Commentary Walkerdeck®* System Load Tables

This commentary describes the development of the maximum unshored clear span lengths for the cellular deck as forms to support the concrete. The commentary also describes the development of the capacity of the concrete slab reinforced by the cellular deck. Both the maximum unshored span lengths and the superimposed slab capacities shown were calculated using the U.S. Customary (English) units. These were then “soft” converted to System International (SI) metric units.

Form Spans

The maximum unshored span lengths are based on the design criteria established by the Steel Deck Institute (SDI) in its “Design Manual for Composite Decks, Form Decks, and Roof Decks.”

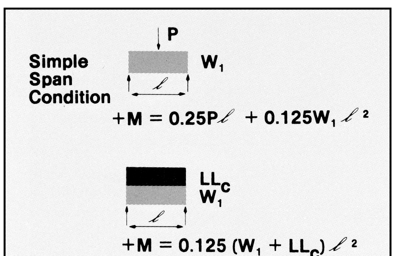
The loading combinations and magnitudes shown are taken from this Standard. It recognizes the need to design for both concentrated and uniform loading during the placement of concrete. The loading condition which produces the worst stress condition is assumed to control.

Maximum unshored span lengths are calculated for single, dual and triple span conditions.

All sectional properties of Walkerdeck*, a registered trademark of The Wiremold Company, were calculated in accordance with the American Iron and Steel Institute’s (AISI) “Specification for the Design of Cold Formed Steel Structural Members.”

The maximum unshored span lengths published in the Walkerdeck* load tables are clear spans; Cordeck recommends that clear spans be used in determining the requirements for shoring.

The following sets of diagrams and equations summarize the loading criteria:



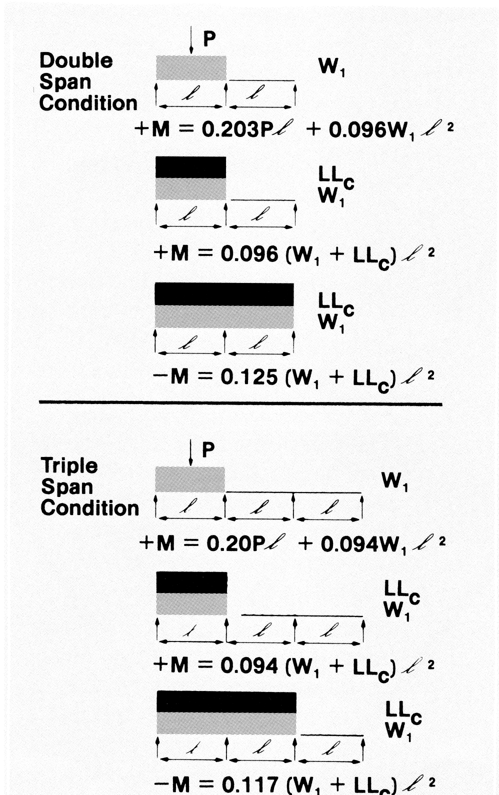


Fig. 1. Loading diagrams and bending moments.

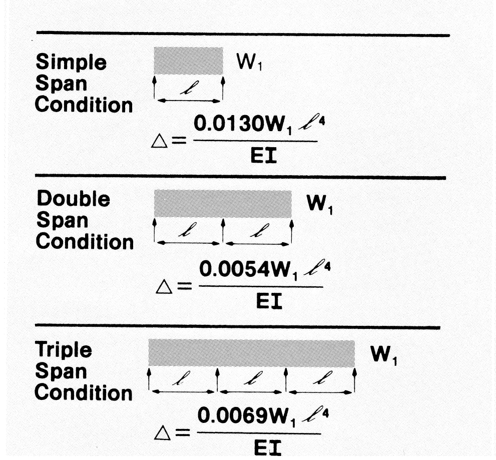


Fig.2. Loading diagrams and deflections.

Where: P = 150 pound concentrated live load applied to a 1 foot width

W_1 = Concrete dead weight combined with the deck dead weight

LL_c = The construction live load defined to be 20 PSF

E = Modulus of elasticity (29,500,000 PSI)

I = Moment of inertia (In^4/ft.)

ℓ = Span length in feet

SLAB CAPACITIES

The superimposed slab capacities in the Walkerdeck* load tables are based on single span design determined using one or more of the following:

1. *Standard for the Structural Design of Composite Slabs* published by the Technical Council for Codes and Standards of the American Society of Civil Engineers.

   The criteria recommends a maximum span to depth ratio of 22 for simply supported spans unless the deflection calculations are preformed to satisfy a particular service condition. The ASCE Criteria also suggests that the average of cracked and uncracked moment of inertia based on a transformation to concrete properties be used for deflection calculations.

   The average of cracked and uncracked composite moment of inertia transformed to steel properties for and Walkerdeck profiles are provided in tables, Pg. 10.

   These moments of inertia transformed to steel properties can be readily converted to moments of inertia transformed to concrete properties by multiplication by the applicable modular ratio (N).

   The live load equation from the ASCE Criteria is as follows:

$$LL = \frac{1}{1.7}\left[\frac{2V_u}{L} - 1.4(\gamma W_1+W_3)\right]$$

$$V_u = \phi\left[d\left(\frac{4mpd}{L} + 12k\sqrt{f'}\right) + \frac{\gamma W^1 L}{2}\right]$$

d = Effective slab depth (distance from extreme concrete compression fiber to centroidal axis of the full cross-section of the steel deck), inches.

f’ = Specified compressive strength of concrete, PSI

k = Ordinate intercept of the reduced experimental shear-bond line.

L = Length of span, feet.

LL = Allowable superimposed live load for service conditions, PSF.
m = Slope of the reduced experimental shear-bond line.
Vu = Ultimate shear capacity, PLF width.
W_1 = Weight of slab, PSF.
W_3 = Dead load applied to slab, exclusive of W_1 PSF.
γ = Coefficient for proportion of dead load added upon removal of shore (= 0.625 for center shore; = 0 for no shoring).
ϕ = Strength reduction factor (ϕ = 0.8 for shear-bond).
p = Reinforcement ratio of steel deck area to effective concrete area A_s/bd.

2. West Virginia University Composite Slab Studies are based on the following:

Flexural Capacity
The bending strength capacity M_{et} is based on linear strain and is limited by the first yield stress f_y on the deck surface. The yield stress actually developed depends on shear transfer efficiency along the shear span as indicated by K. The location of a neutral surface at y_{cc} is determined as well as the neutral surface y_{sb} for the full steel section. The use of these dimensions leads to a stress distribution over the section. The theoretical bending capacity M_{et} is modified to M_t=KM_{et} where K accounts for the effective bond or anchorage development over the shear span L. $K=K_3/(K_1+K_2)$ with K_3 measuring the influence of the panel width, K_1 the effect of steel deck depth, and K_2 the influence of embossments in the webs. When the bond factor K=1.0, the steel deck experiences yield stresses which may extend above the lower surface. The flexural capacity is limited by yielding in the steel; this may be followed by the loss of bond at the interface. When K<1.0, the flexural capacity is controlled by bond with steel stresses being lower than yield.

