

Design No. D858

June 14, 2002

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

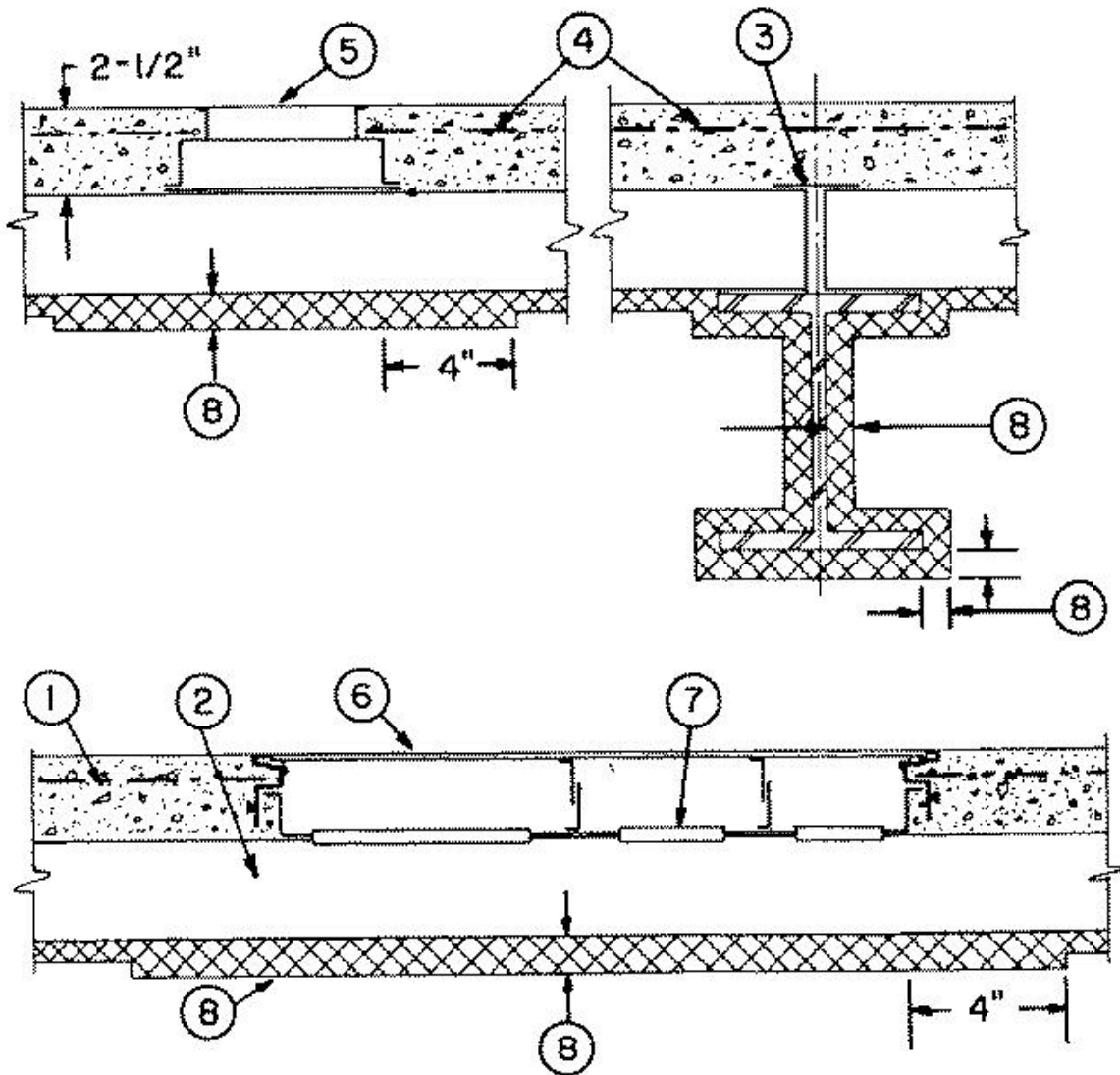
(See Items 2A, 4A and 8)

