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STEEL DECK INSTITUTE
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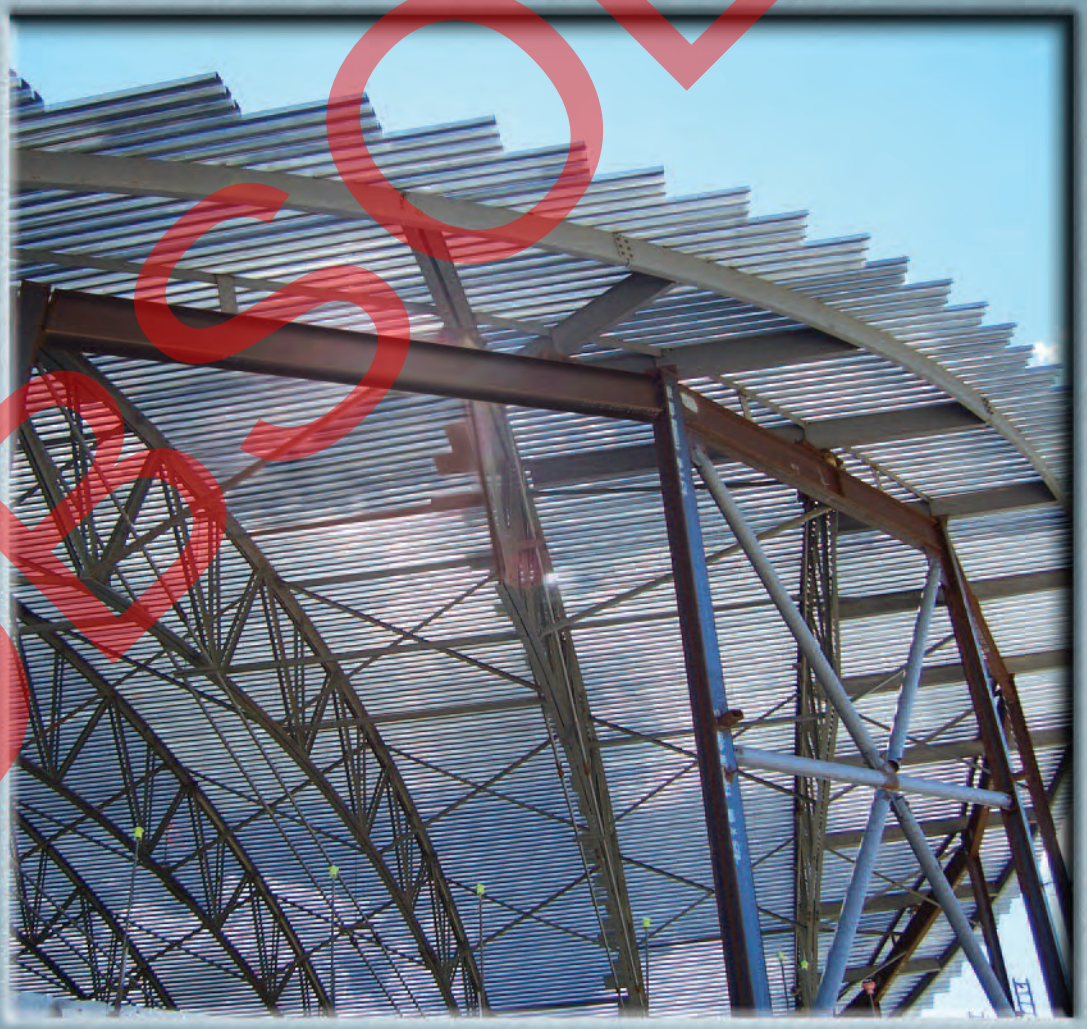
VULCRAFT

Steel Roof & Floor Deck



VULCRAFT 2008

8 5

STEEL DECK

VULCRAFT

A Division of Nucor Corporation

STEEL JOISTS AND JOIST GIRDERS, STEEL ROOF AND FLOOR DECK, COMPOSITE & NON-COMPOSITE FLOOR JOISTS

FOR MORE INFORMATION, CONTACT A VULCRAFT SALES OFFICE

VULCRAFT
MANUFACTURING LOCATIONS:

P.O. Box 100520	• Florence, SC 29501	• (843) 662-0381	Fax: (843) 662-3132
P.O. Box 680169	• Fort Payne, AL 35968	• (256) 845-2460	Fax: (256) 845-2823
P.O. Box 186	• Grapeland, TX 75844	• (936) 687-4665	Fax: (936) 687-4290
P.O. Box 59	• Norfolk, NE 68702	• (402) 644-8500	Fax: (402) 644-8528
P.O. Box 1000	• St. Joe, IN 46785	• (260) 337-1800	Fax: (260) 337-1801
P.O. Box 280	• Chemung, NY 14825	• (607) 529-9000	Fax: (607) 529-9001
P.O. Box 637	• Brigham City, UT 84302*	• (435) 734-9433	Fax: (435) 723-5423

*STEEL JOISTS, JOIST GIRDERS AND COMPOSITE JOISTS ONLY.

Website Address: www.vulcraft.com

The 65,000-seat multi-purpose Alamo Dome, San Antonio, Texas 408,800 ft² 3NA G90 Painted White.
Architects: Marmon Barclay Souter Foster Hays and HOK Sports Facilities Group; Structural Engineer: W.E. Simpson Co. Inc.; Project Manager: Day & Zimmermann, Inc.; Structural Contractor: Lyda Incorporated; Steel Fabricators: Crown Steel Inc. and Industrial Mechanical Co.; Steel Erector: John F. Beasley Construction Co.

The 29-story First Indiana Plaza in downtown Indianapolis used 439,440 square feet of Vulcraft 3" composite deck.
Developer: Duke Associates; Architect: CSO Architects, Inc.; Design Architect: 3DI International; Construction Manager: Duke Construction Management, Inc.; Structural Engineer: Walter P. Moore & Associates; Steel Fabricator: Ferguson Steel Company.

VULCRAFT, a leader in the steel joist and joist girder industry offers a complete range of steel decking at six strategically located deck manufacturing facilities. The deck is accurately roll formed in varying configurations on the most modern high-speed roll forming equipment available.

Steel roof and floor decks have long been recognized for their economy because of their light weight and high strength-to-weight ratio. They provide a durable and attractive roof or floor system for fast all-weather construction. Steel decks also provide excellent lateral diaphragm action thus reducing the necessity for structural bracing and their incombustible nature assures architects, engineers and owners of excellent fire ratings.

FINISHES:

Vulcraft offers a selection of three finishes: prime painted, galvanized and black (uncoated).

Prime painted - prior to applying a baked-on acrylic medium gray primer, the cold rolled sheet is chemically cleaned and pre-treated. An off-white primer is available at an additional cost.

Galvanized - Vulcraft galvanized decks are supplied from mill coated sheets conforming to ASTM-A653-94, Structural Steel, and Federal Spec. QQ-S-775, and they are offered in two zinc coated finishes.

(1) G-90 - 0.9 ounce/sq.ft.
(2) G-60 - 0.6 ounce/sq.ft.

VULCRAFT, a division of Nucor Corporation, has provided this catalog for use by engineers and architects using Vulcraft steel decks. It includes all products available at the time of printing. We reserve the right to change, revise or withdraw any products or procedures without notice.

The information presented in this catalog has been prepared in accordance with recognized engineering principles and is for general information only. While it is believed to be accurate, this information should not be used or relied upon for any specific application without competent professional examination and verification of its accuracy, suitability and applicability by an engineer, architect or other licensed professional.

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FRONT COVER PICTURE:

The Prairie School - Racine, Wisconsin

The primary framing system of this 68,000 sq. ft. facility consisted of a braced, compound-curved steel frame supporting long span barrel vaulted steel joists at the roof with precast plank supported on a steel frame and load bearing masonry walls at the floor. The structure was supported on conventional spread footings. The building featured large areas of clerestory glazing and curvilinear form.

VULCRAFT LOCATIONS

ALABAMA

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ISO 9001 Certified
ISO 14001 Certified
Joists & Deck

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ISO 14001 Certified
Joists & Deck

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ISO 14001 Certified
Joists & Deck

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ISO 14001 Certified
Joists & Deck

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ISO 14001 Certified
Joists & Deck

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ISO 14001 Certified
Joists & Deck

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email: sales@vulcraft-ut.com

ISO 9001 Certified
ISO 14001 Certified
Joists

RECYCLED CONTENT - LEED® PROGRAM

2007 RECYCLED CONTENT OF NUCOR STEEL PRODUCTS FOR THE LEED® PROGRAM

Nucor Corporation is the nation's largest recycler, using over 20 million tons of scrap steel in 2007 to create new products. Nucor uses Electric Arc Furnace (EAF) technology at all of its steel recycling facilities. EAFs use post-consumer scrap steel material for the major feedstock, unlike blast furnace operations which use mined iron ore as the major feedstock. Nucor has prepared the following information to help calculate the recycled content for products being used in "Green Building" applications or for projects in the LEED® program. Percentages are approximate and based on the total weight of the products. Calculations are based on 2007 scrap steel delivered and finished materials produced and are defined in accordance with ISO 14021:1999. Values do not consider home scrap or scrap generated onsite. Specific product information may be available from facility representatives.

RECYCLED CONTENT - LEED® Version 2.2 Credit 4.1 and 4.2

2007 Recycled Steel Content of Nucor Products (% by Total Weight)	
Product Group	**Average Recycled Content**
Nucor Bar Products	>99.7%
Nucor Sheet Products	68%
Total Nucor Steel Combined	**87.3%**
Vulcraft Structural Products	>99.7%
Vulcraft Decking	68%

REGIONAL MATERIALS - LEED® Version 2.2 Credit 5.1 and 5.2

Nucor tracks the origin of all scrap shipments to our mills. Nucor can approximate the amount of scrap extracted from any project site region. Nucor owns steel and steel products manufacturing facilities throughout the US that are within 500 miles of almost any project site. Please contact your local sales representative if you have questions about regional materials.

BAR MILL GROUP - **Darlington, SC; Norfolk, NE; Jewett, TX; Plymouth, UT; Auburn, NY; Birmingham, AL; Kankakee, IL; Jackson, MS; Seattle, WA; Marion, OH**

2007 Approximate Recycled Steel Content Of All Nucor Bar Mill Group Products				
Facility	Total Scrap Steel Use	Total Alloys and Other Iron Units	Total Post Consumer Recycled Content	Total Pre-consumer Recycled Content
All	**>99%**	**<1%**	**83%**	**17%**

The Nucor Bar Mill Group produces rebar, angles, flats, rounds and other miscellaneous shapes. The bar mill group uses recycled scrap steel for over 99% of the feedstock.

RECYCLED CONTENT - LEED® PROGRAM

SHEET MILL GROUP - Crawfordsville, IN; Hickman, AR; Berkeley, SC; Decatur, AL

2007 Approximate Recycled Steel Content Of Nucor Sheet Mill Group Products(*)				
Facility	Total Scrap Steel Used	Total Alloys and Other Iron Units	Total Post Consumer Recycled Content	Total Pre-consumer Recycled Content
Crawfordsville, IN	84%	16%	73%	14%
Hickman, AR	63%	37%	55%	8%
Berkley, SC	57%	43%	50%	7%
Decatur, AL	68%	32%	59%	9%

The Nucor Sheet Mill Group produces hot band, cold rolled, pickled and galvanized products. Nucor Sheet mills use varying amounts of recycled materials depending on metallurgical product demands and market conditions. The combined sheet mill total recycled content is approximately 68%.

VULCRAFT GROUP - Florence, SC; Norfolk, NE; Brigham City, UT; Grapeland, TX; St. Joe, IN; Fort Payne, AL; Chemung, NY

JOISTS - The bar steel for most Vulcraft joists is obtained from one of the ten Nucor bar mills that use over 99% scrap steel as their feedstock. A breakdown of the recycled content of Nucor bar mill products is detailed above. Vulcraft facilities may receive steel from sources outside of Nucor that may contain lower amounts of recycled steel. Specific product information is available from facility representatives.

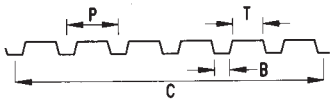
DECK – Steel for decking produced by Vulcraft facilities are typically obtained from one of the four Nucor sheet mills. A breakdown of the recycled content of Nucor sheet mill products is detailed above. Vulcraft deck products contain approximately 68% recycled steel.

Additional information is available online through the Steel Recycling Institute at http://www.recycle-steel.org.

All figures shown are based on 2007 figures and may vary from year to year. Please contact your local sales representative for current average recycled content for Vulcraft products.

(*) Studies show that the recycled steel used for Nucor products consists of approximately 87% post-consumer scrap. The remaining 13% typically consists of pre-consumer scrap generated by manufacturing processes for products made with steel.

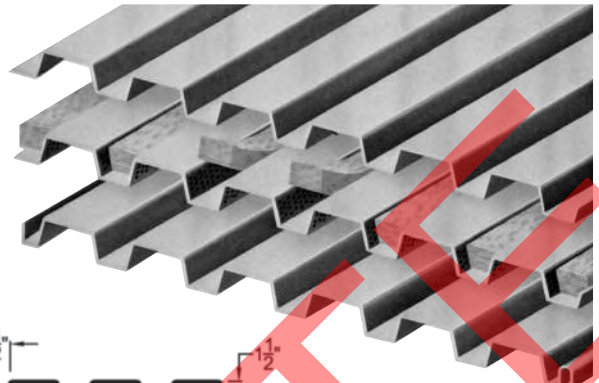
TECHNICAL PRODUCT INFORMATION

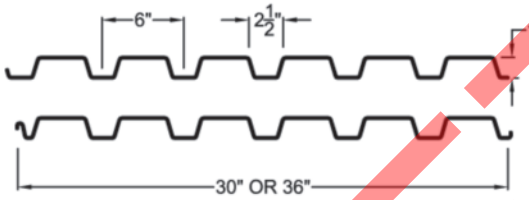


	Deck Type	Gauge	Approximate Dimensions in Inches																			
			Indiana				Nebraska				South Carolina				Texas				Alabama / New York			
			C	P	T	B	C	P	T	B	C	P	T	B	C	P	T	B	C	P	T	B
ROOF	1.5B, 1.5BI, 1.5BA, 1.5BIA 1.5BSV	24 22 20 19 18 16	NA 36 36 36 36 36 36	6.00	3.50	1.75	30 36 36 36 36 36 36	6.00	3.50	1.75	36 36 36 36 36 36 36	6.00	3.50	1.75	NA 36 36 36 36 36 36	6.00	3.50	1.75	36 36 36 36 36 36 36	6.00	3.50	1.75
ROOF	1.5F	22 20 18	30	6.00	4.25	0.50	36	6.00	4.25	0.50	36	6.00	4.25	0.50	36	6.00	4.25	0.50	36	6.00	4.25	0.50
ROOF	1.5A	22 20 18	36	6.00	5.00	0.38	36	6.00	5.00	0.38	36	6.00	5.00	0.38	NA	-	-	-	NA	-	-	-
ROOF	3N, 3NI, 3NA, 3NIA	22 20 18 16	24	8.00	5.38	1.88	24	8.00	5.38	1.88	24	8.00	5.38	1.88	24	8.00	5.38	1.88	24	8.00	5.38	1.88
ROOF	1.0E	26 24 22 20	36	4.00	1.13	1.13	32	4.00	1.01	1.25	33	3.67	0.90	0.90	33	3.67	1.00	1.00	36	4.00	1.13	1.13
NON-COMPOSITE	0.6C and 0.6CSV	28 26 24 22	NA 30 30 NA	2.50	0.62	0.62	NA 36 36 36	3.04	0.63	0.63	35 35 35 35	2.50	0.75	0.75	30 35 35 35	2.50	0.62	0.62	30 30 30 30	2.50	0.75	0.75
NON-COMPOSITE	1.0C and 1.0CSV	26 24 22 20	36	4.00	1.13	1.13	32	4.00	1.25	1.01	33	3.67	0.90	0.90	33	3.67	1.00	1.00	36	4.00	1.13	1.13
NON-COMPOSITE	1.3C and 1.3CSV	26 24 22 20	NA	-	-	-	NA	-	-	-	NA	-	-	-	32	4.57	1.06	1.06	NA	-	-	-
NON-COMPOSITE	1.5C	24 22 20 18	NA 36 36 36	6.00	1.75	3.50	30 36 36 36	6.00	1.75	3.50	36 36 36 36	6.00	1.75	3.50	30 36 36 36	6.00	1.75	3.50	36 36 36 36	6.00	1.75	3.50
NON-COMPOSITE	2C	22 20 18 16	36	12.0	5.00	5.00	36	12.0	5.00	5.00	36	12.0	5.00	5.00	36	12.0	5.00	5.00	36	12.0	5.00	5.00
NON-COMPOSITE	3C	22 20 18 16	36	12.0	4.75	4.75	36	12.0	4.75	4.75	36	12.0	4.75	4.75	36	12.0	4.75	4.75	36	12.0	4.75	4.75
COMPOSITE	1.5VL and 1.5VLI	22 20 19 18 16	36	6.00	3.50	1.75	36	6.00	3.50	1.75	36	6.00	3.50	1.75	36	6.00	3.50	1.75	36	6.0	3.50	1.75
COMPOSITE	1.5VLR	22 20 19 18 16	36	6.00	1.75	3.50	36	6.00	1.75	3.50	36	6.00	1.75	3.50	36	6.00	1.75	3.50	36	6.0	1.75	3.50
COMPOSITE	2VLI	22 20 19 18 16	36	12.0	5.00	5.00	36	12.0	5.00	5.00	36	12.0	5.00	5.00	36	12.0	5.00	5.00	36	12.0	5.00	5.00
COMPOSITE	3VLI	22 20 19 18 16	36	12.0	4.75	4.75	36	12.0	4.75	4.75	36	12.0	4.75	4.75	36	12.0	4.75	4.75	36	12.0	4.75	4.75

1.5 B, BI, BA, BIA

Maximum Sheet Length 42'-0
Extra charge for lengths under 6'-0
ICC ER-3415
FM Global Approved[2]





Interlocking side lap is not drawn to show actual detail.

SECTION PROPERTIES

Deck type	Design thickness in.	W psf	Section Properties				V_a lbs/ft	F_y ksi
			I_p in^4/ft	S_p in^3/ft	I_n in^4/ft	S_n in^3/ft		
B24	0.0239	1.46	0.107	0.120	0.135	0.131	2634	60
B22	0.0295	1.78	0.155	0.186	0.183	0.192	1818	33
B20	0.0358	2.14	0.201	0.234	0.222	0.247	2193	33
B19	0.0418	2.49	0.246	0.277	0.260	0.289	2546	33
B18	0.0474	2.82	0.289	0.318	0.295	0.327	2870	33
B16	0.0598	3.54	0.373	0.408	0.373	0.411	3578	33

ACOUSTICAL INFORMATION

Deck Type	Absorption Coefficient						Noise Reduction Coefficient[1]
	125	250	500	1000	2000	4000	
1.5BA, 1.5BIA	.11	.18	.66	1.02	0.61	0.33	0.60

[1] Source: Riverbank Acoustical Laboratories.
Test was conducted with 1.50 pcf fiberglass batts and 2 inch polyisocyanurate foam insulation for the SDI.

Type B (wide rib) deck provides excellent structural load carrying capacity per pound of steel utilized, and its nestable design eliminates the need for die-set ends.

1" or more rigid insulation is required for Type B deck.

Acoustical deck (Type BA, BIA) is particularly suitable in structures such as auditoriums, schools, and theatres where sound control is desirable. Acoustic perforations are located in the vertical webs where the load carrying properties are negligibly affected (less than 5%).

Inert, non-organic glass fiber sound absorbing batts are placed in the rib openings to absorb up to 60% of the sound striking the deck.

Batts are field installed and may require separation.

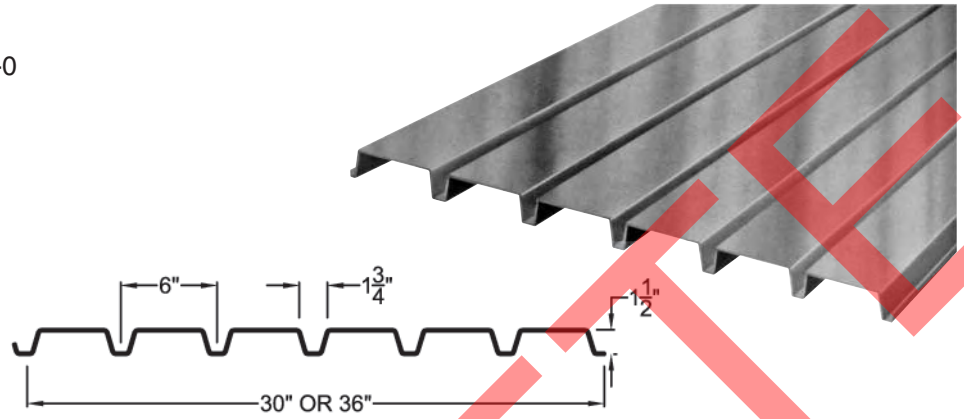
VERTICAL LOADS FOR TYPE 1.5B

No. of Spans	Deck Type	Max. SDI Const. Span	Allowable Total (PSF) / Load Causing Deflection of L/240 or 1 inch (PSF) Span (ft.-in.) ctr to ctr of supports										
			5-0	5-6	6-0	6-6	7-0	7-6	8-0	8-6	9-0	9-6	10-0
1	B24	4'-8	115 / 56	95 / 42	80 / 32	68 / 26	59 / 20	51 / 17	45 / 14	40 / 11	35 / 10	32 / 8	29 / 7
	B22	5'-7	98 / 81	81 / 61	68 / 47	58 / 37	50 / 30	44 / 24	38 / 20	34 / 17	30 / 14	27 / 12	25 / 10
	B20	6'-5	123 / 105	102 / 79	86 / 61	73 / 48	63 / 38	55 / 31	48 / 26	43 / 21	38 / 18	34 / 15	31 / 13
	B19	7'-1	146 / 129	121 / 97	101 / 75	86 / 59	74 / 47	65 / 38	57 / 31	51 / 26	45 / 22	40 / 19	36 / 16
	B18	7'-8	168 / 152	138 / 114	116 / 88	99 / 69	85 / 55	74 / 45	65 / 37	58 / 31	52 / 26	46 / 22	42 / 19
	B16	8'-8	215 / 196	178 / 147	149 / 113	127 / 89	110 / 71	96 / 58	84 / 48	74 / 40	66 / 34	60 / 29	54 / 24
2	B24	5'-10	124 / 153	103 / 115	86 / 88	74 / 70	64 / 56	56 / 45	49 / 37	43 / 31	39 / 26	35 / 22	31 / 19
	B22	6'-11	100 / 213	83 / 160	70 / 124	59 / 97	51 / 78	45 / 63	39 / 52	35 / 43	31 / 37	28 / 31	25 / 27
	B20	7'-9	128 / 267	106 / 201	89 / 155	76 / 122	66 / 97	57 / 79	51 / 65	45 / 54	40 / 46	36 / 39	32 / 33
	B19	8'-5	150 / 320	124 / 240	104 / 185	89 / 145	77 / 116	67 / 95	59 / 78	52 / 65	47 / 55	42 / 47	38 / 40
	B18	9'-1	169 / 369	140 / 277	118 / 213	101 / 168	87 / 134	76 / 109	67 / 90	59 / 75	53 / 63	48 / 54	43 / 46
	B16	10'-3	213 / 471	176 / 354	149 / 273	127 / 214	110 / 172	95 / 140	84 / 115	74 / 96	66 / 81	60 / 69	54 / 59
3	B24	5'-10	154 / 120	128 / 90	108 / 69	92 / 55	79 / 44	69 / 35	61 / 29	54 / 24	48 / 21	43 / 17	39 / 15
	B22	6'-11	124 / 167	103 / 126	87 / 97	74 / 76	64 / 61	56 / 50	49 / 41	43 / 34	39 / 29	35 / 24	31 / 21
	B20	7'-9	159 / 209	132 / 157	111 / 121	95 / 95	82 / 76	72 / 62	63 / 51	56 / 43	50 / 36	45 / 31	40 / 26
	B19	8'-5	186 / 250	154 / 188	130 / 145	111 / 114	96 / 91	84 / 74	74 / 61	65 / 51	58 / 43	52 / 37	47 / 31
	B18	9'-1	210 / 289	174 / 217	147 / 167	126 / 132	108 / 105	95 / 86	83 / 71	74 / 59	66 / 50	59 / 42	54 / 36
	B16	10'-3	264 / 369	219 / 277	185 / 214	158 / 168	136 / 135	119 / 109	105 / 90	93 / 75	83 / 63	74 / 54	67 / 46

Notes: 1. Minimum exterior bearing length required is 1.50 inches. Minimum interior bearing length required is 3.00 inches. If these minimum lengths are not provided, web crippling must be checked.
2. FM Global approved numbers and spans available on page 21.

1.5 F

Maximum Sheet Length 42'-0
Extra Charge for Lengths Under 6'-0
ICC ER-3415
FM Global Approved[2]



Type F (intermediate rib) deck is designed to provide the most economical combination of structural load carrying capacity and insulation materials. The rib openings permit fast and easy installation, and the nestable design eliminates the need for die-set ends. 1" rigid insulation is recommended for Type F deck.

