC, 24, 30 or 36 in. wide Type BLC, and 24 or 36 in. wide Types LFC2 or LFC3 cellular units. Types BL, LF2, LF3, and NL units may be phos/painted.

KAM INDUSTRIES LTD, DBA CORDECK — 24 in. wide Type QL-3, and 24 or 36 in. wide Types 2"-QL-99 and 3" -QL-99 fluted units; 24 in. wide Types QL-NKX, QL-UKX, QL-GKXH and QL-TKX, and 24 or 36 in. wide Types QL-AKX, QL-AKD, QL-WKD, and QL-WKX cellular units.

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

DECK WEST INC — 36 in. wide Type 2-DW, 3-DW, B-DW or BA-DW fluted units.

DECKCO LLC – 36 in. wide, Types DC 1.5B, DC 1.5 Form, DC 1.5 Inverted Composite, DC 1.5 Inverted Form, DC 1.5 Composite, DC 2 Form, DC 2 Composite, DC 3 Form, DC 3 Composite.

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. wide Types EC150, EC366; 36 in. wide Type EC266 fluted units; 24 in. wide Types EPC2, EPC3, ECP150, ECP366, 30 in. wide Type ECB150; 36 in. wide Type ECP266 cellular units.

INTSEL STEEL EAST LLC — 36 in. wide Types 1.5" COMPOSITE/FLOOR, 2" COMPOSITE/FLOOR, 3" COMPOSITE/FLOOR.

KAM INDUSTRIES LTD, DBA CORDECK — 24 in. wide Types WDR2, WDR3.

NEW MILLENNIUM BUILDING SYSTEMS L L C — 24, 30 or 36 in. wide Types 1.5CD, 1.5CDI, 1.5CFD; 24 or 36 in. wide Types 2.0CD, 3.0CD, 2.0CFD, 3.0CFD, 3.0CFDES. Fluted 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 — Types PLB, HSB, PLN3, HSN3, PLN, N, and 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. Units may be cellular with the suffix "CD" added to the product name, respectively. All non-cellular deck may be vented or non-vented.

VULCRAFT, DIV OF NUCOR CORP — 36 in. wide Types 1.5 VL, 1.5 VLI, 1.5PLVLI and 24 or 36 in. wide Types 2 VLI, 2.0PLVLI, 3 VLI, 3.0PLVLI fluted units; 36 in. wide Types 1.5VLP 1.5PLVLP and 24 or 36 in. wide Types 2 VLP, 2.0PLVLP, 3 VLP, 3.0PLVLP cellular units. Types 1.5VL, 1.5VLI, 1.5PLVLI, 2VLI, 2.0PLVLI, 3VLI, 3.0PLVLI units may be phos/ptd. 36 in. wide Type 1.5 SB; 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.

Spacing of welds attaching units to supports shall be 12 in. OC max unless specified otherwise, adjacent units button-punched or welded together at side joints and unless specified otherwise for specific unit types, spacing of all side joint fastening systems shall not exceed 36 in. OC.

3. **Joint Cover —** (Not Shown) — Burlap tape applied with a bituminous adhesive.

4. **Shear Connector Studs —** (Optional, Not Shown) — Studs, 3/4 in. diam, by 3 in. long for 1-1/2 in. deep form units to 5-1/4 in. deep for 3 in. units, headed type or equivalent per AISC specifications. Welded to top beam flange through steel form units.

5. **Welded Wire Fabric —** 6x6-W1.4xW1.4. When using steel joists, the min welded wire fabric should be 6x6-W2.9xW2.9.

5A. **Negative Reinforcement —** (Optional, Not Shown) Used in lieu of Item 5 and with Item 5B. For floor spans with concrete cast continuous over the supporting beams. Deformed bars designed to resist the support moments of the concrete slab in accordance with the latest ACI Building Code Specifications.

5B. **Fiber Reinforcement* —** (Not Shown) - Required with Item 5A. Any fiber reinforcement bearing the UL Classification Marking for Fire Resistance, Classified for use in lieu of welded wire fabric.
See **Fiber Reinforcement** (CBXQ) Category for names of manufacturers.