Composite steel deck slabs have their tension reinforcement principally on the lower surface rather than having the steel encased in concrete as with reinforcing in conventional slabs. Thus the bending capacity is limited by the ability of the deck to transfer the developed tension forces to the concrete. This transfer condition is similar to the bond stress or anchorage for reinforcing bars where forces must be transferred along the embedded length. The embossing patterns in bars are standardized and the bars must be totally encased in concrete. With deck reinforcement however, embossment patterns are nonstandard, the reinforcement is not encased, and bond transfer along a shear span is complex.

Applications
The formulas are limited to galvanized steel with embossment patterns having height, P_h, between 0.035 and 0.105 inches. Concrete compressive strengths are limited between 2500 psi and 6000 psi.

The nominal moment strength equation for M_n confirmed by test shall represent the profile. The nominal shear strength, V_n, is

$$V_n = 12\ (M_n)/L$$

The nominal uniform load capacity is given by V_n and the nominal superimposed slab capacity W is given by $2\ \text{Ø}\ V_n/1.6L^2$.

Further explanation of these formulations is contained in ASCE's "Standard for the Structural Design of Composite Slabs" published by Technical Council for Codes and Standards.

Design Equations
The shear transfer anchorage forces are developed along the shear span on the steel section depth and on the types of embossments. The calculated bending moment M_n is

$$\mathbf{M_n = 12KM_{et}/C_s \text{ where } K=K_3/(K_1 + K_2)}$$

K_3 establishes the increase in efficiency, with increasing slab width, of average, bond transfer per cell. With N=12 B_d/C_s being the number of cells in the test slab width

$$\mathbf{K_3=0.87+0.06888(N)-0.00222(N)^2=1.4}$$

K_1 measures the influence of the steel section depth on bond development along the shear span

$K_1=[^d d/7.8]^{0.5}$

K_2 is an indicator of mechanical bond performance along shear span and depends on the type of embossment patterns used.

$$\mathbf{K_2 = \frac{D_w^{0.8}(K_3/SS1)}{1.0+60\ (P_h^2 P_{s1/3})}}$$

$$\mathbf{SS1 = (3L_n/70)\ (L_n\text{-}14)+3.6}$$

$$\mathbf{P_s = 12\ L_e/s}$$

Cs = Width of repeating pattern (pitch), inches
L = Shear span, inches
Le = Embossment length, inches
L,Ln = Deck clearspan, feet
Met = Bending moment at first yield, FT-LB/FT
K,K_1,K_2,K_3 = Relaxation Constants
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Ph = Embossment pattern height, inches
Ps = Embossment intensity factory (12Le/S)
S = Embossment spacing, inches
SS1 = Span curvature factor
Vn = Nominal vertical shear capacity PLF
Ø = .75

3. ICC-ES Legacy Report ER-4315 published by ICC Evaluation Service, Inc. a subsidiary of the International Conference of Building Officals.

4. Load testing to confirm the performance predicted by the standards.

Commentary On Walkerdeck* Load Tables

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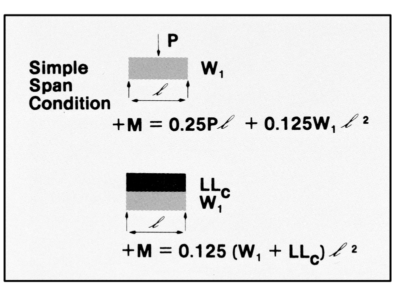

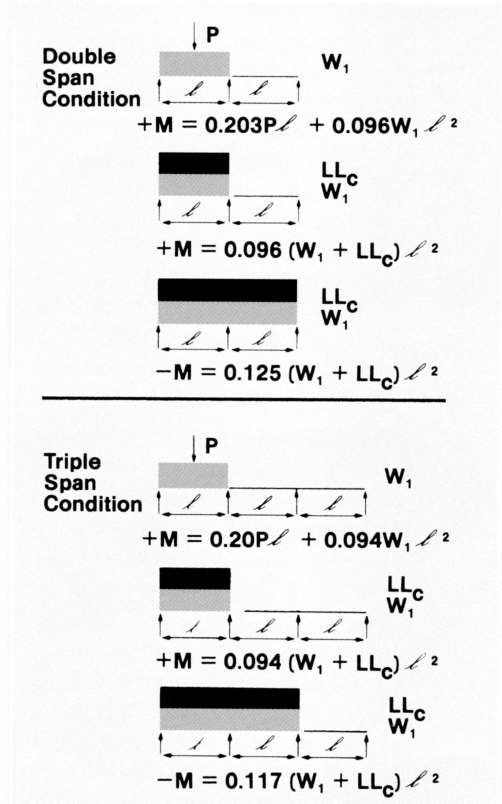

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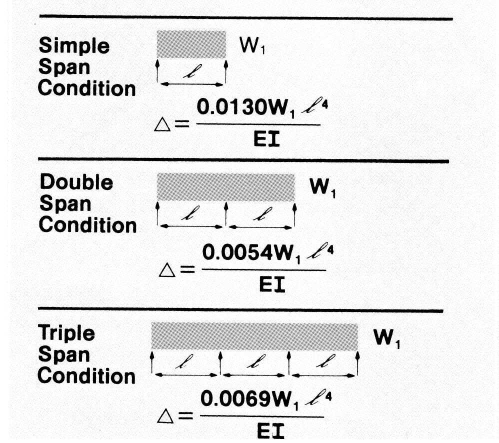

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f' = Specified compressive strength of concrete, PSI

k = Ordinate intercept of the reduced experimental shear-bond line.

Commentary On The Walkerdeck* Load Tables (continued)

LL = Allowable superimposed live load for service conditions, PSF.
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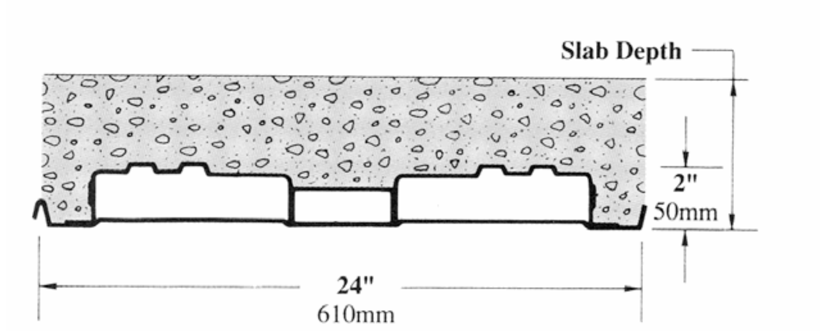
4. Load testing to confirm the performance predicted by the standards.