SECTION PROPERTIES

Deck type	Design thickness in.	W psf	Section Properties				V_a lbs/ft	F_y ksi
			I_p in^4/ft	S_p in^3/ft	I_n in^4/ft	S_n in^3/ft		
F22	0.0295	1.73	0.113	0.112	0.129	0.121	1944	33
F20	0.0358	2.09	0.145	0.139	0.157	0.148	2347	33
F19	0.0418	2.42	0.177	0.166	0.183	0.172	2726	33
F18	0.0474	2.74	0.206	0.190	0.208	0.195	3077	33

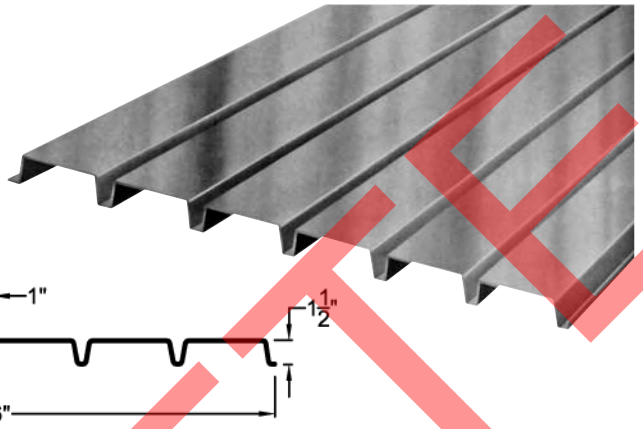
VERTICAL LOADS FOR TYPE 1.5F

No. of Spans	Deck Type	Max. SDI Const. Span	Allowable Total (PSF) / Load Causing Deflection of L/240 or 1 inch (PSF) Span (ft.-in.) ctr to ctr of supports										
			4-0	4-6	5-0	5-6	6-0	6-6	7-0	7-6	8-0	8-6	9-0
1	F22	4'-3	92 / 116	73 / 81	59 / 59	49 / 45	41 / 34	35 / 27	30 / 22	26 / 18	23 / 14	20 / 12	18 / 10
	F20	5'-4	114 / 149	90 / 104	73 / 76	61 / 57	51 / 44	43 / 35	37 / 28	33 / 23	29 / 19	25 / 15	23 / 13
	F19	6'-0	137 / 181	108 / 127	87 / 93	72 / 70	61 / 54	52 / 42	45 / 34	39 / 28	34 / 23	30 / 19	27 / 16
	F18	6'-5	156 / 211	124 / 148	100 / 108	83 / 81	70 / 63	59 / 49	51 / 39	44 / 32	39 / 26	35 / 22	31 / 19
2	F22	5'-3	99 / 299	78 / 210	63 / 153	52 / 115	44 / 88	38 / 70	32 / 56	28 / 45	25 / 37	22 / 31	20 / 26
	F20	6'-6	121 / 373	96 / 262	78 / 191	64 / 143	54 / 110	46 / 87	40 / 70	35 / 57	30 / 47	27 / 39	24 / 33
	F19	7'-1	140 / 444	111 / 312	90 / 227	75 / 171	63 / 132	53 / 104	46 / 83	40 / 67	35 / 56	31 / 46	28 / 39
	F18	7'-8	159 / 511	126 / 359	102 / 262	85 / 196	71 / 151	61 / 119	52 / 95	46 / 77	40 / 64	35 / 53	32 / 45
3	F22	5'-3	123 / 234	97 / 164	79 / 120	65 / 90	55 / 69	47 / 55	41 / 44	35 / 35	31 / 29	28 / 24	25 / 21
	F20	6'-6	151 / 292	119 / 205	97 / 149	80 / 112	67 / 86	57 / 68	50 / 54	43 / 44	38 / 36	34 / 30	30 / 26
	F19	7'-1	175 / 348	139 / 244	112 / 178	93 / 134	78 / 103	67 / 81	58 / 65	50 / 53	44 / 43	39 / 36	35 / 31
	F18	7'-8	198 / 400	157 / 281	127 / 205	105 / 154	89 / 119	76 / 93	65 / 75	57 / 61	50 / 50	44 / 42	40 / 35

Notes: 1. Minimum exterior bearing length required is 1.50 inches. Minimum interior bearing length required is 3.00 inches. If these minimum lengths are not provided, web crippling must be checked.
2. FM Global approved numbers and spans available on page 21.

1.5 A

Maximum Sheet Length 42'-0
Extra Charge for Lengths Under 6'-0
ICC ER-3415
FM Global Approved[2]



Type A (narrow rib) deck provides an economical roof system when utilized with thinner insulation materials. It also allows the maximum area for adhesive contact, and its nestable quality eliminates the need for die-set ends.

1/2" rigid insulation may be used with Type A deck.

SECTION PROPERTIES

Deck type	Design thickness in.	W psf	Section Properties				V_a lbs/ft	F_y ksi
			I_p in^4/ft	S_p in^3/ft	I_n in^4/ft	S_n in^3/ft		
A22	0.0295	1.80	0.104	0.098	0.120	0.106	1700	33
A20	0.0358	2.16	0.134	0.122	0.145	0.130	2049	33
A19	0.0418	2.51	0.163	0.145	0.170	0.152	2377	33
A18	0.0474	2.84	0.190	0.167	0.193	0.172	2679	33

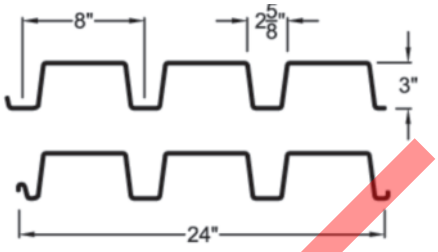
VERTICAL LOADS FOR TYPE 1.5A

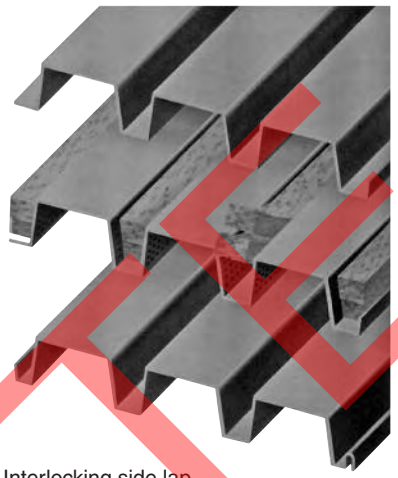
No. of Spans	Deck Type	Max. SDI Const. Span	Allowable Total (PSF) / Load Causing Deflection of L/240 or 1 inch (PSF) Span (ft.-in.) ctr to ctr of supports										
			4-0	4-6	5-0	5-6	6-0	6-6	7-0	7-6	8-0	8-6	9-0
1	A22	3'-9	81 / 107	64 / 75	52 / 55	43 / 41	36 / 32	31 / 25	26 / 20	23 / 16	20 / 13	18 / 11	16 / 9
	A20	4'-8	100 / 137	79 / 96	64 / 70	53 / 53	45 / 41	38 / 32	33 / 26	29 / 21	25 / 17	22 / 14	20 / 12
	A19	5'-6	119 / 167	94 / 117	76 / 85	63 / 64	53 / 49	45 / 39	39 / 31	34 / 25	30 / 21	26 / 17	24 / 15
	A18	6'-2	138 / 195	109 / 137	88 / 100	73 / 75	61 / 58	52 / 45	45 / 36	39 / 30	34 / 24	30 / 20	27 / 17
2	A22	4'-7	87 / 276	69 / 194	56 / 141	46 / 106	39 / 82	33 / 64	28 / 52	25 / 42	22 / 35	19 / 29	17 / 24
	A20	5'-9	106 / 344	84 / 242	68 / 176	56 / 132	47 / 102	40 / 80	35 / 64	30 / 52	27 / 43	24 / 36	21 / 30
	A19	6'-10	124 / 411	98 / 289	80 / 210	66 / 158	55 / 122	47 / 96	41 / 77	36 / 62	31 / 51	28 / 43	25 / 36
	A18	7'-4	140 / 473	111 / 332	90 / 242	75 / 182	63 / 140	53 / 110	46 / 88	40 / 72	35 / 59	31 / 49	28 / 41
3	A22	4'-7	108 / 216	85 / 152	69 / 111	57 / 83	48 / 64	41 / 50	35 / 40	31 / 33	27 / 27	24 / 23	21 / 19
	A20	5'-9	132 / 270	105 / 189	85 / 138	70 / 104	59 / 80	50 / 63	44 / 50	38 / 41	33 / 34	30 / 28	26 / 24
	A19	6'-10	155 / 322	122 / 226	99 / 165	82 / 124	69 / 95	59 / 75	51 / 60	44 / 49	39 / 40	35 / 34	31 / 28
	A18	7'-4	175 / 370	138 / 260	112 / 190	93 / 142	78 / 110	67 / 86	58 / 69	50 / 56	44 / 46	39 / 39	35 / 32

Notes: 1. Minimum exterior bearing length required is 1.50 inches. Minimum interior bearing length required is 3.00 inches. If these minimum lengths are not provided, web crippling must be checked.
2. FM Global approved numbers and spans available on page 21.

3 N, NI, NA, NIA

Maximum Sheet Length 42'-0
Extra Charge for Lengths Under 6'-0
ICC ER-3415
FM Global Approved[2]





Interlocking side lap is not drawn to show actual detail.

SECTION PROPERTIES

Deck type	Design thickness in.	W psf	Section Properties				V_a lbs/ft	F_y ksi
			I_p in^4/ft	S_p in^3/ft	I_n in^4/ft	S_n in^3/ft		
N22	0.0295	2.26	0.659	0.382	0.884	0.433	2232	33
N20	0.0358	2.71	0.848	0.501	1.079	0.552	3287	33
N19	0.0418	3.15	1.045	0.597	1.260	0.659	4217	33
N18	0.0474	3.56	1.238	0.688	1.430	0.749	4771	33
N16	0.0598	4.46	1.683	0.893	1.807	0.944	5988	33

ACOUSTICAL INFORMATION

Deck Type	Absorption Coefficient						Noise Reduction Coefficient[1]
	125	250	500	1000	2000	4000	
3NA, 3NIA	.18	.39	.88	.93	.58	.39	0.70

[1] Source: Riverbank Acoustical Laboratories.
Test was conducted with 1.50 pcf fiberglass batts and 2 inch polyisocyanurate foam insulation for the SDI.

Acoustical deck (Type 3 NA, NIA) is particularly suitable in structures such as auditoriums, schools and theaters where sound control is desirable. Acoustic perforations are located in the vertical webs where the load carrying properties are negligibly affected (less than 5%).

Inert, non-organic glass fiber sound absorbing batts are placed in the rib openings to absorb up to 70% of the sound striking the deck.

Batts are field installed and may require separation.

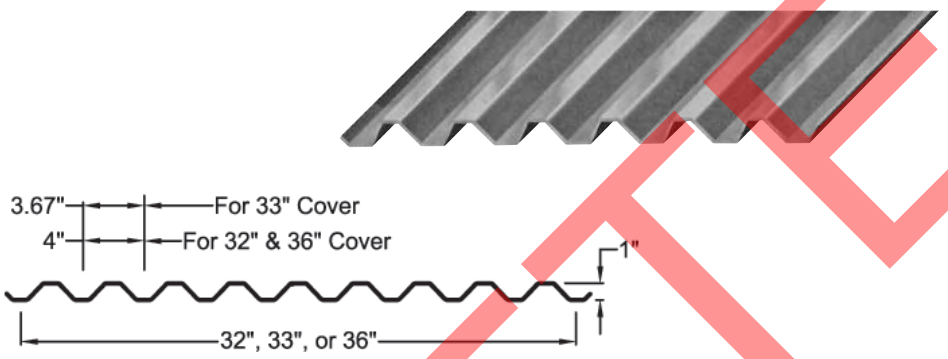
VERTICAL LOADS FOR TYPE 3N

No. of Spans	Deck Type	Max. SDI Const. Span	Allowable Total (PSF) / Load Causing Deflection of L/240 or 1 inch (PSF) Span (ft.-in.) ctr to ctr of supports										
			10-0	10-6	11-0	11-6	12-0	12-6	13-0	13-6	14-0	14-6	15-0
1	N22	11'-7	50 / 43	46 / 37	42 / 32	38 / 28	35 / 25	32 / 22	30 / 20	28 / 18	26 / 16	24 / 14	22 / 13
	N20	13'-2	66 / 56	60 / 48	55 / 42	50 / 37	46 / 32	42 / 28	39 / 25	36 / 23	34 / 20	31 / 18	29 / 16
	N19	14'-7	79 / 69	71 / 59	65 / 51	59 / 45	55 / 40	50 / 35	47 / 31	43 / 28	40 / 25	37 / 22	35 / 20
	N18	15'-11	91 / 81	82 / 70	75 / 61	69 / 53	63 / 47	58 / 42	54 / 37	50 / 33	46 / 30	43 / 27	40 / 24
	N16	18'-6	118 / 110	107 / 95	97 / 83	89 / 73	82 / 64	75 / 56	70 / 50	65 / 45	60 / 40	56 / 36	52 / 33
2	N22	13'-8	56 / 122	51 / 105	47 / 92	43 / 80	39 / 71	36 / 62	34 / 55	31 / 50	29 / 44	27 / 40	25 / 36
	N20	15'-6	72 / 152	65 / 131	60 / 114	55 / 100	50 / 88	46 / 78	43 / 69	40 / 62	37 / 55	34 / 50	32 / 45
	N19	16'-11	86 / 182	78 / 157	71 / 137	65 / 120	60 / 105	55 / 93	51 / 83	47 / 74	44 / 66	41 / 60	38 / 54
	N18	18'-1	98 / 211	89 / 182	81 / 158	74 / 139	68 / 122	63 / 108	58 / 96	54 / 86	50 / 77	47 / 69	44 / 62
	N16	20'-4	123 / 276	112 / 238	102 / 207	93 / 181	86 / 159	79 / 141	73 / 125	68 / 112	63 / 100	59 / 90	55 / 82
3	N22	13'-8	69 / 95	64 / 82	58 / 72	53 / 63	49 / 55	45 / 49	42 / 43	39 / 39	36 / 35		
	N20	15'-6	90 / 119	81 / 103	74 / 90	68 / 78	63 / 69	58 / 61	53 / 54	50 / 48	46 / 43		
	N19	16'-11	107 / 143	97 / 123	89 / 107	81 / 94	75 / 83	69 / 73	64 / 65	59 / 58	55 / 52		
	N18	18'-1	122 / 165	111 / 143	101 / 124	92 / 109	85 / 96	78 / 84	72 / 75	67 / 67	63 / 60		
	N16	20'-4	154 / 216	139 / 186	127 / 162	116 / 142	107 / 125	99 / 111	91 / 98	85 / 88	79 / 79		

Notes: 1. Minimum exterior bearing length required is 1.50 inches. Minimum interior bearing length required is 3.00 inches. If these minimum lengths are not provided, web crippling must be checked.
2. FM Global approved numbers and spans available on page 21.

1.0 E

Maximum Sheet Length 42'-0
Extra Charge for Lengths Under 6'-0



Type E deck provides a very economical roof deck for use on shorter spans. 1" or more rigid insulation should be used with Type E deck. Installation of rigid insulation should be with mechanical fasteners.

This deck also lends itself for use as a building siding.

SECTION PROPERTIES

Deck type	Design thickness in.	W psf	Section Properties				V_a lbs/ft	F_y ksi
			I_p in^4/ft	S_p in^3/ft	I_n in^4/ft	S_n in^3/ft		
E26	0.0179	1.06	0.040	0.067	0.042	0.071	2216	60
E24	0.0239	1.38	0.057	0.098	0.059	0.103	3867	60
E22	0.0295	1.67	0.073	0.130	0.073	0.134	4754	60
E20	0.0358	2.01	0.088	0.167	0.088	0.165	5744	60

VERTICAL LOADS FOR TYPE 1.0E

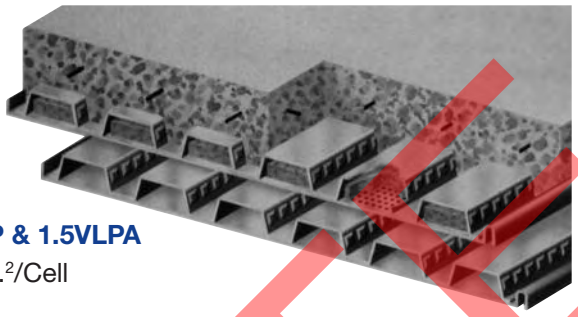
No. of Spans	Deck Type	Max. SDI Const. Span	Allowable Total (PSF) / Load Causing Deflection of L/240 or 1 inch (PSF) Span (ft.-in.) ctr to ctr of supports										
			2-6	3-0	3-6	4-0	4-6	5-0	5-6	6-0	6-6	7-0	7-6
1	E26	2'-10	257 / 168	178 / 97	131 / 61	100 / 41	79 / 29	64 / 21	53 / 16	45 / 12	38 / 10	33 / 8	29 / 6
	E24	3'-5	376 / 239	261 / 138	192 / 87	147 / 58	116 / 41	94 / 30	78 / 22	65 / 17	56 / 14	48 / 11	42 / 9
	E22	3'-10	498 / 306	346 / 177	254 / 112	195 / 75	154 / 53	125 / 38	103 / 29	86 / 22	74 / 17	64 / 14	55 / 11
	E20	4'-2	640 / 369	444 / 214	327 / 135	250 / 90	198 / 63	160 / 46	132 / 35	111 / 27	95 / 21	82 / 17	71 / 14
2	E26	3'-4	267 / 414	187 / 240	138 / 151	106 / 101	84 / 71	68 / 52	56 / 39	47 / 30	40 / 24	35 / 19	30 / 15
	E24	4'-0	390 / 586	272 / 339	200 / 214	153 / 143	121 / 101	98 / 73	81 / 55	68 / 42	58 / 33	50 / 27	44 / 22
	E22	4'-6	506 / 738	353 / 427	260 / 269	199 / 180	158 / 127	128 / 92	106 / 69	89 / 53	76 / 42	65 / 34	57 / 27
	E20	5'-0	623 / 889	435 / 515	320 / 324	246 / 217	194 / 152	158 / 111	130 / 84	109 / 64	93 / 51	81 / 41	70 / 33
3	E26	3'-4	330 / 325	232 / 188	171 / 118	132 / 79	104 / 56	84 / 41	70 / 30	59 / 23	50 / 18	43 / 15	38 / 12
	E24	4'-0	485 / 459	338 / 266	249 / 167	191 / 112	151 / 79	123 / 57	102 / 43	85 / 33	73 / 26	63 / 21	55 / 17
	E22	4'-6	629 / 578	440 / 334	324 / 211	249 / 141	197 / 99	160 / 72	132 / 54	111 / 42	95 / 33	82 / 26	71 / 21
	E20	5'-0	774 / 697	541 / 403	399 / 254	306 / 170	242 / 119	197 / 87	163 / 65	137 / 50	117 / 40	101 / 32	88 / 26

Notes: 1. Minimum exterior bearing length required is 1.50 inches. Minimum interior bearing length required is 3.00 inches. If these minimum lengths are not provided, web crippling must be checked.

CELLULAR DECK

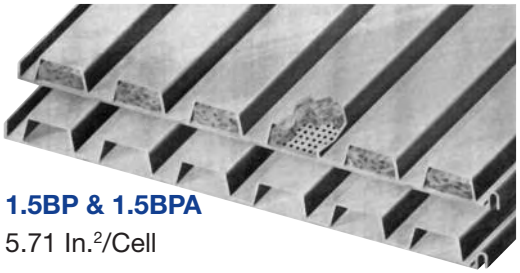
For: Electrified Raceways — Canopies — Long Spans
Heavy Forms — Flat Acoustical Ceilings

Vulcraft Cellular Units are approved by U.L. for use as Electrical Raceways.
1.5BP, 1.5BPA, 3NP, 3NPA FM Global Approved[1]

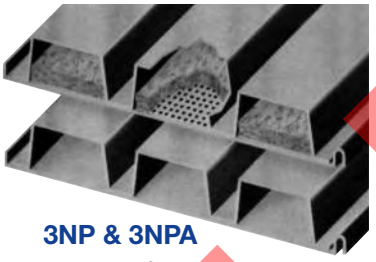


1.5VLP & 1.5VLPA
5.71 In.²/Cell

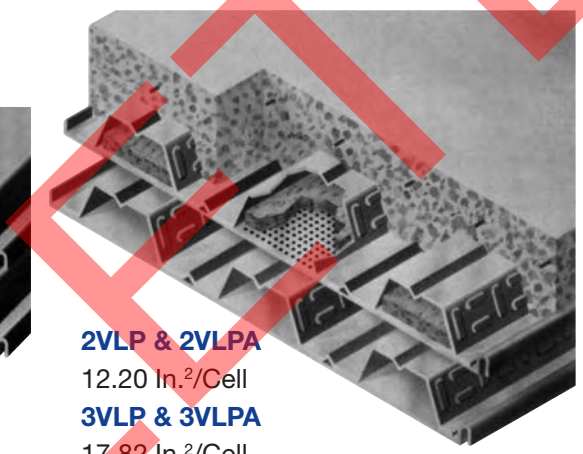
Interlocking side lap is not drawn to show actual detail.



1.5BP & 1.5BPA
5.71 In.²/Cell



3NP & 3NPA
17.43 In.²/Cell



2VLP & 2VLPA
12.20 In.²/Cell

3VLP & 3VLPA
17.82 In.²/Cell

ACOUSTICAL DATA

Deck Type	Absorption Coefficients 125	250	500	1000	2000	4000	Noise Reduction Coefficient		RAL™ Test No.
1.5BPA	0.34	0.42	0.36	0.22	0.17	0.17	0.30	W/O Insulation	A85-154
3NPA	0.40	0.38	0.47	0.19	0.11	0.17	0.30	W/O Insulation	A85-156
1.5VLPA	0.09	0.11	0.25	0.14	0.16	0.28	0.15	W/O Insulation	A86-317
2VLPA	0.12	0.24	0.20	0.14	0.07	0.18	0.15	W/O Insulation	A86-319
3VLPA	0.33	0.31	0.30	0.14	0.09	0.01	0.20	W/O Insulation	A86-321
1.5BPA	0.38	0.49	0.63	0.98	0.74	0.54	0.70	W/ Insulation	A85-155
3NPA	0.48	0.56	0.98	0.92	0.72	0.58	0.80	W/ Insulation	A85-157
1.5VLPA	0.14	0.21	0.61	0.99	0.69	0.27	0.65	W/ Insulation	A86-318
2VLPA	0.31	0.41	0.94	0.88	0.56	0.44	0.70	W/ Insulation	A86-320
3VLPA	0.40	0.56	1.07	0.78	0.57	0.35	0.75	W/ Insulation	A86-322

W/Insulation indicates rigid insulation in the cells. Source: Riverbank Acoustical Laboratories.

SECTION PROPERTIES

Fy = 33KSI

Deck Type	Hat/Pan Gage	Design Thickness Hat	Pan	W_t PSF	I in⁴/ft	S_P in³/ft	S_N in³/ft
1.5VLP and 1.5BP	20/20	.0358	.0358	3.83	.357	.301	.394
	20/18	.0358	.0474	4.36	.388	.310	.413
	18/20	.0474	.0358	4.47	.483	.446	.510
	18/18	.0474	.0474	5.00	.527	.458	.532
	18/16	.0474	.0598	5.56	.567	.468	.556
	16/18	.0598	.0474	5.68	.668	.631	.657
	16/16	.0598	.0598	6.24	.722	.664	.685
2VLP	20/20	.0358	.0358	3.59	.675	.417	.426
	20/18	.0358	.0474	4.10	.726	.425	.441
	18/20	.0474	.0358	4.16	.841	.585	.554
	18/18	.0474	.0474	4.67	.902	.595	.572
	18/16	.0474	.0598	5.22	.960	.606	.589
	16/18	.0598	.0474	5.28	1.083	.741	.709
	16/16	.0598	.0598	5.83	1.153	.754	.731
3VLP	20/20	.0358	.0358	3.75	1.484	.650	.657
	20/18	.0358	.0474	4.26	1.594	.662	.681
	18/20	.0474	.0358	4.36	1.840	.904	.853
	18/18	.0474	.0474	4.88	1.980	.922	.883
	18/16	.0474	.0598	5.43	2.103	.936	.910
	16/18	.0598	.0474	5.54	2.365	1.146	1.094
	16/16	.0598	.0598	6.09	2.517	1.166	1.128
3NP	20/20	.0358	.0358	4.30	1.465	.610	.976
	20/18	.0358	.0474	4.83	1.583	.624	1.017
	18/20	.0474	.0358	5.08	1.979	.892	1.266
	18/18	.0474	.0474	5.61	2.152	.913	1.315
	18/16	.0474	.0598	6.18	2.308	.933	1.367
	16/18	.0598	.0474	6.45	2.750	1.257	1.626
	16/16	.0598	.0598	6.98	2.962	1.285	1.682

Notes: 1. FM Global approved numbers and spans available on page 21.

ANSI/SDI-RD1.0 Standard for Steel Roof Deck

1. General

1.1 Scope:

A. This Specification for Steel Roof Deck shall govern the materials, design, and erection of cold formed steel deck used for the support of roofing materials, design live loads and SDI construction loads.

B. Commentary shall not be considered part of the mandatory document.

1.2 Reference Codes, Standards and Documents:

A. Codes and Standards: For purposes of this Standard, comply with applicable provisions of the following Codes and Standards:

1. American Iron and Steel Institute (AISI) Standard - *North American Specification for the Design of Cold-Formed Steel Structural Members,* 2001 Edition with Supplement 2004
2. American Welding Society - ANSI/AWS D1.3 Structural Welding Code/Sheet Steel - 98 Structural Welding Code - Sheet Steel
3. American Society for Testing and Materials (ASTM) A653 (A653M)-06, A924 (A924M)-06, A1008 (A1008M)-06
4. American Society of Civil Engineering (ASCE) – SEI/ASCE7-05
5. Underwriters Laboratories (UL) Fire Resistance Directory - http://www.ul.com/database 2006

B. Reference Documents: Refer to the following documents:

1. SDI Manual of Construction with Steel Deck - MOC2-2006
2. SDI Standard Practice Details - SPD2-2001
3. SDI Position Statement - Field Painting of Steel Deck-2004
4. SDI Diaphragm Design Manual - DDM03-2004

2. Products

2.1 Material:

A. Sheet steel for galvanized deck shall conform to ASTM A653 (A653M) Structural Quality, with a minimum yield strength of 33 ksi (230 MPa).

B. Sheet steel for cold rolled plus painted deck shall conform to ASTM A1008 (A1008M) with a minimum yield strength of 33 ksi (230 MPa). Other structural sheet steels or high strength low alloy steels are acceptable, and shall be selected from the *North American Specification for the Design of Cold-Formed Steel Structural Members.*

C. Sheet steel for accessories shall conform to ASTM A653 (A653M) Structural Quality for structural accessories, ASTM A653 (A653M) Commercial Quality for non-structural accessories, or ASTM A1008 (A1008M) for either structural or non-structural accessories. Other structural sheet steels or high strength low alloy steels are acceptable, and shall be selected from the *North American Specification for the Design of Cold-Formed Steel Structural Members.*

D. The deck type (profile) and thickness (gage) shall be as shown on the plans.

2.2 Tolerance:

A. Uncoated thickness shall not be less than 95% of the design thickness as listed in Table 2.2.1:

Table 2.2.1

Gage No.	Design Thickness		Minimum Thickness	
	in.	mm.	in.	mm.
22	0.0295	0.75	0.028	0.71
21	0.0329	0.84	0.031	0.79
20	0.0358	0.91	0.034	0.86
19	0.0418	1.06	0.040	1.01
18	0.0474	1.20	0.045	1.14
17	0.0538	1.37	0.051	1.30
16	0.0598	1.52	0.057	1.44

B. Panel length shall be within plus or minus 1/2 inch (12 mm) of specified length.

C. Panel cover width shall be no greater than minus 3/8 inch (10 mm), plus 3/4 inch (20 mm).

D. Panel camber and/or sweep shall be no greater than 1/4 inch in 10 foot length (6 mm in 3 m).

E. Panel end out of square shall not be greater than 1/8 inch per foot of panel width (10 mm per m).

2.3 Finish:

A. Galvanizing shall conform to ASTM A653 (A653M).

B. Painted with a shop coat of primer shall be applied to steel sheet conforming to ASTM A1008 (A1008M).

C. The finish of the steel roof deck shall be suitable for the environment of the structure.

ANSI/SDI-RD1.0 Standard for Steel Roof Deck

2.3 Finish:

Commentary: The primer coat is intended to protect the steel for only a short period of exposure in ordinary atmospheric conditions and shall be considered an impermanent and provisional coating. Field painting of prime painted deck is recommended especially where the deck is exposed. (See SDI *Field Painting of Steel Deck*).

In corrosive or high moisture atmospheres, a galvanized finish is desirable in a G60 (Z180) or G90 (Z275) coating. In highly corrosive or chemical atmospheres or where reactive materials could be in contact with the steel deck, special care in specifying the finish should be used.

2.4 Design:

A. The deck shall be selected by the designer to provide the load capabilities shown on the drawings (design live and dead loads and the SDI construction loads).