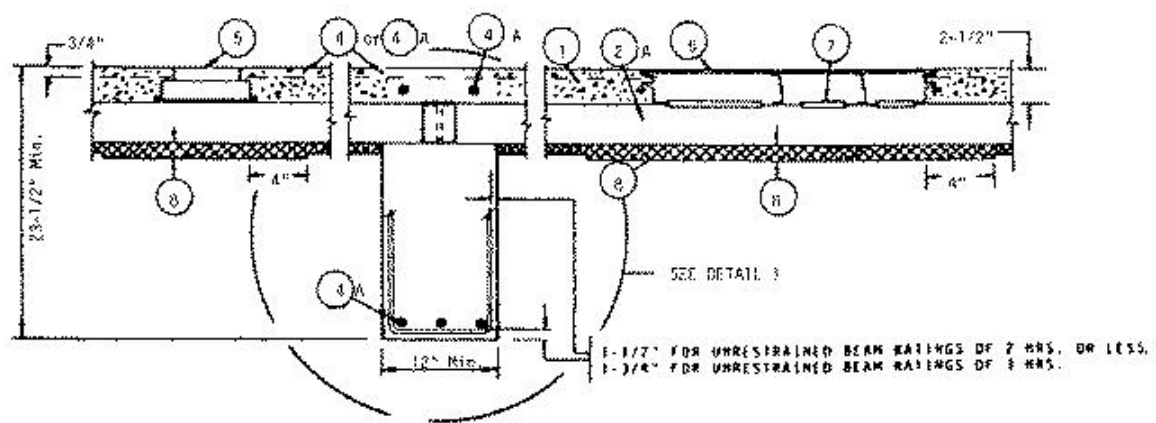
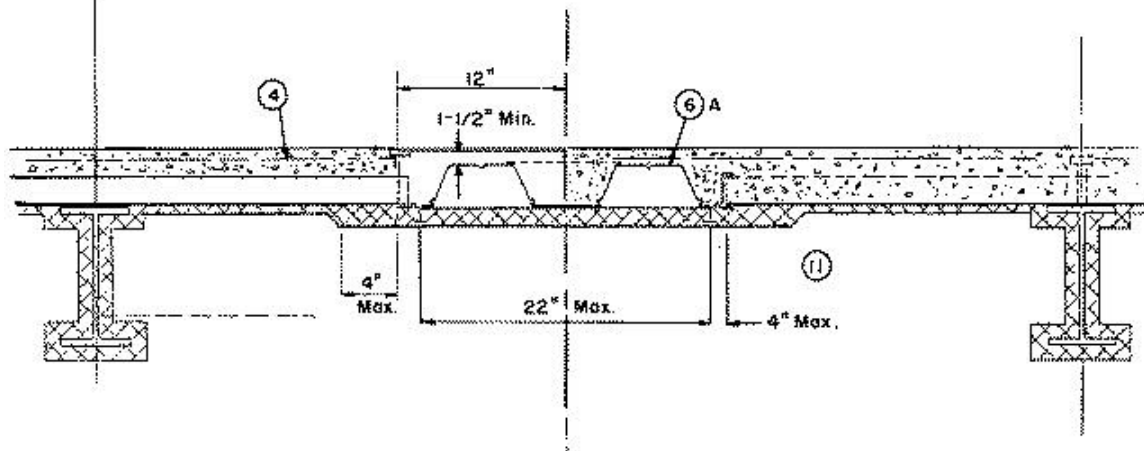
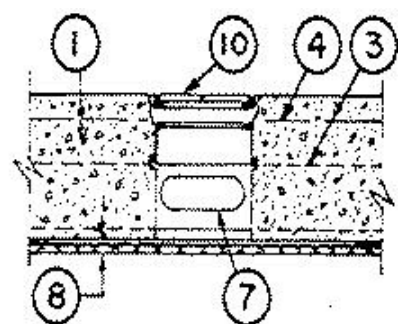
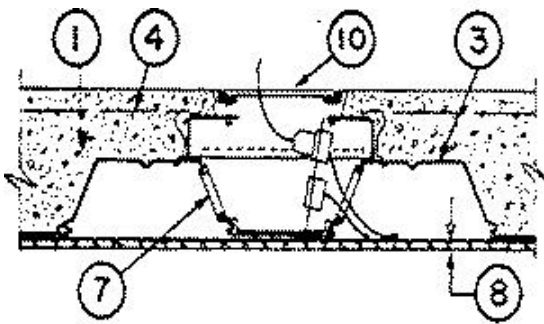
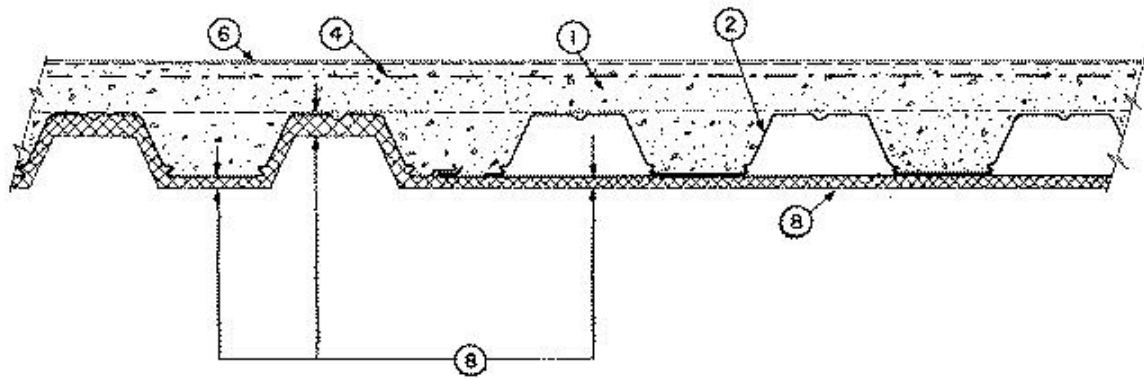
Unrestrained Assembly Ratings — 1, 1-1/2, 2, 3 and 4 Hr.