Cellular Deck
WDR2



(N=9) NORMAL WEIGHT CONCRETE (145pcf/ 2323 kg/m^3)

Total Slab Thickness	Slab Dead Load	Concrete Usage	Deck Gage	Maximum Unshored Clear Span (**ft.in.** / mm)			Superimposed Slab Capacities (**psf**/kPa) Clear Span (**ft. in**./mm)												
in. mm	**psf** kg/m^2	**CY/100SF** m^3/100m^2	**GAGE** mm	1 Span	2 Span	3 Span	**7'-0"** 2100	**7'-6"** 2250	**8'-0"** 2400	**8'-6"** 2550	**9'-0"** 2700	**9'-6"** 2850	**10'-0"** 3000	**10'-6"** 3150	**11'-0"** 3300	**11'-6"** 3450	**12'-0"** 3600	**12'-6"** 3750	**13'-0"** 3900
			20/20 0.909/0.909	**8'-10"** 2692	**9'-8"** 2946	**9'-11"** 3023	!	!''	!	!	!	!	!	**197** 9.43	**185** 8.86	**174** 8.33	**164** 7.85	**156** 7.47	**148** 7.09
			20/18 0.909/1.204	**9'-1"** 2769	**10'-1"** 3073	**10'-5"** 3175	!''	!''	!''	!	!	!	!	!	**195** 9.34	**183** 8.76	**173** 8.28	**164** 7.85	**155** 7.42
			18/20 1.204/0.909	**10'-8"** 3251	**10'-10"** 3302	**11'-3"** 3429	!	!	!	!	!	!	!	!	!	!	!	!	!
4½ 115	**39** 190	**0.981** 8.07	**18/18** 1.204/1.204	**10'-9"** 3277	**11'-4"** 3454	**11'-9"** 3581	!	!	!	!	!	!	!	!	!	!	!	!	!
			18/16 1.204/1.524	**10'-11"** 3327	**11'-8"** 3556	**12'-0"** 3658	!''	!''	!''	!''	!	!	!	!	!	!	!	!	!
			16/18 1.524/1.204	**12'-0"** 3658	**12'-5"** 3785	**12'-4"** 3759	!	!	!	!	!	!	!	!	!	!	!	!	!
			16/16 1.524/1.524	**12'-2"** 3708	**12'-10"** 3912	**12'-10"** 3912	!	!	!	!	!	!	!	!	!	!	!	!	!
			20/20 0.909/0.909	**8'-0"** 2438	**8'-8"** 2642	**9'-0"** 2743	!	!	!	!	!	!	!	!	!	**197** 9.43	**186** 8.91	**176** 8.43	**167** 8.00
			20/18 0.909/1.204	**8'-1"** 2464	**9'-1"** 2769	**9'-5"** 2870	!''	!''	!''	!''	!	!	!	!	!	!	**195** 9.34	**185** 8.86	**175** 8.38
			18/20 1.204/0.909	**9'-6"** 2896	**9'-10"** 2997	**10'-2"** 3099	!	!	!	!	!	!	!	!	!	!	!	!	!
5 125	**52** 254	**1.133** 9.32	**18/18** 1.204/1.204	**9'-8"** 2946	**10'-3"** 3124	**10'-7"** 3226	!	!	!	!	!	!	!	!	!	!	!	!	!
			18/16 1.204/1.524	**9'-9"** 2972	**10'-6"** 3200	**10'-10"** 3302	!''	!''	!''	!''	!''	!''	!	!	!	!	!	!	!
			16/18 1.524/1.204	**11'-1"** 3378	**11'-4"** 3454	**11'-6"** 3505	!	!	!	!	!	!	!	!	!	!	!	!	!
			16/16 1.524/1.524	**11'-4"** 3454	**11'-8"** 3556	**11'-11"** 3632	!	!	!	!	!	!	!	!	!	!	!	!	!
			20/20 0.909/0.909	**7'-8"** 2337	**8'-4"** 2540	**8'-8"** 2642	!	!	!	!	!	!	!	!	!	!	!	**196** 9.38	**186** 8.91
			20/18 0.909/1.204	**7'-9"** 2362	**8'-9"** 2667	**9'-0"** 2743	!''	!''	!''	!''	!''	!	!	!	!	!	!	!	**195** 9.34
			18/20 1.204/0.909	**9'-2"** 2794	**9'-5"** 2870	**9'-9"** 2972	!	!	!	!	!	!	!	!	!	!	!	!	!
5½ 140	**58** 283	**1.285** 10.58	**18/18** 1.204/1.204	**9'-3"** 2819	**9'-10"** 2997	**10'-2"** 3099	!	!	!	!	!	!	!	!	!	!	!	!	!
			18/16 1.204/1.524	**9'-5"** 2870	**10'-2"** 3099	**10'-6"** 3200	!''	!''	!''	!''	!''	!''	!''	!	!	!	!	!	!
			16/18 1.524/1.204	**10'-8"** 3251	**10'-11"** 3327	**11'-2"** 3404	!	!	!	!	!	!	!	!	!	!	!	!	!
			16/16 1.524/1.524	**10'-10"** 3302	**11'-3"** 3429	**11'-7"** 3531	!	!	!	!	!	!	!	!	!	!	!	!	!

(!) Indicates Slab Capacities in excess of 200 p.s.f. (9.58 kPa). Contact Cordeck for information regarding dynamic loads

NOTE 1. The above maximum unshored clear span lengths are governed by the following – (a) a deflection limitation of L/180 not to exceed ¾" (19mm) relative to the supports; (b) a yield strength of 37ksi (255MPa) minimum [Design Stress = 22.2 ksi (153 MPa)]; (c) the web crippling design equations contained in 1986 Specification for the Design of Cold Formed Steel Structural Members published by AISI.

NOTE 2. Total superimposed slab loading is limited to 200 p.s.f. (9.58 kPa); greater magnitudes usually indicate heavy concentrated moving loads which may require additional reinforcement. This type of loading should be thoroughly investigated.
NOTE 3. WDR2 and WDR 3 profiles are in compliance with ICC-ES Legacy Report ER-4315.