1. The section properties of the steel roof unit deck shall be computed in accordance with the *North American Specification for the Design of Cold-Formed Steel Structural Members.*
2. Allowable Stress Design (ASD): Bending stress shall not exceed 0.60 times the yield strength with a maximum of 36 ksi (250 MPa) under the combined dead and design live loads.
3. Load and Resistance Factor Design (LRFD): The load factors are defined in the governing code. ASCE 7 (See section 1.2.A.5) shall be used in the absence of a governing code. The resistance factors and nominal resistances shall be determined in accordance with the *North American Specification for the Design of Cold-Formed Steel Structural Members.*
4. Deck Deflection: Deflection of the deck shall not exceed 1/240 of the span (centerline to centerline) or 1 inch (25 mm), whichever is less, under the uniformly distributed design live load. All spans are to be considered center-to-center of supports.

Commentary: The adequacy of deck edge support details should be reviewed by the designer. At the building perimeter or any other deck termination or direction change, occasional concentrated loading of the roof deck could result in temporary differences in deflection between the roof deck and the adjacent stationary building component. Supplemental support such as a perimeter angle may be warranted.

5. Suspended Loads: All suspended loads shall be included in the analysis and calculations for stress and deflection.

Commentary: The designer must take into account the sequence of loading. Suspended loads may include ceilings, light fixtures, ducts or other utilities. The designer must be informed of any loads applied after the roofing has been installed.

6. Construction and Maintenance Loads: Deck shall be selected by the designer to provide a minimum 30 lbs/sq.ft. (1.44 kPa) construction load. Span lengths shall be governed by a maximum stress of 0.7 Fy and a maximum deflection of 1/240 of the span with a 200-pound (0.89 kN) concentrated load at midspan on a 1 foot (300 mm) wide section of deck. If the designer contemplates loads of greater magnitude, spans shall be decreased or the thickness of the steel deck increased as required. All loads shall be distributed by appropriate means to prevent damage to the completed assembly during construction.
7. Cantilever loads: The cantilever span shall be determined by the lowest value considering,
(a) construction phase load of 10 psf (0.48 kPa) on adjacent span and cantilever, plus 200 pound load (0.89 kN) at end of cantilever with a stress limit of 0.7 Fy (ASD),
(b) a service load of 45 psf (2.15 kPa) on adjacent span and cantilever, plus 100 pound load (0.44 kN) at end of cantilever with a stress limit of 0.6 Fy (ASD), or
(c) with service loads, a deflection limitation of 1/240 of adjacent span for interior span and deflection limitation at end of cantilever of 1/120 of overhang.

Commentary: Under Construction and Maintenance Loads, and Cantilever Loads, 0.7 Fy maximum stress was selected to unify the ASD and LRFD values. Apply a load factor of 1.4 to 200 pound load when LRFD is used.

8. Diaphragm Shear Capacity: Roof deck shear capacity shall be determined in accordance with the SDI Diaphragm Design Manual or from tests conducted by an independent professional engineer.

Commentary: Calculations of diaphragm strength and stiffness should be made using the SDI Diaphragm Design Manual. If testing is used as the means for determining the diaphragm strength and stiffness, then it should follow the AISI TS 7-02 test protocol.

B. Load Tables: Uniform loads determined for published tables shall be based on equal adjacent two and three span conditions and on single spans. Appropriate combinations of shear and bending shall be made to determine the published loads. Lengths of 1-1/2 inches (38 mm) for end bearing and 4 inches (100 mm) for interior bearing shall be used to check web crippling. Deflection coefficients shall be 0.013 for single spans, 0.0054 for double spans and 0.0069 for triple spans.

Commentary: For deck layouts that provide more than three equal spans, the user can apply the loads published for three spans. Published uniform load tables do not apply for adjacent spans that differ in length by more than 10%.

2.5 Accessories:

A. Ridge and valley plates, and flat plates at change of deck direction shall be furnished as shown on plans to provide a flat (finished) surface for the application of roof insulation and roof cover.

B. Sump pans shall be furnished to receive roof drains as shown on plans. Holes for drains are to be field cut (by others) in the field.

C. Mechanical fasteners or welds shall be permitted for deck and accessory attachment.

3. Execution

3.1 Installation/General:

A. Support framing and field conditions shall be examined for compliance with requirements for installation tolerances and other conditions affecting performance of work of this section. All OSHA rules for erection shall be followed.

B. Deck panels and accessories shall be installed according to the SDI Manual of Construction with Steel Deck, placement plans, and requirements of this Section.

C. Deck panels shall be placed on structural supports and adjusted to final position with ends aligned, and attached securely to the supports immediately after placement in order to form a safe working platform. All deck sheets shall have adequate bearing and fastening to all supports to prevent slip off during construction. Deck ends over supports shall be installed with a minimum end bearing of 1-1/2 inches (38 mm). Deck areas subject to heavy or repeated traffic, concentrated loads, impact loads, wheel loads, etc. shall be adequately protected by planking or other approved means to avoid overloading and/or damage.

D. Lapped or Butted Ends: Deck ends shall be either lapped or butted over supports. Gaps up to 1 inch (25 mm) shall be permitted at butted ends.

E. Deck units and accessories shall be cut and neatly fit around scheduled openings and other work projecting through or adjacent to the decking.

Commentary: It is the responsibility of the designer to designate holes/openings to be decked over in compliance with applicable federal and state OSHA directives. Care should be taken to analyze spans between supports at openings, when determining those holes/openings to be decked over. When a framed opening span exceeds the maximum deck span limits for construction loads, the opening must be detailed around instead of decked over. (Minimum roof construction load 30 lbs/sq ft (1.44kPa), unless job specific requirements dictate otherwise).

F. Trades that subsequently cut unscheduled openings through the deck shall be responsible for reinforcing these openings based upon an approved engineered design.

ANSI/SDI-RD1.0 Standard for Steel Roof Deck

3.2 Installation/Anchorage:

A. Roof deck units shall be anchored to steel supporting members including perimeter support steel and/or bearing walls by arc spot welds of the following diameter and spacing, fillet welds of equal strength, or mechanical fasteners. Anchorage shall provide lateral stability to the top flange of the supporting structural members and resist the following minimum gross uplifts; 45 pounds per square foot (2.15 kPa) for eave overhang; 30 pounds per square foot (1.44 kPa) for all other roof areas. The dead load of the roof deck construction shall be deducted from the above forces.

1. All welding of deck shall be in accordance with ANSI/AWS D1.3, Structural Welding Code - Sheet Steel. Each welder shall demonstrate an ability to produce satisfactory welds using a procedure such as shown in the SDI Manual of Construction with Steel Deck, and/or as described in ANSI/AWS D1.3.
2. Welding washers shall be used on all deck units with metal thickness less than 0.028 inches (0.7 mm). Welding washers shall be a minimum thickness of 0.0598 inches (16 gage, 1.50 mm) and have a nominal 3/8 inch (10 mm) diameter hole.
3. Where welding washers are not used, a minimum visible 5/8 inch (15 mm) diameter arc puddle weld shall be used. Weld metal shall penetrate all layers of deck material at end laps and shall have good fusion to the supporting members.
4. Weld spacing: Ribs of panels shall be welded at each support. Space additional welds an average of 12 inches (300 mm) apart but not more than 18 inches (460 mm).
5. When used, fillet welds shall be at least 1-1/2 inches (38 mm) long.
6. Mechanical fasteners, either powder actuated, pneumatically driven, or screws, shall be permitted in lieu of welding to fasten deck to supporting framing if fasteners meet all project service requirements. When the fasteners are powder actuated or pneumatically driven, the load value per fastener used to determine the maximum fastener spacing is based on a minimum structural support thickness of not less than 1/8 inch (3 mm) and on the fastener providing a minimum 5/16 inch (8 mm) diameter bearing surface (fastener head size). When the structural support thickness is less than 1/8 inch (3 mm), powder actuated or pneumatically driven fasteners shall not be used, but screws are acceptable.

Commentary: Mechanical fasteners (screws, powder or pneumatically driven fasteners, etc.) are recognized as viable anchoring methods, provided the type and spacing of the fastener satisfies the design criteria. Documentation in the form of test data, design calculations, or design charts should be submitted by the fastener manufacturer as the basis for obtaining approval.

7. For deck units with spans greater than 5 feet (1.5 m), side laps and perimeter edges of units between span supports shall be fastened at intervals not exceeding 36 inches (1 m) on center, using one of the following methods:
   a. #10 self drilling screws.
   b. Crimp or button punch.
   c. Arc puddle welds 5/8 inch (15 mm) minimum visible diameter, or minimum 1 inch (25 mm) long fillet weld.

Commentary: The above side lap spacing is a minimum. Service loads or diaphragm design may require closer spacing. Good metal to metal contact is necessary for a good side lap weld. Burn holes are to be expected.

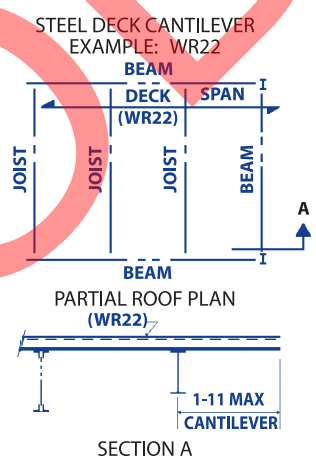
B. Accessory Attachment:

1. Accessories shall be anchored to supporting members by arc spot welds or self drilling screws at 12 inches (300 mm) maximum intervals or as shown on design drawings.

Steel Roof Deck

RECOMMENDED MAXIMUM SPANS FOR CONSTRUCTION AND MAINTENANCE LOADS STANDARD FOR 1½ INCH AND 3 INCH ROOF DECK						
	TYPE	SPAN CONDITION	SPAN		MAX. RECOMMENDED SPANS ROOF DECK CANTILEVER	
			FT.-IN.	METERS	FT.-IN.	METERS
NARROW RIB DECK	NR22	1	3′-10″	1.15 m	1′-0″	.30 m
	NR22	2 or more	4′-9″	1.45 m		
	NR20	1	4′-10″	1.45 m	1′-2″	.35 m
	NR20	2 or more	5′-11″	1.80 m		
	NR18	1	5′-11″	1.80 m	1′-7″	.45 m
	NR18	2 or more	6′-11″	2.10 m		
INTERMEDIATE RIB DECK	IR22	1	4′-6″	1.35 m	1′-2″	.35 m
	IR22	2 or more	5′-6″	1.65 m		
	IR20	1	5′-3″	1.60 m	1′-5″	.40 m
	IR20	2 or more	6′-3″	1.90 m		
WIDE RIB DECK	WR22	1	5′-6″	1.65 m	1′-11″	.55 m
	WR22	2 or more	6′-6″	1.75 m		
	WR20	1	6′-3″	1.90 m	2′-4″	.70 m
	WR20	2 or more	7′-5″	2.25 m		
	WR18	1	7′-6″	2.30 m	2′-10″	.85 m
	WR18	2 or more	8′-10″	2.70 m		
DEEP RIB DECK	3DR22	1	11′-0″	3.35 m	3′-5″	1.05 m
	3DR22	2 or more	13′-0″	3.95 m		
	3DR20	1	12′-6″	3.80 m	3′-11″	1.20 m
	3DR20	2 or more	14′-8″	4.45 m		
	3DR18	1	15′-0″	4.55 m	4′-9″	1.45 m
	3DR18	2 or more	17′-8″	5.40 m		

CANTILEVER DESIGN



Notes:

1. Adjacent span: Limited to those spans determined in Section 2.4 of Roof Deck Standards. In those instances where the adjacent span is less than 3 times the cantilever span, the individual manufacturer should be consulted for the appropriate cantilever span.
2. Sidelaps must be attached at end of cantilever and at a maximum of 12 inches (300 mm) on center from end.
3. No permanent suspended loads are to be supported by the steel deck.
4. The deck must be completely attached to the supports and at the sidelaps before any load is applied to the cantilever.
5. Service loads may be more severe than indicated in section 2.4.A.7.

Short Form Specifications
For Steel Roof Deck

1. General

1.1 Related Documents
General provisions of the Contract, including General and Supplementary Conditions and General Requirements, apply to work of this section.

1.2 Summary
This section shall include all materials, equipment and labor necessary for the installation of steel roof deck in accordance with this specification and design drawings.

Requirements for structural deck supports, field painting, fireproofing, roof sumps, flashings, drains, collars, gutters, downspouts, insulation and other miscellaneous items are specified elsewhere.

1.3 Submittal
A. General: Submit each item in this Article according to the conditions of the Contract and Division 1 Specification Sections.

B. Product data: Submit manufacturers' specifications/ installation instructions for each steel roof deck type and specified accessories.

C. Shop drawings: Submit roof deck placement drawings showing layout for each type of deck, anchorage details, sump pans, cut openings and accessories.

D. Welder certification signed by contractor certifying that welders comply with requirements specified under "Quality Assurance" Article 1.4. If mechanical fasteners are used, independent test reports shall be provided by the fastener manufacturer.

1.4 Quality Assurance
A. Codes and Standards - Comply with provisions of the following unless otherwise indicated:

1. American Iron and Steel Institute (AISI) Specification for Design of Cold Formed Steel Structural Members, latest edition.
2. American Welding Society (AWS) D1.3 Structural Welding Code/Sheet Steel.
3. Steel Deck Institute (SDI) Design Manual, latest edition.

B. Certify that each welder has satisfactorily passed AWS qualification test for the welding process involved, and, if applicable, has undergone recertification.

1.5 Delivery, Storage, and Handling
A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage and handling.

B. If ground storage is needed, the deck bundles must be stored off the ground, with one end elevated to provide drainage. Bundles must be protected against condensation with a ventilated waterproof covering. Bundles must be stacked so there is no danger of tipping, sliding, rolling, shifting or material damage. Bundles must be periodically checked for tightness, and retightened as necessary (so wind cannot loosen sheets) to prevent damage caused by the wind.

C. Deck bundles placed on the building frame must always be placed near a main supporting beam at a column or wall. In no case are the bundles to be placed on unbolted frames or on unattached and unbridged joists. The structural frame must be properly braced to receive the bundles.

2. Products

2.1 A manufacturer offering steel roof deck products to be incorporated into the work must be a member of the Steel Deck Institute.

2.2 Materials
A. Steel roof deck shall be (narrow rib) (intermediate rib) (wide rib) (deep rib) (long span) configuration _____ in depth with a design thickness of _____ and shall be designed in accordance with and comply with the standard Roof Deck load tables of the SDI.

B. Sheet steel for galvanized roof deck and accessories shall conform to ASTM A653/A653M Structural Quality grade SS33 (230 MPa) or higher.

1. Galvanizing shall conform to ASTM A924/A924M with a minimum coating class of G30 (Z090) as defined in ASTM A653/A653M.

C. Sheet steel for prime painted roof deck and/or accessories shall conform to ASTM A1008 with a minimum yield strength of 33 ksi (230 MPa).

D. Steel deck shall have a coat of manufacturers standard shop primer paint.

2.3 Accessories

The deck manufacturer shall furnish ridge and valley plates, flat plates at change of deck direction and sump pans, as shown on plans to provide a finished surface for the application of roof insulation and roof covering.

3. Execution

3.1 Examine support framing and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance of work of this section. All OSHA, State and Local rules for erection must be followed.

3.2 Preparation

Place deck in accordance with approved placement plans. Locate deck bundles to prevent overloading of support members.

3.3 Installation, General

A. Install deck panels and accessories according to SDI Specifications, SDI Manual of Construction with Steel Deck, and in accordance with the placement plans and requirements of this section.

B. Place deck panels on structural supports and adjust to final position with ends lapped or butted over structural supports with a minimum end bearing of 1-1/2 inches (38 mm). Attach the deck panels firmly to the supports immediately after placement in order to form a safe working platform.

C. Cut and neatly fit deck and accessories at skew conditions, around openings and other work projecting through or adjacent to the decking.

D. Trades that subsequently cut unscheduled openings through the deck are responsible for reinforcing the openings in accordance with the requirements of the Engineer of Record.

3.4 Attachment

A. Anchor deck units to steel supporting members by arc spot puddle welds or approved mechanical fasteners.

1. Arc spot puddle welds shall be 5/8 inch (15 mm) minimum visible diameter with the attachment pattern shown on placement drawings.
2. Mechanical fasteners, either powder actuated, pneumatically driven, or self drilling screws may be used in lieu of welding, provided product data has been submitted and approved.

B. Minimum Side Lap Attachment – Fasten side laps of deck units with span greater than 5'-0" (1.5 m) at mid-span or 36" (1 m) intervals whichever distance is smaller or as shown on design drawings for diaphragm design using one of the following methods:

1. #10 self drilling screws.
2. Crimp or button punch.
3. Arc puddle welds - 5/8 inch (15 mm) minimum visible diameter, or 1 inch (25 mm) long fillet weld.

C. Minimum Edge Attachment – Fasten perimeter edges of deck units at 36" (1 m) maximum intervals or as shown on design drawings for diaphragm design using one of the following methods:

1. Arc spot puddle welds 5/8 inch (15 mm) minimum visible diameter or 1 inch (25 mm) long arc seam or fillet weld.
2. Mechanical fasteners, either powder actuated, pneumatically driven or screws may be used in lieu of welding, provided product data has been submitted and approved.

3.5 Repairs

Before placement of roof insulation and roof covering, the deck shall be inspected for tears, dents or other damage that may prevent the deck from acting as a structural roof base. The need for repair of the damaged deck shall be determined by the Architect or Engineer of Record.

3.6 Construction Guidelines

A. Do not use deck units as a working platform or storage area until units are permanently attached in position.

B. Construction loads must not exceed load carrying capacity of deck.

ROOF DECK FIRE RESISTANCE RATINGS

Restrained Assembly Rating	Type of Protection	Type of Insulation	U.L. Design No. (1,2)	Classified Deck Type		Unrestrained Beam Rating
				Form Deck	Roof Deck	
1 Hr.	Exposed Grid	Rigid Insulation	P211+		B, BI, F, A	
			P214+		B, BI, F, A	1 Hr.
			P224+		B, BI, F, A	
			P225+		B, BI, F, A	1,1.5 Hr.
			P227+		B, BI, F, A	1,1.5 Hr.
			P230+		B, BI, F, A	1 Hr.
			P232+		B, BI, F, A	
			P235+		B, BI, F, A	1 Hr.
		Insulating Fill	P214+		B, BI, F, A	1 Hr.
			P231+	1.0C, 1.0CSV, 1.3C, 1.3CSV, 1.5C		1,1.5 Hr.
			P246+	0.6C, 0.6CSV, 1.0C, 1.0CSV, 1.3C, 1.3CSV, 1.5C		1 Hr.
			P251+	0.6C, 1.0C, 1.3C, 1.5C		1,1.5,2 Hr.
			P255+	0.6C, 0.6CSV, 1.0C, 1.0CSV, 1.3C, 1.3CSV, 1.5C		1 Hr.
	Gypsum Board	Rigid Insulation	P510+		B, BI, F, A	
		Insulating Fill	P509+	1.3C, 1.3CSV, 1.5C		1 Hr.
	Cementitious	Rigid Insulation	P701*		B, BI, F, A, N, NI	1,1.5,2 Hr.
			P711*		B, BI, F, N, NI	1,1.5,2 Hr.
			P715*		B, BI, F, A, N, NI	1,1.5,2 Hr.
			P717*		B, BI, N, NI	1,1.5,2 Hr.
	Sprayed Fiber	Rigid Insulation	P801*		B, BI, F, A, N, NI	1,1.5,2 Hr.
			P813		B, BI, F, A, N, NI	
			P815*		B, BI, F, A, N, NI	1,1.5,2 Hr.
			P816*		B, BI, F, N, NI	1,1.5,2 Hr.
			P817*		B, BI, F, N, NI	1,1.5,2 Hr.
			P818*		B, BI, F, N, NI	1,1.5,2 Hr.
			P819*		B, BI, F, N, NI	1,1.5,2 Hr.
	Unprotected Deck	Insulating Fill	P902	0.6C, 1.0C, 1.3C, 1.5C	B, BI, N, NI	1,1.5,2 Hr.
			P907	0.6C, 1.0C, 1.3C, 1.5C	B, BI, N, NI	1,1.5,2 Hr.
			P908	0.6C, 1.0C, 1.3C, 1.5C	B, BI, N, NI	1,1.5,2 Hr.
			P919	1.0C, 1.0CSV, 1.3C, 1.3CSV, 1.5C	B, BI, N, NI	1,1.5 Hr.
			P920	1.0C, 1.0CSV, 1.3C, 1.3CSV, 1.5C	B, BI, N, NI	1,1.5,2 Hr.
			P921	0.6C, 0.6CSV, 1.0C, 1.0CSV, 1.3C, 1.3CSV, 1.5C	B, BI, N, NI	1,1.5,2 Hr.
			P922	1.0C, 1.0CSV, 1.3C, 1.3CSV, 1.5C	B, BI, N, NI	1,1.5,2 Hr.
			P923	0.6C, 0.6CSV, 1.0C, 1.0CSV, 1.3C, 1.3CSV, 1.5C	B, BI, N, NI	1,1.5,2 Hr.
1 1/2 Hr.	Exposed Grid	Rigid Insulation	P225+		B, BI, F, A	1,1.5 Hr.
			P227+		B, BI, F, A	1,1.5 Hr.
			P230+		B, BI, F, A	1 Hr.
		Insulating Fill	P231+	1.0C, 1.0CSV, 1.3C, 1.3CSV, 1.5C		1,1.5 Hr.
			P251+	0.6C, 1.0C, 1.3C, 1.5C		1,1.5,2 Hr.
	Metal Lath	Rigid Insulation	P404+		B, BI	
	Gypsum Board	Rigid Insulation	P510+		B, BI, F, A	
	Cementitious	Rigid Insulation	P701*		B, BI, F, A, N, NI	1,1.5,2 Hr.
			P711*		B, BI, F, N, NI	1,1.5,2 Hr.
			P715*		B, BI, F, A, N, NI	1,1.5,2 Hr.
			P717*		B, BI, N, NI	1,1.5,2 Hr.
	Sprayed Fiber	Rigid Insulation	P801*		B, BI, F, A, N, NI	1,1.5,2 Hr.
			P813		B, BI, F, A, N, NI	
			P815*		B, BI, F, A, N, NI	1,1.5,2 Hr.
			P816*		B, BI, F, N, NI	1,1.5,2 Hr.
			P817*		B, BI, F, N, NI	1,1.5,2 Hr.
			P818*		B, BI, F, N, NI	1,1.5,2 Hr.
			P819*		B, BI, F, N, NI	1,1.5,2 Hr.
	Unprotected Deck	Insulating Fill	P902	0.6C, 1.0C, 1.3C, 1.5C	B, BI, N, NI	1,1.5,2 Hr.
			P907	0.6C, 1.0C, 1.3C, 1.5C	B, BI, N, NI	1,1.5,2 Hr.
			P908	0.6C, 1.0C, 1.3C, 1.5C	B, BI, N, NI	1,1.5,2 Hr.
			P919	1.0C, 1.0CSV, 1.3C, 1.3CSV, 1.5C	B, BI, N, NI	1,1.5 Hr.
			P920	1.0C, 1.0CSV, 1.3C, 1.3CSV, 1.5C	B, BI, N, NI	1,1.5,2 Hr.
			P921	0.6C, 0.6CSV, 1.0C, 1.0CSV, 1.3C, 1.3CSV, 1.5C	B, BI, N, NI	1,1.5,2 Hr.
			P922	1.0C, 1.0CSV, 1.3C, 1.3CSV, 1.5C	B, BI, N, NI	1,1.5,2 Hr.
			P923	0.6C, 0.6CSV, 1.0C, 1.0CSV, 1.3C, 1.3CSV, 1.5C	B, BI, N, NI	1,1.5,2 Hr.
2 Hr.	Exposed Grid	Rigid Insulation	P237+		B, BI, F, A	2 Hr.
		Insulating Fill	P251+	0.6C, 1.0C, 1.3C, 1.5C		1,1.5,2 Hr.
	Metal Lath	Rigid Insulation	P404+		B, BI	
	Gypsum Board	Rigid Insulation	P514+		B, BI, F, A	
	Cementitious	Rigid Insulation	P701		B, BI, F, A, N, NI	1,1.5,2 Hr.
			P711*		B, BI, F, N, NI	1,1.5,2 Hr.
			P715*		B, BI, F, A, N, NI	1,1.5,2 Hr.
			P717*		B, BI, N, NI	1,1.5,2 Hr.
	Sprayed Fiber	Rigid Insulation	P801		B, BI, F, A, N, NI	1,1.5,2 Hr.
			P815*		B, BI, F, A, N, NI	1,1.5,2 Hr.
			P816*		B, BI, F, N, NI	1,1.5,2 Hr.
			P817*		B, BI, F, N, NI	1,1.5,2 Hr.
			P818*		B, BI, F, N, NI	1,1.5,2 Hr.
			P819*		B, BI, F, N, NI	1,1.5,2 Hr.
	Unprotected Deck	Insulating Fill	P902	0.6C, 1.0C, 1.3C, 1.5C	B, BI, N, NI	1,1.5,2 Hr.
			P907	0.6C, 1.0C, 1.3C, 1.5C	B, BI, N, NI	1,1.5,2 Hr.
			P908	0.6C, 1.0C, 1.3C, 1.5C	B, BI, N, NI	1,1.5,2 Hr.
			P920	1.0C, 1.0CSV,1.3C, 1.3CSV, 1.5C	B, BI, N, NI	1,1.5,2 Hr.
			P921	0.6C, 0.6CSV, 1.0C, 1.0CSV, 1.3C, 1.3CSV, 1.5C	B, BI, N, NI	1,1.5,2 Hr.
			P922	1.0C, 1.0CSV,1.3C, 1.3CSV, 1.5C	B, BI, N, NI	1,1.5,2 Hr.
3 Hr.	Metal Lath	Insulating Fill	P923	0.6C, 0.6CSV, 1.0C, 1.0CSV, 1.3C, 1.3CSV, 1.5C	B, BI, N, NI	1,1.5,2 Hr

NOTES: 1. Refer to the U.L. "Fire Resistance Directory" for the necessary construction details.
2. Deck finish shall be galvanized unless noted otherwise.
+ Deck finish is not critical for fire resistance when used in P2--, P4--, & P5-- Series designs. Deck finish shall be galvanized or painted.
* Denotes deck finish is critical for fire resistance. Deck finish shall be galvanized or painted. This is a special type of paint and is compatible with the spray-applied fire protection and is U.L. approved for use in the denoted P7-- & P8-- Series designs.

