UL Product iQ™

BXUV.E701 - FIRE-RESISTANCE RATINGS - ANSI/UL 263

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. E701

January 22, 2019

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

(See Items 4, 6A and 7)

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

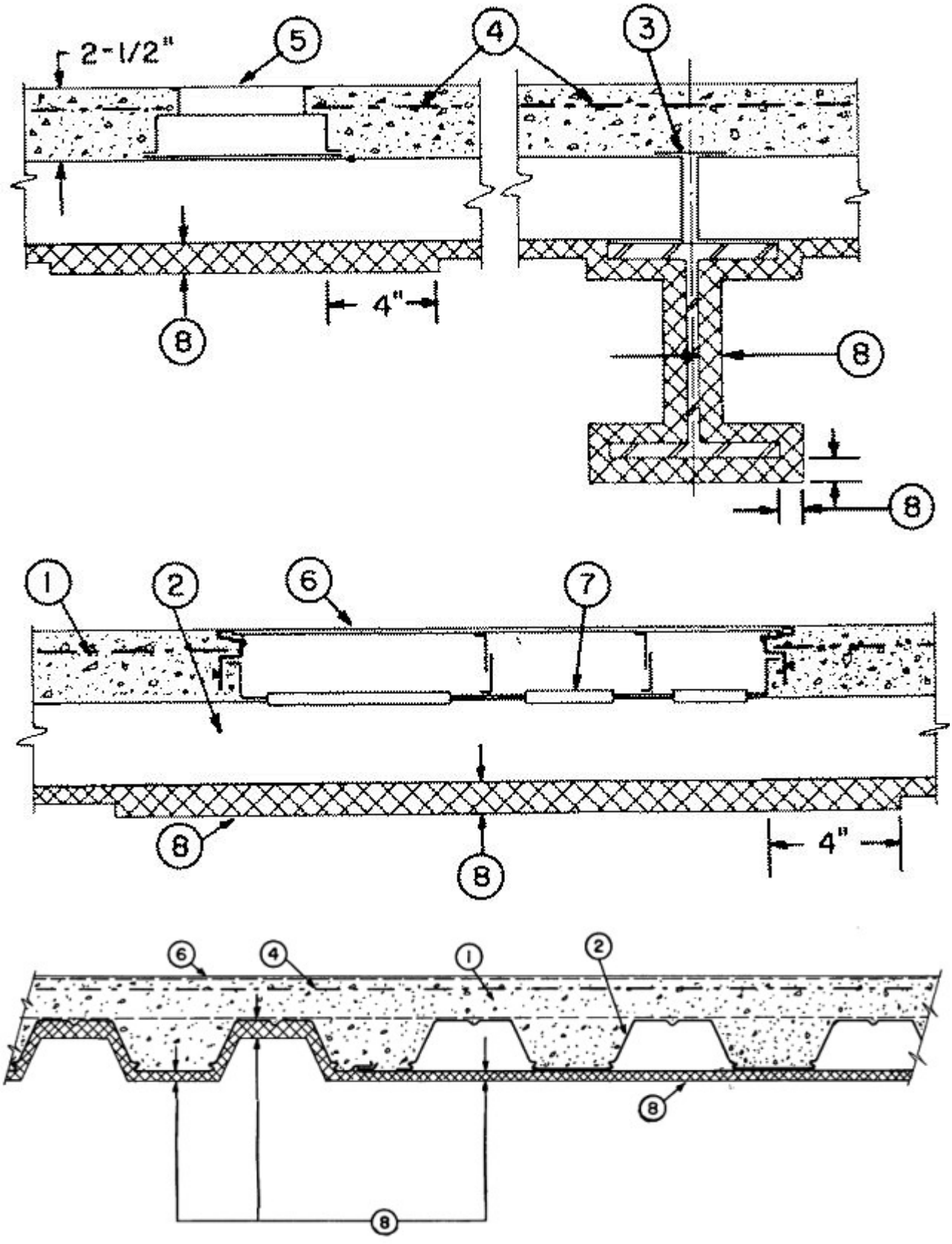
(See Items 4 and 7)

Unrestrained Beam Ratings — 1, 1-1/2, 2 and 3 Hr.