Cellular Deck WDR2

SECTIONAL PROPERTIES

GAGE	DESIGN THICKNESS **in.** mm	WEIGHT **psf** kg/m²	I_f **in⁴/ft** 10⁶mm⁴/m	I_d **in⁴/ft** 10⁶mm⁴/m	S_p **in³/ft** 10³mm³/m	S_n **in³/ft** 10³mm³/m
20/20	**.0358/.0358** 0.909/0.909	**4.29** 20.95	**.522** 0.713	**.495** 0.676	**.389** 20.91	**.371** 19.95
20/18	**.0358/.0474** 0.909/1.204	**4.84** 23.63	**.565** 0.772	**.532** 0.726	**.398** 21.40	**.406** 21.83
18/20	**.0474/.0358** 1.204/0.909	**4.90** 23.92	**.642** 0.877	**.627** 0.856	**.516** 27.74	**.473** 25.43
18/18	**.0474/0.474** 1.204/1.204	**5.45** 26.61	**.695** 0.949	**.676** 0.923	**.528** 28.39	**.515** 27.69
18/16	**.0474/.0600** 1.204/1.524	**6.04** 29.49	**.742** 1.013	**.718** 0.980	**.538** 28.92	**.544** 29.25
16/18	**.0600/.0474** 1.524/1.204	**6.09** 29.73	**.828** 1.131	**.823** 1.124	**.668** 35.91	**.631** 33.92
16/16	**.0600/.0600** 1.524/1.524	**6.68** 32.61	**.884** 1.207	**.877** 1.198	**.681** 36.61	**.665** 35.75

(N=14) LIGHTWEIGHT CONCRETE (110pcf/ 1760 kg/m³)

Total Slab Thickness	Slab Dead Load	Concrete Usage	Deck Gage	Maximum Unshored Clear Span (**ft.in.** / mm)			Superimposed Slab Capacities (**psf**/kPa) Clear Span (**ft. in.**/mm)												
in. mm	**psf** kg/m²	**CY/100SF** m³/100m²	**GAGE** mm	1 Span	2 Span	3 Span	**7’-0”** 2100	**7’-6”** 2250	**8’-0”** 2400	**8’-6”** 2550	**9’-0”** 2700	**9’-6”** 2850	**10’-0”** 3000	**10’-6”** 3150	**11’-0”** 3300	**11’-6”** 3450	**12’-0”** 3600	**12’-6”** 3750	**13’-0”** 3900
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			20/18 0.909/1.204	**9’-3”** 2819	**10’-4”** 3150	**10’-8”** 3251	!	!	!	**189** 9.05	**174** 8.33	**161** 7.71	**150** 7.18	**140** 6.70	**123** 5.89	**116** 5.55	**109** 5.22	**102** 4.88	**97** 4.64
			18/20 1.204/0.909	**10’-11”** 3327	**11’-2”** 3404	**11’-5”** 3480	!	!	!	!	!	**185** 8.86	**170** 8.14	**158** 7.57	**147** 7.04	**137** 6.56	**121** 5.79	**113** 5.41	**106** 5.07
4½ 115	**36** 176	**0.981** 8.07	**18/18** 1.204/1.204	**11’-2”** 3404	**11’-8”** 3556	**12’-0”** 3658	!	!	!	!	!	!	**184** 8.81	**170** 8.14	**158** 7.57	**147** 7.04	**138** 6.61	**122** 5.84	**114** 5.46
			18/16 1.204/1.524	**11’-4”** 3454	**12’-0”** 3658	**12’-4”** 3759	!	!	!	!	!	!	**198** 9.48	**183** 8.76	**170** 8.14	**158** 7.57	**148** 7.09	**131** 6.27	**123** 5.89
			16/18 1.524/1.204	**12’-3”** 3734	**12’-8”** 3861	**12’-7”** 3835	!	!	!	!	!	!	**198** 9.48	**183** 8.76	**170** 8.14	**158** 7.57	**148** 7.09	**138** 6.61	**130** 6.22
			16/16 1.524/1.524	**12’-5”** 3785	**13’-0”** 3962	**13’-0”** 3962	!	!	!	!	!	!	!	**196** 9.38	**182** 8.71	**169** 8.09	**158** 7.57	**148** 7.09	**139** 6.66
			20/20 0.909/0.909	**8’-9”** 2667	**9’-6”** 2896	**9’-10”** 2997	!	!	!	!	**184** 8.81	**171** 8.19	**159** 7.61	**140** 6.70	**131** 6.27	**123** 5.89	**115** 5.51	**109** 5.22	**103** 4.93
			20/18 0.909/1.204	**9’-0”** 2743	**10’-0”** 3048	**10’-4”** 3150	!	!	!	!	**197** 9.43	**182** 8.71	**169** 8.09	**149** 7.13	**139** 6.66	**130** 6.22	**122** 5.84	**115** 5.51	**109** 5.22
			18/20 1.204/0.909	**10’-6”** 3200	**10’-9”** 3277	**11’-1”** 3378	!	!	!	!	!	!	**193** 9.24	**179** 8.57	**166** 7.95	**146** 6.99	**137** 6.56	**128** 6.13	**120** 5.75
5 125	**40** 195	**1.133** 9.32	**18/18** 1.204/1.204	**10’-8”** 3251	**11’-3”** 3429	**11’-7”** 3531	!	!	!	!	!	!	!	**192** 9.19	**179** 8.57	**167** 8.00	**147** 7.04	**138** 6.61	**129** 6.18
			18/16 1.204/1.524	**10’-10”** 3302	**11’-6”** 3505	**12’-0”** 3658	!	!	!	!	!	!	!	!	**192** 9.19	**179** 8.57	**167** 8.00	**148** 7.09	**139** 6.66
			16/18 1.524/1.204	**11’-11”** 3632	**12’-4”** 3759	**12’-3”** 3734	!	!	!	!	!	!	!	!	**192** 9.19	**179** 8.57	**167** 8.00	**157** 7.52	**147** 7.04
			16/16 1.524/1.524	**12’-1”** 3683	**12’-9”** 3886	**12’-9”** 3886	!	!	!	!	!	!	!	!	!	**191** 9.14	**178** 8.52	**167** 8.00	**157** 7.52
			20/20 0.909/0.909	**8’-7”** 2616	**9’-4”** 2845	**9’-7”** 2921	!	!	!	!	**195** 9.34	**180** 8.62	**159** 7.61	**148** 7.09	**138** 6.61	**130** 6.22	**122** 5.84	**115** 5.51	**109** 5.22
			20/18 0.909/1.204	**8’-8”** 2642	**9’-9”** 2972	**10’-1”** 3073	!	!	!	!	!	**192** 9.19	**179** 8.57	**158** 7.57	**147** 7.04	**138** 6.61	**129** 6.18	**122** 5.84	**115** 5.51
			18/20 1.204/0.909	**10’-3”** 3124	**10’-6”** 3200	**10’-10”** 3302	!	!	!	!	!	!	!	**189** 9.05	**176** 8.43	**155** 7.42	**145** 6.94	**135** 6.46	**127** 6.08
5½ 135	**43** 210	**1.193** 9.82	**18/18** 1.204/1.204	**10’-5”** 3175	**11’-0”** 3353	**11’-4”** 3454	!	!	!	!	!	!	!	!	**189** 9.05	**176** 8.43	**156** 7.47	**145** 6.94	**136** 6.51
			18/16 1.204/1.524	**10’-6”** 3200	**11’-3”** 3429	**11’-8”** 3556	!	!	!	!	!	!	!	!	!	**189** 9.05	**167** 8.00	**156** 7.47	**146** 6.99
			16/18 1.524/1.204	**11’-8”** 3556	**12’-0”** 3683	**12’-0”** 3683	!	!	!	!	!	!	!	!	!	**189** 9.05	**177** 8.47	**166** 7.95	**146** 6.99
			16/16 1.524/1.524	**11’-11”** 3632	**12’-6”** 3810	**12’-11”** 3937	!	!	!	!	!	!	!	!	!	!	**189** 9.05	**177** 8.47	**166** 7.95