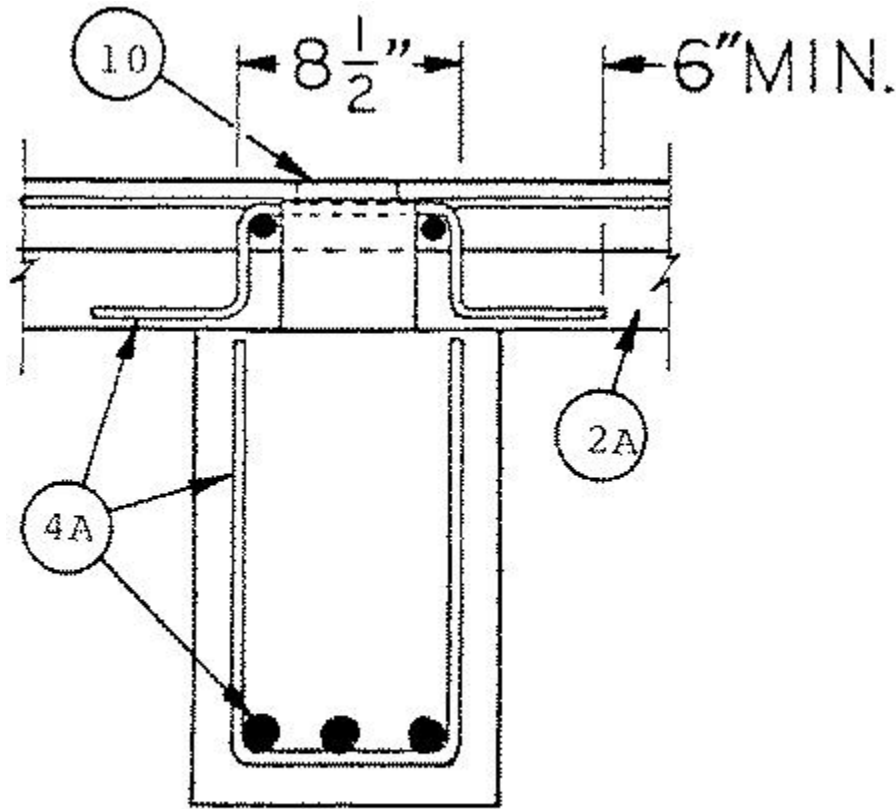
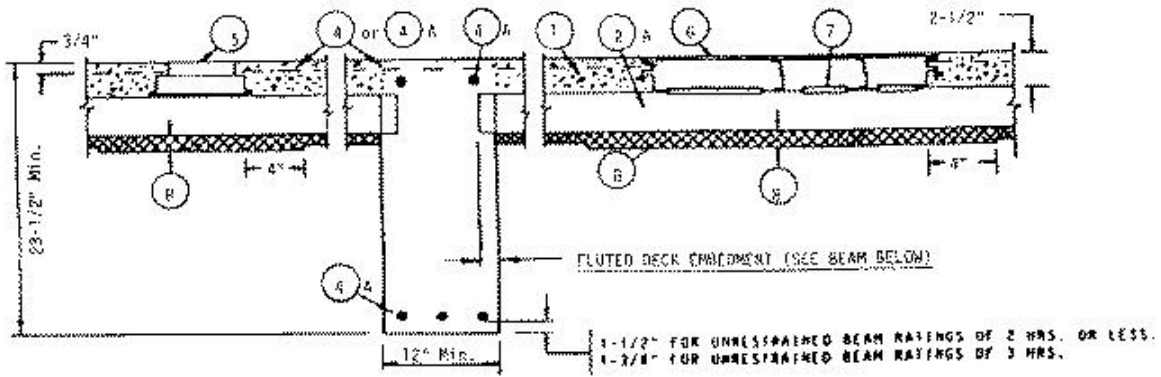
(See Items 2A, 4A and 8)

Unrestrained Beam Ratings — 1, 1-1/2, 2, 3 and 4 Hr.

(See Items 2A, 4A and 8)







## DETAIL I

**Beam** — W10X25, min size. For 3 Hr or less Restrained and Unrestrained Assembly and Unrestrained Beam Ratings, as alternate to steel beams, cast in place reinforced concrete beams or girders designed in accordance with the provisions of the Building Code Requirements for Reinforced Concrete (ACI 318-89), may be used as supports for the 3 in. deep floor units. (See Item 2A). Min width and depth of concrete beams shall be 12 and 23-1/2 in., respectively. Fluted units shall be embedded in the concrete beams a min of 0.0139 times the clear span or 1-1/2 in., whichever is greater. The cellular units may be continuous or with a butted end joint centered over the concrete beams. For continuous floor spans, negative moment reinforcement for the slabs is required over the supporting beams.

**1. Normal Weight or Lightweight Aggregate Concrete** — Normal weight concrete, carbonate or siliceous aggregate, 150 +or- 3 pcf unit weight, 3,000 psi compressive strength, vibrated. Lightweight concrete, expanded shale, clay or slate aggregate by rotary kiln method; 113 (+2, -5) pcf unit weight, 3,000 psi compressive strength, vibrated.

**2. Steel Floor and Form Units\*** — Composite 1-1/2, 2 or 3 in. deep galv units. Fluted units may be uncoated. Min gauges are 22 MSG for fluted and 20/20 MSG for cellular. For spans with trench headers the allowable loading shall be based on noncomposite design. The following combination of units may be

used: (1) All fluted; (2) All 24, 30 or 36 in. wide cellular; (3) Any blend of fluted and 24, 30 or 36 in. wide cellular

**CONSOLIDATED SYSTEMS INC** — 24 or 36 in. wide Types CFD-1.5, CFD-2 or CFD-3. Adjacent fluted and cellular units welded or screwed together 30 in. OC along side joints. Screws shall be 3/4 in. long, No. 14 self-tapping, self-drilling steel screws. Types CFD-2, CFD-3 units may be phos/ptd for the 1, 1-1/2 and 2 hr ratings.

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

**2A. Steel Floor and Form Units\*** — (For use with alternate cast in place concrete beams)— Composite 3 in. deep galv units. Fluted units may be uncoated. Min gauges are 20 MSG for fluted and 20/20 MSG for cellular. The ratio of blended units shall not exceed one 24 in. wide cellular unit to 36 in. wide fluted unit for the cast in place concrete frame buildings.