Vulcraft Steel Deck — FM Global Approved Spans

Maximum Vulcraft deck spans approved for use in FM Global constructions are shown below. The Engineer of Record must investigate the design as published by FM Global for the required attachment of the steel deck to the supporting structure, deck-to-deck fastening, attachment of insulation to the roof deck, etc. Reference shall be made to: https://roofnav.fmglobal.com

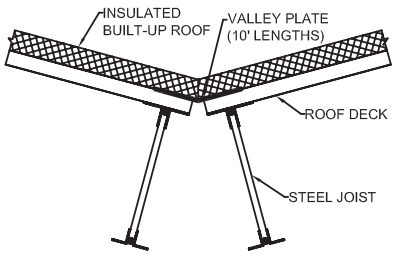
Roof Deck

	FM Span / Profile					
Gauge	1.5B, 1.5BI	1.5BA, 1.5 BIA	1.5F	1.5A	3N, 3NI	3NA, 3NIA
22	6' - 0"	5' - 9"	4' - 11"	4' - 0"	12' - 0"	12' - 7"
20	6' - 6"	6' - 4"	5' - 5"	5' - 3"	13' - 5"	13' - 11"
18	7' - 5"	7' - 3"	6' - 3"	6' - 0"	15' - 10"	16' - 1"
16	9' - 4"	7' - 11"	—	—	18' - 1"	18' - 3"

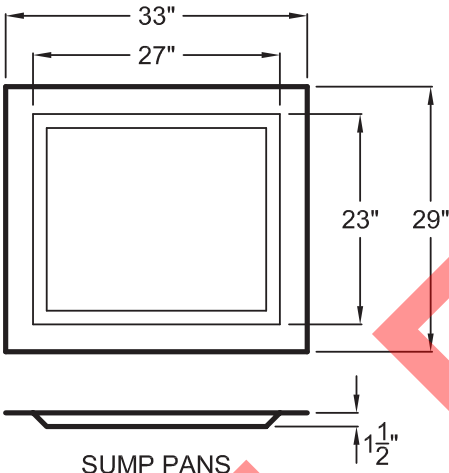
Cellular Deck

	FM Span / Profile	
Gauges	1.5BP, 1.5BPA	3NP, 3NPA
20/20	6' - 6"	13' - 5"
20/18	6' - 6"	13' - 5"
18/20	7' - 5"	15' - 10"
18/18	7' - 5"	15' - 10"
18/16	7' - 5"	15' - 10"
16/18	9' - 4"	18' - 1"
16/16	9' - 4"	18' - 1"

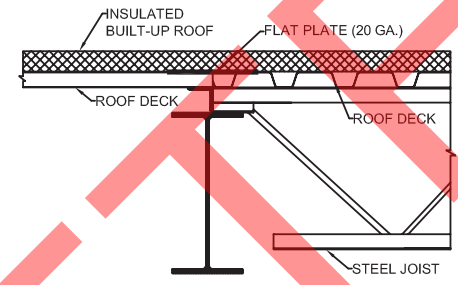
ACCESSORIES



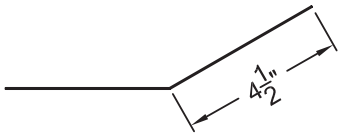
VALLEY DETAIL



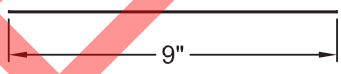
SUMP PANS
14 GA.
GALVANIZED ONLY



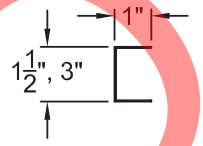
DETAIL WHERE DECK
CHANGES DIRECTION



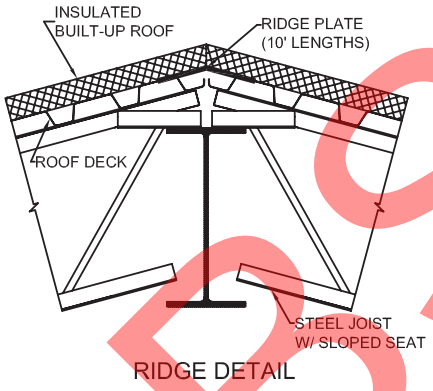
RIDGE OR VALLEY PLATE (20 GA.)
10'-0" LENGTHS
GALVANIZED ONLY



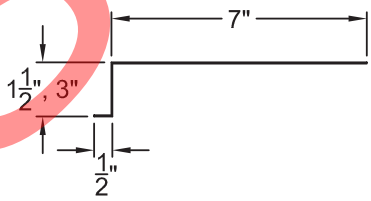
FLAT PLATE (20 GA.)
10'-0" LENGTHS
GALVANIZED ONLY



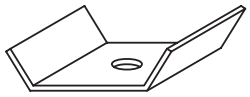
INSIDE OR OUTSIDE CLOSURE (20 GA.)
10'-0" LENGTHS
GALVANIZED ONLY



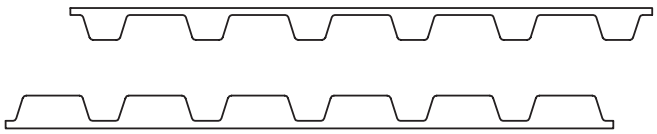
RIDGE DETAIL



FILLER SHEET (20 GA.)
10'-0" LENGTHS
GALVANIZED ONLY



WELDING WASHER
(16 GA.)
3/8" HOLE



RUBBER CLOSURES
TOP & UNDERSIDE

CONFORM (TYPE "C")

INDIVIDUAL DECK TABLES

"MAXIMUM CONSTRUCTION CLEAR SPANS"

These tables list the maximum construction clear span based on the S.D.I. criteria as is outlined on page 41.

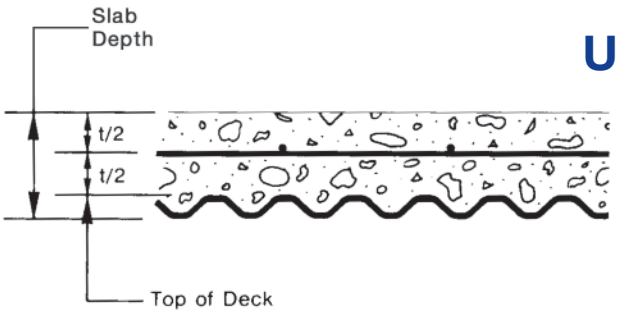
"REINFORCED CONCRETE SLAB ALLOWABLE LOADS"

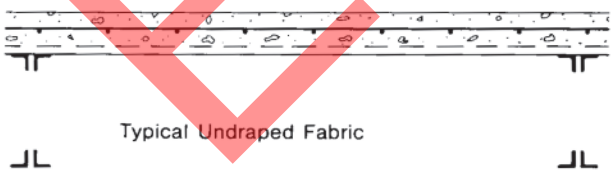
This table shows the load carrying capacity the concrete slab will develop when it is reinforced with welded wire fabric (mesh). For the loads shown in light print, the live loads were calculated with the mesh halfway between the top of the slab and the top of the deck. This is considered "undraped". The loads shown in bold print were calculated using the mesh near the top of the slab as negative reinforcement at the supports and near the bottom of the slab as positive reinforcement between supports. This is called "draped". See illustration below.

"ALLOWABLE UNIFORM LOADS"

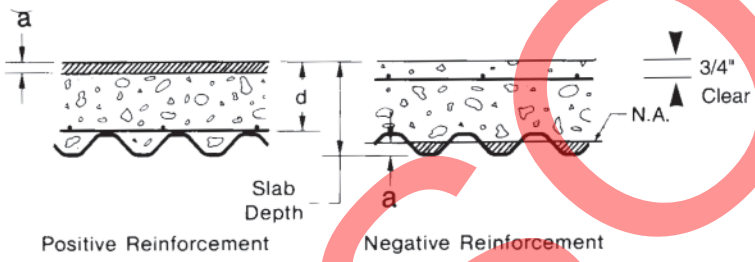
These tables list the uniform allowable load the deck alone will carry. Designers will want to use one of the three categories of load carrying capacities depending on the application.

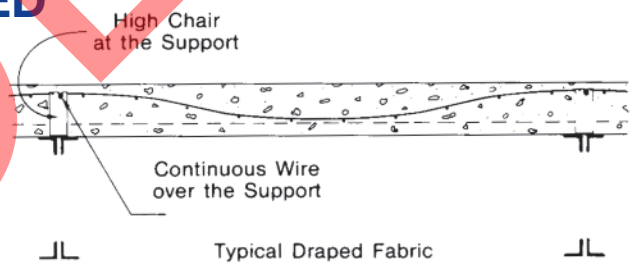
UNDRAPED





DRAPED





DESIGN NOTES FOR REINFORCED CONCRETE SLABS

1. Slabs that are temporarily shored must have the slab weight deducted from the allowable live load regardless of the type of finish.
2. Finish—Vulcraft painted floor decks can be considered as a permanent form for use in normal building environments. It's structural life would be similar to that of painted roof deck. In high moisture atmospheres, a galvanized finish is recommended. Uncoated decks are not considered permanent and the weight of the slab should be deducted from the slab allowable load.
3. Allowable Slab Loads—These tables are based on a three span condition using a moment coefficient of 1/12 as allowed by A.C.I. 318-05 (Sec. 8.3.3) for spans 10 feet or less. A moment coefficient of 1/10 per A.C.I. 318-05 (Sec. 8.3.3) was used for spans over 10 foot. For a two span condition this coefficient should be increased to 1/9 per A.C.I. 318-05 (Sec. 8.3.3) and for one span to 1/8. Other conditions may require further analysis.

f'_c = 3,000 psi	E = 29,500,000 psi	b = 12 in	+ M = 1/16W L^2	+ M_c = T (d-a/2)/12
f_y = 60,000 psi	ϕ = 0.90	p = A_s/bd	- M = 1/12W L^2 (L≤10 ft.)	- M_c = T (d-na)/12
	T = $A_s f_y$	a = T/0.85 f'_cb	- M = 1/10W L^2 (L>10 ft.)	M_L = ϕM_c/1.7

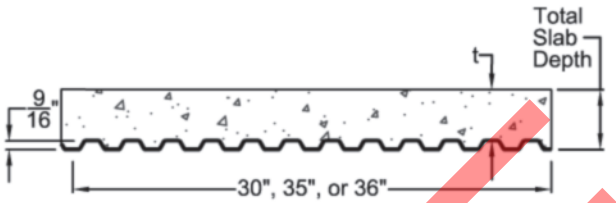
4. Yield stress of material is 60,000 psi.

SLOT VENTS Length ≈ 5/8"
(Type 0.6CSV, 1.0CSV, & 1.3CSV)

.6C, 1.0C & 1.3C do not include slot vents in the bottom flute. Check with plant for availability of sidelap vents.

0.6CSV, 1.0CSV & 1.3CSV are the types of deck that should be specified if slot vents in the bottom flute are required. Check with plant for availability of deck types.

0.6 C, CSV CONFORM



MAXIMUM CONSTRUCTION CLEAR SPANS (S.D.I. CRITERIA)

Total Slab Depth	DECK	WEIGHT PSF	NW CONCRETE N=9 145 PCF 1 SPAN	NW CONCRETE N=9 145 PCF 2 SPAN	NW CONCRETE N=9 145 PCF 3 SPAN	WEIGHT PSF	LW CONCRETE N=14 110 PCF 1 SPAN	LW CONCRETE N=14 110 PCF 2 SPAN	LW CONCRETE N=14 110 PCF 3 SPAN
	0.6C28	23	2- 3	2- 10	2- 11	17	2- 4	2- 11	3- 0
2	0.6C26	23	2- 8	3- 5	3- 5	18	2- 9	3- 6	3- 7
(t=1.50)	0.6C24	23	3- 4	4- 3	4- 4	18	3- 6	4- 6	4- 6
	0.6C22	23	3- 10	5- 0	5- 1	18	4- 1	5- 3	5- 4
	0.6C28	29	2- 2	2- 9	2- 9	22	2- 3	2- 10	2- 11
2.5	0.6C26	29	2- 6	3- 3	3- 4	22	2- 8	3- 5	3- 6
(t=2.00)	0.6C24	29	3- 2	4- 1	4- 2	22	3- 4	4- 4	4- 4
	0.6C22	29	3- 8	4- 9	4- 10	23	3- 11	5- 1	5- 1
	0.6C28	35	2- 1	2- 8	2- 8	27	2- 2	2- 9	2- 10
3	0.6C26	35	2- 5	3- 2	3- 2	27	2- 7	3- 4	3- 4
(t=2.50)	0.6C24	35	3- 0	3- 11	3- 11	27	3- 2	4- 2	4- 2
	0.6C22	36	3- 6	4- 7	4- 7	27	3- 9	4- 10	4- 11
	0.6C28	41	2- 0	2- 7	2- 7	31	2- 1	2- 9	2- 9
3.5	0.6C26	41	2- 4	3- 0	3- 1	31	2- 6	3- 3	3- 3
(t=3.00)	0.6C24	41	2- 10	3- 9	3- 10	32	3- 1	4- 0	4- 1
	0.6C22	42	3- 4	4- 5	4- 5	32	3- 7	4- 8	4- 9
	0.6C28	47	1- 11	2- 6	2- 6	36	2- 1	2- 8	2- 8
4	0.6C26	47	2- 3	2- 11	3- 0	36	2- 5	3- 1	3- 2
(t=3.50)	0.6C24	47	2- 9	3- 8	3- 8	36	3- 0	3- 11	3- 11
	0.6C22	48	3- 2	4- 3	4- 3	36	3- 5	4- 6	4- 7
	0.6C28	53	1- 10	2- 5	2- 6	40	2- 0	2- 7	2- 7
4.5	0.6C26	53	2- 2	2- 10	2- 11	40	2- 4	3- 1	3- 1
(t=4.00)	0.6C24	53	2- 8	3- 6	3- 7	41	2- 11	3- 9	3- 10
	0.6C22	54	3- 1	4- 1	4- 1	41	3- 4	4- 5	4- 5
	0.6C28	59	1- 10	2- 5	2- 5	45	1- 11	2- 6	2- 7
5	0.6C26	59	2- 1	2- 9	2- 10	45	2- 3	3- 0	3- 0
(t=4.50)	0.6C24	59	2- 7	3- 5	3- 6	45	2- 10	3- 8	3- 9
	0.6C22	60	3- 0	3- 11	4- 0	46	3- 3	4- 3	4- 4

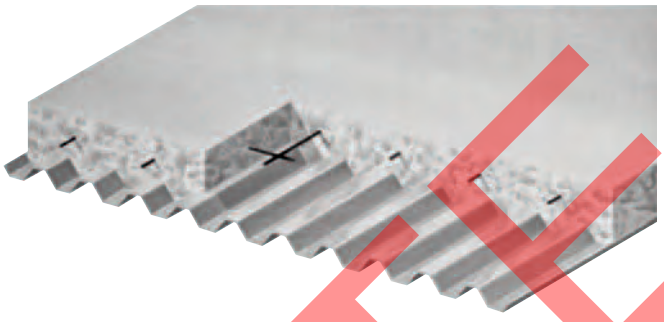
REINFORCED CONCRETE SLAB ALLOWABLE LOADS

Slab Depth	REINFORCEMENT W.W.F.	REINFORCEMENT As	Superimposed Uniform Load (psf) -- 3 Span Condition Clear Span (ft.-in.) 2- 0	2- 3	2- 6	2- 9	3- 0	3- 3	3- 6	3- 9	4- 0	4- 6	5- 0
	6X6-W1.4XW1.4	0.028*	194	153	124	103	86	74	63				
2	6X6-W2.1XW2.1	0.042	285	225	183	151	127	108	93				
(t=1.50)	6X6-W2.9XW2.9	0.058	384	304	246	203	171	146	125				
	6X6-W1.4XW1.4	0.028*	268	212	172	142	119	102	88	76	67	53	
2.5	6X6-W2.1XW2.1	0.042	396	313	254	210	176	150	129	113	99	78	
(t=2.00)	6X6-W2.9XW2.9	0.058	400	400	344	284	239	204	176	153	134	106	
	6X6-W1.4XW1.4	0.028*	342	271	219	181	152	130	112	97	86		
3	6X6-W2.1XW2.1	0.042*	400	400	325	268	226	192	166	144	127		
(t=2.50)	6X6-W2.9XW2.9	0.058	400	400	400	366	307	262	226	197	173		
	6X6-W2.1XW2.1	0.042*	400	400	396	327	275	234	202	176	155		
3.5	6X6-W2.9XW2.9	0.058*	400	400	400	400	375	320	276	240	211		
(t=3.00)	4X4-W2.9XW2.9	0.087	400	400	400	400	400	400	400	353	310		
	6X6-W2.1XW2.1	0.042*	400	400	400	384	322	275	237	206	181		
4	6X6-W2.9XW2.9	0.058*	400	400	400	400	400	372	321	280	246		
(t=3.50)	4X4-W2.9XW2.9	0.087	400	400	400	400	400	400	400	400	358		
	6X6-W2.9XW2.9	0.058*	400	400	400	400	400	400	359	313	275		
4.5	4X4-W2.9XW2.9	0.087	400	400	400	400	400	400	400	400	400		
(t=4.00)	4X4-W4.0XW4.0	0.120	400	400	400	400	400	400	400	400	400		
	6X6-W2.9XW2.9	0.058*	400	400	400	400	400	400	396	345	303		
5	4X4-W2.9XW2.9	0.087*	400	400	400	400	400	400	400	400	400		
(t=4.50)	4X4-W4.0XW4.0	0.120	400	400	400	400	400	400	400	400	400		

NOTES:
1. * As does not meet A.C.I. criterion for temperature and shrinkage.
2. Superimposed loads are based upon three span conditions and A.C.I. moment coefficients.
3. Load values for single span and double spans are to be reduced.
4. Vulcraft's painted or galvanized form deck can be considered as permanent support in most building applications. See page 23.
   If uncoated form deck is used, deduct the weight of the slab from the allowable superimposed uniform loads.

SLAB INFORMATION

Total Slab Depth, in.	Theo. Concrete Volume		Recommended Welded Wire Fabric
	Yd^3 / 100 ft^2	ft^3 / ft^2	
2	0.52	0.142	6x6 - W1.4xW1.4
2 1/2	0.68	0.183	6x6 - W1.4xW1.4
3	0.83	0.225	6x6 - W1.4xW1.4
3 1/4	0.91	0.246	6x6 - W1.4xW1.4
3 1/2	0.99	0.267	6x6 - W2.1xW2.1
4	1.14	0.308	6x6 - W2.1xW2.1
4 1/4	1.22	0.329	6x6 - W2.1xW2.1
4 1/2	1.30	0.350	6x6 - W2.1xW2.1



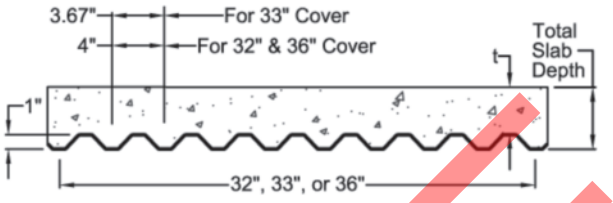
SECTION PROPERTIES

Deck Type	Design Thickness in.	Deck Weight psf	Section Properties I_p in^4/ft	I_n in^4/ft	S_p in^3/ft	S_n in^3/ft	V_a lbs/ft	F_y ksi
0.6C28	0.0149	0.76	0.012	0.012	0.035	0.036	2029	60
0.6C26	0.0179	0.91	0.015	0.015	0.043	0.043	2928	60
0.6C24	0.0239	1.21	0.019	0.019	0.057	0.057	4064	60
0.6C22	0.0295	1.49	0.024	0.024	0.070	0.070	5048	60

ALLOWABLE UNIFORM LOAD (PSF)

TYPE NO.	NO. OF SPANS	DESIGN CRITERIA	CLEAR SPAN (ft-in) 2- 0	2- 3	2- 6	2- 9	3- 0	3- 3	3- 6	3- 9	4- 0	4- 6	5- 0	5- 6	6- 0
0.6C28	1	Fb = 36,000	210	166	134	111	93	79	68	60	52	41	34	28	23
		Defl. = l/240	98	69	50	38	29	23	18	15	12	9	6	5	4
		Defl. = l/180	131	92	67	51	39	31	25	20	16	12	8	6	5
	2	Fb = 36,000	214	169	137	113	95	81	70	61	54	43	34	28	24
		Defl. = l/240	237	167	121	91	70	55	44	36	30	21	15	11	9
		Defl. = l/180	316	222	162	122	94	74	59	48	40	28	20	15	12
	3	Fb = 36,000	266	211	171	142	119	102	88	76	67	53	43	36	30
		Defl. = l/240	186	130	95	71	55	43	35	28	23	16	12	9	7
		Defl. = l/180	247	174	127	95	73	58	46	38	31	22	16	12	9
0.6C26	1	Fb = 36,000	257	203	165	136	114	98	84	73	64	51	41	34	29
		Defl. = l/240	123	86	63	47	36	29	23	19	15	11	8	6	5
		Defl. = l/180	164	115	84	63	49	38	31	25	21	14	11	8	6
	2	Fb = 36,000	256	202	164	136	114	97	84	73	64	51	41	34	29
		Defl. = l/240	296	208	152	114	88	69	55	45	37	26	19	14	11
		Defl. = l/180	395	278	202	152	117	92	74	60	49	35	25	19	15
	3	Fb = 36,000	319	253	205	169	142	121	105	91	80	63	51	43	36
		Defl. = l/240	232	163	119	89	69	54	43	35	29	20	15	11	9
		Defl. = l/180	309	217	158	119	92	72	58	47	39	27	20	15	11
0.6C24	1	Fb = 36,000	341	270	218	181	152	129	111	97	85	67	55	45	38
		Defl. = l/240	156	110	80	60	46	36	29	24	19	14	10	7	6
		Defl. = l/180	208	146	106	80	62	48	39	32	26	18	13	10	8
	2	Fb = 36,000	339	269	218	180	151	129	111	97	85	67	55	45	38
		Defl. = l/240	375	264	192	144	111	87	70	57	47	33	24	18	14
		Defl. = l/180	501	352	256	193	148	117	93	76	63	44	32	24	19
	3	Fb = 36,000	423	335	272	225	189	161	139	121	106	84	68	56	47
		Defl. = l/240	294	206	150	113	87	68	55	45	37	26	19	14	11
		Defl. = l/180	392	275	201	151	116	91	73	59	49	34	25	19	15
0.6C22	1	Fb = 36,000	419	331	268	222	186	159	137	119	105	83	67	55	47
		Defl. = l/240	197	138	101	76	58	46	37	30	25	17	13	9	7
		Defl. = l/180	263	184	134	101	78	61	49	40	33	23	17	13	10
	2	Fb = 36,000	417	330	267	221	186	158	137	119	105	83	67	55	47
		Defl. = l/240	474	333	243	182	141	111	88	72	59	42	30	23	18
		Defl. = l/180	632	444	324	243	187	147	118	96	79	56	40	30	23
	3	Fb = 36,000	520	411	334	276	232	198	171	149	131	103	84	69	58
		Defl. = l/240	371	261	190	143	110	86	69	56	46	33	24	18	14
		Defl. = l/180	495	348	253	190	147	115	92	75	62	43	32	24	18

1.0 C, CSV CONFORM



NON-COMPOSITE

MAXIMUM CONSTRUCTION CLEAR SPANS (S.D.I. CRITERIA)

Total Slab Depth	DECK	WEIGHT PSF	NW CONCRETE N=9 145 PCF 1 SPAN	2 SPAN	3 SPAN	WEIGHT PSF	LW CONCRETE N=14 110 PCF 1 SPAN	2 SPAN	3 SPAN
	1.0C26	25	3- 8	4- 10	4- 10	19	3- 11	5- 1	5- 1
2.5	1.0C24	25	4- 11	6- 5	6- 6	19	5- 3	6- 10	6- 11
(t=1.50)	1.0C22	25	6- 0	7- 10	7- 10	20	6- 5	8- 0	8- 3
	1.0C20	26	6- 8	8- 3	8- 3	20	7- 3	8- 11	9- 0
	1.0C26	31	3- 6	4- 7	4- 7	24	3- 9	4- 10	4- 11
3	1.0C24	31	4- 7	6- 1	6- 1	24	4- 11	6- 6	6- 7
(t=2.00)	1.0C22	31	5- 7	7- 3	7- 3	24	6- 1	7- 11	7- 11
	1.0C20	32	6- 3	7- 8	7- 8	25	6- 10	8- 5	8- 5
	1.0C26	37	3- 4	4- 4	4- 5	28	3- 7	4- 8	4- 9
3.5	1.0C24	37	4- 4	5- 9	5- 10	29	4- 9	6- 2	6- 3
(t=2.50)	1.0C22	37	5- 3	6- 10	6- 10	29	5- 9	7- 6	7- 6
	1.0C20	38	5- 11	7- 3	7- 3	29	6- 5	7- 11	7- 11
	1.0C26	43	3- 2	4- 2	4- 3	33	3- 5	4- 6	4- 7
4	1.0C24	43	4- 2	5- 6	5- 7	33	4- 6	5- 11	6- 0
(t=3.00)	1.0C22	43	5- 0	6- 6	6- 6	33	5- 6	7- 1	7- 1
	1.0C20	44	5- 7	6- 11	6- 11	34	6- 1	7- 7	7- 7
	1.0C26	49	3- 1	4- 1	4- 1	37	3- 4	4- 4	4- 5
4.5	1.0C24	49	4- 0	5- 4	5- 4	38	4- 4	5- 9	5- 10
(t=3.50)	1.0C22	50	4- 9	6- 3	6- 3	38	5- 3	6- 10	6- 10
	1.0C20	50	5- 4	6- 8	6- 8	38	5- 10	7- 3	7- 3
	1.0C26	55	2- 11	3- 11	4- 0	42	3- 2	4- 3	4- 3
5	1.0C24	55	3- 10	5- 1	5- 2	42	4- 2	5- 7	5- 7
(t=4.00)	1.0C22	56	4- 7	6- 0	6- 0	43	5- 0	6- 7	6- 7
	1.0C20	56	5- 2	6- 5	6- 5	43	5- 8	7- 0	7- 0
	1.0C26	61	2- 10	3- 10	3- 10	47	3- 1	4- 1	4- 2
5.5	1.0C24	61	3- 8	4- 11	5- 0	47	4- 0	5- 5	5- 5
(t=4.50)	1.0C22	62	4- 5	5- 10	5- 10	47	4- 10	6- 4	6- 4
	1.0C20	62	5- 0	6- 2	6- 2	47	5- 5	6- 9	6- 9

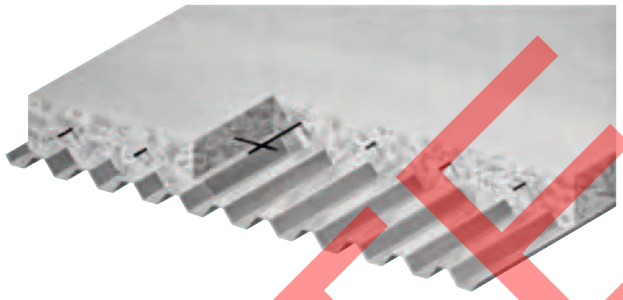
REINFORCED CONCRETE SLAB ALLOWABLE LOADS

Slab Depth	REINFORCEMENT W.W.F.	As	Superimposed Uniform Load (psf) -- 3 Span Condition Clear Span (ft.-in.) 3- 0	3- 3	3- 6	3- 9	4- 0	4- 6	5- 0	5- 6	6- 0	6- 6	7- 0
	6X6-W1.4XW1.4	0.028*	95	81	70								
2.5	6X6-W2.1XW2.1	0.042	140	119	103								
(t=1.50)	6X6-W2.9XW2.9	0.058	189	161	139								
	6X6-W1.4XW1.4	0.028*	128	109	94	82	72	57					
3	6X6-W2.1XW2.1	0.042	190	161	139	121	107	84					
(t=2.00)	6X6-W2.9XW2.9	0.058	257	219	189	165	145	114					
	6X6-W2.1XW2.1	0.042*	239	204	176	153	134	106	86	71			
3.5	6X6-W2.9XW2.9	0.058	326	277	239	208	183	145	117	97			
(t=2.50)	4X4-W2.9XW2.9	0.087	400	400	350	305	268	212	172	142			
	6X6-W2.1XW2.1	0.042*	288	246	212	185	162	128	**153**	**126**	**106**	**91**	
4	6X6-W2.9XW2.9	0.058*	394	336	289	252	222	175	**205**	**169**	**142**	**121**	
(t=3.00)	4X4-W2.9XW2.9	0.087	400	400	400	371	326	257	**298**	**247**	**207**	**177**	
	6X6-W2.1XW2.1	0.042*	338	288	248	216	190	150	**180**	**148**	**125**	**106**	
4.5	6X6-W2.9XW2.9	0.058*	400	394	340	296	260	205	**241**	**199**	**168**	**143**	
(t=3.50)	4X4-W2.9XW2.9	0.087	400	400	400	400	383	303	**354**	**292**	**246**	**209**	
	6X6-W2.9XW2.9	0.058*	400	400	390	339	298	236	**278**	**230**	**193**		
5	4X4-W2.9XW2.9	0.087	400	400	400	400	400	348	**400**	**338**	**284**		
(t=4.00)	4X4-W4.0XW4.0	0.120	400	400	400	400	400	400	**400**	**400**	**378**		
	6X6-W2.9XW2.9	0.058*	400	400	400	383	337	266	**315**	**260**	**219**		
5.5	4X4-W2.9XW2.9	0.087	400	400	400	400	400	394	**400**	**384**	**322**		
(t=4.50)	4X4-W4.0XW4.0	0.120	400	400	400	400	400	400	**400**	**400**	**400**		

NOTES:
1. * As does not meet A.C.I. criterion for temperature and shrinkage.
2. Superimposed loads are based upon three span conditions and A.C.I. moment coefficients.
3. Load values for single span and double spans are to be reduced.
4. Vulcraft's painted or galvanized form deck can be considered as permanent support in most building applications. See page 23.
   If uncoated form deck is used, deduct the weight of the slab from the allowable superimposed uniform loads.
5. Superimposed load values shown in bold type require that mesh be draped. See page 23.