6. **Normal Weight Or Lightweight Concrete —** Normal weight concrete: carbonate or siliceous aggregate, 150 plus or minus 3 pcf unit weight, 3000 psi compressive strength, vibrated. Lightweight aggregate concrete: expanded shale, clay or slate aggregate by rotary-kiln method, 112 plus or minus 3 pcf unit weight, 3000 psi compressive strength, vibrated, 4 to 7 percent entrained air.

7. **Spray-Applied Fire Resistive Materials* —** Prepared by mixing with water. Spray-applied in one or more coats to beam surfaces to a min final thickness as shown in the table below. Beam surfaces must be clean and free of dirt, loose scale and oil. Crest areas of deck above the beams shall be filled with Spray-Applied Fire Resistive Materials. Min average and min individual density of 15 pcf and 14 pcf respectively for Types 300, 300 AC, 300ES, 300HS, 300N, 3000, 3000ES, and SB. For types 400, 400AC, and 400ES min average and min individual density of 22 pcf and 19 pcf respectively. Min average of 44 pcf with min individual value of 40 pcf for types M-II and TG. Min average density of 47 pcf, with min individual value of 43 pcf for Type M-II/P. For method of density determination, see Design Information Section, Sprayed Material. Use of Type PC Pre-coat is required on all cellular units. The Type PC Pre-coat shall be

applied to cover approximately 70 percent of the flat plate surface. Thickness of the Type PC Pre-coat is included in the total thickness of the protection material.

Restrained Assembly Rating, Hr	Unrestrained Assembly Rating, Hr	Unrestrained Beam Rating, Hr	Min Thkns Spray Applied Fire Resistive Mtl In.				
			Deck Fluted	Deck Cellular	Beam (a)	Beam (b)	12K5 Joist
1+	1+	1	3/8	3/8	5/16	5/16	9/16++
1-1/2+	1-1/2+	1-1/2	3/8	3/8	1/2	9/16	1
2+	1+	1	3/8	3/8	5/16	5/16	1-3/8
2+	1-1/2+	1-1/2	3/8	3/8	1/2	9/16	1-3/8
2+	1-1/2+	2	3/8	3/8	11/16	13/16	1-3/8
2+	2+	2+	3/8	3/8	11/16	13/16	1-3/8
3+	1-1/2+	1-1/2	13/16	5/8	1/2	9/16	2-1/4
3+	2+	2+	13/16	5/8	11/16	13/16	2-1/4
3+	3+	3+	13/16	3/4	1-1/16	1-5/16	2-1/4

(a) Thickness applied when beam supports fluted units only.

(b) Thickness applies when beam supports cellular or blended units.

+ When trench headers (Item 9 or 9A) are used, the maximum Restrained and Unrestrained Assembly Rating is 1-1/2 hr; when electrical inserts (Item 12) are used, the maximum Restrained and Unrestrained Assembly Rating is 2 hr.

++ 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.

Additional thicknesses are required when trench headers and electrical inserts are used. Refer to Items 9, 9A and 12 for required thicknesses.

When **Mineral and Fiber Boards** (Item 13) is used over the concrete floor (without the use of penetrations), the following thicknesses are to be used:

Restrained Assembly Rating Hr	Unrestrained Assembly Rating Hr	Unrestrained Beam Rating Hr	Min Thkns Spray Applied Fire Resistive Mtl In.			
			Deck Fluted	Deck Cellular	Beam (a)	Beam (b)
2	2	1-1/2	1/2	7/16	15/16	15/16
3	3	1-1/2	15/16	7/8	1-1/2	1-1/2

(a) Thickness applied when beam supports fluted units only.

(b) Thickness applies when beam supports cellular or blended units.