**3. Joint Cover** — 2 in. wide pressure-sensitive cloth tape applied following the contour of the steel floor units.

**4. Welded Wire Fabric** — 6 by 6 — W1.4 x W1.4.

**4A. Reinforcement** — Deformed bars of grade 60 steel, for use in floors supported by reinforced concrete beams or girders. Min size No. 3 bars for use as negative reinforcement or vertical stirrups for beams, girders or slabs. Min No. 5 bars for use as positive reinforcement for beams or girders. Min net concrete cover on the beam or girder bottom reinforcements, shall be 1-1/2 in. for Restrained Assembly Ratings up to 3 Hr and Unrestrained Assembly and Beam Ratings up to 2 Hr. For 3 Hr Unrestrained Assembly and Beam Ratings, 1-3/4 in. cover is required. When continuous cellular units intersect the supporting concrete beams (interrupting the beam stirrups), short pieces of additional stirrups shall be placed in the top part of the beam above the units.

**5. Header Duct and Fittings** — (Bearing the UL Listing Mark). 1-1/2 in. deep by 6-3/4 in. wide. Housing constructed of steel. (See Item 8)

**6. 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. The space between the bottom of the trench and the top of the floor unit shall be filled with concrete. The use of the trench header requires additional protection underneath the trench header. (See Item 8.) The additional protection shall extend a min of 4 in. beyond the sides of the trench header.

**6A. Trench Header** — (Bearing the UL Listing Mark) — As an alternate to Item 6, a trench header 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. For QL-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. (See Item 8). The additional protection shall extend a min of 4 in. beyond the sides of the bottomless trench header.

**6B. Feeder Duct System** — As an alternate to Item 6 or 6A, a feeder duct system consisting of 3 in. deep, nom 24 in. wide, 20/18 MSG Type QL-WKM or QL-WKM-E cellular steel floor unit (feeder duct) and nom 24 by 24 in. junction boxes may be used. The valley between the two cells of the feeder duct may or may not be covered by a steel plate to form a third cell. Feeder duct installed at the same elevation and

perpendicular to 2 or 3 in. deep fluted and/or cellular steel floor units which are cantilevered from support beams on one or both sides of the feeder duct. The junction boxes consisting of extruded aluminum screeds, 18 galv steel outside flute closures, 16 galv steel compartment divider and 0.21 in. thick steel cover plate are used at intersections of 2 or 3 in. cellular units and the feeder duct, where desired. Bottom tabs of the flute closures are fastened to the valleys of the 2 or 3 in. units and to the feeder duct with self-drilling tek fasteners while the cover plate is retained in position by four latch clips, one near each corner of the plate. The height and the level of the aluminum screed are adjusted by four adjustment screws, two each on opposite sides. In between the junction boxes the ends of the 2 or 3 in. fluted and/or cellular units are covered with steel end closure angles tack-welded to the top of the units. Welded wire fabric (Item 4) extends over the feeder duct between junction boxes. The allowable superimposed load for spans with the feeder duct system shall be based on noncomposite design. Steel studs with discs (Item 11) shall be welded to the underside of the feeder duct in two rows. The spacing between rows shall not exceed 22 in. OC and the spacing of studs in each row shall not exceed 24 in. OC. The use of this feeder duct system requires additional protection underneath the feeder duct. (See Item 8)

**H H ROBERTSON** — 24 in. wide Types QL-WKM or QL-WKM-E.

**6C. Trench Header** — (Bearing the UL Listing Mark) — As an alternate to Items 6, 6A or 6B, a trench header with an intermittent bottom may be used for 2 Hr (or less) Restrained Assembly Rating. 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 max width of 24 in., consists of a horizontal closure plate (min. No. 22 MSG), over the fluted deck sections at the desired trench header location and affixed to the floor units by welding or screws (No. 14 by 3/4 in. long self-tapping, self-drilling). At the trench header where horizontal plates cover the fluted units, concrete is to be vibrated into the voids formed by the plate and fluted units. The side rails consist of extruded aluminum screeds secured to the galv steel channels (min. No. 18 MSG), positioned over the edge of the horizontal closure plates, aligned and welded to the cells and fluted floor units. A separate U-shaped galv steel channel (min No. 18 MSG), serving as the power compartment is welded to the horizontal closure plates and floor units. Steel cover plates 1/4 in. thick, shall be screw attached to the side rails. The use of the intermittent trench header requires additional protection underneath the trench header. (See Item 8). The additional protection shall extend a min of 4 in. beyond the sides of the intermittent bottom trench header.

**6D. Trench Header** — (Bearing the UL Listing Mark) — As an alternate to Item 6, 6A, 6B or 6C, a trench header with an intermittent bottom may be used. 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 max 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. Void closures above the cellular areas of the units to be welded to the ribs of the units on both sides of the trench header adjacent to the outer sides of the side rails to prevent the concrete from flowing into the raceway inside the trench header area. A separate U-shaped galvanized steel channel (min. No. 14. MSG) serving as the power compartment welded on both sides to the horizontal closure plates and to the floor units. Support post strips, 2-1/4 in. wide, with vertical posts pre-welded at 7 in. OC, welded to the horizontal closure plates and the steel deck parallel to and on both sides of the U-channel, with 1 in. long welds at 24 in. OC and at the ends of the strips. Steel cover plates 1/4 in. thick, shall be screw attached to the side rails. For 2 h Restrained and Unrestrained Assembly Ratings, the required fireproofing thickness shall be applied in conjunction with stud pins with discs below the trench header (See Item 8). The additional protection shall extend a min of 4 in. beyond the sides of the intermittent trench header.

**6E. Trench Header** — (Bearing the UL Listing Mark) — As an alternate to Item 6, 6A, 6B, 6C or 6D, a trench header without a bottom pan may be used. The allowable superimposed load for span with a bottomless trench header shall be based on noncomposite design. Bottomless trench header with a max width of 36 in., consists of "L" shaped closure plates (min No. 16 MSG) support strips with 4 threaded studs, side rails, power channel and cover plates. The closure plates are cell closures which conform to the contour of the floor units and are affixed to the floor units by welds along both sides of the trench. 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 stud on top of the plates. Void closures above the cellular areas of the units to be welded to the

ribs of the units on both sides of the trench header adjacent to the outer sides of the side rails to prevent the concrete from flowing into the raceway inside the trench header and on top of the cellular units. A separate U-shaped galvanized steel channel, min No. 14 MSG serving as the power compartment welded on both sides to the horizontal closure plates and the floor units.