SLAB INFORMATION

Total Slab Depth, in.	Theo. Concrete Volume		Recommended Welded Wire Fabric
	Yd^3 / 100 ft^2	ft^3 / ft^2	
2 1/2	0.62	0.167	6x6 - W1.4xW1.4
3	0.77	0.208	6x6 - W1.4xW1.4
3 1/2	0.93	0.250	6x6 - W1.4xW1.4
3 3/4	1.00	0.271	6x6 - W1.4xW1.4
4	1.08	0.292	6x6 - W2.1xW2.1
4 1/2	1.23	0.333	6x6 - W2.1xW2.1
4 3/4	1.31	0.354	6x6 - W2.1xW2.1
5	1.39	0.375	6x6 - W2.1xW2.1



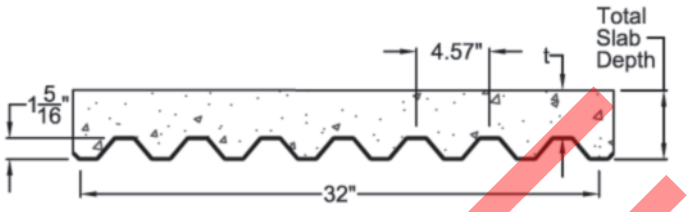
SECTION PROPERTIES

Deck Type	Design Thickness in.	Deck Weight psf	Section Properties I_p in^4/ft	I_n in^4/ft	S_p in^3/ft	S_n in^3/ft	V_a lbs/ft	F_y ksi
1.0C26	0.0179	0.96	0.040	0.042	0.067	0.071	2216	60
1.0C24	0.0239	1.28	0.057	0.059	0.098	0.103	3867	60
1.0C22	0.0295	1.57	0.073	0.073	0.130	0.134	4803	60
1.0C20	0.0358	1.91	0.088	0.088	0.167	0.165	5744	60

ALLOWABLE UNIFORM LOAD (PSF)

TYPE NO.	NO. OF SPANS	DESIGN CRITERIA	CLEAR SPAN (ft-in) 3- 0	3- 3	3- 6	3- 9	4- 0	4- 6	5- 0	5- 6	6- 0	6- 6	7- 0	7- 6	8- 0
1.0C26	1	Fb = 36,000	178	152	131	114	100	79	64	53	45	38	33	29	25
		Defl. = l/240	97	77	61	50	41	29	21	16	12	10	8	6	5
		Defl. = l/180	130	102	82	66	55	38	28	21	16	13	10	8	7
	2	Fb = 36,000	187	159	138	120	106	84	68	56	47	40	35	30	27
		Defl. = l/240	240	189	151	123	101	71	52	39	30	24	19	15	13
		Defl. = l/180	320	252	202	164	135	95	69	52	40	31	25	20	17
	3	Fb = 36,000	232	198	171	149	132	104	84	70	59	50	43	38	33
		Defl. = l/240	188	148	118	96	79	56	41	30	23	18	15	12	10
		Defl. = l/180	250	197	158	128	106	74	54	41	31	25	20	16	13
1.0C24	1	Fb = 36,000	261	222	192	167	147	116	94	78	65	56	48	42	37
		Defl. = l/240	139	109	87	71	58	41	30	22	17	14	11	9	7
		Defl. = l/180	185	145	116	95	78	55	40	30	23	18	15	12	10
	2	Fb = 36,000	272	232	200	174	153	121	98	81	68	58	50	44	39
		Defl. = l/240	340	267	214	174	143	101	73	55	42	33	27	22	18
		Defl. = l/180	453	356	285	232	191	134	98	73	57	45	36	29	24
	3	Fb = 36,000	338	289	249	218	191	151	123	102	85	73	63	55	48
		Defl. = l/240	266	209	167	136	112	79	57	43	33	26	21	17	14
		Defl. = l/180	354	279	223	181	149	105	77	58	44	35	28	23	19
1.0C22	1	Fb = 36,000	346	295	254	221	195	154	125	103	86	74	64	55	49
		Defl. = l/240	178	140	112	91	75	53	38	29	22	17	14	11	9
		Defl. = l/180	237	186	149	121	100	70	51	38	30	23	19	15	12
	2	Fb = 36,000	353	301	260	227	200	158	128	106	89	76	65	57	50
		Defl. = l/240	427	336	269	219	180	127	92	69	53	42	34	27	23
		Defl. = l/180	570	448	359	292	240	169	123	92	71	56	45	36	30
	3	Fb = 36,000	440	375	324	283	249	197	160	132	111	95	82	71	63
		Defl. = l/240	334	263	211	171	141	99	72	54	42	33	26	21	18
		Defl. = l/180	446	351	281	228	188	132	96	72	56	44	35	29	24
1.0C20	1	Fb = 36,000	444	379	327	284	250	198	160	132	111	95	82	71	63
		Defl. = l/240	214	168	135	110	90	63	46	35	27	21	17	14	11
		Defl. = l/180	285	224	180	146	120	85	62	46	36	28	22	18	15
	2	Fb = 36,000	435	371	320	279	246	194	158	130	109	93	81	70	62
		Defl. = l/240	515	405	324	264	217	153	111	84	64	51	41	33	27
		Defl. = l/180	687	540	433	352	290	204	148	111	86	68	54	44	36
	3	Fb = 36,000	541	462	399	348	306	242	197	163	137	117	101	88	77
		Defl. = l/240	403	317	254	206	170	119	87	65	50	40	32	26	21
		Defl. = l/180	538	423	339	275	227	159	116	87	67	53	42	34	28

1.3 C, CSV CONFORM



MAXIMUM CONSTRUCTION CLEAR SPANS (S.D.I. CRITERIA)

Total Slab Depth	DECK	WEIGHT PSF	NW CONCRETE N=9 145 PCF 1 SPAN	2 SPAN	3 SPAN	WEIGHT PSF	LW CONCRETE N=14 110 PCF 1 SPAN	2 SPAN	3 SPAN
	1.3C26	33	4- 6	5- 11	6- 0	25	4- 10	6- 4	6- 5
3.3	1.3C24	34	5- 6	7- 4	7- 5	26	6- 0	7- 11	8- 0
(t=2.00)	1.3C22	34	6- 4	8- 3	8- 3	26	6- 11	8- 10	9- 0
	1.3C20	34	7- 1	8- 9	8- 9	26	7- 9	9- 7	9- 7
	1.3C26	39	4- 3	5- 7	5- 8	30	4- 7	6- 1	6- 2
3.8	1.3C24	40	5- 3	6- 11	7- 0	30	5- 8	7- 7	7- 8
(t=2.50)	1.3C22	40	6- 0	7- 10	7- 10	31	6- 7	8- 6	8- 6
	1.3C20	40	6- 9	8- 4	8- 4	31	7- 4	9- 1	9- 1
	1.3C26	45	4- 1	5- 5	5- 5	35	4- 5	5- 10	5- 11
4.3	1.3C24	46	5- 0	6- 8	6- 9	35	5- 5	7- 3	7- 4
(t=3.00)	1.3C22	46	5- 8	7- 5	7- 5	35	6- 3	8- 2	8- 2
	1.3C20	46	6- 5	7- 11	7- 11	36	7- 0	8- 8	8- 8
	1.3C26	51	3- 11	5- 2	5- 3	39	4- 3	5- 8	5- 8
4.8	1.3C24	52	4- 9	6- 4	6- 5	40	5- 3	6- 11	7- 0
(t=3.50)	1.3C22	52	5- 5	7- 2	7- 2	40	6- 0	7- 10	7- 10
	1.3C20	52	6- 1	7- 7	7- 7	40	6- 9	8- 4	8- 4
	1.3C26	57	3- 9	5- 0	5- 1	44	4- 1	5- 5	5- 6
5.3	1.3C24	58	4- 7	6- 2	6- 2	44	5- 0	6- 9	6- 10
(t=4.00)	1.3C22	58	5- 3	6- 11	6- 11	44	5- 9	7- 6	7- 6
	1.3C20	58	5- 10	7- 4	7- 4	45	6- 6	8- 0	8- 0
	1.3C26	63	3- 8	4- 9	4- 11	48	4- 0	5- 3	5- 4
5.8	1.3C24	64	4- 5	5- 11	6- 0	49	4- 10	6- 6	6- 7
(t=4.50)	1.3C22	64	5- 1	6- 8	6- 8	49	5- 7	7- 3	7- 3
	1.3C20	64	5- 8	7- 1	7- 1	49	6- 3	7- 9	7- 9
	1.3C26	69	3- 7	4- 5	4- 9	53	3- 10	5- 2	5- 2
6.3	1.3C24	70	4- 4	5- 9	5- 10	53	4- 8	6- 4	6- 5
(t=5.00)	1.3C22	70	4- 11	6- 6	6- 6	54	5- 4	7- 1	7- 1
	1.3C20	70	5- 6	6- 11	6- 11	54	6- 0	7- 6	7- 6

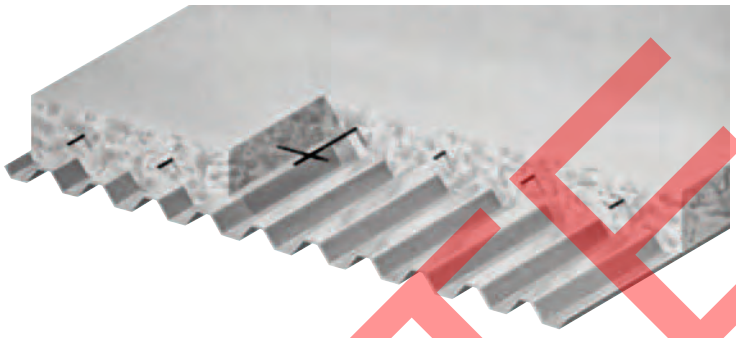
REINFORCED CONCRETE SLAB ALLOWABLE LOADS

Slab Depth	REINFORCEMENT W.W.F.	As	Superimposed Uniform Load (psf) -- 3 Span Condition Clear Span (ft.-in.) 4- 0	4- 6	5- 0	5- 6	6- 0	6- 6	7- 0	7- 6	8- 0	8- 6	9- 0
	6X6-W1.4XW1.4	0.028*	71	56									
3.3	6X6-W2.1XW2.1	0.042	105	83									
(t=2.00)	6X6-W2.9XW2.9	0.058	142	113									
	6X6-W2.1XW2.1	0.042*	133	105	85	70							
3.8	6X6-W2.9XW2.9	0.058	181	143	116	96							
(t=2.50)	4X4-W2.9XW2.9	0.087	265	209	169	140							
	6X6-W2.1XW2.1	0.042*	161	127	**156**	**129**	**108**	**92**	**79**				
4.3	6X6-W2.9XW2.9	0.058*	219	173	**209**	**173**	**145**	**124**	**107**				
(t=3.00)	4X4-W2.9XW2.9	0.087	322	255	**309**	**255**	**215**	**183**	**158**				
	6X6-W2.1XW2.1	0.042*	188	149	**191**	**158**	**133**	**113**	**98**	**85**			
4.8	6X6-W2.9XW2.9	0.058*	258	204	**258**	**213**	**179**	**153**	**132**	**115**			
(t=3.50)	4X4-W2.9XW2.9	0.087	380	300	**383**	**316**	**266**	**226**	**195**	**170**			
	6X6-W2.9XW2.9	0.058*	296	234	**299**	**247**	**208**	**177**	**153**				
5.3	4X4-W2.9XW2.9	0.087	400	346	**400**	**364**	**306**	**260**	**225**				
(t=4.00)	4X4-W4.0XW4.0	0.120	400	400	**400**	**400**	**400**	**347**	**299**				
	6X6-W2.9XW2.9	0.058*	334	264	**336**	**278**	**233**	**199**	**172**				
5.8	4X4-W2.9XW2.9	0.087*	400	391	**400**	**400**	**344**	**293**	**253**				
(t=4.50)	4X4-W4.0XW4.0	0.120	400	400	**400**	**400**	**400**	**392**	**338**				
	6X6-W2.9XW2.9	0.058*	373	295	**373**	**308**	**259**	**221**					
6.3	4X4-W2.9XW2.9	0.087*	400	400	**400**	**400**	**382**	**326**					
(t=5.00)	4X4-W4.0XW4.0	0.120	400	400	**400**	**400**	**400**	**400**					

NOTES:
1. * As does not meet A.C.I. criterion for temperature and shrinkage.
2. Superimposed loads are based upon three span conditions and A.C.I. moment coefficients.
3. Load values for single span and double spans are to be reduced.
4. Vulcraft's painted or galvanized form deck can be considered as permanent support in most building applications. See page 23.
   If uncoated form deck is used, deduct the weight of the slab from the allowable superimposed uniform loads.
5. Superimposed load values shown in bold type require that mesh be draped. See page 23.

SLAB INFORMATION

Total Slab Depth, in.	Theo. Concrete Volume Yd^3 / 100 ft^2	Theo. Concrete Volume ft^3 / ft^2	Recommended Welded Wire Fabric
3.3	0.82	0.221	6x6 - W1.4xW1.4
3.8	0.97	0.263	6x6 - W1.4xW1.4
4.3	1.13	0.304	6x6 - W1.4xW1.4
4.55	1.20	0.325	6x6 - W1.4xW1.4
4.8	1.28	0.346	6x6 - W2.1xW2.1
5.3	1.44	0.388	6x6 - W2.1xW2.1
5.55	1.51	0.408	6x6 - W2.1xW2.1
5.8	1.59	0.429	6x6 - W2.1xW2.1



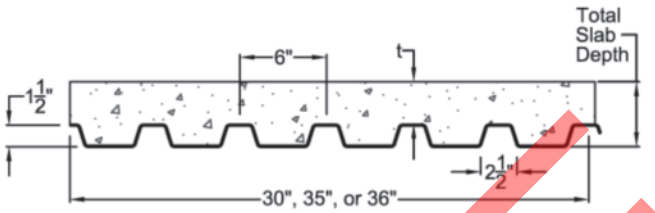
SECTION PROPERTIES

Deck Type	Design Thickness in.	Deck Weight psf	Section Properties I_p in^4/ft	Section Properties I_n in^4/ft	Section Properties S_p in^3/ft	Section Properties S_n in^3/ft	V_a lbs/ft	F_y ksi
1.3C26	0.0179	0.99	0.070	0.069	0.097	0.098	1940	60
1.3C24	0.0239	1.33	0.093	0.093	0.132	0.132	3458	60
1.3C22	0.0295	1.62	0.115	0.115	0.163	0.162	4789	60
1.3C20	0.0358	1.97	0.140	0.140	0.197	0.197	5727	60

ALLOWABLE UNIFORM LOAD (PSF)

TYPE NO.	NO. OF SPANS	DESIGN CRITERIA	CLEAR SPAN (ft-in) 4- 0	4- 6	5- 0	5- 6	6- 0	6- 6	7- 0	7- 6	8- 0	8- 6	9- 0	9- 6	10- 0
1.3C26	1	Fb = 36,000	145	115	93	77	65	55	47	41	36	32	29	26	23
		Defl. = l/240	72	50	37	28	21	17	13	11	9	7	6	5	5
		Defl. = l/180	96	67	49	37	28	22	18	15	12	10	8	7	6
	2	Fb = 36,000	144	114	93	77	65	55	48	42	37	32	29	26	23
		Defl. = l/240	172	121	88	66	51	40	32	26	21	18	15	13	11
		Defl. = l/180	229	161	117	88	68	53	43	35	29	24	20	17	15
	3	Fb = 36,000	179	142	115	96	81	69	59	52	46	40	36	32	29
		Defl. = l/240	134	94	69	52	40	31	25	20	17	14	12	10	9
		Defl. = l/180	179	126	92	69	53	42	33	27	22	19	16	13	11
1.3C24	1	Fb = 36,000	198	156	126	105	88	75	65	56	49	44	39	35	32
		Defl. = l/240	95	67	49	37	28	22	18	14	12	10	8	7	6
		Defl. = l/180	127	89	65	49	38	30	24	19	16	13	11	9	8
	2	Fb = 36,000	196	155	126	104	87	75	64	56	49	44	39	35	32
		Defl. = l/240	230	161	118	88	68	54	43	35	29	24	20	17	15
		Defl. = l/180	306	215	157	118	91	71	57	46	38	32	27	23	20
	3	Fb = 36,000	243	193	157	130	109	93	80	70	62	55	49	44	39
		Defl. = l/240	180	126	92	69	53	42	34	27	22	19	16	13	12
		Defl. = l/180	240	168	123	92	71	56	45	36	30	25	21	18	15
1.3C22	1	Fb = 36,000	244	193	156	129	108	92	80	69	61	54	48	43	39
		Defl. = l/240	118	83	60	45	35	27	22	18	15	12	10	9	8
		Defl. = l/180	157	110	81	61	47	37	29	24	20	16	14	12	10
	2	Fb = 36,000	241	190	154	128	107	92	79	69	61	54	48	43	39
		Defl. = l/240	284	199	145	109	84	66	53	43	36	30	25	21	18
		Defl. = l/180	379	266	194	146	112	88	71	57	47	39	33	28	24
	3	Fb = 36,000	300	237	193	159	134	114	99	86	76	67	60	54	48
		Defl. = l/240	222	156	114	86	66	52	41	34	28	23	20	17	14
		Defl. = l/180	296	208	152	114	88	69	55	45	37	31	26	22	19
1.3C20	1	Fb = 36,000	295	233	189	156	131	112	96	84	74	65	58	52	47
		Defl. = l/240	144	101	74	55	43	33	27	22	18	15	13	11	9
		Defl. = l/180	192	135	98	74	57	45	36	29	24	20	17	14	12
	2	Fb = 36,000	292	232	188	155	131	111	96	84	74	65	58	52	47
		Defl. = l/240	346	243	177	133	102	81	65	52	43	36	30	26	22
		Defl. = l/180	461	324	236	177	137	107	86	70	58	48	40	34	30
	3	Fb = 36,000	364	289	234	194	163	139	120	105	92	81	73	65	59
		Defl. = l/240	271	190	139	104	80	63	50	41	34	28	24	20	17
		Defl. = l/180	361	253	185	139	107	84	67	55	45	38	32	27	23

1.5 C CONFORM



NON-COMPOSITE

MAXIMUM CONSTRUCTION CLEAR SPANS (S.D.I. CRITERIA)

Total Slab Depth	DECK	WEIGHT PSF	NW CONCRETE N=9 145 PCF 1 SPAN	2 SPAN	3 SPAN	WEIGHT PSF	LW CONCRETE N=14 110 PCF 1 SPAN	2 SPAN	3 SPAN
	1.5C24	37	5- 4	7- 1	7- 2	28	5- 10	7- 7	7- 9
3.5	1.5C22	37	5- 9	7- 8	7- 9	29	6- 4	8- 2	8- 5
(t=2.00)	1.5C20	38	6- 10	8- 9	9- 1	29	7- 5	9- 5	9- 9
	1.5C18	38	8- 5	10- 3	10- 8	30	9- 3	11- 1	11- 6
	1.5C24	43	5- 1	6- 9	6- 10	33	5- 6	7- 4	7- 5
4	1.5C22	43	5- 6	7- 3	7- 5	33	6- 0	7- 11	8- 1
(t=2.50)	1.5C20	44	6- 5	8- 4	8- 8	34	7- 1	9- 1	9- 5
	1.5C18	44	7- 11	9- 9	10- 1	34	8- 9	10- 8	11- 0
	1.5C24	49	4- 10	6- 5	6- 7	38	5- 4	7- 1	7- 2
4.5	1.5C22	49	5- 3	6- 11	7- 1	38	5- 9	7- 7	7- 9
(t=3.00)	1.5C20	50	6- 2	8- 0	8- 3	38	6- 9	8- 9	9- 0
	1.5C18	51	7- 6	9- 4	9- 8	39	8- 4	10- 3	10- 7
	1.5C24	55	4- 8	6- 2	6- 4	42	5- 1	6- 9	6- 11
5	1.5C22	56	5- 0	6- 8	6- 10	43	5- 6	7- 4	7- 6
(t=3.50)	1.5C20	56	5- 10	7- 8	7- 11	43	6- 6	8- 5	8- 8
	1.5C18	57	7- 2	9- 0	9- 3	44	8- 0	9- 10	10- 2
	1.5C24	61	4- 6	5- 11	6- 1	47	4- 11	6- 7	6- 8
5.5	1.5C22	62	4- 10	6- 5	6- 7	47	5- 4	7- 1	7- 2
(t=4.00)	1.5C20	62	5- 8	7- 4	7- 7	47	6- 3	8- 1	8- 5
	1.5C18	63	6- 11	8- 8	8- 11	48	7- 8	9- 6	9- 10
	1.5C24	67	4- 4	5- 9	5- 11	51	4- 9	6- 4	6- 5
6	1.5C22	68	4- 8	6- 2	6- 4	52	5- 2	6- 10	7- 0
(t=4.50)	1.5C20	68	5- 6	7- 1	7- 4	52	6- 0	7- 10	8- 1
	1.5C18	69	6- 9	8- 4	8- 7	53	7- 5	9- 3	9- 6
	1.5C24	73	4- 3	5- 6	5- 8	56	4- 7	6- 2	6- 3
6.5	1.5C22	74	4- 7	6- 0	6- 2	56	5- 0	6- 8	6- 9
(t=5.00)	1.5C20	74	5- 4	6- 10	7- 1	57	5- 10	7- 7	7- 10
	1.5C18	75	6- 7	8- 1	8- 4	57	7- 2	8- 11	9- 3

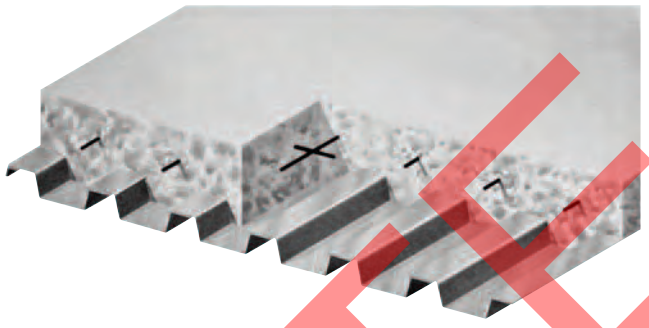
REINFORCED CONCRETE SLAB ALLOWABLE LOADS

Slab Depth	REINFORCEMENT W.W.F.	As	Superimposed Uniform Load (psf) -- 3 Span Condition Clear Span (ft.-in.) 4- 0	4- 6	5- 0	5- 6	6- 0	6- 6	7- 0	7- 6	8- 0	8- 6	9- 0
	6X6-W2.1XW2.1	0.042*	108	86									
3.5	6X6-W2.9XW2.9	0.058	147	116									
(t=2.00)	4X4-W2.9XW2.9	0.087	214	169									
	6X6-W2.1XW2.1	0.042*	136	108	87	72							
4	6X6-W2.9XW2.9	0.058	185	147	119	98							
(t=2.50)	4X4-W2.9XW2.9	0.087	272	215	174	144							
	6X6-W2.1XW2.1	0.042*	164	129	**160**	**132**	**111**	**95**	**82**				
4.5	6X6-W2.9XW2.9	0.058*	224	177	**215**	**177**	**149**	**127**	**110**				
(t=3.00)	4X4-W2.9XW2.9	0.087	329	260	**318**	**263**	**221**	**188**	**162**				
	6X6-W2.9XW2.9	0.058*	262	207	**264**	**218**	**183**	**156**	**135**	**117**			
5	4X4-W2.9XW2.9	0.087	387	306	**392**	**324**	**272**	**232**	**200**	**174**			
(t=3.50)	4X4-W4.0XW4.0	0.120	400	400	**400**	**400**	**363**	**310**	**267**	**233**			
	6X6-W2.9XW2.9	0.058*	301	238	**313**	**259**	**217**	**185**	**160**				
5.5	4X4-W2.9XW2.9	0.087	400	351	**400**	**385**	**323**	**275**	**237**				
(t=4.00)	4X4-W4.0XW4.0	0.120	400	400	**400**	**400**	**400**	**370**	**319**				
	6X6-W2.9XW2.9	0.058*	339	268	**358**	**296**	**249**	**212**	**183**				
6	4X4-W2.9XW2.9	0.087*	400	397	**400**	**400**	**370**	**315**	**272**				
(t=4.50)	4X4-W4.0XW4.0	0.120	400	400	**400**	**400**	**400**	**400**	**366**				
	4X4-W2.9XW2.9	0.087*	400	400	**400**	**400**	**400**	**348**					
6.5	4X4-W4.0XW4.0	0.120	400	400	**400**	**400**	**400**	**400**					
(t=5.00)	4X4-W5.0XW5.0	0.150	400	400	**400**	**400**	**400**	**400**					

NOTES:
1. * As does not meet A.C.I. criterion for temperature and shrinkage.
2. Superimposed loads are based upon three span conditions and A.C.I. moment coefficients.
3. Load values for single span and double spans are to be reduced.
4. Vulcraft's painted or galvanized form deck can be considered as permanent support in most building applications. See page 23.
   If uncoated form deck is used, deduct the weight of the slab from the allowable superimposed uniform loads.
5. Superimposed load values shown in bold type require that mesh be draped. See page 23.