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

GREENTECH ASIA PACIFIC SDN BDH — Types M-II or M-II/P

GREENTECH THERMAL INSULATION PRODUCTS MFG CO L L C — Types 300, 300AC, 300HS 400, 400AC, or 3000; Types M-II, TG, and M-II/P

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

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

7A. **Sprayed Fiber Insulation* —** Spray applied fiber insulation, Classified to Surface Burning Materials (BNST), having a maximum applied density of 3.5 pcf, applied over Spray-Applied Fire Resistive Material (Item 7) on both steel floor and form units (Item 2) and supports (Item 1). Sprayed fiber insulation may be over Spray-Applied Fire Resistive Material (Item 7) according to the following tables:

Allowable Spray-Applied Fiber Insulation Thickness Over Cellular Steel Deck

Installed SFRM Thickness (in.) on Deck	SFRM Density (pcf)			
	15	22	44	47
3/8	2-1/8	3-1/8	6-5/16	6-11/16
5/8	1-1/16	1-9/16	3-1/8	3-3/8
3/4	9/16	13/16	1-9/16	1-11/16

Allowable Spray-Applied Fiber Insulation Thickness Over Fluted Steel Deck

Installed SFRM Thickness (in.) on Deck	SFRM Density (pcf)			
	15	22	44	47
3/8	8	8	8	8
13/16	8	8	8	8

Allowable Spray-Applied Fiber Insulation Thickness Over Beam

Installed SFRM Thickness (in.) on Beam	SFRM Density (pcf)			
	15	22	44	47
5/16	5-1/16	7-7/16	8	8
1/2	4-5/16	6-5/16	8	8
9/16	4	5-7/8	8	8
11/16	3-1/2	5-1/8	8	8
13/16	2-15/16	4-5/16	8	8
1-1/16	1-7/8	2-3/4	5-1/2	5-7/8

Allowable Spray-Applied Fiber Insulation Thickness Over Joist

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

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

Allowable Spray-Applied Fiber Insulation Thickness Over Trench Headers

Installed SFRM Thickness (in.) on Trench Headers	SFRM Density (pcf)			
	15	22	44	47
1 5/8	2-11/16	3-15/16	7-7/8	8
1 3/4	2-1/8	3-1/8	6-5/16	6-11/16
2 1/4	0	0	0	0

Allowable Spray-Applied Fiber Insulation Thickness Over Electrical Inserts

Installed SFRM Thickness (in.) on Electrical Inserts	SFRM Density (pcf)			
	15	22	44	47
3/8	3-3/4	5-1/2	8	8
7/16	3-1/2	5-1/8	8	8
1/2	3-3/16	4-11/16	8	8
9/16	2-15/16	4-5/16	8	8
5/8	2-11/16	3-15/16	7-7/8	8
3/4	2-1/8	3-1/8	6-5/16	6-11/16
13/16	1-7/8	2-3/4	5-1/2	5-7/8
7/8	1-5/8	2-3/8	4-11/16	5-1/16
15/16	1-5/16	1-15/16	3-15/16	4-3/16
1-1/16	13/16	1-3/16	2-3/8	2-1/2
1-1/4	0	0	0	0

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

7B. **Sprayed Fiber Insulation* —** (Optional, Not Shown) — Spray applied fiber insulation, Classified as Noncombustible Building Material (BICW), having a maximum applied density of 3.5 pcf, applied over Spray-Applied Fire Resistive Material (Item 7) on both steel floor and form units (Item 2) and supports (Item 1). Sprayed fiber insulation may be over Spray-Applied Fire Resistive Material (Item 7) according to the following tables:

Allowable Spray-Applied Fiber Insulation Thickness Over Cellular Steel Deck

Installed SFRM Thickness (in.) on Deck	SFRM Density (pcf)

	15	22	44	47
3/8	2-1/8	3-1/8	5	5
7/16	1-7/8	2-3/4	5	5
5/8	1-1/16	1-9/16	3-1/8	3-3/8
3/4	9/16	13/16	1-9/16	1-1/16
7/8	0	0	0	0

