

BXUV.D832

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. D832

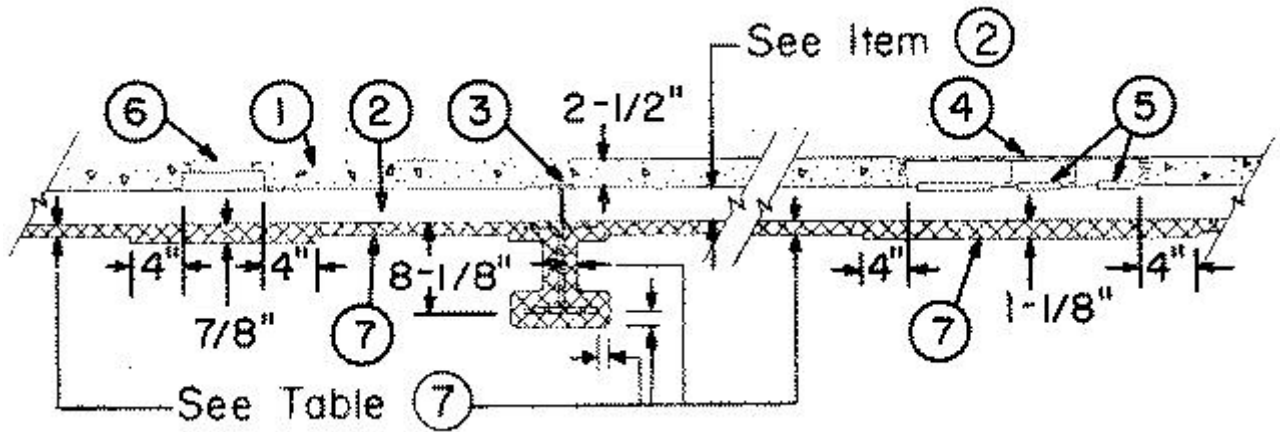
Restrained Assembly Ratings – 1, 1-1/2, 2 and 3 Hr.
(See items 4, 6A and 7)

Unrestrained Assembly Ratings – 1, 1-1/2, 2 and 3 Hr.
(See Items 4 and 7)