SLAB INFORMATION

Total Slab Depth, in.	Theo. Concrete Volume		Recommended Welded Wire Fabric
	Yd^3 / 100 ft^2	ft^3 / ft^2	
3 1/2	0.92	0.247	6x6 - W1.4xW1.4
4	1.07	0.289	6x6 - W1.4xW1.4
4 1/2	1.22	0.331	6x6 - W1.4xW1.4
4 3/4	1.30	0.352	6x6 - W1.4xW1.4
5	1.38	0.372	6x6 - W2.1xW2.1
5 1/2	1.53	0.414	6x6 - W2.1xW2.1
5 3/4	1.61	0.435	6x6 - W2.1xW2.1
6	1.69	0.456	6x6 - W2.1xW2.1



SECTION PROPERTIES

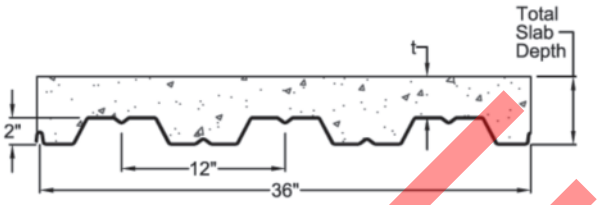
Deck Type	Design Thickness in.	Deck Weight psf	Section Properties				V_a lbs/ft	F_y ksi
			I_p in^4/ft	I_n in^4/ft	S_p in^3/ft	S_n in^3/ft		
1.5C24	0.0239	1.44	0.136	0.108	0.132	0.120	2634	60
1.5C22	0.0295	1.78	0.177	0.143	0.179	0.169	2754	50
1.5C20	0.0358	2.14	0.222	0.186	0.231	0.224	3322	50
1.5C18	0.0474	2.82	0.295	0.272	0.324	0.311	4350	50

ALLOWABLE UNIFORM LOAD (PSF)

TYPE NO.	NO. OF SPANS	DESIGN CRITERIA	CLEAR SPAN (ft-in)												
			4- 0	4- 6	5- 0	5- 6	6- 0	6- 6	7- 0	7- 6	8- 0	8- 6	9- 0	9- 6	10- 0
1.5C24	1	Fb = 36,000	198	156	126	105	88	75	65	56	49	44	39	35	32
		Defl. = l/240	140	98	71	54	41	33	26	21	17	15	12	10	9
		Defl. = l/180	186	131	95	72	55	43	35	28	23	19	16	14	12
	2	Fb = 36,000	177	140	114	94	79	68	58	51	45	40	35	32	29
		Defl. = l/240	301	212	154	116	89	70	56	46	38	31	26	22	19
		Defl. = l/180	402	282	206	155	119	94	75	61	50	42	35	30	26
	3	Fb = 36,000	220	175	142	117	99	84	73	63	56	49	44	40	36
		Defl. = l/240	236	166	121	91	70	55	44	36	29	25	21	18	15
		Defl. = l/180	314	221	161	121	93	73	59	48	39	33	28	23	20
1.5C22	1	Fb = 30,000	223	176	143	118	99	85	73	64	56	49	44	40	36
		Defl. = l/240	182	128	93	70	54	42	34	28	23	19	16	14	12
		Defl. = l/180	242	170	124	93	72	56	45	37	30	25	21	18	15
	2	Fb = 30,000	207	164	133	110	93	79	68	60	52	47	41	37	34
		Defl. = l/240	395	278	202	152	117	92	74	60	49	41	35	29	25
		Defl. = l/180	527	370	270	203	156	123	98	80	66	55	46	39	34
	3	Fb = 30,000	257	204	166	137	116	99	85	74	65	58	52	47	42
		Defl. = l/240	309	217	158	119	92	72	58	47	39	32	27	23	20
		Defl. = l/180	412	290	211	159	122	96	77	63	52	43	36	31	26
1.5C20	1	Fb = 30,000	288	228	184	152	128	109	94	82	72	64	57	51	46
		Defl. = l/240	228	160	117	88	67	53	42	35	28	24	20	17	15
		Defl. = l/180	304	213	155	117	90	71	57	46	38	32	27	23	19
	2	Fb = 30,000	273	217	176	146	123	105	91	79	69	62	55	49	45
		Defl. = l/240	504	354	258	194	149	117	94	76	63	53	44	38	32
		Defl. = l/180	672	472	344	258	199	157	125	102	84	70	59	50	43
	3	Fb = 30,000	339	269	219	182	153	131	113	98	87	77	69	62	56
		Defl. = l/240	394	277	202	152	117	92	74	60	49	41	35	29	25
		Defl. = l/180	526	369	269	202	156	123	98	80	66	55	46	39	34
1.5C18	1	Fb = 30,000	404	319	259	214	180	153	132	115	101	90	80	72	65
		Defl. = l/240	303	213	155	116	90	71	56	46	38	32	27	23	19
		Defl. = l/180	404	283	207	155	120	94	75	61	50	42	35	30	26
	2	Fb = 30,000	379	301	244	203	171	146	126	110	96	85	76	68	62
		Defl. = l/240	700	492	359	269	207	163	131	106	88	73	61	52	45
		Defl. = l/180	934	656	478	359	277	218	174	142	117	97	82	70	60
	3	Fb = 30,000	468	373	304	252	212	181	157	137	120	107	95	85	77
		Defl. = l/240	548	385	281	211	162	128	102	83	68	57	48	41	35
		Defl. = l/180	731	513	374	281	216	170	136	111	91	76	64	55	47

Minimum exterior bearing length is 1.5 inches.
Minimum exterior bearing length is 3.0 inches.

2 C CONFORM



Interlocking side lap is not drawn to show actual detail.

MAXIMUM CONSTRUCTION CLEAR SPANS (S.D.I. CRITERIA)

Total Slab Depth	DECK	WEIGHT PSF	NW CONCRETE N=9 145 PCF 1 SPAN	NW CONCRETE N=9 145 PCF 2 SPAN	NW CONCRETE N=9 145 PCF 3 SPAN	WEIGHT PSF	LW CONCRETE N=14 110 PCF 1 SPAN	LW CONCRETE N=14 110 PCF 2 SPAN	LW CONCRETE N=14 110 PCF 3 SPAN
	2C22	44	6- 11	9- 0	9- 4	34	7- 8	9- 10	10- 2
4.5	2C20	45	8- 2	10- 3	10- 7	34	9- 0	11- 3	11- 7
(t=2.50)	2C18	45	10- 2	12- 4	12- 4	35	11- 2	13- 1	13- 1
	2C16	46	10- 5	12- 6	12- 11	36	11- 7	13- 8	13- 10
	2C22	50	6- 7	8- 7	8- 11	39	7- 4	9- 5	9- 9
5	2C20	51	7- 9	9- 10	10- 2	39	8- 7	10- 9	11- 2
(t=3.00)	2C18	51	9- 7	11- 10	11- 11	40	10- 9	12- 9	12- 9
	2C16	52	9- 11	12- 0	12- 4	40	11- 0	13- 1	13- 5
	2C22	56	6- 4	8- 0	8- 6	43	7- 0	9- 1	9- 5
5.5	2C20	57	7- 5	9- 5	9- 9	43	8- 3	10- 4	10- 9
(t=3.50)	2C18	57	9- 2	11- 4	11- 7	44	10- 3	12- 5	12- 5
	2C16	58	9- 5	11- 6	11- 10	45	10- 6	12- 7	13- 0
	2C22	62	6- 1	7- 5	8- 2	48	6- 9	8- 9	9- 1
6	2C20	63	7- 1	9- 1	9- 4	48	7- 11	10- 0	10- 4
(t=4.00)	2C18	63	8- 10	10- 11	11- 3	49	9- 10	12- 0	12- 1
	2C16	64	9- 1	11- 1	11- 5	49	10- 1	12- 2	12- 7
	2C22	68	5- 11	6- 11	7- 11	52	6- 6	8- 6	8- 9
6.5	2C20	69	6- 11	8- 9	9- 0	53	7- 7	9- 8	10- 0
(t=4.50)	2C18	69	8- 7	10- 6	10- 11	53	9- 6	11- 8	11- 10
	2C16	70	8- 10	10- 8	11- 0	54	9- 9	11- 10	12- 2
	2C22	74	5- 10	6- 6	7- 5	57	6- 4	8- 0	8- 6
7	2C20	75	6- 9	8- 6	8- 9	57	7- 4	9- 5	9- 8
(t=5.00)	2C18	75	8- 4	10- 2	10- 6	58	9- 2	11- 4	11- 7
	2C16	76	8- 7	10- 4	10- 8	59	9- 5	11- 5	11- 10

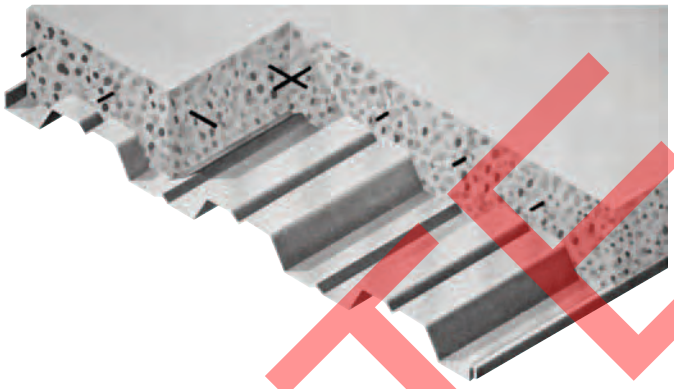
REINFORCED CONCRETE SLAB ALLOWABLE LOADS

Slab Depth	REINFORCEMENT W.W.F.	REINFORCEMENT As	Superimposed Uniform Load (psf) -- 3 Span Condition Clear Span (ft.-in.) 5- 0	5- 6	6- 0	6- 6	7- 0	7- 6	8- 0	8- 6	9- 0	9- 6	10- 0
	6X6-W2.1XW2.1	0.042*	84	69									
4.5	6X6-W2.9XW2.9	0.058	114	94									
(t=2.50)	4X4-W2.9XW2.9	0.087	167	138									
	6X6-W2.1XW2.1	0.042*	**153**	**127**	**107**	**91**	**78**						
5	6X6-W2.9XW2.9	0.058*	**206**	**170**	**143**	**122**	**105**						
(t=3.00)	4X4-W2.9XW2.9	0.087	**305**	**252**	**212**	**180**	**155**						
	6X6-W2.9XW2.9	0.058*	**255**	**211**	**177**	**151**	**130**	**113**	**100**				
5.5	4X4-W2.9XW2.9	0.087	**378**	**313**	**263**	**224**	**193**	**168**	**148**				
(t=3.50)	4X4-W4.0XW4.0	0.120	**400**	**400**	**351**	**299**	**258**	**224**	**197**				
	6X6-W2.9XW2.9	0.058*	**304**	**251**	**211**	**180**	**155**	**135**	**119**	**105**	**94**		
6	4X4-W2.9XW2.9	0.087	**400**	**374**	**314**	**267**	**231**	**201**	**177**	**156**	**140**		
(t=4.00)	4X4-W4.0XW4.0	0.120	**400**	**400**	**400**	**359**	**309**	**270**	**237**	**210**	**187**		
	6X6-W2.9XW2.9	0.058*	**353**	**292**	**245**	**209**	**180**	**157**	**138**	**122**	**109**	**98**	**88**
6.5	4X4-W2.9XW2.9	0.087*	**400**	**400**	**365**	**311**	**268**	**234**	**205**	**182**	**162**	**146**	**131**
(t=4.50)	4X4-W4.0XW4.0	0.120	**400**	**400**	**400**	**400**	**361**	**315**	**277**	**245**	**219**	**196**	**177**
	4X4-W2.9XW2.9	0.087*	**400**	**400**	**400**	**355**	**306**	**266**	**234**	**207**	**185**	**166**	**150**
7	4X4-W4.0XW4.0	0.120	**400**	**400**	**400**	**400**	**400**	**360**	**316**	**280**	**250**	**224**	**202**
(t=5.00)	4X4-W5.0XW5.0	0.150	**400**	**400**	**400**	**400**	**400**	**400**	**389**	**344**	**307**	**276**	**249**

NOTES:
1. * As does not meet A.C.I. criterion for temperature and shrinkage.
2. Superimposed loads are based upon three span conditions and A.C.I. moment coefficients.
3. Load values for single span and double spans are to be reduced.
4. Vulcraft's painted or galvanized form deck can be considered as permanent support in most building applications. See page 23.
   If uncoated form deck is used, deduct the weight of the slab from the allowable superimposed uniform loads.
5. Superimposed load values shown in bold type require that mesh be draped. See page 23.

SLAB INFORMATION

Total Slab Depth, in.	Theo. Concrete Volume		Recommended Welded Wire Fabric
	Yd^3 / 100 ft^2	ft^3 / ft^2	
4	0.93	0.250	6x6 - W1.4xW1.4
4 1/2	1.08	0.292	6x6 - W1.4xW1.4
5	1.23	0.333	6x6 - W1.4xW1.4
5 1/4	1.31	0.354	6x6 - W1.4xW1.4
5 1/2	1.39	0.375	6x6 - W2.1xW2.1
6	1.54	0.417	6x6 - W2.1xW2.1
6 1/4	1.62	0.438	6x6 - W2.1xW2.1
6 1/2	1.70	0.458	6x6 - W2.1xW2.1



SECTION PROPERTIES

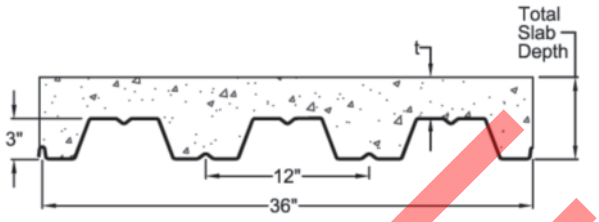
Deck Type	Design Thickness in.	Deck Weight psf	Section Properties				V_a lbs/ft	F_y ksi
			I_p in^4/ft	I_n in^4/ft	S_p in^3/ft	S_n in^3/ft		
2C22	0.0295	1.62	0.324	0.321	0.263	0.266	1832	50
2C20	0.0358	1.97	0.409	0.406	0.341	0.346	2698	50
2C18	0.0474	2.61	0.559	0.558	0.495	0.504	3608	50
2C16	0.0598	3.29	0.704	0.704	0.653	0.653	3618	40

ALLOWABLE UNIFORM LOAD (PSF)

TYPE NO.	NO. OF SPANS	DESIGN CRITERIA	CLEAR SPAN (ft-in)												
			5- 0	5- 6	6- 0	6- 6	7- 0	7- 6	8- 0	8- 6	9- 0	9- 6	10- 0	10- 6	11- 0
2C22	1	Fb = 30,000	210	174	146	124	107	93	82	73	65	58	52	48	43
		Defl. = l/240	170	128	98	77	62	50	42	35	29	25	21	18	16
		Defl. = l/180	227	170	131	103	83	67	55	46	39	33	28	25	21
	2	Fb = 30,000	200	167	141	121	105	92	81	72	64	58	52	47	43
		Defl. = l/240	408	306	236	186	149	121	100	83	70	59	51	44	38
		Defl. = l/180	544	409	315	248	198	161	133	111	93	79	68	59	51
	3	Fb = 30,000	243	204	173	149	129	113	100	89	80	72	65	59	54
		Defl. = l/240	319	240	185	145	116	95	78	65	55	47	40	34	30
		Defl. = l/180	426	320	246	194	155	126	104	87	73	62	53	46	40
2C20	1	Fb = 30,000	272	225	189	161	139	121	106	94	84	75	68	62	56
		Defl. = l/240	215	161	124	98	78	64	52	44	37	31	27	23	20
		Defl. = l/180	286	215	166	130	104	85	70	58	49	42	36	31	27
	2	Fb = 30,000	263	219	185	159	137	120	106	94	84	75	68	62	56
		Defl. = l/240	515	387	298	235	188	153	126	105	88	75	64	56	48
		Defl. = l/180	687	516	398	313	250	204	168	140	118	100	86	74	65
	3	Fb = 30,000	322	269	228	196	170	149	131	117	104	94	85	77	70
		Defl. = l/240	403	303	233	184	147	119	98	82	69	59	50	44	38
		Defl. = l/180	538	404	311	245	196	159	131	109	92	78	67	58	50
2C18	1	Fb = 30,000	395	327	274	234	202	176	154	137	122	109	99	90	82
		Defl. = l/240	294	221	170	134	107	87	72	60	50	43	37	32	28
		Defl. = l/180	392	294	227	178	143	116	96	80	67	57	49	42	37
	2	Fb = 30,000	380	317	268	230	199	174	154	136	122	110	99	90	82
		Defl. = l/240	706	531	409	321	257	209	172	144	121	103	88	76	66
		Defl. = l/180	942	708	545	429	343	279	230	192	161	137	118	102	88
	3	Fb = 30,000	464	389	330	283	246	215	190	169	151	136	123	112	102
		Defl. = l/240	553	415	320	252	201	164	135	113	95	81	69	60	52
		Defl. = l/180	737	554	426	335	269	218	180	150	126	107	92	80	69
2C16	1	Fb = 24,000	417	345	290	247	213	185	163	144	129	116	104	95	86
		Defl. = l/240	370	278	214	168	135	110	90	75	63	54	46	40	35
		Defl. = l/180	493	370	285	224	180	146	120	100	85	72	62	53	46
	2	Fb = 24,000	392	328	277	238	206	180	159	141	126	114	103	93	85
		Defl. = l/240	890	669	515	405	324	264	217	181	153	130	111	96	84
		Defl. = l/180	1187	892	687	540	433	352	290	242	204	173	148	128	111
	3	Fb = 24,000	479	401	341	293	254	223	197	175	156	141	127	116	106
		Defl. = l/240	697	523	403	317	254	206	170	142	119	102	87	75	65
		Defl. = l/180	929	698	538	423	339	275	227	189	159	135	116	100	87

Minimum exterior bearing length is 2.0 inches.
Minimum exterior bearing length is 4.0 inches.

3 C CONFORM



Interlocking side lap is not drawn to show actual detail.

MAXIMUM CONSTRUCTION CLEAR SPANS (S.D.I. CRITERIA)

Total Slab Depth	DECK	WEIGHT PSF	NW CONCRETE N=9 145 PCF 1 SPAN	NW CONCRETE N=9 145 PCF 2 SPAN	NW CONCRETE N=9 145 PCF 3 SPAN	WEIGHT PSF	LW CONCRETE N=14 110 PCF 1 SPAN	LW CONCRETE N=14 110 PCF 2 SPAN	LW CONCRETE N=14 110 PCF 3 SPAN
	3C22	56	8- 4	8- 10	10- 1	43	9- 3	10- 9	11- 9
6	3C20	57	9- 8	11- 10	12- 3	43	10- 9	13- 1	13- 6
(t=3.00)	3C18	57	11- 10	14- 2	14- 2	44	12- 11	15- 2	15- 2
	3C16	58	12- 2	14- 4	14- 10	45	13- 7	15- 9	16- 0
	3C22	62	8- 0	8- 3	9- 4	48	8- 11	10- 0	11- 4
6.5	3C20	63	9- 3	11- 5	11- 9	48	10- 4	12- 7	13- 0
(t=3.50)	3C18	63	11- 4	13- 9	13- 10	49	12- 7	14- 9	14- 9
	3C16	64	11- 7	13- 10	14- 3	49	13- 0	15- 2	15- 7
	3C22	68	7- 9	7- 8	8- 8	52	8- 7	9- 4	10- 8
7	3C20	69	9- 0	10- 11	11- 4	53	9- 11	12- 2	12- 7
(t=4.00)	3C18	69	11- 0	13- 3	13- 6	53	12- 3	14- 5	14- 5
	3C16	70	11- 4	13- 4	13- 9	54	12- 6	14- 9	15- 3
	3C22	74	7- 7	7- 2	8- 2	57	8- 3	8- 10	10- 0
7.5	3C20	75	8- 9	10- 2	11- 0	57	9- 7	11- 10	12- 2
(t=4.50)	3C18	75	10- 9	12- 10	13- 3	58	11- 9	14- 2	14- 2
	3C16	76	11- 0	12- 11	13- 4	59	12- 1	14- 3	14- 9
	3C22	80	7- 5	6- 9	7- 8	61	8- 0	8- 4	9- 5
8	3C20	81	8- 7	9- 7	10- 8	62	9- 3	11- 6	11- 10
(t=5.00)	3C18	81	10- 6	12- 5	12- 10	62	11- 5	13- 10	13- 11
	3C16	82	10- 9	12- 6	12- 11	63	11- 8	13- 11	14- 4

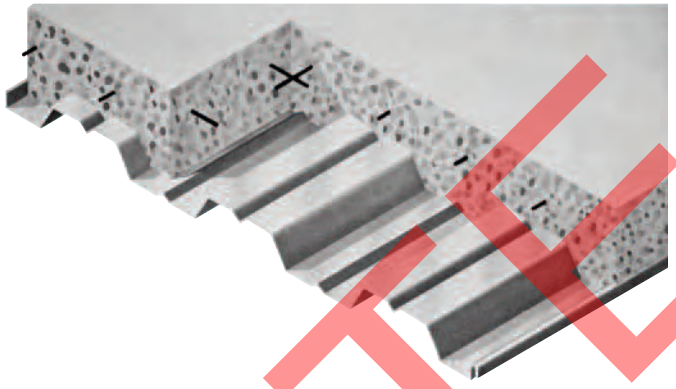
REINFORCED CONCRETE SLAB ALLOWABLE LOADS

Slab Depth	REINFORCEMENT W.W.F.	REINFORCEMENT As	Superimposed Uniform Load (psf) -- 3 Span Condition Clear Span (ft.-in.) 6- 6	7- 0	7- 6	8- 0	8- 6	9- 0	9- 6	10- 0	10- 6	11- 0	11- 6
	6X6-W2.9XW2.9	0.058*	**125**	**108**									
6	4X4-W2.9XW2.9	0.087	**185**	**160**									
(t=3.00)	4X4-W4.0XW4.0	0.120	**246**	**212**									
	6X6-W2.9XW2.9	0.058*	**154**	**133**	**116**	**102**							
6.5	4X4-W2.9XW2.9	0.087	**229**	**198**	**172**	**151**							
(t=3.50)	4X4-W4.0XW4.0	0.120	**306**	**264**	**230**	**202**							
	6X6-W2.9XW2.9	0.058*	**183**	**158**	**138**	**121**	**107**	**96**					
7	4X4-W2.9XW2.9	0.087	**273**	**235**	**205**	**180**	**159**	**142**					
(t=4.00)	4X4-W4.0XW4.0	0.120	**366**	**316**	**275**	**242**	**214**	**191**					
	4X4-W2.9XW2.9	0.087*	**316**	**273**	**238**	**209**	**185**	**165**	**148**	**134**	**121**		
7.5	4X4-W4.0XW4.0	0.120	**400**	**368**	**320**	**281**	**249**	**222**	**200**	**180**	**163**		
(t=4.50)	4X4-W5.0XW5.0	0.150	**400**	**400**	**392**	**345**	**306**	**273**	**245**	**221**	**200**		
	4X4-W2.9XW2.9	0.087*	**360**	**310**	**270**	**238**	**210**	**188**	**168**	**152**	**138**	**126**	**115**
8	4X4-W4.0XW4.0	0.120	**400**	**400**	**365**	**321**	**284**	**254**	**228**	**205**	**186**	**170**	**155**
(t=5.00)	4X4-W5.0XW5.0	0.150	**400**	**400**	**400**	**395**	**350**	**312**	**280**	**253**	**229**	**209**	**191**

NOTES:
1. * As does not meet A.C.I. criterion for temperature and shrinkage.
2. Superimposed loads are based upon three span conditions and A.C.I. moment coefficients.
3. Load values for single span and double spans are to be reduced.
4. Vulcraft's painted or galvanized form deck can be considered as permanent support in most building applications. See page 23.
   If uncoated form deck is used, deduct the weight of the slab from the allowable superimposed uniform loads.
5. Superimposed load values shown in bold type require that mesh be draped. See page 23.

SLAB INFORMATION

Total Slab Depth, in.	Theo. Concrete Volume		Recommended Welded Wire Fabric
	Yd^3 / 100 ft^2	ft^3 / ft^2	
5	1.08	0.292	6x6 - W1.4xW1.4
5 1/2	1.23	0.333	6x6 - W1.4xW1.4
6	1.39	0.375	6x6 - W1.4xW1.4
6 1/4	1.47	0.396	6x6 - W1.4xW1.4
6 1/2	1.54	0.417	6x6 - W2.1xW2.1
7	1.70	0.458	6x6 - W2.1xW2.1
7 1/4	1.77	0.479	6x6 - W2.1xW2.1
7 1/2	1.85	0.500	6x6 - W2.1xW2.1



SECTION PROPERTIES

Deck Type	Design Thickness in.	Deck Weight psf	Section Properties				V_a lbs/ft	F_y ksi
			I_p in^4/ft	I_n in^4/ft	S_p in^3/ft	S_n in^3/ft		
3C22	0.0295	1.77	0.730	0.729	0.414	0.426	1528	50
3C20	0.0358	2.14	0.920	0.919	0.534	0.551	2698	50
3C18	0.0474	2.84	1.254	1.252	0.770	0.797	4729	50
3C16	0.0598	3.58	1.580	1.580	1.013	1.013	5309	40

ALLOWABLE UNIFORM LOAD (PSF)

TYPE NO.	NO. OF SPANS	DESIGN CRITERIA	CLEAR SPAN (ft-in)												
			6- 6	7- 0	7- 6	8- 0	8- 6	9- 0	9- 6	10- 0	10- 6	11- 0	11- 6	12- 0	12- 6
3C22	1	Fb = 30,000	196	169	147	129	114	102	92	83	75	68	62	57	53
		Defl. = l/240	175	140	114	94	78	66	56	48	41	36	32	28	25
		Defl. = l/180	233	186	151	125	104	88	75	64	55	48	42	37	33
	2	Fb = 30,000	177	155	137	122	109	98	88	80	73	67	62	57	52
		Defl. = l/240	420	336	273	225	188	158	134	115	100	87	76	67	59
		Defl. = l/180	560	448	364	300	250	211	179	154	133	116	101	89	79
	3	Fb = 30,000	212	186	165	147	132	119	108	98	90	82	76	70	65
		Defl. = l/240	329	263	214	176	147	124	105	90	78	68	59	52	46
		Defl. = l/180	438	351	285	235	196	165	140	120	104	90	79	70	62
3C20	1	Fb = 30,000	252	218	189	167	148	132	118	107	97	88	81	74	68
		Defl. = l/240	220	176	143	118	98	83	70	60	52	45	40	35	31
		Defl. = l/180	293	235	191	157	131	110	94	81	70	61	53	47	41
	2	Fb = 30,000	242	211	185	164	146	131	118	107	97	89	81	75	69
		Defl. = l/240	529	424	345	284	237	199	170	145	126	109	96	84	74
		Defl. = l/180	706	565	459	379	316	266	226	194	167	146	127	112	99
	3	Fb = 30,000	294	257	226	201	179	161	145	131	120	109	100	93	85
		Defl. = l/240	414	332	270	222	185	156	133	114	98	85	75	66	58
		Defl. = l/180	552	442	360	296	247	208	177	152	131	114	100	88	78
3C18	1	Fb = 30,000	364	314	273	240	213	190	170	154	139	127	116	107	98
		Defl. = l/240	300	240	195	161	134	113	96	82	71	62	54	48	42
		Defl. = l/180	400	320	260	214	179	151	128	110	95	82	72	64	56
	2	Fb = 30,000	358	311	272	240	214	191	172	156	141	129	118	109	100
		Defl. = l/240	721	577	469	387	323	272	231	198	171	149	130	115	101
		Defl. = l/180	962	770	626	516	430	362	308	264	228	198	174	153	135
	3	Fb = 30,000	439	382	335	296	264	236	213	193	175	160	147	135	125
		Defl. = l/240	564	452	367	303	252	213	181	155	134	116	102	90	79
		Defl. = l/180	753	603	490	404	337	284	241	207	179	155	136	120	106
3C16	1	Fb = 24,000	383	330	288	253	224	200	179	162	147	134	122	112	104
		Defl. = l/240	378	302	246	203	169	142	121	104	90	78	68	60	53
		Defl. = l/180	504	403	328	270	225	190	161	138	119	104	91	80	71
	2	Fb = 24,000	367	319	279	246	218	195	176	159	144	132	121	111	102
		Defl. = l/240	909	728	592	488	407	343	291	250	216	188	164	145	128
		Defl. = l/180	1213	971	789	650	542	457	388	333	288	250	219	193	170
	3	Fb = 24,000	451	392	344	304	270	242	218	197	179	164	150	138	127
		Defl. = l/240	712	570	463	382	318	268	228	195	169	147	129	113	100
		Defl. = l/180	949	760	618	509	424	357	304	261	225	196	171	151	133

Minimum exterior bearing length is 2.5 inches.
Minimum exterior bearing length is 5.0 inches.