Allowable Spray-Applied Fiber Insulation Thickness Over Fluted Steel Deck

Installed SFRM Thickness (in.) on Deck	SFRM Density (pcf)			
	15	22	44	47
3/8	5	5	5	5
1/2	5	5	5	5
13/16	5	5	5	5
15/16	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
1/2	5	5	5	5
9/16	5	5	5	5
11/16	5	5	5	5
13/16	4-9/16	5	5	5
15/16	4	5	5	5
1-1/16	3-1/2	5	5	5
1-1/2	1-5/8	2-3/8	4-11/16	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

1	5	5	5	5
1-3/8	3-3/4	5	5	5
2-1/4	0	0	0	0

Allowable Spray-Applied Fiber Insulation Thickness Over Trench Headers

Installed SFRM Thickness (in.) on Trench Headers	SFRM Density (pcf)			
	15	22	44	47
1-/8	2-11/16	3-15/16	5	5
1-/4	2-1/8	3-1/8	5	5
2-/4	0	0	0	0

Allowable Spray-Applied Fiber Insulation Thickness Over Electrical Inserts

Installed SFRM Thickness (in.) on Electrical Inserts	SFRM Density (pcf)			
	15	22	44	47
3/8	3-3/4	5	5	5
7/16	3-1/2	5	5	5
1/2	3-3/16	4-11/16	5	5
9/16	2-15/16	4-5/16	5	5
5/8	2-11/16	3-15/16	5	5
3/4	2-1/8	3-1/8	5	5
13/16	1-7/8	2-3/4	5	5
7/8	1-5/8	2-3/8	4-11/16	5
15/16	1-5/16	1-15/16	3-15/16	4-3/16
1-1/16	13/16	1-3/16	2-3/8	2-1/2
1-1/4	0	0	0	0

THERMACOUSTICS IND — Type TC-417

7C. **Sprayed Fiber Insulation* —** (Optional, Not Shown) — Spray applied fiber insulation, Classified to Surface Burning Materials (BNST), having a maximum applied density of 2.8 pcf, applied over Spray-Applied Fire Resistive Material (Item 7) on both steel floor and form units (Item 2) and supports (Item 1). Sprayed fiber insulation may be over Spray-Applied Fire Resistive Material (Item 7) according to the following tables:

Allowable Spray-Applied Fiber Insulation Thickness Over Cellular Steel Deck

Installed SFRM Thickness (in.) on Deck	SFRM Density (pcf)

	15	22	44	47
3/8	2-11/16	3-15/16	5	5
7/16	2-3/8	3-7/16	5	5
5/8	1-5/16	1-15/16	3-15/16	4-3/16
3/4	11/16	1	1-15/16	2-1/8
7/8	0	0	0	0

Allowable Spray-Applied Fiber Insulation Thickness Over Fluted Steel Deck

Installed SFRM Thickness (in.) on Deck	**SFRM Density (pcf)**			
	15	22	44	47
3/8	5	5	5	5
1/2	5	5	5	5
13/16	5	5	5	5
15/16	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
1/2	5	5	5	5
9/16	5	5	5	5
11/16	5	5	5	5
13/16	5	5	5	5
15/16	5	5	5	5
1-1/16	4-3/8	5	5	5
1-1/2	2	2-15/16	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
1	5	5	5	5
1-3/8	4-11/16	5	5	5
2-1/4	0	0	5	5

Allowable Spray-Applied Fiber Insulation Thickness Over Trench Headers

Installed SFRM Thickness (in.) on Trench Headers	**SFRM Density (pcf)**			
	15	22	44	47
1-5/8	3-3/8	4-15/16	5	5
1-3/4	2-11/16	3-15/16	5	5
2-1/4	0	0	0	0

Allowable Spray-Applied Fiber Insulation Thickness Over Electrical Inserts

Installed SFRM Thickness (in.) on Electrical Inserts	**SFRM Density (pcf)**			
	15	22	44	47
3/8	4 11/16	5	5	5
7/16	4 3/8	5	5	5
1/2	4	5	5	5
9/16	3-11/16	5	5	5
5/8	3-3/8	4-15/16	5	5
3/4	2-11/16	3-15/16	5	5
13/16	2-3/8	3-7/16	5	5
7/8	2	2-15/16	5	5
15/16	1-11/16	2-7/16	4-15/16	5
1-1/16	1	1-1/2	2-15/16	3-1/8
1-1/4	0	0	0	0

MONOGLASS INC — Type Monoglass

8. **Metal Lath —** (Optional, Not Shown) — 3/8 in. diamond mesh, expanded steel weighing 1.7 lb per sq yd, secured to one side of joist using No. 16 SWG steel tie wire located at the mid-height of every other web.