Support posts strips, 2-1/4 in. wide, with vertical posts pre-welded at 7 in OC, welded to the horizontal closure plates and the steel deck parallel to and on both sides of the U-channel, with 1 in. long welds at 24 in. OC and at the ends of the strips. Steel cover plates, 1/4 in. thick, shall be screw attached to the side rails. The use of trench header requires additional protection underneath the trench header. (See Item 8). The additional protection shall extend a min of 4 in. beyond the sides of the trench header.

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

8. **Spray-Applied Fire Resistive Materials\*** — Applied by spraying with water, in several coats to final untamped thickness shown in tables below, to steel surfaces which are free of dirt, oil or scale. Use of adhesive is required under bottomless trenches and cellular units, optional on other conditions. Min avg untamped density is 13 pcf on beam and steel floor units with min ind untamped density of 11 pcf for Types II or DC/F. Min avg and min ind untamped densities of 22 and 19 pcf, respectively, for Type HP. For method of density determination refer to Design Information Section.

<b>Restrained Assembly Rating Hr</b>	<b>Min Required Unrestrained Beam Rating Hr</b>	<b>Min Mtl Thkns on Beam In.</b>
1	1	1/2
1-1/2	1	1/2
2	1	1/2
3	1-1/2	7/8
4	2	1-1/8
—	3	1-1/2
—	4	1-3/4

**General Floor Area (Without Header Duct, Trench Header, Feeder Duct or Electrical Inserts)**

<b>Restrained Assembly Rating Hr</b>	<b>Unrestrained Assembly Rating Hr #</b>	<b>Steel Floor Unit Depth In.</b>	<b>Concrete Type</b>	<b>Min Mtl Thk In</b>		
				<b>Crests</b>	<b>Valley</b>	<b>Flat Plate</b>
1	0##	2 or 3	LW	0	0	0
1	1	1-1/2	LW or NW	3/8	3/8	3/8
1, 1-1/2 or 2	1, 1-1/2 or 2	2 or 3	LW or NW	3/8	3/8	3/8
3	1-1/2, 2 or 3	3	LW	5/8	5/8	1/2
3	1-1/2, 2 or 3	2	LW	13/16	1/2	1/2
3	1-1/2, 2 or 3	3	NW	13/16	13/16	5/8
3	1-1/2, 2 or 3	2	NW	7/8	5/8	5/8
4	2, 3 or 4	3	LW or NW	1-7/16	13/16	13/16
4	2, 3 or 4	2	LW or NW	1-1/2	1-1/8	1-1/8

Under Header Duct (Item 5)						
1	1 or 0###	3	LW or NW	7/16	3/8	3/8
1	1 or 0###	2	LW or NW	9/16	3/8	3/8
1-1/2	1 or 1-1/2	3	LW or NW	5/8	3/8	3/8
1-1/2	1 or 1-1/2	2	LW or NW	3/4	1/2	1/2
2	1, 1-1/2 or 2	3	LW or NW	3/4	1/2	1/2
2	1, 1-1/2 or 2	2	LW or NW	7/8	5/8	5/8
3	1-1/2, 2 or 3	3	LW or NW	1	3/4	3/4
3	1-1/2, 2 or 3	2	LW or NW	1-1/8	7/8	7/8
Under Trench Header (Item 6)						
1	1 or 0###	3	LW or NW	9/16	3/8	3/8
1	1 or 0###	2	LW or NW	11/16	1/2	1/2
1-1/2	1 or 1-1/2	3	LW or NW	3/4	1/2	1/2
1-1/2	1 or 1-1/2	2	LW or NW	7/8	11/16	11/16
2	1, 1-1/2 or 2	3	LW or NW	7/8	5/8	5/8
2	1, 1-1/2 or 2	2	LW or NW	1-1/8	7/8	7/8
3	1-1/2, 2 or 3	3	LW or NW	1-3/16	15/16	15/16
3	1-1/2, 2 or 3	2	LW or NW	1-3/8	1-3/16	1-3/16
4	2, 3 or 4	3	NW	1-5/8	1-5/8	1-1/2
4	2, 3 or 4	2	NW	1-11/16	1-11/16	1-9/16
Under Trench Header (Item 6A)						
Or Feeder Duct System (Item 6B)						
1	1 or 0###	2 or 3	LW or NW	1-3/16	1	1
1-1/2	1 or 1-1/2	2 or 3	LW or NW	1-1/2	1-1/4	1-1/4
2	1, 1-1/2 or 2	2 or 3	LW or NW	1-3/4	1-5/8	1-5/8
3	1-1/2, 2 or 3	2 or 3	LW or NW	2-1/4	2-1/8	2-1/8
Under Trench Header (Item 6C)						
2	1, 1-1/2 or 2	2 or 3	LW or NW	1-1/8	1-1/8	1-1/8
Under Trench Header (Item 6D)						
1	1 or 0	2 or 3	NW	1	1	1
1-1/2	1 or 1-1/2	2 or 3	NW	1-1/4	1-1/4	1-1/4
2	1, 1-1/2 or 2	2 or 3	NW	1-5/8	1-5/8	1-5/8
Under Trench Header (Item 6E)						
1-1/2	1 or 1-1/2	2 or 3	LW or NW	1-3/4	1-5/8	1-5/8

#Unrestrained Assembly Rating cannot exceed Unrestrained Beam Rating.