ANSI/SDI-NC1.0 Standard for Non-Composite Steel Floor Deck

1. General

1.1 Scope:

A. This Specification for Non-Composite Steel Floor Deck shall govern the materials, design, and erection of cold formed non-composite steel deck used as a form for reinforced concrete slabs.

Commentary: In the past, most of the steel decking used in the manner this specification covers was referred to as "centering," however, various roof deck units have successfully been used as non-composite forms. This specification is intended to also include these applications.

B. Commentary shall not be considered part of the mandatory document.

1.2 Reference Codes, Standards and Documents:

A. Codes and Standards: For purposes of this standard, comply with applicable provisions of the following Codes and Standards:

1. American Iron and Steel Institute (AISI) Standard - *North American Specification for the Design of Cold-Formed Steel Structural Members*, 2001 Edition with Supplement 2004
2. American Welding Society - ANSI/AWS D1.3 Structural Welding Code/Sheet Steel - 98 Structural Welding Code - Sheet Steel
3. American Society for Testing and Materials (ASTM) A653 (A653M)-06, A924 (A924M)-06, A1008 (A1008M)-06
4. American Society of Civil Engineering (ASCE) -SEI/ASCE7-05
5. American Concrete Institute (ACI) Building Code Requirements for Reinforced Concrete – ACI 318-05
6. Underwriters Laboratories (UL) Fire Resistance Directory - http://www.ul.com/database2006

B. Reference Documents: Refer to the following documents:

1. SDI White Paper - Designing with Steel Form Deck-2003
2. SDI Manual of Construction with Steel Deck - MOC2-2006
3. SDI Standard Practice Details - SPD2-2001
4. SDI Diaphragm Design Manual - DDMO3-2004

2. Products

2.1 Material:

A. Sheet steel for galvanized deck shall conform to ASTM A653 (A653M) Structural Quality, with a minimum yield strength of 33 ksi (230 MPa).

B. Sheet steel for uncoated deck shall conform to ASTM A1008 (A1008M) with a minimum yield strength of 33 ksi (230 MPa). Other structural sheet steels or high strength low alloy steels are acceptable, and shall be selected from the *North American Specification for the Design of Cold-Formed Steel Structural Members.*

Commentary: Materials are offered in A653 (A653M) grade 80 steel (galvanized) or ASTM A1008 (A1008M) grade 80 steel (uncoated). This steel has a minimum yield strength of 80 ksi (550 MPa) and is generally over 90 ksi (620 MPa). The AISI specifications allow a maximum allowable stress of 36 ksi (250 MPa) for this material.

C. Sheet steel for accessories shall conform to ASTM A653 (A653M) Structural Quality for structural accessories, ASTM A653 (A653M) Commercial Quality for non-structural accessories, or ASTM A1008 (A1008M) for either structural or non-structural accessories. Other structural sheet steels or high strength low alloy steels are acceptable, and shall be selected from the *North American Specification for the Design of Cold-Formed Steel Structural Members.*

D. The deck type profile and thickness (gage) shall be as shown on the plans.

2.2 Tolerance:

A. Uncoated thickness shall not be less than 95% of the design thickness as listed in Table 2.2.1:

Table 2.2.1

Gage No.	Design Thickness		Minimum Thickness	
	in.	mm.	in.	mm.
28	0.0149	0.38	0.014	0.35
26	0.0179	0.45	0.017	0.43
24	0.0238	0.60	0.023	0.57
22	0.0295	0.75	0.028	0.71
20	0.0358	0.91	0.034	0.86
18	0.0474	1.20	0.045	1.14
16	0.0598	1.52	0.057	1.44

B. Panel length shall be within plus or minus 1/2 inch (12 mm) of specified length.

C. Panel cover width shall be no greater than minus 3/8 inch (10 mm), plus 3/4 inch (20 mm).

D. Panel camber and/or sweep shall be no greater than 1/4 inch in 10 foot length (6 mm in 3 m).

E. Panel end out of square shall not be greater than 1/8 inch per foot of panel width (10 mm per m).

2.3 Finish:

A. Galvanizing shall conform to ASTM A924 (A924M) and/or ASTM A653 (A653M).

B. Uncoated (black) shall conform to ASTM A1008 (A1008M).

C. Painted with a shop coat of primer paint (one or both sides) shall be applied to steel sheet conforming to ASTM A1008 (A1008M).

D. The finish on the steel non-composite floor deck shall be suitable for the environment of the structure.

Commentary: The uncoated finish is, by custom, referred to as "black" by some users and manufacturers; the use of the word "black" does not refer to paint color on the product. When galvanized material is used to support a reinforced concrete slab, the slab dead load is considered to be permanently carried by the deck. For any permanent load carrying function, a minimum galvanized coating conforming to ASTM A653 (A653M), G30 (Z090) is recommended.

2.4 Design:

A. Deck used as a form for structural (reinforced) concrete slab:

1. The section properties of the steel floor deck unit shall be computed in accordance with the *North American Specification for the Design of Cold-Formed Steel Structural Members.*

2. Allowable Stress Design (ASD): Bending stress shall not exceed 0.60 times the yield strength, nor exceed 36 ksi (250 MPa) under the combined loads of wet concrete, deck weight, and the following construction live loads: 20 pounds per square foot (1 kPa) uniform load or 150 pound concentrated load on a 1'-0" (300 mm) wide section of deck (2.2 kN per m). The interaction of shear and bending shall be considered in the calculations. (See Figure 1 - Attachment NC1)

3. Load and Resistance Factor Design (LRFD): The load combination for construction are as shown in Attachment NC1. Load factors shall be in accordance with ASCE 7. (See Section 1.2.A.5) The resistance factors and nominal resistances shall be in accordance with the North American Specification for the Design of Cold-Formed Steel Structural Members.

Commentary: The loading shown in Figure 1, Attachment NC1 is representative of the sequential loading of wet concrete on the form. The 150 pound load (per foot of width) is the result of distributing a 300 pound man over a 2 foot (600 mm) width. Experience has shown this to be a conservative distribution. The metric equivalent of the 150 pound load is 2.2 kN per meter of width. For single span deck conditions, the ability to control the concrete placement may be restricted and a factor of 1.5 is applied to the concrete load to address this condition; however, in order to keep this 50% load increase within a reasonable limit, the increase is not to exceed 30 psf (1.44 kPa). Whenever possible, the deck shall be multi-span and not require shoring during the concrete placement procedure.

4. Deck Deflection: Calculated deflections of the deck shall be based on the load of the wet concrete, as determined by the design slab thickness and the weight of the steel deck, uniformly loaded on all spans, and shall be limited to 1/180 of the clear span or 3/4 inch (20 mm), whichever is smaller. Calculated deflections shall be relative to supporting members.

Commentary: The deflection calculations do not take into account construction loads because these are considered temporary loads. The deck is designed to always be in the elastic range so removal of temporary loads should allow the deck to recover. The structural steel also deflects under the loading of the wet concrete.

The designer is urged to check the deflection of the total system, especially if composite beams and girders are being used. If the designer wants to include additional concrete loading on the deck because of frame deflection, the additional load should be shown on the design drawings or stated in the deck section of the job specifications.

2.4 Design:

5. Minimum Bearing: Minimum bearing lengths shall be determined in accordance with the web crippling provisions of the North American Specification for the Design of Cold-Formed Steel Structural Members; the uniform loading case of wet concrete, plus the weight of the steel deck, plus 20 psf (1 kPa) construction load shall be used.

   Commentary: Experience has shown that 1-1/2 inches (38 mm) of bearing is sufficient for non-composite floor decks. If less than 1-1/2 inches (38 mm) of end bearing is available, or if high support reactions are expected, the design professional should check the deck web crippling capacity. The deck must be adequately attached to the structure to prevent slip off.

6. Diaphragm Shear Capacity: Diaphragms without concrete shall be designed in accordance with the SDI Diaphragm Design Manual, or from tests conducted by an independent professional engineer.

   Commentary: Calculations of diaphragm strength and stiffness should be made using the SDI Diaphragm Design Manual. If testing is used as the means for determining the diaphragm strength and stiffness, then it should follow the AISI TS 7-02 test protocol.

B. Concrete Slab Design:

1. General: The design of the concrete slabs shall be done in accordance with the ACI Building Code Requirements for Reinforced Concrete. The minimum concrete thickness above the top of the deck shall be 1-1/2 inches (38 mm). Randomly distributed fibers or fibrous admixtures shall not be substituted for welded wire fabric tensile reinforcement.

   Commentary: In following the ACI requirements for temperature reinforcement, the designer may eliminate the concrete area that is displaced by the deck ribs. For slabs with total depth of 3 inches (75 mm) or less, the reinforcing mesh may be considered to be at the center of the concrete above the deck. (Refer to the SDI Designing with Steel Form Deck for slab design information) If uncoated or painted deck is used as the form, the load from concrete slab weight must be deducted from the calculated capacity of the reinforced concrete slab. If galvanized form is used, the load from the slab weight is considered to be permanently carried by the deck and need not be deducted from the live load. If temporary shoring is used, the load of the slab must be deducted from the calculated capacity of the reinforced slab, regardless of the deck finish. Except for some diaphragm values, the deck should not be assumed to act compositely with the concrete even though strong chemical bonds can, and do, develop.

2. Concrete: Concrete design shall be in accordance with the applicable sections of the ACI *Building Code Requirements for Reinforced Concrete.* Minimum compressive strength (f'c) shall be 3 ksi (20 MPa) or as required for fire ratings or durability. Admixtures containing chloride salts shall not be used.

   Commentary: The use of admixtures containing chloride salts is not allowed because the salts will corrode the steel non-composite floor deck.

3. Cantilever Loads: When cantilevered slabs are encountered, top reinforcing steel shall be proportioned by the designer. For construction loads, the deck shall be designed for the more severe of (a) deck plus slab weight plus 20 psf (1kPa) construction load on both cantilever and adjacent span, or (b) deck plus slab weight on both cantilever and adjacent span plus a 150 pound (665N) concentrated load per foot of width at end of cantilever. The load factors shall be in accordance with ASCE7. Resistance factors for bending, shear, and interior bearing shall be by the *North American Specification for the Design of Cold-Formed Steel Structural Members.*

   The maximum cantilever deflection as a form, under deck plus slab weight, shall be a/90 where "a" is the clear cantilever length, and shall not exceed 3/4 inch (19 mm).

   Side laps shall be attached at the end of the cantilever and a maximum spacing of 12 inches (300 mm) on center from cantilever end. Each corrugation shall be fastened

at both the perimeter support and the first interior support. The deck shall be completely attached to the supports and at the side laps before any load is applied to the cantilever. Concrete shall not be placed on the cantilever until after placement on the adjacent span.

2.5 Accessories:

A. Pour stops, column closures, end closures, cover plates, and girder fillers shall be the type suitable for the application. Pour stop minimum gages shall be in accordance with the Steel Deck Institute. (See Pour Stop Selection Table, Attachment NC2)

B. Mechanical fasteners or welds shall be permitted for deck and accessory attachment.

3. Execution

3.1 Installation/General:

A. Support framing and field conditions shall be examined for compliance with requirements for installation tolerances and other conditions affecting performance of work of this section. All OSHA rules for erection shall be followed.

B. Deck panels shall be installed on a concrete support structure only after concrete has attained 75% of its specified design strength.

C. Deck panels and accessories shall be installed according to the SDI Manual of Construction with Steel Deck, placement plans, and requirements of this Section.

D. Temporary shoring, if required, shall be installed before placing deck panels. Temporary shoring shall be designed to resist a minimum uniform load of 50 psf (2.4 kPa), and loading indicated on Attachment NC1. Shoring shall be securely in place before the floor deck erection begins. The shoring shall be designed and installed in accordance with the ACI Building Code Requirements for Reinforced Concrete, and shall be left in place until the slab attains 75% of its specified design strength and a minimum of seven (7) days.

E. Deck panels shall be placed on structural supports and adjusted to final position with ends aligned, and attached securely to the supports immediately after placement in order to form a safe working platform. All deck sheets shall have adequate bearing and fastening to all supports to prevent slip off during construction. Deck ends over supports shall be installed with a minimum end bearing of 1-1/2 inches (38 mm). Deck areas subject to heavy or repeated traffic, concentrated loads, impact loads, wheel loads, etc. shall be adequately protected by planking or other approved means to avoid overloading and/or damage.

Commentary: Staggering deck ends is not a recommended practice. The deck capacity as a form and the load capacity of a non-composite deck/slab system are not increased by staggering end joints, yet layout and erection costs are increased.

F. Lapped or Butted Ends: Deck ends shall be either lapped or butted over supports. Gaps up to 1 inch (25 mm) shall be permitted at butted ends.

G. Deck units and accessories shall be cut and neatly fit around openings and other work projecting through or adjacent to the decking.

Commentary: It is the responsibility of the designer to designate holes/openings to be decked over in compliance with applicable federal and state OSHA directives. Care should be taken to analyze spans between supports at openings when determining those holes/openings to be decked over.

When a framed opening span exceeds the maximum deck span limits for construction loads, the opening must be detailed around instead of decked over. (Minimum construction load 50 lbs./sq. ft. (2.4 kPa), unless specific requirements dictate otherwise). When a framed hole/opening in floor deck is shown and dimensioned on the structural design drawings, pour stop (screed) angle is required to top of slab. When specified, cell closure angles will be provided at the open ends of deck 1-1/2 inches (38 mm) deep or deeper, in standard 10 feet (3 m) lengths to be field sized, cut and installed. Typically, non-composite floor decks that are less than 1-1/2 inches (38 mm) deep do not require or use cell closure. Alternate means to dam concrete may be used in lieu of cell closure, at the discretion of the installer, if approved by the project engineer.

3.1 Installation/General:

When a hole/opening is not shown and dimensioned on the structural design drawings, no provisions for concrete retainage will be provided by the metal deck manufacturer/ supplier. Metal floor decking holes and openings to be cut after the concrete pour shall not be field cut until concrete has reached 75% of its design strength and a minimum seven (7) days.

H. Trades that subsequently cut unscheduled openings through the deck shall be responsible for reinforcing these openings based upon an approved engineered design.

3.2 Installation/Anchorage:

A. Form deck units shall be anchored to steel supporting members including perimeter support steel and/or bearing walls by arc spot puddle welds of the following diameter and spacing, fillet welds of equal strength, or mechanical fasteners.

1. All welding of deck shall be in accordance with ANSI/AWS D1.3, Structural Welding Code - Sheet Steel. Each welder shall demonstrate an ability to produce satisfactory welds using a procedure such as shown in the SDI Manual of Construction with Steel Deck, or as described in ANSI/AWS D1.3.
2. Welding washers shall be used on all deck units with metal thickness less than 0.028 inches (0.7 mm). Welding washers shall be a minimum thickness of 0.0598 inches (16 gage, 1.50 mm) and have a nominal 3/8 inch (10 mm) diameter hole.
3. Where welding washers are not used, a minimum visible 5/8 inch (15 mm) diameter arc puddle weld shall be used. Weld metal shall penetrate all layers of deck material at end laps and shall have good fusion to the supporting members.
4. Weld spacing: Fastening pattern shall allow slabs to be designed on a continuous basis.
5. When used, fillet welds shall be at least 1-1/2 inch (38 mm) long.
6. Mechanical fasteners, either powder actuated, pneumatically driven, or screws, shall be permitted in lieu of welding to fasten deck to supporting framing if fasteners meet all project service requirements. When the fasteners are powder actuated or pneumatically driven, the load value per fastener used to determine the maximum fastener spacing shall be based on a minimum structural support thickness of not less than 1/8 inch (3 mm) and on the fastener providing a minimum 5/16 inch (8 mm) diameter bearing surface (fastener head size). When the structural support thickness is less than 1/8 inch (3 mm), powder actuated or pneumatically driven fasteners shall not be used, but screws are acceptable.

Commentary: Mechanical fasteners (powder actuated, screws, pneumatically driven fasteners, etc.) are recognized as viable anchoring methods, provided the type and spacing of the fastener satisfies the design criteria. Documentation in the form of test data, design calculations, or design charts should be submitted by the fastener manufacturer as the basis for obtaining approval.

7. For deck units with spans greater than five feet (1.5 m), side laps and perimeter edges of units between span supports shall be fastened at intervals not exceeding 36 inches (1 m) on center, using one of the following methods:
   a. #10 self drilling screws.
   b. Crimp or button punch.
   c. Arc puddle welds 5/8 inch (15 mm) minimum visible diameter, or minimum 1 inch (25 mm) long fillet weld.

Commentary: The above side lap spacing is a minimum. Service loads or diaphragm design may require closer spacing or larger side lap welds. Good metal to metal contact is necessary for a good side lap weld. Burn holes are to be expected.

B. Accessory Attachment:

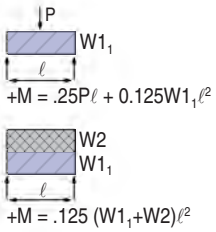
1. Pour Stop and Girder Fillers: Pour stops and girder fillers shall be fastened to supporting structure in accordance with the SDI Standard Practice Details, and Attachment NC2.
2. Floor Deck Closures: Column closures, cell closures, and Z closures shall be fastened to provide tight fitting closures at open ends of ribs and sides of decking. Fasten cell closures at changes of direction of floor deck units unless otherwise directed.

Commentary: Cell closures are generally not used on form deck of 1-5/16 inch (33 mm) depth or less.

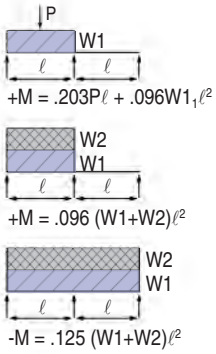
ANSI/SDI-NC-1.0 ATTACHMENT NC1
Concrete Form Construction Loading Diagrams

FIGURE 1
Loading Diagrams and Bending Moments

Simple Span Condition



Double Span Condition



Triple Span Condition

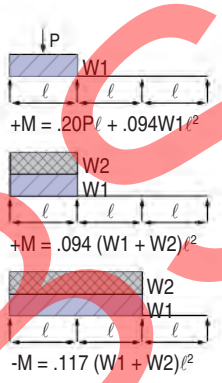
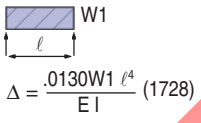


FIGURE 2
Loading Diagrams and Deflections

Simple Span Condition



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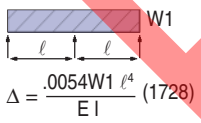
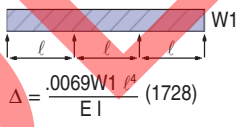


Triple Span Condition



Notes for Figures 1 and 2 — **LRFD Load Factors**

P	=	150 pound concentrated load	1.4
I	=	in⁴/ft. - deck moment of inertia	
W1	=	slab weight	1.6
		+ deck weight	1.2
W2	=	20 pounds per square foot construction load	1.4
E	=	29.5 x 10⁶ psi	
ℓ	=	clear span length (ft.)	
$W1_1$	=	1.5 x slab weight + deck weight ≤ slab weight + 30 + deck weight	

Dimensional check shows the need for the 1728 factor when calculating deflections using pound inch units.

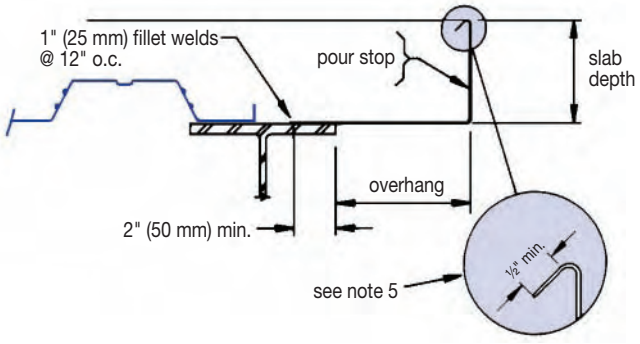
Note: In addition to an analysis of slab weight plus construction surcharge, the deck must be independently investigated for a total construction load of 50 psf. The step loads in figures 1 and 2 shall be used.

ANSI/SDI-NC-1.0 ATTACHMENT NC2
SDI Pour Stop Selection Table

NON-COMPOSITE

SLAB DEPTH (INCHES)	OVERHANG (INCHES)												
	0	1	2	3	4	5	6	7	8	9	10	11	12
	POUR STOP TYPES												
4.00	20	20	20	20	18	18	16	14	12	12	12	10	10
4.25	20	20	20	18	18	16	16	14	12	12	12	10	10
4.50	20	20	20	18	18	16	16	14	12	12	12	10	10
4.75	20	20	18	18	16	16	14	14	12	12	10	10	10
5.00	20	20	18	18	16	16	14	14	12	12	10	10	
5.25	20	18	18	16	16	14	14	12	12	12	10	10	
5.50	20	18	18	16	16	14	14	12	12	12	10	10	
5.75	20	18	16	16	14	14	12	12	12	12	10	10	
6.00	18	18	16	16	14	14	12	12	12	10	10	10	
6.25	18	18	16	14	14	12	12	12	12	10	10		
6.50	18	16	16	14	14	12	12	12	12	10	10		
6.75	18	16	14	14	14	12	12	12	10	10	10		
7.00	18	16	14	14	12	12	12	12	10	10	10		
7.25	16	16	14	14	12	12	12	10	10	10			
7.50	16	14	14	12	12	12	12	10	10	10			
7.75	16	14	14	12	12	12	10	10	10	10			
8.00	14	14	12	12	12	12	10	10	10				
8.25	14	14	12	12	12	10	10	10	10				
8.50	14	12	12	12	12	10	10	10					
8.75	14	12	12	12	12	10	10	10					
9.00	14	12	12	12	10	10	10						
9.25	12	12	12	12	10	10	10						
9.50	12	12	12	10	10	10							
9.75	12	12	12	10	10	10							
10.00	12	12	10	10	10	10							
10.25	12	12	10	10	10								
10.50	12	12	10	10	10								
10.75	12	10	10	10									
11.00	12	10	10	10									
11.25	12	10	10										
11.50	10	10	10										
11.75	10	10											
12.00	10	10											

TYPES	DESIGN THICKNESS
20	0.0358
18	0.0474
16	0.0598
14	0.0747
12	0.1046
10	0.1345



NOTES: This Selection Chart is based on following criteria:

1. Normal weight concrete (150 PCF).
2. Horizontal and vertical deflection is limited to ¼" maximum for concrete dead load.
3. Design stress is limited to 20 KSI for concrete dead load temporarily increased by one-third for the construction live load of 20 PSF.
4. Pour Stop Selection Chart does not consider the effect of the performance, deflection, or rotation of the pour stop support which may include both the supporting composite deck and/or the frame.
5. Vertical leg return lip is recommended for all types (gages).

Short Form Specifications

For Non-Composite Form Deck

1. General

1.1 Related Documents

Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

1.2 Summary

This section pertains to non-composite steel form deck.

A. Related Sections
   1. Division 3 Section "Cast In Place Concrete" for concrete fill and reinforcing steel.
   2. Division 5 Section "Structural Steel" for structural steel supporting the deck.
   3. Division 7 Section "Insulating Fill."

1.3 Submittals

A. General: Submit each item in this Article according to the conditions of the Contract and Division 1 Specification Sections.

B. Product Data for each type of decking specified, including dimensions of individual components, profiles, and finishes.

C. Shop Drawings showing location of deck units, anchorage details, and other information required for a thorough review.

D. Product Certificates (if required) signed by the manufacturer of the steel deck, certifying the supplied products comply with specified requirements.

E. Welder Certificates signed by Contractor certifying that welders comply with requirements specified under "Quality Assurance" Article 1.4. If mechanical fasteners are used, independent test reports shall be provided by the fastener manufacturer.

1.4 Quality Assurance

A. Codes and Standards: Comply with applicable provisions of the following specifications:
   1. American Iron and Steel Institute (AISI).
   2. American Welding Society (ANSI/AWS D1.3 Structural Welding Code/Sheet Steel).
   3. Steel Deck Institute (SDI).

B. Certify that each welder has satisfactorily passed A.W.S. qualification tests for welding processes involved, and, if applicable, has undergone recertification.

C. Fire Resistance Assemblies: Provide deck units classified by Underwriters Laboratories (UL) in the *Fire Resistance Directory* for design number _____. (If a fire rated assembly is required.)

1.5 Delivery, Storage, and Handling

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage and handling.

B. If ground storage is needed, the deck bundles must be stored off the ground, with one end elevated to provide drainage. Bundle must be protected against condensation with a ventilated waterproof covering. Bundles must be stacked so there is no danger of tipping, sliding, rolling, shifting or material damage. Bundles must be periodicallychecked for tightness, and retightened as necessary so wind cannot loosen sheets.

C. Deck bundles placed on the building frame must be placed near a main supporting beam at a column or wall. In no case, are the bundles to be placed on unbolted frames or on unattached and/or unbridged joists. The structural frame must be properly braced to receive the bundles.

2. Products

2.1 A manufacturer offering deck products to be incorporated into the work must be a member of the Steel Deck Institute.

2.2 Materials [The specifier must choose the appropriate section(s) and eliminate those not applicable.]

A. Sheet steel for deck and accessories shall conform to ASTM A653 Structural Quality, with a minimum yield strength of 33 ksi (230 MPa).
   1. Galvanizing shall conform to ASTM A924 with a minimum coating class of G30 (Z090) as defined in A653.

or

B. Sheet steel for deck and accessories shall conform to ASTM A1008 with a minimum yield strength of 33 ksi (230 MPa).

C. The deck type and thickness shall be as shown on the plans.

or

D. The deck shall be _____ with a minimum metal thickness of ___.

or

E. The deck shall be selected to provide the load capacities shown on the drawings and as

determined using the Steel Deck Institute construction loading criteria.