8A. **Glass Fiber Mesh —** (Not Shown) — As an alternate to metal lath (Item 8), min 3/32 in. square mesh, coated fiberglass scrim fabric, weighing a min of 1.9 oz/sq yd, 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. An acceptable method of attaching the mesh is by embedding the mesh in min 1/4 in. long beads of hot melted glue. The beads of glue shall be spaced max 12 in. OC along the top chord of the joists. Another method of attachment is by the use of 1-1/4 in. long 1/2 in. wide hairpin clips formed from 0.064 in. diam steel wire, alternating from top to bottom of the joist web member.

9. **Trench Header —** (Bearing the UL Listing Mark) — (Optional, Not Shown) — Constructed of steel and provided with metal edge screeds. When the trench header is located near a support, the load carrying capacity of the span may be based on the allowable moment or shear stress of the floor units at the edge of the trench header away from the support or on the allowable composite moment or shear capacity of the slab at the center of the span, whichever governs.

As an alternate in spans employing min 20/18 MSG cellular floor units and/or min 20 MSG fluted floor units, trench headers (Bearing the UL Listing Mark) without the bottom pan may be used. The allowable superimposed load for spans with a bottomless trench header shall be based on non-composite design. The bottomless trench header, with a max width of 36 in., consists of two cell closers which conform to the contour of the floor units, placed along the sides of the desired trench header location and welded to the floor units. The side rails, consisting of extruded aluminum screeds secured to galv steel channels (min 18 MSG), are positioned over the cell closers, aligned, and secured to the cell closers and floor units. A separate U-shaped galv steel channel (min 18 MSG), serving as the power compartment, is welded or riveted to the floor units. Steel cover plates, 1/4 in. thick, shall be secured to the side rails. In bottomless trench headers wider than 18 in., each side joint of the steel floor units shall be welded with a 1 in. long weld near the trench header centerline. For QG-GKX-24 or -30 cellular floor units only, a separate KED-PTS (UL Listed) power transition sleeve is secured to power compartment with one rivet or screw.

The use of trench header requires additional protection underneath the trench header; Spray-Applied Fire Resistive Materials thickness shall be increased as shown on the following table:

Restrained & Unrestrained Assembly Rating Hr	Min Thkns of Spray Applied Fire Resistive Mtl on Crests	In. & on Valley & Flat Plate *	Min Thkns of Spray Applied Fire Resistive Mtl on Metal Lath**
1 and 1-1/2	1-3/4	1-5/8	—
2	—	—	1-3/4
3	—	—	2-1/4

*Steel studs with discs (Item 10) must be applied to flat plates of cellular units.

**Spray-Applied Fire Resistive Materials applied to metal lath (Item 11). Thickness measured to bottom plane of metal lath and to extend a min of 4 in. beyond the trench areas.

9A. **Trench Header —** (Not Shown) With an intermittent bottom (as an alternate to Item 9) when Walker's Type WDR cellular units are used-(Bearing The UL Listing Mark)-The allowable superimposed load for spans with an intermittent bottom trench header shall be based on non-composite design. The intermittent bottom trench header, with a maximum width of 36 in., consists of horizontal closure plates, (min No. 16 MSG) with 4 threaded studs pre-welded on the top side of each plate near its corners. The plates are to be placed over the fluted areas of the floor units and affixed to the floor units by welds at each corner. Concrete is to be vibrated into the voids formed by the plates and the fluted areas of the units beneath the trench header. The upper side rail is extruded aluminum attached to the lower steel side rail clip with an adjusting screw. The lower side rail positioned over the edge of the horizontal closure plates snapped-on the pre-welded threaded studs on top of the plates. Spray-Applied Fire Resistive Materials thickness shall be increased to 1-3/4 in. in crests and 1-5/8 in. on valleys and flat plates for the 1 and 1-1/2 h ratings. Steel studs with discs (Item 10) must be applied to flat plates of cellular units.