(See Item 7)

Load 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 States Design provisions of Part 4 of the National Building Code of Canada — 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.**


2-1/2"
5
4
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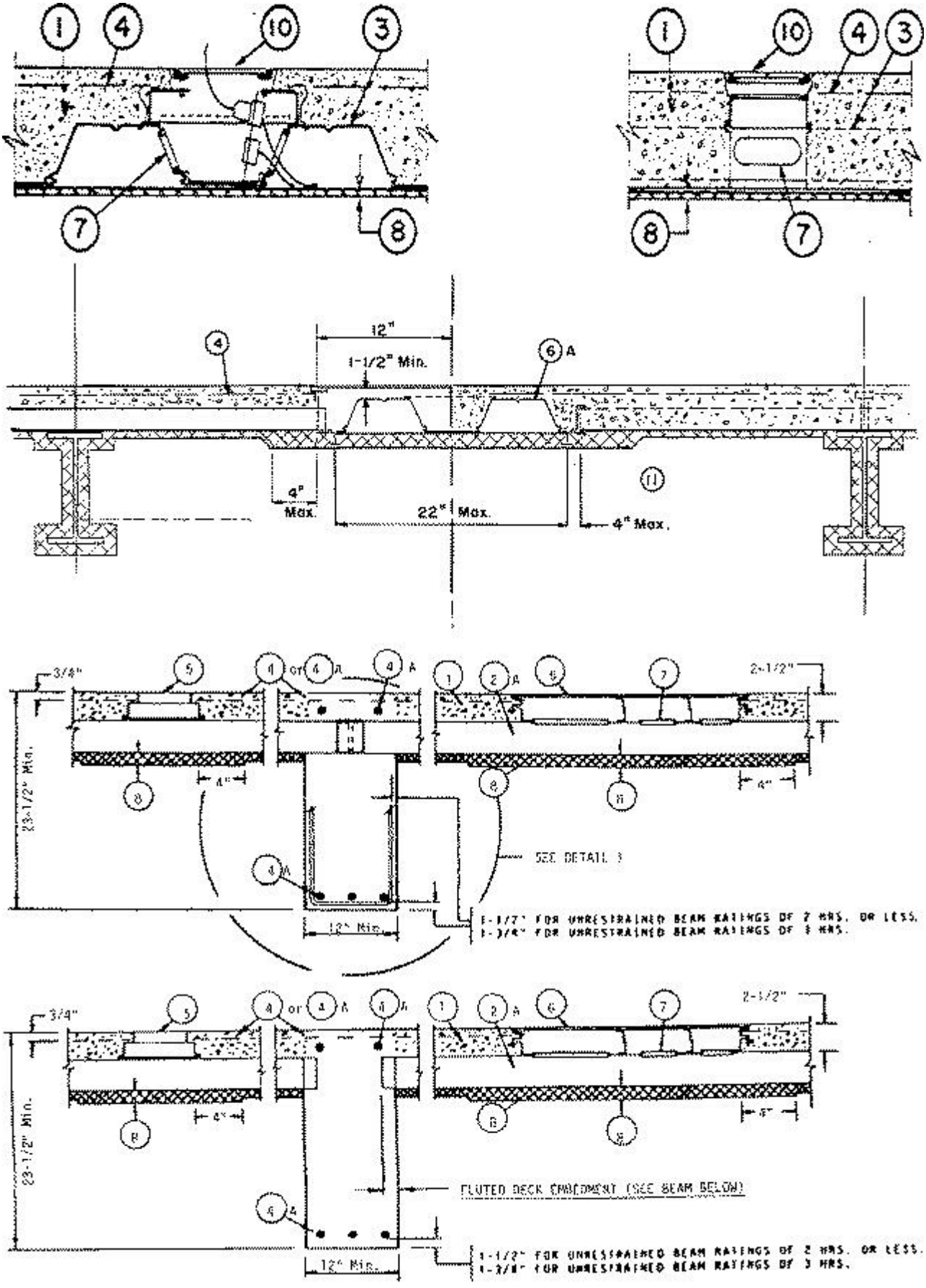
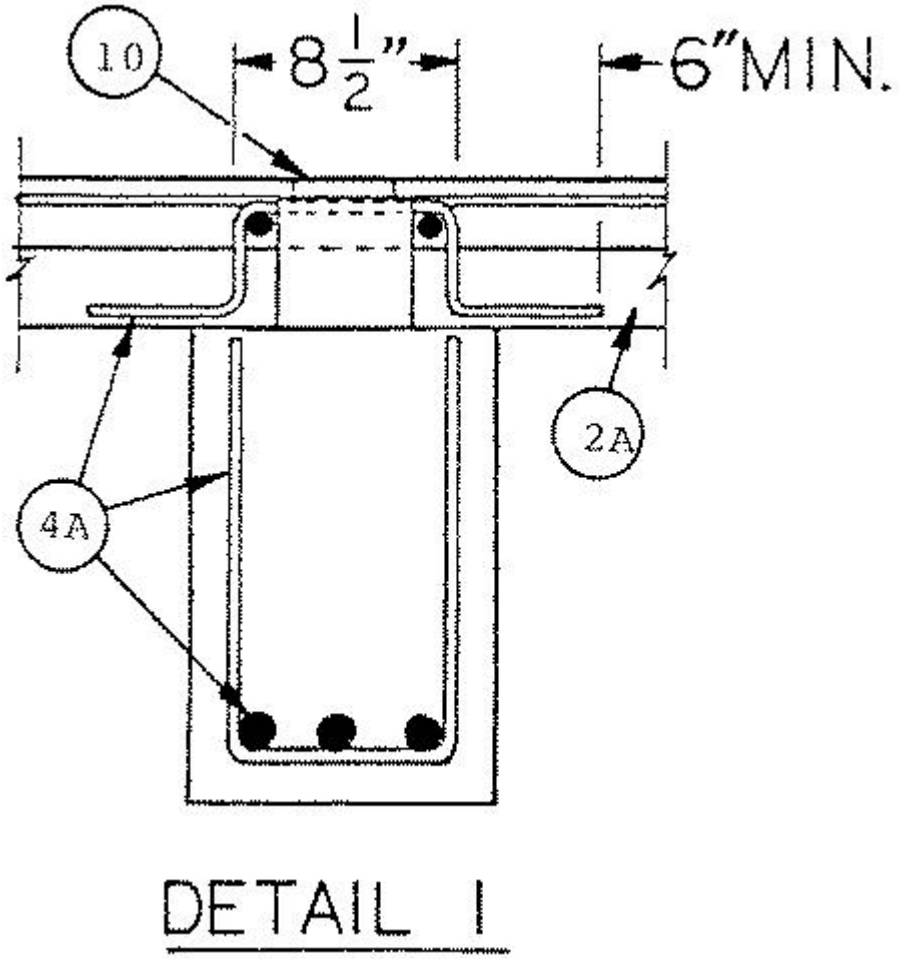

