

Design No. D759

October 31, 2003

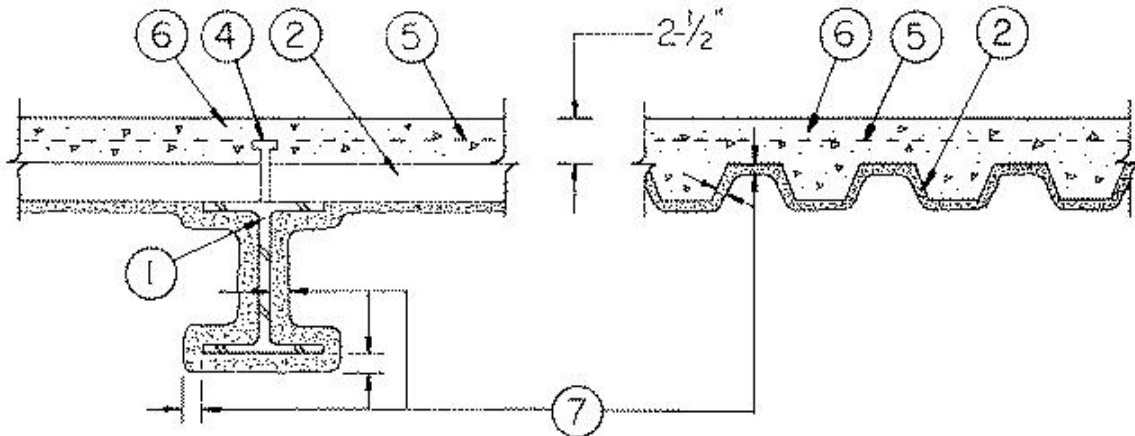
Restrained Assembly Rating — 1, 1-1/2, 2 and 3 Hr.

(See Items 2, 7, 9, 9A and 12).

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

(See Items 2, 7, 9, 9A and 12).

Unrestrained Beam Rating — 1, 1-1/2, 2, 3 Hr. (See Item 7).



1. **Steel Beam**, — W8x28 steel beam min size.

1A. **Steel Joist**, — (Not Shown) Composite or noncomposite welded or bolted to end supports. 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. 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 noncomposite joists are used.

2. **Steel Floor And Form Units*** — 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.

CONSOLIDATED SYSTEMS INC — 24 or 36 in. wide Type CFD-1.5, CFD-2 or CFD-3. Adjacent fluted units welded or screwed together 30 in. O.C. along side joints. Screws shall be 3/4 in. long, No. 14 self-tapping and self-drilling steel screws. 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.

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*** — Applied by mixing with water and spraying in one or more coats to the thicknesses shown below, to steel surfaces which are clean and free of dirt, loose scale and oil. Use of Type PC Pre-coat is required on all cellular units when Types 300, 300ES, 300N or SB are used. 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. Min average and min individual density of 17.5 and 16 pcf, respectively for Types 300, 300ES, 300N and SB. Min average and min individual density of 22 and 19 pcf, respectively for Type 400. For method of density determination, see Design Information Section, Sprayed Material.

Restrained Assembly Rating Hr	Unrestrained Assembly Rating Hr	Unrestrained Beam Rating Hr	Min Thkns Spray Applied Resistive Mtl			
			Steel Fluted	Deck Cellular	Beam	Joist
1+	1+	1	3/8	3/8	5/16	9/16++
1-1/2+	1-1/2+	1-1/2	3/8	3/8	5/8	1
2+	1+	1	3/8	3/8	5/16	—
2+	1-1/2+	1-1/2	3/8	3/8	5/8	—
2+	1-1/2+	2	3/8	3/8	13/16	1-3/8
2+	2+	2+	3/8	3/8	13/16	1-3/8
3+	1-1/2+	1-1/2	13/16	5/8	5/8	2-1/4
3+	2+	2+	13/16	5/8	13/16	—
3+	3+	3+	13/16	3/4	1-5/16	2-1/4

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

++ — 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.		
			Steel Fluted	Deck Cellular	Beam
2	2	1-1/2	1/2	7/16	15/16
3	3	1-1/2	15/16	7/8	1-1/2

CIL GROUP LTD — Type 300.

ISOLATEK INTERNATIONAL — Type 300, Type 300ES, Type 300N, Type 400 or Type SB and Type PC.

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 midheight 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) — (Not Shown — Optional) — 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 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		Min Thkns of Spray Applied Fire Resistive Mtl on Metal Lath**
	on Crests	In. & on Valley & Flat Plate *	
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** — 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 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 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 galvanized 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.

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) **H H ROBERTSON** —

(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

H H ROBERTSON — 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) CONSOLIDATED SYSTEMS INC — Installed per accompanying installation instructions over factory pre-punched knockouts or factory installed over pre-punched knockout holes in Mac-Way 2- or 3-633 MTWA cellular floor units. Required Spray-Applied Fire Resistive Materials thicknesses on cellular floor units with inserts are:

Restrained Assembly Rating Hr	Floor Unit Type	Concrete Type	Min Thkns In.
2	Mac-Way 2-, 3-633 MTWA	NW	1/2
2	Mac-Way 2-, 3-633 MTWA	LW	7/8

The holes cut in the activation covers for passage of wires shall be no more than 1/8 in. larger diam than the wire. Abandonment requires use of insert cover with no holes in it.

CONSOLIDATED SYSTEMS INC — MSIX insert. Types MSH-400, MSH-450 activating fittings.

(3) Walker Systems Inc. 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

WALKER SYSTEMS INC — 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*.

CELLULAR CONCRETE L L C — 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.

LITE-CRETE INC — Cast density 29 (+ 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.

*Bearing the UL Classification Mark

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