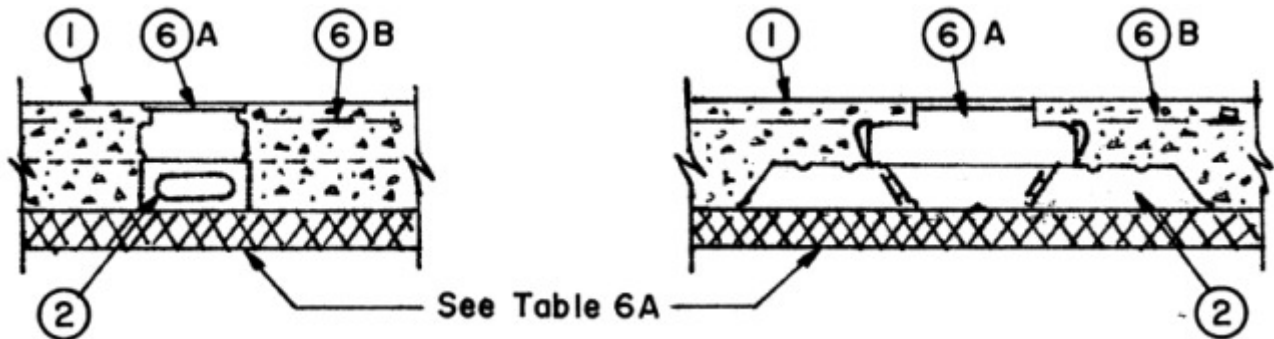
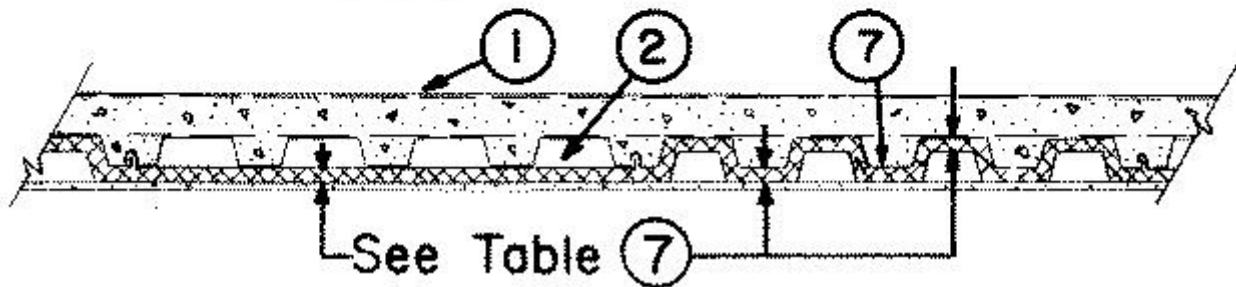
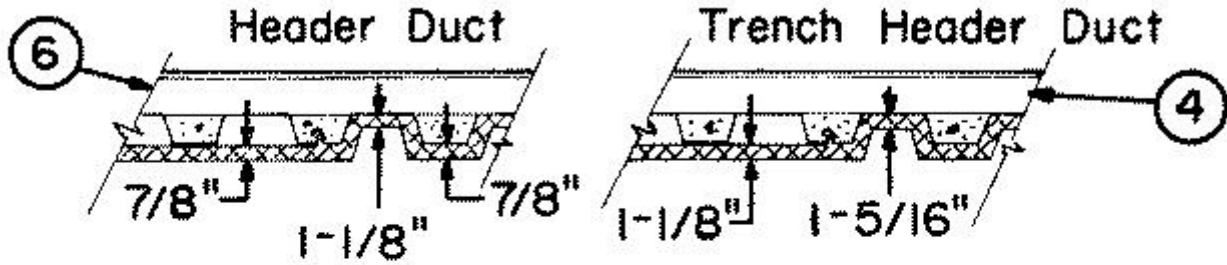
Unrestrained Beam Ratings – 1, 1-1/2, 2 and 3 Hr.
(See Items 4 and 7)

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.**



Sections Thru



Steel Beam — W8X28 steel beam min size.

Note: Joists from the N series designs may be substituted for the listed beam. 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 in front of the Fire Resistance Directory - III. Floor-Ceiling and Roof-Ceilings, Item 7 - Steel Joists, or IV. Beams.

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

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 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 non-composite 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, 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 — 36 in. wide Type P-3623, P-3606, P-3615 and 24 in wide Type P-2432 composite, 36 in. wide Type P-3606 and P-3615 non-composite; 24 or 36 in. wide Type LF3. Type LF3 unit may be phos/ptd; 36 in. wide Types 1.5B, 1.5BI, 1.5BL and 1.5BL.

CANAM STEEL CORP — 36 in. wide Type P-3623, P-3606, P-3615 and 24 in wide Type P-2432 composite, 36 in. wide Type P-3606 and P-3615 non-composite.

CANAM STEEL CORP — 24, 30 or 36 in. wide, Types BL, BLC; 24 in. wide, Types LF2, LF3, LF15, LFC1, LFC2, LFC3, NL, NLC; 36 in. wide, Types LF2, LF3, LFC2, LFC3. Types BL, LF2, LF3 and NL units may be phos/ptd.

KAM INDUSTRIES LTD, DBA CORDECK — QL Types 24 in. wide 3, UKX, NKC-1.5, 2 in. 99, AKX, AKD; 26 or 28 in. wide UKX; 36 in. wide 2 or 3 in. 99, AKX, WKX, AKD, WKD; 24 or 30 in. wide 3 in. QL-GKX, -GKXH, -GKX-A.

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.