12"
1-1/2" Min.
4" Max.
22" Max.
4" Max.
3/4"
2-1/2"
23-1/2" Min.
SEE DETAIL 3
12" Min.
FLUTED DECK EMBEDMENT (SEE BEAM BELOW)



DETAIL 1

Beam — W8X28, min size. (See Item 7).

1. **Normal Weight or Lightweight Concrete —** Normal weight concrete, carbonate or siliceous aggregate, 150 ± 3 pcf unit weight, 3500-psi compressive strength, vibrated. Lightweight concrete, expanded shale, clay, or slate aggregate by rotary-kiln method, 112 ± 3 pcf unit wt, 3000 psi compressive strength, vibrated, 4 to 7 percent entrained air.

2. **Steel Floor and Form Units* —** Composite 1-1/2, 2 or 3 in. deep galv units. Min gauges are 22 MSG for fluted and 20/20 MSG for cellular. In spans containing a bottomless trench header, min 20/18 MSG cellular units and/or min 20 MSG fluted units shall be used. For spans with trench headers the allowable loading shall be based on noncomposite design. The following combinations of units may be used:
(1) All fluted.

(2) 1 or more fluted to one cellular.

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, 3WH-36, 3W-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 STEEL CORP — 36 in. wide Types P-3623, P-3606, P-3615 composite; 24 in wide Type P-2432 composite; 36 in. wide Types P-3606 and P-3615 non-composite; 24 in. wide Types P-2436, P-2404, P-2403, and P2438.

CANAM STEEL CORP — 24, 30 or 36 in. wide, Types BL, BLC; 24 in. wide, Types LF2, LF3, LF1.5, LFC1, LFC2, LFC3, NL, NLC; 36 in. wide, Types LF2, LF3, LFC2, LFC3. Types BL, LF2, LF3 and NL units may be phos/ptd.

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

NEW MILLENNIUM BUILDING SYSTEMS L L C — 24 in. wide Types B2C or NC; 30 in. wide Type B3C; 36 in. wide Type Mac-Lok 2; 24 or 36 in. wide Type Mac-Lok 3; 12 in. wide Mac-Way 2 or 3-633 MTWA. Types B2C, B3C, NC, Mac-Lok 2, Mac-Lok 3 may be phos/ptd. Type EBS adhesive is required on phos/ptd units. (See Item 7).

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

DESIGN ASSISTANCE CONSTRUCTION SYSTEMS INC — 24 in. wide Types DACS2.0CD or DACS3.0CD.

EPIC METALS CORP — 24 in. wide Types EC150, -366, ECP150, -366; 24 or 30 in. wide Types EPC2, EPC3; 30 in. wide Type ECB-150.

KAM INDUSTRIES LTD, DBA CORDECK — Hi-Bond Types 24 in. wide 3KA1F24; 30 in. wide 3KF30, 3P30. Type 3P30 unit may be phos/ptd and 24 in. wide, WDR2, WDR3.

MARLYN STEEL DECKS INC — Types 1.5 CF, 2.0 CF or 3.0 CF.

NEW MILLENNIUM BUILDING SYSTEMS L L C — 24, 30 or 36 in. wide Types 1.5CD, 1.5CDI, 1.5CDR, 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.

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 1.5VL, 1.5VLI, 1.5PLVLI, 1.5VLP, 1.5PLVLP; 24 or 36 in. wide, Types 2VLI, 2.0PLVLI, 3VLI, 3.0PLVLI, 2VLP, 2.0PLVLP and 3VLP, 3PLVLP. Types 1.5VLI, 1.5PLVLI, 2VLI, 2.0PLVLI, 3VLI, 3.0PLVLI units may be phos/ptd. 36 in. wide Type High Strength 1.5 SBI, 36 in. wide Type High Strength 1.5 SBN; 36 in. wide Types 1.5 SB, 1.5 SBR; 24 or 36 in wide Types 2.0 SB, 3.0 SB. Units may be phos/ptd.

Min gauge 20/18 MSG for Types WDR2 or WDR3 cellular units used with min 20 MSG fluted units. Allowable loading for the floor shall be calculated based upon published loading tables for the fluted units. Types WDR2 or WDR3 units may also be used without being blended with fluted units when NW concrete is used and the allowable bending stress for the cellular units does not exceed 16,000 psi.

Spacing of welds attaching units to supports shall be at each side and not to exceed 16 in. OC between sides. For Types WDR2 or WDR3 units, welds not to exceed 12 in. OC. Unless noted otherwise, adjacent units button-punched or welded together 36 in. OC along side joints.

Alternate Construction — Noncomposite units of the same type listed above may be used provided allowable loading is calculated on the basis of noncomposite design.

3. **Joint Cover —** (Not Shown) — 2 in. wide cloth adhesive tape applied following the contour of the steel floor units.