10. **Steel Studs With Discs —** (Not Shown) — For use on cellular steel floor and form units under the trench headers. The stud consists of No. 12 SWG steel wire, 1-1/4 in. long with one end welded to 1-1/2 in. diam, No. 28 MSG galvanized steel disc. The total number of studs shall average at least one stud per 250 sq in. The ends of the studs opposite the discs shall be welded to the cellular units in rows parallel with the trench header. The distance between the outer rows of the studs and the edge of the trench header shall not exceed 8-1/2 in. The spacing between the rows shall not exceed 9-1/2 in. The spacing between studs in each row shall not exceed 12 in.

11. **Metal Lath —** (Not shown) — For use on fluted and cellular steel floor and form units under the trench-headers and/or on cellular units when Type 400 is used — 3/8 in. diamond, expanded steel weighing 3.4 lb per sq yd, secured to the underside of the trench-header. The width of the lath shall extend a min of 1-1/2 in. on either side of the trench-header. The lath is to be placed with the ribs upward and secured with S-12 by 3/8 in. long panhead, self-drilling, self-tapping steel screws spaced max 12 in. O.C. Steel screws to be fitted with 1/2 in. diam steel washers.

11A. **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.

12. **Electrical Inserts —** (Not Shown) — Preset and after set electrical inserts Classified as Outlet Boxes and Fittings Classified for Fire Resistance*. Unless specified otherwise for a particular preset electrical insert type, the spacing of the preset electrical inserts shall be not less than 24 in. O.C. along cellular steel floor units with not more than one preset electrical insert in each 8 sq ft of floor area. The required thickness of spray-applied resistive material on the steel floor units with inserts shall cover the entire length and width of the units between supports and shall extend beyond the edge of inserts onto adjacent floor units for a min horizontal width of 12 in. In floor spans (between supports) containing electrical inserts, the entire floor span (fluted and cellular steel floor units) must be sprayed with a min of 1/2 in. thickness of spray-applied resistive materials.

(1) KAM INDUSTRIES LTD, DBA CORDECK

(Tapmate II, II-EA, II-FN, II-EAFN: Series KEB)

Installed per accompanying installation instructions over factory-punched holes in QL-AKX or QL-WKX floor units. Inserts are used in the pre-active, active or abandoned condition. Required spray-applied resistive material thicknesses on floor units with inserts are:

Restrained Assembly Rating Hr	Floor Unit Type	Concrete Type	Min Thkns In.
(Tapmate II, II-EA)			
2	QL-AKX, -WKX	NW	7/8
2	QL-AKX	LW	1-1/16
2	QL-WKX	LW	15/16
(Tapmate II-FN or II-EAFN)			
2	QL-AKX, -WKX	NW	7/16
2	QL-AKX, -WKX	LW	3/4

The Tapmate II-FN insert may use KEM-HP-1 outlet box fittings in lieu of the KEB-PC flush cover fittings.

(Tapmate II-EAFN-FC1: Series KEB)

Installed per accompanying installation instructions over factory-punched holes in QL-WKX floor units. Inserts are used in the pre-active, active, or abandoned condition. Required spray-applied resistive material thickness on floor units with inserts are:

Restrained Assembly Rating Hr	Floor Unit Type	Concrete Type	Min Thkns In.
2	QL-WKX	NW	7/16

For abandonment, see installation instructions.

(Tapmate III-FN, III-EAFN: Series KEC)

Installed per accompanying installation instructions over factory-punched holes in QL-AKD or QL-WKD floor units. Inserts are used in the pre-active, active, or abandoned condition. Required spray-applied resistive material mixture thicknesses on floor units with inserts are:

Restrained Assembly Rating Hr	Floor Unit Type	Concrete Type	Min Thkns In.
(Tapmate III-FN or III-EAFN)			
2	QL-AKD, WKD	NW	1/2
2	QL-AKD, WKD	LW	13/16
(Tapmate III-EAFN-FCI)			
2	QL-WKD	NW	1/2
2	QL-WKD	LW	13/16

The hole cut in insert cover for passage of wires shall be no more than 1/8 in. larger diam than the wire. For abandonment of Tapmate inserts, see installation instructions.