(!) Indicates Slab Capacities in excess of 200 p.s.f. (9.58 kPa). Contact Cordeck for information regarding dynamic loads

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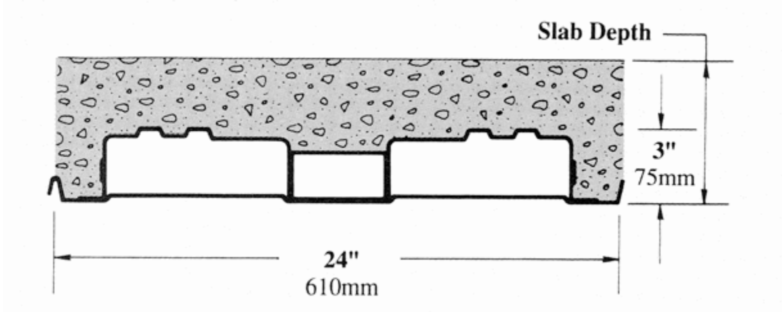
NOTE 5. No information presented herein should be used to replace the judgement of experienced structural engineers.

NOTE 6. Chloride add mixtures or add mixtures containing chloride salts shall not be added under any circumstances to the concrete. Such additives have proven deleterious to steel and steel finish.

Cellular Deck WDR3



(N=9) NORMAL WEIGHT CONCRETE (145pcf/ 2323 kg/m^3)

Total Slab Thickness	Slab Dead Load	Concrete Usage	Deck Gage	Maximum Unshored Clear Span (**ft.in.** / mm)			Superimposed Slab Capacities (**psf**/kPa) Clear Span (**ft. in.**/mm)												
in. mm	**psf** kg/m^2	**CY/100SF** m^3/100m^2	**GAGE** mm	1 Span	2 Span	3 Span	**9'-0"** 2700	**9'-6"** 2850	**10'-0"** 3000	**10'-6"** 3150	**11'-0"** 3300	**11'-6"** 3450	**12'-0"** 3600	**12'-6"** 3750	**13'-0"** 3900	**13'-6"** 4050	**14'-0"** 4200	**14'-6"** 4350	**15'-0"** 4500
5½ 140	**48** 234	**1.041** 8.57	**20/20** 0.909/0.909	**12'-4"** 3759	**13'-0"** 3962	**13'-5"** 4089	!	!''	!	!	!	!	!	!	!	!	!	**195** 9.34	**186** 8.91
			20/18 0.909/1.204	**12'-4"** 3759	**13'-0"** 3962	**13'-5"** 4089	!''	!''	!''	!''	!''	!''	!''	!''	!''	!''	!''	!''	!''
			18/20 1.204/0.909	**13'-9"** 4191	**13'-10"** 4089	**13'-9"** 4191	!	!	!	!	!	!	!	!	!	!	!	!	!
			18/18 1.204/1.204	**14'-0"** 4267	**14'-6"** 4420	**14'-5"** 4394	!	!	!	!	!	!	!	!	!	!	!	!	!
			18/16 1.204/1.524	**14'-2"** 4318	*	*	!''	!''	!''	!''	!''	!''	!''	!''	!''	!''	!''	!''	!''
			16/18 1.524/1.204	**14'-8"** 4470	*	*	!	!	!	!	!	!	!	!	!	!	!	!	!
			16/16 1.524/1.524	**14'-11"** 4547	*	*	!	!	!	!	!	!	!	!	!	!	!	!	!
6 150	**54** 264	**1.193** 9.82	**20/20** 0.909/0.909	**11'-7"** 3531	**11'-11"** 3632	**12'-4"** 3759	!	!	!	!	!	!	!	!	!	!	!	!	!
			20/18 0.909/1.204	**11'-9"** 3581	**12'-5"** 3785	**12'-11"** 3937	!''	!''	!''	!''	!''	!''	!''	!''	!''	!''	!''	!''	!''
			18/20 1.204/0.909	**13'-3"** 4039	**13'-5"** 4089	**13'-4"** 4064	!	!	!	!	!	!	!	!	!	!	!	!	!
			18/18 1.204/1.204	**13'-7"** 4140	**14'-0"** 4267	**14'-0"** 4267	!	!	!	!	!	!	!	!	!	!	!	!	!
			18/16 1.204/1.524	**13'-9"** 4191	**14'-4"** 4369	**14'-7"** 4445	!''	!''	!''	!''	!''	!''	!''	!''	!''	!''	!''	!''	!''
			16/18 1.524/1.204	**14'-3"** 4343	**14'-8"** 4470	**14'-7"** 4445	!	!	!	!	!	!	!	!	!	!	!	!	!
			16/16 1.524/1.524	**14'-6"** 4420	*	*	!	!	!	!	!	!	!	!	!	!	!	!	!
6½ 165	**60** 293	**1.348** 11.09	**20/20** 0.909/0.909	**11'-1"** 3378	**11'-6"** 3505	**11'-11"** 3632	!	!	!	!	!	!	!	!	!	!	!	!	!
			20/18 0.909/1.204	**11'-3"** 3429	**12'-0"** 3658	**12'-5"** 3785	!''	!''	!''	!''	!''	!''	!''	!''	!''	!''	!''	!''	!''
			18/20 1.204/0.909	**13'-0"** 3962	**13'-1"** 3988	**13'-0"** 3962	!	!	!	!	!	!	!	!	!	!	!	!	!
			18/18 1.204/1.204	**13'-3"** 4039	**13'-5"** 4089	**13'-7"** 4140	!	!	!	!	!	!	!	!	!	!	!	!	!
			18/16 1.204/1.524	**13'-4"** 4064	**13'-9"** 4191	**14'-2"** 4318	!''	!''	!''	!''	!''	!''	!''	!''	!''	!''	!''	!''	!''
			16/18 1.524/1.204	**13'-10"** 4216	**14'-3"** 4343	**14'-3"** 4343	!	!	!	!	!	!	!	!	!	!	!	!	!
			16/16 1.524/1.524	**14'-1"** 4293	**14'-10"** 4521	**14'-10"** 4521	!	!	!	!	!	!	!	!	!	!	!	!	!

(*) Indicated maximum clear span in excess of 15'-0" (4572mm).

(!) Indicates Slab Capacities in excess of 200 p.s.f. (9.58 kPa). Contact Cordeck for information regarding dynamic loads

NOTE 1. The above maximum unshored clear span lengths are governed by the following – (a) a deflection limitation of L/180 not to exceed ¾" (19mm) relative to the supports; (b) a yield strength of 37ksi (255MPa) minimum [Design Stress = 22.2 ksi (153 MPa)]; (c) the web crippling design equations contained in 1986 Specification for the Design of Cold Formed Steel Structural Members published by AISI.