4. **Trench Header —** (Bearing the UL Listing Mark). 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 noncomposite 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 welded or riveted 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. The use of the bottomless trench header requires additional protection underneath the trench header. Fireproofing thickness shall be increased as shown on the following table:

Restrained & Unrestrained Assembly Rating Hr	Thkns of Spray Applied Resistive Mtl, In.	
	on Crests	on Valley & Flat Plate
1	1-3/16	1
1-1/2	1-1/2	1-5/16
2	1-3/4	1-5/8

3	2-1/4	2-1/8

The use of the trench header requires additional protection underneath the trench header (See Item 7). The additional protection shall extend a min of 4 in. beyond the sides of the trench header.

4A. **Trench Header —** With an intermittent bottom (as an alternate to Item 4) when 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 noncomposite 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 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. The use of the intermittent bottom trench header requires additional protection underneath the trench header (See Item 7). The additional protection shall extend a min of 4 in. beyond the sides of the intermittent bottom trench header.

5. **Access Openings —** As required, with grommets.

6. **Header Duct —** (Bearing the UL Listing Mark) 1-1/2 in. deep by 6-7/8 in. wide. Housing constructed of steel.

6A. **Electrical Inserts —** 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. on center 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 Fire Resistive Materials on the steel floor units with inserts shall be sprayed the entire length and width of the units between supports and shall extend beyond the edge of inserts onto adjacent floor units for a minimum 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 minimum of 3/8 in. thickness of Spray-Applied Fire Resistive Materials.
Wiremold Co. and **Kam Industries LTD d/b/a Cordeck** Inserts

(NRG Bloc IV Preset Inserts; FAKM-II, RAKM-II, RAKM, RPF, FPF, S36BB, S36CC, S37BB, S37CC, S36PB, S36PP, S37PB, S37PP, S38CC, S38BB, S38PB, S38PP, S39CC, FPCT, FPBT, FPCTC, FPBTC, FPFFT, FPFFTC Service Fittings or Type S3AXBP abandonment plate)

The NRG Bloc IV preset insert is furnished by **KAM INDUSTRIES LTD d/b/a CORDECK**. The service fitting components are furnished by **WIREMOLD CO**. Installed per accompanying installation instructions over factory-punched holes in 3 in. deep K-Type cellular steel floor units (furnished by KAM INDUSTRIES LTD d/b/a CORDECK). Openings made in the two-part access hatch of the Type RAKM service fitting for passage of wires shall be no greater than 1/8 in. larger than diameter of wire. When Types RPF, FPF, S36PB, S36PP, S37PB, S37PP, S38PP, S39PP, FPFFTC, FPFFT service fittings are used, furniture whip for power feed from service fitting cover to be liquid-tight steel conduit with cast steel 90 degree elbow connector. Refer to installation instructions for Classified assemblies. The 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 Mtl Thkns, In.
(Types RAKM-II, S36BB, S36CC, S38BB, S38CC, FPBTC, FPCTC, S3AXBP)			
1	3 in. K	LW or NW	3/8
1-1/2	3 in. K	LW or NW	7/16
2	3 in. K	LW or NW	11/16
3	3 in. K	LW or NW	1
(Type FAKM-II)			
1, 1-1/2	3 in. K	LW or NW	3/8
2	3 in. K	LW or NW	7/16
3	3 in. K	LW or NW	13/16

(Types RAKM, S37BB, S37CC, S39BB, S39CC, FPBT, FPCT)			
1, 1-1/2	3 in. K	LW or NW	3/8
2	3 in. K	LW or NW	11/16
(Types RPF, S37PB, S37PP, S39PP, FPFFT)			
1	3 in. K	NW, LW	3/8
1-1/2	3 in. K	NW	3/8
1-1/2	3 in. K	LW	1/2
2	3 in. K	NW	9/16
2	3 in. K	LW	3/4
3	3 in. K	NW	1
(Types FPF, S36PB, S36PP, FPFFTC)			
1, 1-1/2	3 in. K	LW, NW	3/8
2	3 in. K	LW, NW	7/16
3	3 in. K	LW, NW	13/16

(PK Series Preset Inserts: RPF, S37PB, S37PP, S39PP or FPFFT Service Fittings)