##Use of screwed side joints is not acceptable. When floor span between supports contains a blend of fluted and cellular floor units with electrical inserts (Item 10), the entire surface of fluted units must be sprayed with material to a minimum thickness of 3/8 in.

###Entire span with header duct, trench header or feeder duct must be protected. Unrestrained Assembly Rating is 1 Hr for spans with header duct, trench header or feeder duct. If lightweight concrete is used and spans without headers are unprotected, the Unrestrained Assembly Rating becomes 0 Hr.

**ISOLATEK INTERNATIONAL** — Type D-C/F, HP, or II, Type EBS or Type X adhesive.

9. **Shear-Connector Studs** — **Optional** — (Not Shown) — Studs, 3/4 in. diam, headed type or equivalent per AISC specifications. Welded to the top flange of beam through the steel floor units. Min 1/2.in. concrete cover over studs.

10. **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 4 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 min horizontal width of 12 in.

**Consolidated Systems, Inc.** Inserts.

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 steel floor units. Either Type MSH-400 or MSH-450 fittings are installed with MSIX insert per accompanying installation instructions. The holes cut in the activation covers for passage of wires shall be not more than 1/8 in. larger diameter than the wire. Abandonment requires use of insert cover with no holes in it. The required Spray-Applied Fire Resistive Materials thicknesses on the steel floor units with inserts are tabulated below:

<b>Restrained Assembly Rating Hr</b>	<b>Floor Unit Depth In.</b>	<b>Concrete Type</b>	<b>Min Mtl Thkns In.</b>
2	2 or 3	NW	1/2
2	2 or 3	LW	7/8

**CONSOLIDATED SYSTEMS INC** — MSIX inserts with MSH400 or MSH450 fittings.

**Robertson, H. H.** Inserts.

(Tapmate II, IIEA, IIFN, IIEAFN; Series KEB)

Installed per accompanying installation instructions over factory-punched holes in 24 or 36 in. wide QL Types AKX, WKX and Metric Units-QLC Types -78-600, -78-900 steel floor units. The holes 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 KEB-HP-1 outlet box fittings in lieu of the KEB-PC flush cover fittings. The required Spray-Applied Fire Resistive Materials thicknesses on the steel floor units with inserts are tabulated below:

**(Tapmate II or II EA)**

<b>Restrained Assembly Rating Hr</b>	<b>Floor Unit Depth In.</b>	<b>Concrete Type</b>	<b>Min Mtl Thkns In.</b>
1	2	NW	9/16
1	3	LW or NW	1/2
1	2	LW	5/8
1-1/2	2 or 3	NW	11/16
1-1/2	2	LW	7/8
1-1/2	3	LW	3/4
2	2 or 3	NW	7/8
2	2	LW	11/16
2	3	LW	15/16
3	2	NW	1-1/4
3	3	NW	13/16
3	2	LW	1-1/2
3	3	LW	1-3/8
4	2	NW	1-5/8
4	3	NW	1-9/16
<b>(Tapmate II FN or II EAFN)</b>			
1	2 or 3	NW	3/8
1	2 or 3	LW	1/2
1-1/2	2 or 3	NW	3/8
1-1/2	2 or 3	LW	9/16
2	2 or 3	NW	7/16
2	2 or 3	LW	3/4
3	2 or 3	NW	3/4
<b>(Tapmate II-EAFN-FC1; Series KEB)</b>			

Installed per accompanying installation instructions over factory-punched holes in 24 or 36 in. wide QL-WKX steel floor units with normal weight concrete topping. For abandonment, see installation instructions. The required Spray-Applied Fire Resistive Materials thicknesses on the steel floor units with inserts are tabulated below:

<b>Restrained Assembly Rating Hr</b>	<b>Floor Unit Depth In.</b>	<b>Concrete Type</b>	<b>Min Mtl Thkns In.</b>
1 or 1-1/2	3	NW	3/8
2	3	NW	7/16

**(Tapmate III FN, III EAFN, III-EAFN-FC1; Series KEC)**

Installed per accompanying installation instructions over factory-punched holes in 24 or 36 in. wide QL Types AKD and WKD steel floor units. The holes 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 protection material thicknesses as specified for the Tapmate III-EAFN electrical inserts. The required Spray-Applied Fire Resistive Materials Thicknesses on the steel floor units with inserts are tabulated below:

<b>Restrained Assembly Rating Hr</b>	<b>Floor Unit Depth In.</b>	<b>Concrete Type</b>	<b>Min Mtl Thkns In.</b>
<b>(Tapmate III FN or III EAFN)</b>			
1	2 or 3	NW	3/8
1	2 or 3	LW	9/16
1-1/2	2 or 3	NW	7/16
1-1/2	2 or 3	LW	5/8
2	2 or 3	NW	1/2
2	2 or 3	LW	13/16
3	2 or 3	NW	3/4
<b>(Tapmate III-EAFN-FC1)</b>			
2	3	NW	1/2
<b>(Tapmate V)</b>			
1	3	LW or NW	3/8
1-1/2	3	LW or NW	1/2
2	3	LW or NW	5/8
3	3	LW or NW	1

**(Tapmate IV, IV-S, IV-H, IV-H-M, IV-EA, V; 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. Holes cut in insert 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. The required Spray-Applied Fire Resistive Materials thicknesses on the steel floor units with inserts are tabulated below:

<b>Restrained Assembly Rating Hr</b>	<b>Floor Unit Depth In.</b>	<b>Concrete Type</b>	<b>Min Mtl Thkns In.</b>
Tapmate IV-H, IV-H-M or IV-S)			
1	3	LW or NW	3/8
1-1/2	3	NW	1/2
1-1/2	3	LW	9/16
2	3	NW	5/8
2	3	LW	3/4
3	3	NW	1-1/4
3	3	LW	1-1/2
4	3	NW	1-5/8
(Tapmate IV EA)			
1	3	LW or NW	7/16
1-1/2	3	NW	9/16
1-1/2	3	LW	5/8
2	3	NW	3/4
2	3	LW	7/8

**(Tapmate IV, IV-S, IV-H, IV-H-M, IV-EA; 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.

**(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. Holes 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.

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. The required Spray-Applied Fire Resistive Materials thicknesses on the steel floor units with inserts are tabulated below:

<b>Restrained Assembly Rating Hr</b>	<b>Floor Unit Depth In.</b>	<b>Concrete Type</b>	<b>Min Mtl Thkns In.</b>
(Tapmate IV-FN-S, IV-FN-H, IV-EAFN)			
1	3	NW	3/8
1	3	LW	9/16
1-1/2	3	NW	7/16
1-1/2	3	LW	5/8
2	3	NW	1/2
2	3	LW	11/16
3	3	NW	3/4

**(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:

<b>Restrained Assembly Rating Hr</b>	<b>Floor Unit Type</b>	<b>Concrete Type</b>	<b>Min Mtl Thkns In.</b>
1	3	LW or NW	3/8
1-1/2	3	NW	1/2
1-1/2	3	LW	9/16
2	3	NW	5/8
2	3	LW	3/4
3	3	NW	1-1/4
3	3	LW	1-1/2
4	3	NW	1-5/8

**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.

The following activated versions of Tapmate IV inserts may be installed with either the flip lip plastic cover (KEC-PC3, PC4 and PC5 components) or the Deluxe Cover (KED-NAC): Tapmates IV-S, IV-H, IV-H-M, IV-FN-S, IV-FN-H.

Only those Tapmate II, III or IV inserts having an FN suffix are required to contain the neoprene pad and then only in the activated stage.

**Walker Systems Inc.** Inserts.

**(PK Series Preset Inserts: FAKM-II, RAKM, RAKM-II, RAKM-II-R, FPF, RPF, S36BB, S36BC, S36CC, S37BB, S37BC, S37CC, S36PB, S36PC, S37PB, S37PC Service Fittings)**

Installed per accompanying installation instructions over factory pre-punched knockouts in Type WDR2 or WDR3 cellular steel floor units. Inserts shall be located no closer than 3 ft. from exterior walls of building when installed on an all cellular blend or 1 to 1 blend of fluted and cellular floor units. The holes cut in insert cover for passage of wires shall be no more than 1/8 in. larger diam. than the wire. When Type FPF, RPF, S36PB, S36PC, S37PB or S37PC 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:

<b>Restrained Assembly Rating Hr</b>	<b>Floor Unit Depth In.</b>	<b>Concrete Type</b>	<b>Min Mtl Thkns In.</b>
<b>(Type RAKM, S37BB, S37BC, S37CC)</b>			
1	2 or 3	LW or NW	9/16
1-1/2	2 or 3	LW or NW	11/16
2	2 or 3	NW	3/4
2	2 or 3	LW	1
<b>(Type FAKM-II)</b>			
1	1-1/2, 2 or 3	LW or NW	3/8
1-1/2	2 or 3	NW	7/16
1-1/2	2 or 3	LW	1/2
1-1/2	1-1/2	LW or NW	1/2
2	2 or 3	NW	5/8
2	2 or 3	LW	11/16
2	1-1/2	LW or NW	3/4
3	2 or 3	NW	1
3	2 or 3	LW	1-1/8
<b>(Type RAKM-II, S36BB, S36BC, S36CC)</b>			
1	2 or 3	NW	3/8
1	2 or 3	LW	7/16
1	1-1/2	LW or NW	7/16
1-1/2	2 or 3	NW	7/16
1-1/2	2 or 3	LW	5/8
1-1/2	1-1/2	LW or NW	5/8
2	2 or 3	NW	5/8
2	2 or 3	LW	13/16
2	1-1/2	LW or NW	7/8

3	2 or 3	NW	15/16
3	2 or 3	LW	1-1/4
(Type RAKM-II-R)			
1	1-1/2	LW or NW	7/16
1-1/2	1-1/2	LW or NW	11/16
2	1-1/2	LW or NW	15/16
(Type FPF, S36PB, S36PC)			
1, 1-1/2	2 or 3	LW or NW	3/8
2	2 or 3	LW or NW	9/16
3	2 or 3	LW or NW	15/16
(Type RPF, S37PB, S37PC)			
1	2 or 3	NW	3/8
1	2 or 3	LW	1/2
1-1/2	2 or 3	NW	7/16
1-1/2	2 or 3	LW	5/8
2	2 or 3	NW	11/16
2	2 or 3	LW	7/8
3	2 or 3	NW	1-1/8

**(NRG Bloc IV Preset Inserts: FAKM-II, RAKM-II, FPF, RAKM, S36BB, S36BC, S36CC, S37BB, S37BC, S37CC, S36PB, S36PC, S36PP, S37PB, S37PC, S37PP Service Fittings)**

Installed per accompanying installation instructions over factory-punched holes in 3 in. deep K-Type cellular steel floor units. Openings made in 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 FPF, RPF, S36PB, S36PC, S36PP, S37PB, S37PC or S37PP 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	Concrete Type	Min Mtl Thkns In.
Type FAKM-II)		
1, 1-1/2	LW or NW	3/8
2	LW or NW	7/16
3	LW or NW	13/16
Type RAKM-II, S36BB, S36BC, S36CC)		
1	LW or NW	3/8
1-1/2	LW or NW	7/16