NOTE 2. Total superimposed slab loading is limited to 200 p.s.f. (9.58 kPa); greater magnitudes usually indicate heavy concentrated moving loads which may require additional reinforcement. This type of loading should be thoroughly investigated.
NOTE 3. WDR2 and WDR 3 profiles are in compliance with ICC-ES Legacy Report ER-4315.

Cellular Deck WDR3

	DESIGN THICKNESS **in.** mm	WEIGHT **psf** kg/m²	I_f **in⁴/ft** 10^6mm⁴/m	I_d **in⁴/ft** 10^6mm⁴/m	S_p **in³/ft** 10^3mm³/m	S_n **in³/ft** 10^3mm³/m
20/20	**.0358/.0358** 0.909/0.909	**4.71** 23.00	**1.503** 2.052	**1.392** 1.901	**.729** 39.19	**.718** 38.60
20/18	**.0358/.0474** 0.909/1.204	**5.26** 25.68	**1.629** 2.225	**1.497** 2.044	**.744** 40.00	**.780** 41.94
18/20	**.0474/.0358** 1.204/0.909	**5.40** 26.37	**1.821** 2.487	**1.745** 2.383	**.962** 51.72	**.912** 49.03
18/18	**.0474/.0474** 1.204/1.204	**5.95** 29.05	**1.934** 2.641	**1.881** 2.569	**.983** 52.85	**.978** 52.58
18/16	**.0474/.0600** 1.204/1.524	**6.54** 31.93	**2.110** 2.881	**2.002** 2.734	**1.000** 53.76	**1.032** 55.48
16/18	**.0600/.0474** 1.524/1.204	**6.68** 32.61	**2.325** 3.175	**2.276** 3.108	**1.244** 66.88	**1.193** 64.14
16/16	**.0600/.0600** 1.524/1.524	**7.28** 35.54	**2.486** 3.395	**2.426** 3.313	**1.267** 68.12	**1.255** 67.47

(N=9) LIGHTWEIGHT CONCRETE (110pcf/ 1760 kg/m³)

Total Slab Thickness	Slab Dead Load	Concrete Usage	Deck Gage	Maximum Unshored Clear Span (**ft.in.** / mm)			Superimposed Slab Capacities (**psf**/kPa) Clear Span (**ft. in.**/mm)												
in. mm	**psf** kg/m²	**CY/100SF** m³/100m²	**GAGE** mm	1 Span	2 Span	3 Span	**9'-0"** 2700	**9'-6"** 2850	**10'-0"** 3000	**10'-6"** 3150	**11'-0"** 3300	**11'-6"** 3450	**12'-0"** 3600	**12'-6"** 3750	**13'-0"** 3900	**13'-6"** 4050	**14'-0"** 4200	**14'-6"** 4350	**15'-0"** 4500
			20/20 0.909/0.909	**13'-4"** 4064	**13'-6"** 4115	**13'-10"** 4216	!	!··	**187** **8.95**	**171** **8.19**	**158** **7.57**	**146** **6.99**	**135** **6.46**	**126** **6.03**	**117** **5.60**	**110** **5.27**	**103** **4.93**	**89** **4.26**	**84** **4.02**
			20/18 0.909/1.204	**13'-6"** 4115	**14'-1"** 4293	**14'-6"** 4420	!··	!··	!··	**192** **9.19**	**177** **8.47**	**163** **7.80**	**151** **7.23**	**140** **6.70**	**131** **6.27**	**123** **5.89**	**115** **5.51**	**108** **5.17**	**94** **4.50**
			18/20 1.204/0.909	**14'-6"** 4420	**14'-8"** 4470	**14'-6"** 4420	!	!	!	!	!	**192** **9.19**	**183** **8.76**	**176** **8.43**	**168** **8.04**	**162** **7.76**	**155** **7.42**	**150** **7.18**	**144** **6.89**
5½ 140	**38** 185	**1.041** 8.57	**18/18** 1.204/1.204	**14'-10"** 4521	*	*	!	!	!	!	!	**197** 9.43	**189** **9.05**	**180** **8.62**	**173** **8.28**	**166** **7.95**	**160** **7.66**	**154** **7.37**	**148** **7.09**
			18/16 1.204/1.524	*	*	*	!··	!··	!··	!··	!	!	**193** **9.24**	**185** **8.86**	**177** **8.47**	**170** **8.14**	**164** **7.85**	**158** **7.57**	**152** 7.28
			16/18 1.524/1.204	*	*	*	!	!	!	!	!	**196** **9.38**	**187** **8.95**	**179** **8.57**	**172** **8.23**	**165** **7.90**	**158** **7.57**	**153** **7.33**	**147** **7.04**
			16/16 1.524/1.524	*	*	*	!	!	!	!	!	!	**197** **9.19**	**184** **8.81**	**176** **8.43**	**169** **8.09**	**162** **7.76**	**156** **7.47**	**151** **7.23**
			20/20 0.909/0.909	**12'-8"** 3861	**13'-0"** 3962	**13'-5"** 4089	!	!	!	**191** **9.15**	**176** **8.43**	**162** **7.76**	**151** **7.23**	**140** **6.70**	**131** **6.27**	**122** **5.84**	**106** **5.08**	**99** **4.74**	**93** **4.45**
			20/18 0.909/1.204	**12'-10"** 3912	**13'-6"** 4115	**14'-0"** 4267	!··	!··	!··	!··	**196** **9.38**	**181** **8.67**	**168** **8.04**	**156** **7.47**	**146** **6.99**	**136** **6.51**	**128** **6.13**	**111** **5.31**	**104** **4.98**
			18/20 1.204/0.909	**14'-1"** 4293	**14'-2"** 4318	**14'-1"** 4293	!	!	!	!	!	!	!	**196** **9.38**	**188** **9.00**	**180** **8.62**	**173** **8.28**	**167** **8.00**	**161** **7.71**
6 150	**43** 210	**1.193** 9.82	**18/18** 1.204/1.204	**14'-5"** 4394	**14'-11"** 4547	**14'-10"** 4521	!	!	!	!	!	!	!	!	**193** **9.24**	**185** **8.86**	**178** **8.52**	**171** **8.19**	**165** **7.90**
			18/16 1.204/1.524	**14'-7"** 4445	*	*	!··	!··	!··	!··	!··	!··	!	!	**197** 9.43	**189** **9.05**	**182** **8.71**	**175** **8.38**	**169** **8.09**
			16/18 1.524/1.204	*	*	*	!	!	!	!	!	!	!	**200** **9.58**	**192** **9.19**	**184** **8.81**	**177** **8.47**	**170** **8.14**	**164** **7.85**
			16/16 1.524/1.524	*	*	*	!	!	!	!	!	!	!	!	**196** **9.38**	**188** **9.00**	**181** **8.67**	**174** **8.33**	**168** **8.04**
			20/20 0.909/0.909	**12'-6"** 3810	**12'-9"** 3886	**13'-2"** 4013	!	!	!	**200** **9.58**	**185** **8.86**	**171** **8.19**	**158** **7.57**	**147** **7.04**	**137** **6.56**	**129** **6.18**	**111** **5.31**	**104** **4.98**	**98** **4.69**
			20/18 0.909/1.204	**12'-8"** 3861	**13'-4"** 4064	**13'-9"** 4191	!··	!··	!··	!··	!··	**190** **9.10**	**176** **8.43**	**164** **7.85**	**153** **7.33**	**143** **6.85**	**124** **5.94**	**116** **5.55**	**109** **5.22**
			18/20 1.204/0.909	**13'-11"** 4242	**14'-0"** 4267	**14'-0"** 4267	!	!	!	!	!	!	!	!	!	**190** **9.10**	**182** **8.71**	**176** **8.43**	**170** **8.14**
6¼ 160	**45** 220	**1.304** 10.73	**18/18** 1.204/1.204	**14'-2"** 4318	**14'-9"** 4496	**14'-8"** 4470	!	!	!	!	!	!	!	!	!	**194** **9.29**	**187** **8.95**	**180** **8.62**	**174** **8.33**
			18/16 1.204/1.524	**14'-5"** 4394	*	*	!··	!··	!··	!··	!··	!··	!··	!	!	**199** **9.53**	**191** **9.15**	**184** **8.81**	**177** **8.47**
			16/18 1.524/1.204	**14'-11"** 4547	*	*	!	!	!	!	!	!	!	!	!	**193** **9.24**	**186** **8.91**	**179** **8.57**	**173** **8.28**
			16/16 1.524/1.524	*	*	*	!	!	!	!	!	!	!	!	!	**198** **9.48**	**190** **9.10**	**183** **8.76**	**176** **8.43**