DESIGN ASSISTANCE CONSTRUCTION SYSTEMS INC — 24 in. wide Type 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 — Type 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.

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. Units may be cellular with the suffix "CD" added to the product name.

VULCRAFT, DIV OF NUCOR CORP — 24, 30 or 36 in. wide Type 1.5VL, 1.5VLI, 1.5VLR, 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 Type 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. Type 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 Type 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 — Non-composite units of the same type listed above may be used provided allowable loading is calculated on the basis of non-composite design.

3. **Joint Cover** — 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 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 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. 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 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	Min Thkns, 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 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 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.

(1) KAM INDUSTRIES LTD, DBA CORDECK Inserts

(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 Fire Resistive Materials 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
3	QL-AKX	NW	1-1/4
3	QL-AKX	LW	1-1/2
3	QL-WKX; Metric	NW	1-3/16
	Units-QLC-78-900		
3	QL-WKX; Metric	LW	1-3/8
	Units-QLC-78-900		
(Tapmate II-FN or II-EAFN)			
2	QL-AKX, -WKX; Metric	NW	7/16
	Units-QLC-78-900		
2	QL-AKX, -WKX; Metric	LW	3/4
	Units-QLC-78-900		
3	QL-AKX, -WKX; Metric	NW	3/4
	Units-QLC-78-900		

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 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 Fire Resistive Materials thicknesses 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 Fire Resistive Materials 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; Metric	NW	1/2
	Units-QLC-78-C-900, -78-E-900, -78-F-900		
2	QL-AKD, WKD; Metric	LW	13/16
	Units-QLC-78-C-900, -78-E-900, -78-F-900		
3	QL-AKD, -WKD	NW	3/4
(Tapmate III-EAFN-FC1)			
2	QL-WKD	NW	1/2
	QL-WKD	LW	13/16
3	QL-AKD, WKD; Metric	NW	3/4
	Units-QLC-78-C-900, -78-E-900, -78-F-900		

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 insert 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 Fire Resistive Materials 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

3	QL-GKX	NW	1-1/4
3	QL-GKX	LW	1-1/2
(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

The holes cut in insert cover for passage of wires shall be no more than 1/8 in. larger diameter 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 Fire Resistive Materials 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	13/16
3	QL-GKX	NW	3/4

The hole cut in insert cover for passage of wires shall be no more than 1/8 in. larger diameter 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
3	QL-GKX	NW	1-1/4
3	QL-GKX	LW	1-1/2

(Tapmate VI)

Installed per accompanying installation instructions over factory-punched holes in 3 in. deep Type QL-GKX, 24 in. wide cellular steel floor units. Refer to installation instructions for Classified assemblies. The required Spray-Applied Fire Resistive Materials thicknesses on steel floor units with inserts are:

Restrained Assembly Rating, Hr	Floor Unit Type	Concrete Type	Min Thkns, In.
1		LW or NW	3/8
1-1/2		LW or NW	1/2
2		LW or NW	3/4
3		LW or NW	1

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, Tapmate VI

(2) **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, FPFPT, FPFPTC Service Fittings or Type S3AXB 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 Type RPF, FPF, S36PB, S36PP, S37PB, S37PP, S38PB, S38PP, S39PP, FPFPTC, FPFPT 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 Thkns, In.
(Type RAKM-II, S36BB, S36CC, S38BB, S38CC, FPBTC, FPCTC, S3AXB)			
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
(Type RPF, S37PB, S37PP, S39PP, FPFPT)			
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
(Type FPF, S36PB, S36PP, FPFPTC)			
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 FPFPT Service Fittings)

Installed per accompanying installation instructions over factory pre-punched knockouts or factory installed over pre-punched knockouts in Type 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 Thkns, In.
(Type RPF, S37PB, S37PP, S39PP, FPFPT)		
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 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; Type 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, FPFPT, FPFPTC service fittings or Type S3AXB abandonment plate. Type PK-Series inserts; Type RPF, S37PB, S37PP, S39PP or FPFPT service fittings. Type TSAR, TSACR after set inserts.