The Tapmate III inserts may use KEB-HP-1, Series KEC outlet box fittings with the same hourly rating and fireproofing thicknesses as specified for the Tapmate II-EAFN electrical inserts.

(Tapmate IV, IV-EA, IV-H, IV-H-M, IV-S)

Installed per accompanying installation instructions over factory-punched holes in QL-GKX-24 or -30 floor units. Inserts are used in the preactive, active or abandoned condition. Required spray-applied resistive material thicknesses on floor units with inserts are:

Restrained Assembly Rating Hr	Floor Unit Type	Concrete Type	Min Thkns In.
(Tapmate IV, IV-H, IV-H-M, IV-S)			
1	QL-GKX	NW,LW	3/8
1-1/2	QL-GKX	NW	1/2
1-1/2	QL-GKX	LW	9/16
2	QL-GKX	NW	5/8
2	QL-GKX	LW	3/4

Restrained Assembly Rating Hr	Floor Unit Type	Concrete Type	Min Thkns In.
(Tapmate IV-EA)			
1	QL-GKX	NW, LW	7/16
1-1/2	QL-GKX	NW	9/16
1-1/2	QL-GKX	LW	5/8
2	QL-GKX	NW	3/4
2	QL-GKX	LW	7/8

(Tapmate V)			
1	QL-GKX	NW, LW	3/8
1-1/2	QL-GKX	NW, LW	1/2
2	QL-GKX	NW, LW	5/8

The holes cut in inserts cover for passage of wires shall be no more than 1/8 in. larger diam than the wire. For abandonment of inserts see installation instructions.

Type KED-HP-1 outlet box fittings may be used with Tapmate IV box assemblies or in lieu of Tapmate IV or IV-EA fittings with the same hourly ratings and protection material thicknesses as specified for the above electrical inserts.

(Tapmate IV-FN-S, IV-FN-H, IV-EAFN: Series KED)

Installed per accompanying installation instructions over factory-punched holes in QL-GKX-24 or -30 floor units. Inserts are used in the preactive, active, or abandoned condition. Required spray-applied resistive material thicknesses on floor units with inserts are:

Restrained Assembly Rating Hr	Floor Unit Type	Concrete Type	Min Thkns In.
(Tapmate IV-FN-S, IV-FN-H, IV-EAFN)			
2	QL-GKX	NW	1/2
2	QL-GKX	LW	3/4

The hole cut in insert cover for passage of wires shall be no more than 1/8 in. larger diam than the wire. For abandonment see installation instructions.

Type KED-HP-1 outlet box fittings may be used with Tapmate IV box assemblies or in lieu of Tapmate IV-FN-S, IV-FN-H, IV-EAFN fittings with the same hourly ratings and protection material thicknesses as specified for the above electrical inserts.

(Tapmate KED-MSA Multi-Service After set Inserts)

Installed per accompanying installation instructions in core-drilled holes over QL-GKX-24 or -30 steel floor units. Spacing of after set inserts shall be not more than one insert per each 7-1/2 sq ft of floor area with not less than 25-1/2 in. between edges of adjacent after set inserts. After set inserts may be installed with either the flip lid plastic cover (KEC-PC3, PC4 and PC5 components) or the Deluxe Cover (KED-NAC type). Required Spray-Applied Fire Resistive Materials thicknesses on steel floor units with inserts are tabulated below:

Restrained Assembly Rating Hr	Floor Unit Type	Concrete Type	Min Thkns In.
1	QL-GKX	NW, LW	3/8
1-1/2	QL-GKX	NW	1/2
1-1/2	QL-GKX	LW	9/16
2	QL-GKX	NW	5/8
2	QL-GKX	LW	3/4

KAM INDUSTRIES LTD, DBA CORDECK — Tapmate II, II-EA, II-FN, II-EAFN, II-EAFN-FC1: Series KEB. Tapmate III-FN, III-EAFN, III-EAFN-FC1: Series KEC. Tapmate IV, IV-EA, IV-EAFN, IV-FN-S, IV-FN-H, IV-H, IV-H-M, IV-S: Series KED, Tapmate KED-MSA.