(*) Indicated maximum clear span in excess of 15'-0" (4572mm).

(!) Indicates Slab Capacities in excess of 200 p.s.f. (9.58 kPa). Contact Cordeck for information regarding dynamic loads

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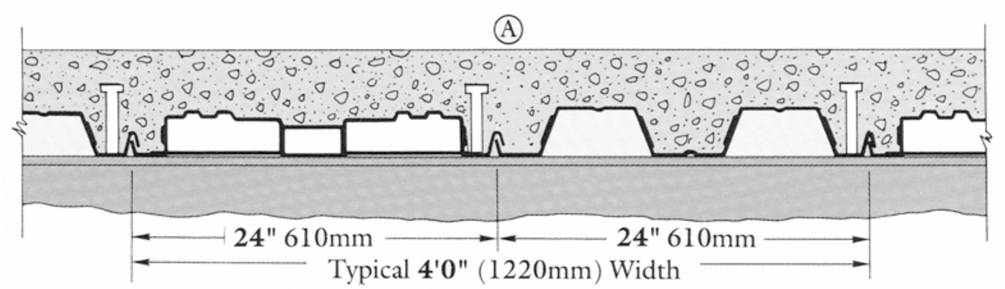
Shear Stud Data



WDR2

Length Of ¾" (19mm) Dia. Stud	Number of Studs Per Rib	Allowable Stud Shear Values KIPS (kN)/STUD	
		Normal Weight Concrete **145pcf** (2323 kg/m^3)	Lightweight Concrete **110pcf** (1760 kg/m^3)
		A	A
4 ½" 114mm	1	**11.50** 51.20	**9.54** 42.40
	2	**11.50** 51.20	**9.54** 42.40
	3	**11.50** 51.20	**9.54** 42.40
5" 127mm	1	**11.50** 51.20	**9.54** 42.40
	2	**11.50** 51.20	**9.54** 42.40
	3	**11.50** 51.20	**9.54** 42.40
5 ½" 140mm	1	**11.50** 51.20	**9.54** 42.40
	2	**11.50** 51.20	**9.54** 42.40
	3	**11.50** 51.20	**9.54** 42.40

WDR3

Length Of ¾" (19mm) Dia. Stud	Number of Studs Per Rib	Allowable Stud Shear Values KIPS (kN)/STUD	
		Normal Weight Concrete **145pcf** (2323 kg/m^3)	Lightweight Concrete **110pcf** (1760 kg/m^3)
		A	A
4 ½" 114mm	1	**9.78** 43.50	**8.12** 36.00
	2	**6.91** 30.70	**5.74** 25.40
	3	**5.64** 25.00	**4.68** 20.80
5" 127mm	1	**11.50** 51.20	**9.54** 42.40
	2	**9.22** 40.90	**7.65** 33.90
	3	**7.53** 33.30	**6.25** 27.60
5 ½" 140mm	1	**11.50** 51.20	**9.54** 42.40
	2	**11.50** 51.20	**9.54** 42.40
	3	**9.41** 42.00	**7.81** 34.80

Notes:

1. Shear stud values are based on the AISC's Specification for Composite Construction and a concrete compressive strength of f'_c=3000 psi (20MPa). To increase the stud values for higher strength concretes (normal or light-weight) use the following multiplier factors.

f_c	3500 25MPa	4000 30MPa
Multiplier	1.08	1.15

2. Rib A is an unusual case not anticipated by this specification: the effective W_R published has been determined by test. Note position of Studs in Rib A relative to centerline of beam.
3. Shear stud values for the cellular profiles WDR2 and WDR3 include composite non-cellular deck.

Moments Of Inertia I_d I_d = (Cracked + Uncracked) in ft. width^4

WDR2

NORMAL WEIGHT CONCRETE, N = 9

GAGE mm	SLAB DEPTH (inches) (mm)		
	4.50	5.00	5.50
	115	125	140
20/20	8.41	11.26	14.68
0.909/0.909	11.48	15.38	20.05
20/18	9.19	12.25	15.92
0.909/1.204	12.55	16.73	21.74
18/20	8.91	11.95	15.61
1.204/0.909	12.17	16.32	21.32
18/18	9.64	12.89	16.77
1.204/1.204	13.16	17.60	22.90
18/16	10.38	13.83	17.96
1.204/1.524	14.17	18.89	24.53
16/18	10.10	13.52	17.63
1.524/1.204	13.79	18.46	24.08
16/16	10.79	14.41	18.74
1.524/1.524	14.73	19.68	25.59

LIGHTWEIGHT CONCRETE, N = 14

GAGE mm	SLAB DEPTH (inches) (mm)		
	4.50	5.00	5.25
	115	125	135
20/20	6.79	9.06	10.37
0.909/0.909	9.27	12.37	14.16
20/18	7.42	9.88	11.28
0.909/1.204	10.13	13.49	15.40
18/20	7.17	9.60	10.99
1.204/0.909	9.79	13.11	15.00
18/18	7.76	10.35	11.84
1.204/1.204	10.60	14.13	16.17
18/16	8.34	11.11	12.69
1.204/1.524	11.39	15.17	17.33
16/18	8.09	10.82	12.39
1.524/1.204	11.05	14.78	16.92
16/16	8.64	11.52	13.18
1.524/1.524	11.80	15.73	18.00