Installed per accompanying installation instructions over factory pre-punched knockouts or factory installed over pre-punched knockouts in Types WDR2 or WDR3 cellular steel floor units. Furniture whip for power feed from service fitting cover to be liquid-tight steel conduit with cast steel 90 degree elbow connector. Refer to installation instructions for Classified assemblies. Required Spray-Applied Fire Resistive Materials thicknesses on floor units with inserts are:

Restrained Assembly Rating, Hr	Concrete Type	Min Mtl Thkns, In.
(Types RPF, S37PB, S37PP, S39PP, FPFFT)		
1	NW	3/8
1	LW	1/2
1-1/2	NW	7/16
1-1/2	LW	5/8
2	NW	11/16
2	LW	7/8
3	NW	1-1/8

(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. Types TSAR and TSACR for use in 7 in. diam holes. Spacing shall be not more than one insert in each 4 sq 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 Mtl 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

WIREMOLD CO — Type NRG Bloc IV preset inserts; Types FAKM-II, RAKM-II, RAKM, RPF, FPF, S36BB, S36CC, S37BB, S37CC, S36PB, S36PP, S37PB, S37PP, S38CC, S38BB, S39BB, S39CC, S38PP, S39PP, FPCT, FPBT, FPCTC, FPBTC, FPFFT, FPFFTC service fittings or Type S3AXBP abandonment plate. Type PK-Series inserts; Types RPF, S37PB, S37PP, S39PP or FPFFT service fittings. Types TSAR, TSACR after set inserts.

6B. **Welded Wire Fabric —** 6 by 6 - W1.4xW1.4 Required only when electrical inserts (Item 6A) are used.

7. **Spray-Applied Fire Resistive Materials* —** Applied by spraying with water to the final thicknesses shown below. Crest areas shall be filled with Spray-Applied Fire Resistive Materials above the beam. Beam surfaces must be clean and are free of dirt, loose scale and oil. Under bottomless and intermittent trench headers (Items 4 and 4A), under for Type WDR cellular floor units, under 20/20 MSG cellular floor units and under 22 MSG fluted floor units, the use of adhesive is required; adhesive is optional for the other conditions and heavier gauges of floor units. Min avg density of 13 pcf with min ind density of 11 pcf for Types DC/F, II, or II HS. Min avg and min ind densities of 22 and 19 pcf, respectively, for Type HP. For method of density determination, refer to Design Information Section, Sprayed Material. The thickness of the Spray-Applied Fire Resistive Material on the Structural Members shall be as follows:

Restrained Assembly Rating, Hr	Unrestrained Assembly Rating, Hr	Min Required Unrestrained Beam Rating, Hr	Concrete Type	Min Mtl Thkns, In. Steel Floor & Form Units				
				W8x28 Beam (a)	W8x28 Beam (b)	Fluted Crests	Fluted Valley	Cellular
2	1	1	NW	3/8	1/2	1/2	3/8	3/8
3	1-1/2	1-1/2	NW	5/8	13/16	11/16	1/2	1/2
2	2	2	NW	13/16	1-1/16	1/2	3/8	3/8
3	3	3	NW	1-5/16	1-11/16	11/16	1/2	1/2
2	1	1	LW	1/2	5/8	1/2	3/8	3/8
3	1-1/2	1-1/2	LW	13/16	1	11/16	1/2	1/2
2	2	2	LW	1-1/8	1-7/16	1/2	3/8	3/8
3	3	3	LW	1-3/4	2-1/4	11/16	1/2	1/2
Mac-Way 2-or 3-633 MTWA cellular units are covered only for the ratings, concrete types and thicknesses shown below:								
2	1, 1-1/2 or 2	1, 1-1/2 or 2	NW	—	++++	—	—	1/2
3	1, 2 or 3	1-1/2, 2 or 3	NW	—	++++	—	—	5/8
2	1, 1-1/2 or 2	1, 1-1/2 or 2	LW	—	++++	—	—	1/2
3	1, 2 or 3	1-1/2, 2 or 3	LW	—	++++	—	—	5/8

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

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

++++ See above beam thickness for applicable Unrestrained Beam and Unrestrained Assembly ratings.