2	LW or NW	11/16
3	LW or NW	1
(Type FPF, S36PB, S36PC, S36PP)		
1, 1-1/2	LW or NW	3/8
2	LW or NW	7/16
3	LW or NW	13/16
(Types RAKM, S37BB, S37BC, S37CC)		
1, 1-1/2	LW or NW	3/8
2	LW or NW	11/16
(Type RPF, S37PB, S37PC, S37PP)		
1	LW or NW	3/8
1-1/2	NW	3/8
1-1/2	LW	1/2
2	NW	9/16
2	LW	3/4
3	NW	1
(Type FAKM-II)		
1, 1-1/2	LW or NW	3/8
2	LW or NW	7/16
3	LW or NW	13/16

**(437 Series Preset/After set Inserts; S125R, S126R, S165B, S166B Fittings)**

Single-service preset or after set inserts installed per accompanying installation instructions over Type WDR2 or WDR3 cellular steel floor units. When used as a preset insert, attaching ring with mud cap installed over 2-1/2 in. diameter factory-punched or field-drilled hole in top of cell prior to concrete placement. When used as an after set insert, a 4 in. diameter hole is core-drilled to, but not through, top of cell and attaching ring is installed over 2-1/2 in. diameter hole drilled in top of cell concentric with core-drilled hole. Inserts may be installed individually or in clusters of two or three inserts at each location. When installed in clusters of two or three inserts, minimum center to center spacing of inserts in cluster is 7-3/4 in. Spacing of inserts (or clusters of inserts) shall be not less than 4 ft transverse to steel floor unit direction and not less than 5 ft along length of steel floor unit. When inserts are installed in clusters of two or three, the required thickness of Spray-Applied Fire Resistive Materials on the cellular floor unit beneath the cluster shall be the greater of thicknesses specified for the individual activation fittings in the cluster. The required Spray-Applied Fire Resistive Materials thicknesses on steel floor units with inserts are tabulated below:

<b>Restrained Assembly Rating Hr</b>	<b>Floor Unit Depth In.</b>	<b>Concrete Type</b>	<b>Min Mtl Thkns In.</b>
<b>(S125R Fittings)</b>			
1	2 or 3	LW or NW	3/8
1-1/2	2 or 3	LW or NW	1/2
2	2 or 3	LW or NW	5/8
3	2 or 3	LW or NW	1-1/4
<b>(S126R Fittings)</b>			
1	2 or 3	NW	1/2
1	2 or 3	LW	9/16
1-1/2	2 or 3	NW	11/16
1-1/2	2 or 3	LW	3/4
2	2 or 3	NW	13/16
2	2 or 3	LW	15/16
3	2 or 3	LW or NW	1-1/4
<b>(S165B Fittings)</b>			
1	2 or 3	LW or NW	3/8
1-1/2	2 or 3	LW or NW	3/8
2	2 or 3	LW or NW	1/2
3	2 or 3	LW or NW	1-1/8
<b>(S166B Fittings)</b>			
1	2 or 3	LW or NW	1/2
1-1/2	2 or 3	LW or NW	11/16
2	2 or 3	NW	13/16
2	2 or 3	LW	15/16
3	2 or 3	LW or NW	1-3/8

**(TSACR, TSAR, After set Inserts)**

Installed per accompanying installation instructions in 7 in. diam hole core-drilled through concrete topping into center of top of cell of Type WDR2 or WDR3 cellular steel floor units. Spacing shall be not more than one insert in each 8 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 steel floor units with inserts are tabulated below:

<b>Restrained Assembly Rating Hr</b>	<b>Floor Unit Depth In.</b>	<b>Concrete Type</b>	<b>Min Mtl Thkns In.</b>
(Types TSACR, TSAR)			
1	2 or 3	LW or NW	1/2
1-1/2	2 or 3	LW or NW	3/4
2	2 or 3	LW or NW	1-1/4

**WALKER SYSTEMS INC** — Type PK Series Inserts; Type FAKM-II, RAKM, RAKM-II, RAKM-II-R, FPF, RPF, S36BB, S36BC, S36CC, S37BB, S37BC, S37CC, S36PB, S36PC, S37PB or S37PC service fittings. Type NRG Bloc IV Inserts; Type FAKM-II, RAKM-II, FPF, RAKM, RPF, S36BB, S36BC, S36CC, S37BB, S37BC, S37CC, S36PB, S36PC, S36PP, S37PB, S37PC or S37PP service fittings. Type 437 Series Inserts; Type S125R, S126R, S165B or S166B activation fittings. Types TSACR, TSAR after set inserts.

**11. Steel Studs With Discs** — The stud consists of No. 12 SWG galv steel wire, 5/8, 7/8, 1-1/4 or 1-3/4 in. long for 1, 1-1/2, 2 or 3 hr protection thicknesses, respectively. One end of studs welded to 1-3/16 in. diam. No. 28 MSG galv steel disc. The ends of studs opposite the discs shall be welded to the feeder duct in rows running parallel with the feeder duct. The distance between the outer rows of studs and the edge of the feeder duct shall not exceed 4 in. The spacing between the rows shall not exceed 22 in. The spacing between studs in each row shall not exceed 24 in. For WDR2 and 3 cellular units the stud length shall be 3/8 in. shorter than the thickness of protection material. The total number of studs shall average at least on stud per 236 sq. in. of cellular floor unit beneath the trench header.

\*Bearing the UL Classification Mark

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