WDR3

NORMAL WEIGHT CONCRETE, N = 9

GAGE mm	SLAB DEPTH (inches) (mm)		
	5.50	6.00	6.50
	140	150	165
20/20	13.39	16.97	21.17
0.909/0.909	18.28	23.17	28.91
20/18	14.75	18.62	23.14
0.909/1.204	20.14	25.43	31.60
18/20	14.23	18.07	22.56
1.204/0.909	19.43	24.68	30.81
18/18	15.52	19.63	24.42
1.204/1.204	21.19	26.81	33.35
18/16	16.83	21.22	26.33
1.204/1.524	22.98	28.98	35.96
16/18	16.29	20.64	25.72
1.524/1.204	22.24	28.19	35.12
16/16	17.51	22.11	27.48
1.524/1.524	23.91	30.19	37.53

LIGHTWEIGHT CONCRETE, N = 14

GAGE mm	SLAB DEPTH (inches) (mm)		
	5.50	6.00	6.25
	140	150	160
20/20	10.97	13.85	15.47
0.909/0.909	14.98	18.91	21.13
20/18	12.10	15.23	16.98
0.909/1.204	16.52	20.80	23.19
18/20	11.63	14.71	16.44
1.204/0.909	15.88	20.09	22.45
18/18	12.69	16.00	17.86
1.204/1.204	17.33	21.85	24.39
18/16	13.75	17.30	19.28
1.204/1.524	18.78	23.62	26.33
16/18	13.28	16.77	18.73
1.524/1.204	18.13	22.90	25.58
16/16	14.26	17.96	20.04
1.524/1.524	19.47	24.53	27.37

These values are transformed to steel properties.
They can be converted to concrete properties by multiplying by the applicable modular ratio.

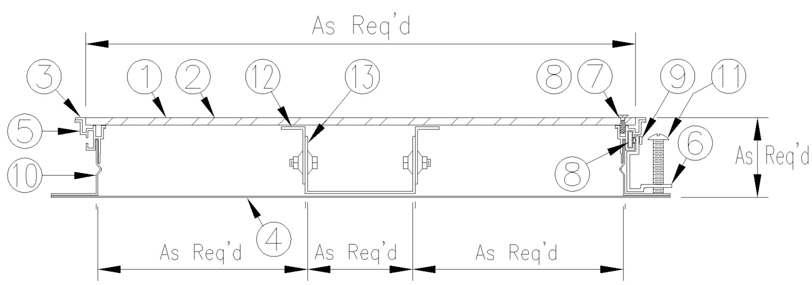
Designing The Trenchduct System

Trenchduct Capacities (All capacities shown are Gross Area) square inches

10^3 square millimeters

	1 Compartment Trenchduct	2 Compartment Trenchduct		3 Compartment Trenchduct		
Trench Size	Single Service	Power Compartment	Tel/Data Compartment	Power Compartment	Telephone Compartment	Data Compartment
12" Wide x 2½" Deep 305mm Wide x 65mm Deep	**24.1** 15.5	**3½" Wide: 7.7** 89mm Wide: 4.9	**16.4** 10.6	**3½" Wide: 7.7** 89mm Wide: 4.9	**8.2** 5.3	**8.2** 5.3
12" Wide x 3¼" Deep 305mm Wide x 85mm Deep	**33.7** 21.7	**3½" Wide: 10.7** 89mm Wide: 6.9	**23.0** 14.8	**3½" Wide: 10.7** 89mm Wide: 6.9	**11.5** 7.4	**11.5** 7.4
18" Wide x 2½" Deep 457mm Wide x 65mm Deep	**37.1** 23.9	**4" Wide: 8.7** 102mm Wide: 5.7	**28.4** 18.2	**4" Wide: 8.7** 102mm Wide: 5.7	**14.2** 9.1	**14.2** 9.1
18" Wide x 3¼" Deep 457mm Wide x 85mm Deep	**52.1** 33.6	**4" Wide: 12.3** 102mm Wide: 8.0	**39.8** 25.6	**4" Wide: 12.3** 102mm Wide: 8.0	**19.9** 12.8	**19.9** 12.8
24" Wide x 2½" Deep 610mm Wide x 65mm Deep	**50.3** 32.5	**5" Wide: 10.9** 127mm Wide: 7.1	**39.4** 25.4	**5" Wide: 10.9** 127mm Wide: 7.1	**19.7** 12.7	**19.7** 12.7
24" Wide x 3¼" Deep 610mm Wide x 85mm Deep	**70.3** 45.4	**5" Wide: 15.3** 127mm Wide: 10.0	**55.0** 35.4	**5" Wide: 15.3** 127mm Wide: 10.0	**27.5** 17.7	**27.5** 17.7
30" Wide x 2½" Deep 762mm Wide x 65mm Deep	**63.4** 40.9	**6½" Wide: 14.2** 165mm Wide: 9.3	**49.2** 31.6	**6½" Wide: 14.2** 165mm Wide: 9.3	**24.6** 15.8	**24.6** 15.8
30" Wide x 3¼" Deep 762mm Wide x 85mm Deep	**88.7** 57.2	**6½" Wide: 19.9** 165mm Wide: 12.8	**68.8** 44.4	**6½" Wide: 19.9** 165mm Wide: 12.8	**34.4** 22.2	**34.4** 22.2
36" Wide x 2½" Deep 915mm Wide x 65mm Deep	**76.5** 49.4	**8" Wide: 17.5** 203mm Wide: 11.4	**59.0** 38.0	**8" Wide: 17.5** 203mm Wide: 11.4	**29.5** 19.0	**29.5** 19.0
36" Wide x 3¼" Deep 915mm Wide x 85mm Deep	**107.0** 69.0	**8" Wide: 24.4** **203mm** Wide: 15.8	**82.6** 53.2	**8" Wide: 24.4** 203mm Wide: 15.8	**41.3** 26.6	**41.3** 26.6

Notes: 1. Only a representative selection of trench sizes have been shown. 2. Compartment sizes and capacities may be changed by relocating partitions. 3. Actual capacities will vary depending on trench style. Those shown are based on VA style trench.



Style VA (three Compartment - Bottomless)
Also Available Full - Bottom

Callouts For Style VA Trenchduct

1. ¼" (6.4mm) thick roller leveled steel coverplate
2. Aluminum and 3/8" (9.5mm) thick steel covers available
3. Aluminum or vinyl trim – factory installed for carpet position and shipping position (for reverse tile floors).
4. 16 gage (1.524mm) galvanized steel duct body.
5. Aluminum siderail with continuous screw slot.
6. Five function combination clip
   A. Adjusts
   B. Couples
   C. Supports
   D. Aligns
   E. Anchors
7. Cover hold down screw – stainless steel
8. Combination clip securing plate.
9. Combination clip attaching screw.
10. Trenchduct leveling foot.
11. Galvanized steel siderail.
12. Leveling screw (shipped separately).
13. Adjustable compartment divider.