6B. **Welded Wire Fabric** — 6x6-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 untamped thicknesses shown below. Crest area shall be filled with Spray-Applied Fire Resistive Materials above the beam. Beam surfaces must be free of dirt, oil or scale. 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 untamped density is 13 pcf with min untamped individual density of 11 pcf for Types DC/F, II, or II HS. Min avg and individual densities of 22 and 19 pcf, respectively, for Type HP. For method of density determination, refer to Design Information Section. The thickness of the Spray-Applied Fire resistive Materials on the beams shall be as follows:

Restrained Assembly Rating, Hr	Unrestrained Assembly and Beam Rating	Concrete Type	Min Thknes, Spray-Applied Resistive Mtl, In.	
			W8x28 When Deck Is All Fluted	W8x28 When Deck Is blend or All Cellular
1	1	NW	3/8	3/8
1-1/2	1-1/2	NW	1/2	1/2
2	1	NW	3/8	3/8
2	2	NW	3/4	13/16
3	1-1/2	NW	1/2	1/2
3	3	NW	1-3/16	1-5/16
1	1	LW	3/8	7/16
1-1/2	1-1/2	LW	5/8	11/16
2	1	LW	3/8	7/16
2	2	LW	1	1
3	1-1/2	LW	5/8	11/16

3	3	LW	1-9/16	1-5/8
---	---	----	--------	-------

For the general floor area, 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. Steel Floor Unit Depth, In.	Concrete Type	Min Thknes, Spray-Applied Resistive Mtl, In.		
				Crests	Valley	Flat Plate
1	1	1-1/2	NW or LW	3/8	3/8	3/8
1-1/2	1-1/2	1-1/2	NW or LW	3/8	3/8	3/8
1-1/2	1-1/2	2	NW or LW	3/8	3/8	3/8
2	1	1-1/2	NW or LW	1/2	3/8	3/8
2	2	1-1/2	NW or LW	1/2	3/8	3/8
2	2	2	NW or LW	3/8	3/8	3/8
3	1-1/2	1-1/2	NW or LW	11/16	1/2	1/2
3	1-1/2	3	NW or LW	5/8	5/8	1/2
3	3	1-1/2	NW or LW	11/16	1/2	1/2
3	3	3	LW	5/8	5/8	1/2

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	Concrete Type	Min Mtl Thkns In. Steel Floor & Form Units	
			Fluted	Cellular
1	1	NW	—	3/8
1, 1-1/2, 2	1	LW	3/8	1/2
1-1/2	1	NW	—	3/8
1-1/2	1-1/2	NW	—	3/8
2	1	NW	—	1/2
2	2	NW	—	1/2
3	1-1/2	NW	—	15/16
3	2	NW	—	15/16
3	3	NW	—	15/16

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 — Type D-C/F, HP, II, or II HS. Type E.B.S. or Type X adhesive/surface sealer are required 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. Adhesive is optional for the other conditions and heavier gauges of floor units.

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.

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.

C. **Foamed Plastic (CCVW)*** — (As an alternate to Item 10 - Not shown - Optional) - Expanded polystyrene insulation installed to a maximum nominal density of 2.0 lb/ft².

BASF CORP STYRENIC FOAMS DIV — — Type Neopor "F" Series

11. **Vermiculite Concrete** — (Optional, Not Shown) Min 2 in. thick, consisting of 6 cu ft **Vermiculite Aggregate** * to 94 lb Portland cement and 0.5 lb air entraining agent, poured over insulation (Item 10A). May be covered with any built-up or single ply **Roof Covering Materials** *.

ELASTIZELL CORP OF AMERICA — Types MS 16-U, MSV 200.

GCP APPLIED TECHNOLOGIES INC

11A. **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.

12. **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 or 11C). 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.**

Last Updated on 2021-05-12

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: "© 2021 UL LLC"