When Type WDR cellular units are used, for the general floor area without trench headers or electrical inserts, the following thicknesses of Spray-Applied Fire Resistive Materials are required on the steel floor units for the various Restrained and Unrestrained Assembly Ratings:

Restrained Assembly Rating, Hr	Unrestrained Assembly Rating, Hr	Min Required Unrestrained Beam Rating, Hr	Concrete Type	W8x28 Beam (a)	W8x28 Beam (b)	Min Mtl Thkns, In. Steel Floor & Form Units	
						Fluted	Cellular
1	1	1	NW	—	1/2	—	3/8
1, 1-1/2, 2	1	1	LW	1/2	5/8	3/8	1/2
1-1/2	1	1	NW	—	1/2	—	3/8
1-1/2	1-1/2	1-1/2	NW	—	13/16	—	3/8
2	1	1	NW	—	1/2	—	1/2
2	2	2	NW	—	1-1/16	—	1/2
3	1-1/2	1-1/2	NW	—	13/16	—	15/16
3	2	3	NW	—	1-1/16	—	15/16
3	3	3	NW	—	1-11/16	—	15/16

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

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

When trench header (Item 4A) is used with Type WDR cellular units, the following thicknesses of Spray-Applied Fire Resistive Materials are required on the steel floor units for the various Restrained and Unrestrained Assembly Ratings.

Restrained Assembly Rating, Hr	Unrestrained Assembly Rating, Hr	Concrete Type	Min Mtl Thkns, In. Trench Header Intermittent (Item 4A)		
			Crests	Valley	Flat Plate
1	1	LW, NW	1-3/16	1	1
1-1/2	1-1/2	NW	1-1/2	1-1/4	1-1/4+
1-1/2	1	LW	1-1/2	1-1/4	1-1/4+
2	2	NW	1-3/4	1-5/8	1-5/8+
2	1	LW	1-3/4	1-5/8	1-5/8+

+ Steel studs with discs (Item 12) must be welded to the cellular units below the trench header.

ISOLATEK INTERNATIONAL — — Types D-C/F, II, II HS, or HP. Investigated for exterior use. Type EBS or Type X adhesive/surface sealer optional.

8. **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.

9. **Roof Covering —** (Optional — Not Shown) — Class A, B or C **Built-Up Roof Covering Materials*** consisting of asphalt (or coal tar pitch) and felt in alternate layers placed over concrete slab.
See Building Materials Directory for descriptions.

10. **Insulation* —** (Optional — Not Shown) — Rigid Insulation Boards installed as indicated below:

A. **Foamed Plastic* —** Rigid polystyrene foamed plastic insulation boards, no restriction on thickness, installed with or without adhesion, over roof covering (Item 9). Covered with min 10 psf crushed stone or concrete pavers.

THE DOW CHEMICAL CO

GCP APPLIED TECHNOLOGIES INC

B. **Mineral and Fiber Board* —** (For use in 2 hr. assembly ratings only) — Applied over concrete floor with no restriction on thickness. When mineral and fiber board is used. **Compatible Roof Covering materials***, providing Class A, B or C coverage shall be used. See Roofing Systems (TGFU) in Building Materials Directory.

11. **Perlite Concrete —** (Optional — Not Shown) — 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.

12. **Cellular Concrete — Roof Topping Mixture* —** (Optional — Not Shown) — 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.

13. **Steel Studs with Discs —** (Not Shown) — The stud consists of No. 12 SWG steel wire, of a length 3/8 in. shorter than the thickness of protection material, with one end welded to 1-3/16 in. diam No. 28 MSG galv steel disc. The total number of studs shall average at least one stud per 236 sq in. of cellular floor units beneath the trench header. The ends of studs opposite the discs shall be welded to the cellular floor units in rows running parallel with the trench header. The distance between the outer rows of studs and the edge of the trench header shall not exceed 4 in. The spacing between rows shall not exceed 22 in. The spacing between the studs in each row shall not exceed 24 in.

* 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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