(2)**Wiremold Co.** After set Inserts.

(Types TSAR, TSACR After set Inserts)

After set inserts installed per accompanying installation instructions in holes core drilled through concrete topping to top of cells of the cellular floor units. TSAR and TSACR, for use in 7 in. diam holes . Spacing shall be not more than one insert in each 4 square ft of floor area with not less than 2 ft center to center of adjacent inserts. The required Spray-Applied Fire Resistive Materials thicknesses on floor units with inserts are shown below:

Restrained Assembly Rating Hr	Floor Unit Type	Concrete Type	Min Thkns In.
(Types TSAR, TSACR)			
1	WDR2 or WDR3	NW, LW	1/2
1-1/2	WDR2 or WDR3	NW, LW	3/4
2	WDR2 or WDR3	NW, LW	1-1/4

When spacing is not more than one insert in each 8 square ft of floor area with not less than 2 ft center to center of adjacent inserts, the required Spray-Applied Fire Resistive Materials thicknesses on floor units with inserts are shown below:

Restrained Assembly Rating Hr	Floor Unit Type	Concrete Type	Min Thkns In.
(Types TSAR, TSACR)			
1	WDR2 or WDR3	NW	3/8
1-1/2	WDR2 or WDR3	NW	3/8
2	WDR2 or WDR3	NW	1/2
3	WDR2 or WDR3	NW	3/4

WIREMOLD CO — Types TSAR, TSACR after set inserts.

13. **Mineral And Fiber Boards* —** (Optional — Not Shown) — Applied over concrete floor with no penetrations. No restriction on thickness. See **Mineral And Fiber Board*** (CERZ) category for names of manufacturers.

14. **Foamed Plastic* —** (Optional — Not Shown) — Polystyrene insulation applied over concrete floor with no penetrations. No restriction on thickness. Max density of 5 pcf. See **Foamed Plastic*** (CCVW) category for names of manufacturers.

15. **Cellular Concrete — Roof Topping Mixture* —** (Not Shown) — Optional — Foam concentrate mixed with water and Portland cement per manufacturer's application instruction. 28 day compressive strength of min 190 psi as determined in accordance with ASTM C495-86, min 2 in. thick, poured above the foamed plastic (Item 10A). May be covered with any built-up or single ply roof covering materials*.

AERIX INDUSTRIES — Cast dry density of 37 (+ or -) 3.0 pcf.

ELASTIZELL CORP OF AMERICA — Type II. Mix #1 of cast dry density 39 (+ or -) 3.0 pcf, Mix #2 of cast dry density 40 (+ or -) 3.0 pcf, Mix #3 of cast dry density 47 (+ or -) 3.0 pcf.

16. **Roof Covering Materials* —** (Optional — Not Shown) — Consisting of materials compatible with insulations described herein which provide Class A, B or C coverings. See **Built-Up Roof Covering Materials*** in the Building Materials Directory.

17. **Insulated concrete —** (Optional — Not Shown) — Various type of insulated concrete prepared and applied in the thickness indicated.

A. **Vermiculite Concrete —** Mix consists of 6 cu ft of Vermiculite Aggregate*, 94 lbs of Portland cement and 60 oz of air entraining agent. Thickness to be 2 in. min from the top plane of steel roof deck.
ELASTIZELL CORP OF AMERICA — Types MS 16-U, MSV 200.

B. **Perlite Concrete —** Mix consists of 6.2 cu ft Perlite Aggregate* to 94 lbs of Portland cement and 1-1/2 pt air entraining agent. Compressive strength 80 psi min.
See Perlite Aggregate (CFFX) category for names of Classified companies.

*** 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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