F. Whenever possible, the deck shall be multi-span and not require shoring during the concrete placement procedure.

2.3 Accessories

A. Pour stops, column closures, end closures, cover plates, and girder fillers shall be the type required by the Steel Deck Institute.

B. Mechanical fasteners or welds are acceptable for accessory attachments.

3. Execution

3.1 Examine support framing and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance of work of this section. All OSHA rules for erection must be followed.

3.2 Preparation

A. Place deck in accordance with approved placement plans.

B. Do not place deck panels on concrete support structure until concrete has cured and is dry.

C. Locate deck bundles to prevent overloading of support members.

3.3 Installation, General

A. Install deck panels and accessories according to Steel Deck Institute specifications and recommendations, and in accordance with the placement plans and requirements of this Section.

B. Install temporary shoring, if required, before placing deck panels.

C. Place deck panels on structural supports and adjust to final position with ends aligned. Attach firmly to the supports immediately after placement in order to form a safe working platform.

D. Cut and neatly fit deck units and accessories around openings and other work projecting through or adjacent to the decking.

E. Trades that subsequently cut unscheduled openings through the deck are responsible for reinforcing the openings.

3.4 Installation, Form Deck

A. Anchor floor deck units to steel supporting members by arc spot puddle welds of the following diameter and spacing or fillet welds of equal strength.

1. For deck units with metal thickness equal to or greater than 0.028 inches (22 gage, 0.7 mm) use 5/8 inch (15 mm) minimum visible diameter welds with the weld pattern shown on the design drawings.
2. For deck units with metal thickness less than 0.028 inches (22 gage, 0.7 mm) weld deck through manufacturer's standard welding washers with the weld pattern shown on the design drawings.
3. Mechanical fasteners, either powder actuated, pneumatically driven or screws, may be used in lieu of welding to fasten deck to supporting framing, provided they have been specifically approved.
4. For deck units with spans greater than five feet (1.5 m) fasten side laps and perimeter edges of units between supports at intervals not exceeding 36 inches (1 m) on center, using one of the following methods.
   a. #10 self drilling screws.
   b. crimp or button punch.
   c. arc puddle welds - 5/8 inch (15 mm) minimum visible diameter, or 1 inch (25 mm) long fillet.

B. Install deck ends over supports with a minimum end bearing of 1.5 inches (38 mm).

C. Fasten pour stops and girder fillers to supporting structure in accordance with the SDI Standard Practice Details and Attachment NC2.

D. Fasten column closures, cell closures, and Z closures to deck to provide tight fitting closures at open ends of ribs and sides of decking.

E. Fasten cell closures at changes of direction of deck units unless otherwise directed.

3.5 Repairs

Before concrete placement, the deck shall be inspected for tears, dents, or other damage that may prevent the deck from acting as a tight and substantial form. The need for the repair or temporary shoring of the damaged deck shall be determined.

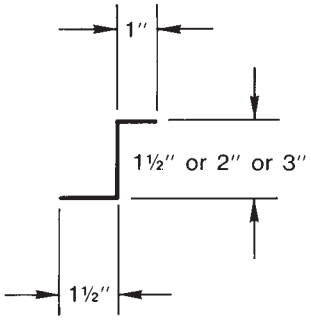
FLOOR-CEILING ASSEMBLIES WITH FORM DECKS

Restrained Assembly Rating	Type of Protection	Concrete Thickness & Type (1)	U.L. Design No. (2,3)	Type of Form Deck	Unrestrained Beam Rating
1 Hr.	Exposed Grid	2 1/2" NW	G256 +	0.6C, 1.0C, 1.3C, 1.5C	1,2,3 Hr.
	Cementitious	2 1/2" NW&LW	G701	0.6C, 1.0C, 1.3C, 1.5C	1,1.5,2,3 Hr.
			G705	0.6C, 1.0C, 1.3C, 1.5C	1,1.5,2 Hr.
		2 3/4" NW&LW	G702	0.6C, 1.0C, 1.3C, 1.5C	1,1.5,2 Hr.
	Sprayed Fiber	2 1/2" NW&LW	G801	0.6C, 1.0C, 1.3C, 1.5C	1,1.5,2 Hr.
			G804	0.6C, 1.0C, 1.3C, 1.5C	1,1.5,2 Hr.
		2 3/4" NW&LW	G802	0.6C, 1.0C, 1.3C, 1.5C	1,1.5,2 Hr.
1 1/2 Hr.	Exposed Grid	2" NW	G229 +	0.6C, 1.0C, 1.3C, 1.5C	1.5,2,3 Hr.
		2 1/2" NW	G228 +	0.6C, 1.0C, 1.3C, 1.5C	1.5,2 Hr.
			G243 +	0.6C, 1.0C, 1.3C, 1.5C	1.5,2 Hr.
		3" NW	G213 +	0.6C, 1.0C, 1.3C, 1.5C	1.5,2,3 Hr.
	Gypsum Board	2" NW&LW	G502 +	0.6C, 1.0C, 1.3C, 1.5C	
	Cementitious	2 1/2" NW&LW	G701	0.6C, 1.0C, 1.3C, 1.5C	1,1.5,2,3 Hr.
			G705	0.6C, 1.0C, 1.3C, 1.5C	1,1.5,2 Hr.
		2 3/4" NW&LW	G702	0.6C, 1.0C, 1.3C, 1.5C	1,1.5,2 Hr.
	Sprayed Fiber	2 1/2" NW&LW	G801	0.6C, 1.0C, 1.3C, 1.5C	1,1.5,2 Hr.
			G804	0.6C, 1.0C, 1.3C, 1.5C	1,1.5,2 Hr.
		2 3/4" NW&LW	G802	0.6C, 1.0C, 1.3C, 1.5C	1,1.5,2 Hr.
2 Hr.	Concealed Grid	2 1/4" NW	G023 +	0.6C, 1.0C, 1.3C, 1.5C	2 Hr.
		2 1/2" NW	G031 +	0.6C, 1.0C, 1.3C, 1.5C	3 Hr.
			G036 +	0.6C, 1.0C, 1.3C, 1.5C	3 Hr.
	Exposed Grid	2 1/2" NW	G227 +	0.6C, 1.0C, 1.3C, 1.5C	3 Hr.
			G228 +	0.6C, 1.0C, 1.3C, 1.5C	1.5,2 Hr.
			G229 +	0.6C, 1.0C, 1.3C, 1.5C	1.5,2,3 Hr.
			G243 +	0.6C, 1.0C, 1.3C, 1.5C	1.5,2 Hr.
			G256 +	0.6C, 1.0C, 1.3C, 1.5C	1,2,3 Hr.
		3" NW	G213 +	0.6C, 1.0C, 1.3C, 1.5C	1.5,2,3 Hr.
	Gypsum Board	2" NW	G505 +	0.6C, 1.0C, 1.3C, 1.5C	
		2 1/2" NW&LW	G529 +	0.6C, 1.0C, 1.3C, 1.5C	2,3 Hr.
		2 1/2" NW	G514 +	0.6C, 1.0C, 1.3C, 1.5C	3 Hr.
			G523 +	0.6C, 1.0C, 1.3C, 1.5C	2 Hr.
	Cementitious	2 1/2" NW&LW	G701	0.6C, 1.0C, 1.3C, 1.5C	1,1.5,2,3 Hr.
			G705	0.6C, 1.0C, 1.3C, 1.5C	1,1.5,2 Hr.
		2 3/4" NW&LW	G702	0.6C, 1.0C, 1.3C, 1.5C	1,1.5,2 Hr.
	Sprayed Fiber	2 1/2" NW&LW	G801	0.6C, 1.0C, 1.3C, 1.5C	1,1.5,2 Hr.
			G804	0.6C, 1.0C, 1.3C, 1.5C	1,1.5,2 Hr.
		2 3/4" NW&LW	G802	0.6C, 1.0C, 1.3C, 1.5C	1,1.5,2 Hr.
3 Hr.	Concealed Grid	3 1/4" NW	G036 +	0.6C, 1.0C, 1.3C, 1.5C	3 Hr.
		3 1/2" NW	G033 +	0.6C, 1.0C, 1.3C, 1.5C	3 Hr.
	Exposed Grid	3 1/4" NW	G229 +	0.6C, 1.0C, 1.3C, 1.5C	1.5,2,3 Hr.
		3 1/2" NW	G213 +	0.6C, 1.0C, 1.3C, 1.5C	1.5,2,3 Hr.
			G256 +	0.6C, 1.0C, 1.3C, 1.5C	1,2,3 Hr.
	Gypsum Board	3 3/4" NW&LW	G529 +	0.6C, 1.0C, 1.3C, 1.5C	3 Hr.
	Cementitious	2 3/4" NW&LW	G701	0.6C, 1.0C, 1.3C, 1.5C	1,1.5,2,3 Hr.
			G705	0.6C, 1.0C, 1.3C, 1.5C	1,1.5,2 Hr.
	Sprayed Fiber	2 3/4" NW&LW	G801	0.6C, 1.0C, 1.3C, 1.5C	1,1.5,2 Hr.

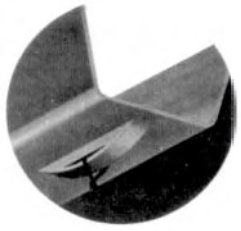
NOTES:
1. Concrete thickness is thickness of slab above deck, in.
2. Refer to the U.L. "Fire Resistance Directory" for the necessary construction details.
3. Deck finish shall be galvanized unless noted otherwise.
   + Denotes deck finish is not critical when used in G0--, G2-- & G5-- Series designs. Deck finish shall be galvanized or painted.

NOTES

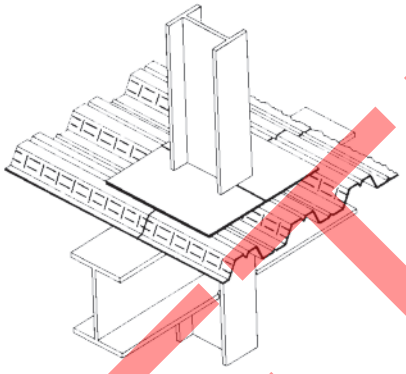
NON-COMPOSITE & COMPOSITE DECK DETAILS



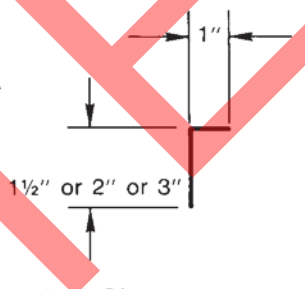
"Z" Closure



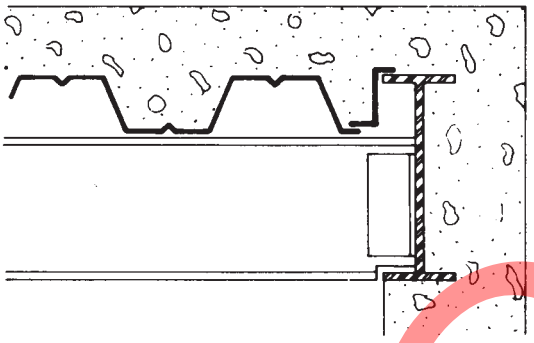
Hanger Tab
Max. Load
60 lbs. per Tab
#12 Wire Minimum



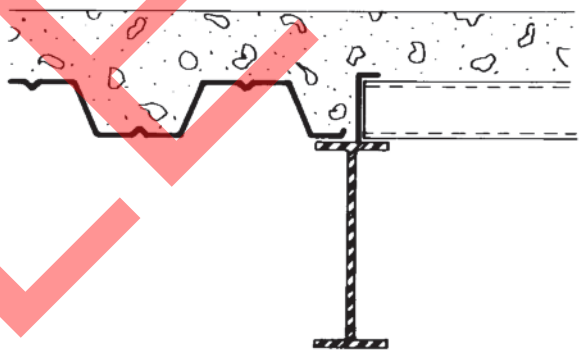
COLUMN CLOSURE



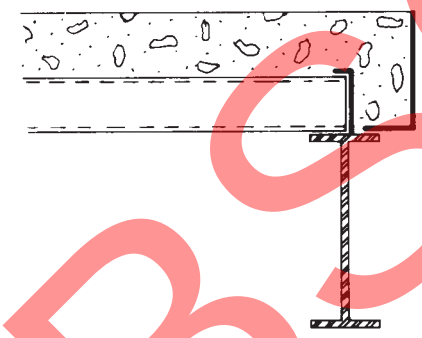
Cell Closure



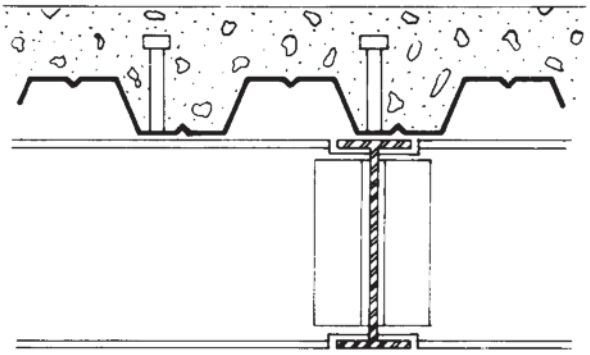
"z" CLOSURE



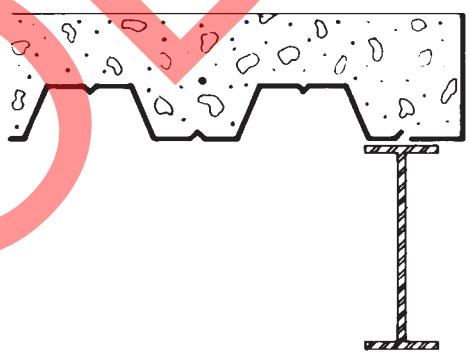
CELL CLOSURE



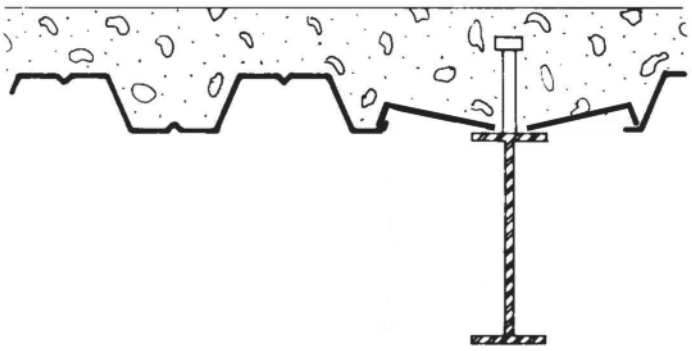
POUR STOP AT END



STUD LOCATIONS



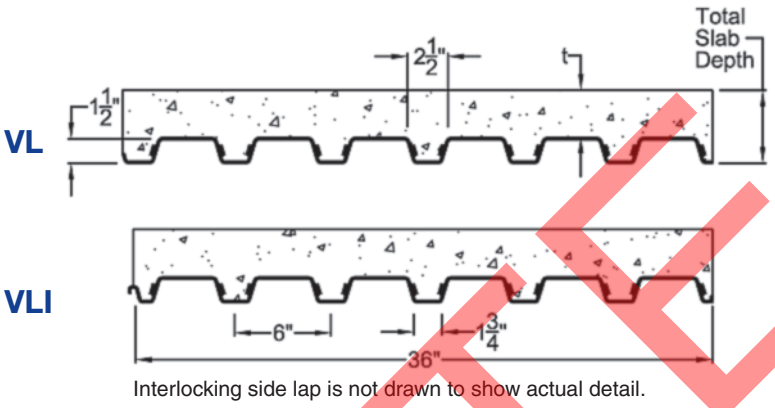
POUR STOP AT SIDE



GIRDER FILLER

1.5 VL, VLI

Maximum Sheet Length 42'-0
Extra Charge for Lengths Under 6'-0
ICBO Approved (N0. 3415)



Interlocking side lap is not drawn to show actual detail.

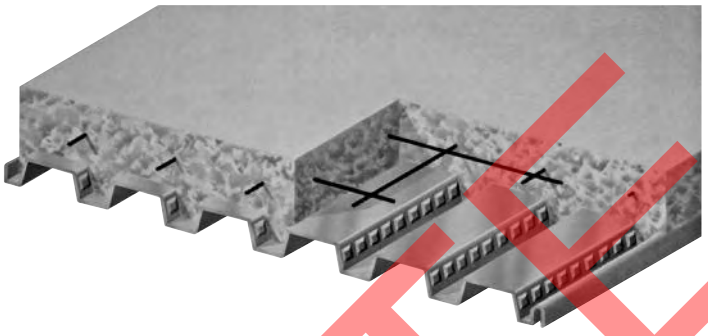
STEEL SECTION PROPERTIES

Deck Type	Design Thickness in	Deck Weight psf	Section Properties I_p in⁴/ft	S_p in³/ft	I_n in⁴/ft	S_n in³/ft	V_a lbs/ft	F_y ksi
1.5VL22	0.0295	1.78	0.143	0.169	0.177	0.179	2754	50
1.5VL20	0.0358	2.14	0.186	0.224	0.222	0.231	3322	50
1.5VL19	0.0418	2.49	0.230	0.271	0.260	0.282	3857	50
1.5VL18	0.0474	2.82	0.272	0.311	0.295	0.324	4350	50
1.5VL16	0.0598	3.54	0.373	0.404	0.373	0.411	4336	40

(N=9.35) NORMAL WEIGHT CONCRETE (145 PCF)

TOTAL SLAB DEPTH	DECK TYPE	SDI Max. Unshored Clear Span 1 SPAN	2 SPAN	3 SPAN	Superimposed Live Load, PSF Clear Span (ft.-in.) 5'-0	5'-6	6'-0	6'-6	7'-0	7'-6	8'-0	8'-6	9'-0	9'-6	10'-0	10'-6	11'-0	11'-6	12'-0
	1.5VL22	5'-10	7'-10	7'-10	314	279	230	206	186	169	154	141	130	120	111	100	87	76	67
3.50	1.5VL20	7'-0	9'-4	9'-6	345	306	275	249	227	187	171	157	144	133	124	108	94	82	73
(t=2.00)	1.5VL19	7'-11	10'-3	10'-8	372	330	296	268	244	224	186	171	157	145	134	116	101	88	78
33 PSF	1.5VL18	8'-8	11'-0	11'-2	395	351	315	285	260	238	220	204	168	156	142	123	107	94	82
	1.5VL16	8'-10	11'-0	11'-4	397	353	316	286	261	239	221	205	169	156	145	135	119	105	92
	1.5VL22	5'-6	7'-5	7'-5	366	325	267	239	216	196	179	164	151	139	129	119	111	103	96
4.00	1.5VL20	6'-7	8'-10	8'-11	400	356	319	289	239	217	198	182	167	155	143	133	124	115	108
(t=2.50)	1.5VL19	7'-5	9'-9	10'-1	400	383	344	311	283	235	215	197	182	168	156	145	135	126	115
39 PSF	1.5VL18	8'-1	10'-5	10'-7	400	400	365	330	301	276	254	211	194	180	167	156	145	136	122
	1.5VL16	8'-3	10'-5	10'-9	400	400	365	330	301	276	255	211	194	180	167	155	145	136	127
	1.5VL22	5'-3	7'-1	7'-1	400	345	307	275	248	225	205	188	173	159	147	136	127	118	109
4.50	1.5VL20	6'-3	8'-5	8'-6	400	400	366	303	274	249	227	208	192	177	164	152	142	132	123
(t=3.00)	1.5VL19	7'-1	9'-3	9'-7	400	400	393	356	325	269	246	226	208	192	179	166	155	144	135
45 PSF	1.5VL18	7'-8	9'-11	10'-1	400	400	400	378	344	316	262	241	222	206	191	178	166	155	145
	1.5VL16	7'-10	9'-11	10'-3	400	400	400	377	344	315	262	240	222	205	190	177	165	155	145
	1.5VL22	5'-0	6'-9	6'-9	400	391	347	311	280	254	232	213	195	180	167	154	143	133	124
5.00	1.5VL20	6'-0	8'-1	8'-2	400	400	400	343	310	281	257	236	217	200	186	172	160	149	139
(t=3.50)	1.5VL19	6'-9	8'-11	9'-2	400	400	400	400	335	304	278	255	235	218	202	188	175	163	153
51 PSF	1.5VL18	7'-3	9'-6	9'-8	400	400	400	400	389	324	297	272	251	233	216	201	187	175	164
	1.5VL16	7'-5	9'-6	9'-10	400	400	400	400	388	323	295	271	250	232	215	200	187	175	164
	1.5VL22	4'-10	6'-6	6'-6	400	400	388	348	314	285	260	238	219	202	186	173	160	149	138
5.50	1.5VL20	5'-9	7'-9	7'-10	400	400	400	383	346	314	287	263	243	224	208	193	179	167	156
(t=4.00)	1.5VL19	6'-5	8'-6	8'-9	400	400	400	400	374	340	311	286	263	243	226	210	196	183	171
57 PSF	1.5VL18	7'-0	9'-1	9'-4	400	400	400	400	400	363	331	305	281	260	241	225	210	196	183
	1.5VL16	7'-1	9'-2	9'-5	400	400	400	400	400	361	330	303	279	259	240	224	209	195	183
	1.5VL22	4'-8	6'-4	6'-4	400	400	400	385	347	315	288	263	242	223	206	191	178	165	153
6.00	1.5VL20	5'-6	7'-5	7'-6	400	400	400	400	383	348	318	292	269	248	230	213	199	185	173
(t=4.50)	1.5VL19	6'-2	8'-2	8'-5	400	400	400	400	400	377	344	316	291	270	250	232	217	202	189
63 PSF	1.5VL18	6'-8	8'-9	9'-0	400	400	400	400	400	400	367	337	311	288	267	249	232	217	203
	1.5VL16	6'-10	8'-10	9'-1	400	400	400	400	400	399	365	335	309	286	266	248	231	216	202

Notes:
1. Minimum exterior bearing length required is 1.50 inches. Minimum interior bearing length required is 3.00 inches. If these minimum lengths are not provided, web crippling must be checked.
2. Always contact Vulcraft when using loads in excess of 200 psf. Such loads often result from concentrated, dynamic, or long term load cases for which reductions due to bond breakage, concrete creep, etc. should be evaluated.
3. All fire rated assemblies are subject to an upper live load limit of 250 psf.



SLAB INFORMATION

Total Slab Depth, in.	Theo. Concrete Volume Yd^3 / 100 ft^2	Theo. Concrete Volume ft^3 / ft^2	Recommended Welded Wire Fabric
3 1/2	0.78	0.211	6x6 - W1.4xW1.4
4	0.94	0.253	6x6 - W1.4xW1.4
4 1/2	1.09	0.294	6x6 - W1.4xW1.4
4 3/4	1.17	0.315	6x6 - W1.4xW1.4
5	1.24	0.336	6x6 - W2.1xW2.1
5 1/2	1.40	0.378	6x6 - W2.1xW2.1
5 3/4	1.48	0.398	6x6 - W2.1xW2.1
6	1.55	0.419	6x6 - W2.1xW2.1

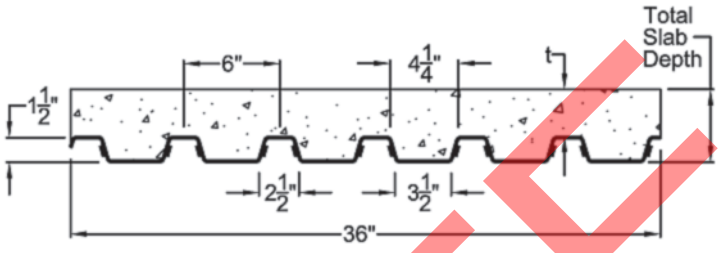
(N=14.15) LIGHTWEIGHT CONCRETE (110 PCF)

TOTAL SLAB DEPTH	DECK TYPE	SDI Max. Unshored Clear Span			Superimposed Live Load, PSF Clear Span (ft.-in.)														
		1 SPAN	2 SPAN	3 SPAN	5'-0	5'-6	6'-0	6'-6	7'-0	7'-6	8'-0	8'-6	9'-0	9'-6	10'-0	10'-6	11'-0	11'-6	12'-0
	1.5VL22	6'-4	8'-5	8'-6	278	247	222	185	167	152	139	124	105	89	76	66	57	50	44
3.50	1.5VL20	7'-8	9'-7	9'-11	305	271	243	220	201	184	154	135	114	97	83	72	62	54	48
(t=2.00)	1.5VL19	8'-8	10'-7	11'-0	329	292	262	237	216	198	173	145	122	104	89	77	67	58	51
26 PSF	1.5VL18	9'-6	11'-4	11'-9	350	311	279	252	230	211	184	153	129	110	94	81	71	62	54
	1.5VL16	9'-8	11'-5	11'-10	352	312	280	253	231	212	195	171	144	122	105	91	79	69	61
	1.5VL22	6'-0	8'-1	8'-1	324	288	258	215	194	177	161	148	136	126	113	98	85	75	66
4.00	1.5VL20	7'-3	9'-7	9'-9	355	315	283	256	233	195	178	164	151	140	123	106	92	81	71
(t=2.50)	1.5VL19	8'-2	10'-7	10'-11	382	339	304	275	251	230	212	178	164	152	131	113	99	86	76
30 PSF	1.5VL18	8'-11	11'-4	11'-5	400	360	323	292	266	244	225	209	175	162	139	120	104	91	80
	1.5VL16	9'-1	11'-4	11'-8	400	360	323	292	266	244	225	209	195	162	151	134	116	102	90
	1.5VL22	5'-9	7'-8	7'-8	372	330	275	246	223	202	185	170	156	145	134	125	116	106	93
4.50	1.5VL20	6'-11	9'-2	9'-4	400	361	324	293	246	223	204	188	173	160	149	139	129	114	101
(t=3.00)	1.5VL19	7'-9	10'-1	10'-5	400	388	348	315	287	264	221	203	188	174	162	151	140	122	107
35 PSF	1.5VL18	8'-6	10'-10	11'-0	400	400	369	334	305	279	258	239	200	186	173	161	147	129	114
	1.5VL16	8'-7	10'-10	11'-2	400	400	369	334	304	279	257	239	199	185	172	160	150	140	126
	1.5VL22	5'-7	7'-7	7'-7	396	352	293	263	237	216	197	181	167	154	143	133	124	115	108
4.75	1.5VL20	6'-9	9'-0	9'-1	400	385	345	312	262	238	218	200	184	171	159	148	138	129	118
(t=3.25)	1.5VL19	7'-7	9'-11	10'-3	400	400	371	336	306	281	235	216	200	185	172	160	150	140	126
37 PSF	1.5VL18	8'-3	10'-7	10'-9	400	400	393	356	324	298	274	231	213	198	184	171	160	150	133
	1.5VL16	8'-5	10'-7	11'-0	400	400	392	355	324	297	274	230	212	197	183	171	159	149	140
	1.5VL22	5'-6	7'-5	7'-5	400	374	311	279	252	229	209	192	177	164	152	141	131	123	115
5.00	1.5VL20	6'-7	8'-10	8'-11	400	400	367	332	278	253	231	212	196	181	168	157	146	137	128
(t=3.50)	1.5VL19	7'-5	9'-9	10'-1	400	400	394	356	325	273	250	230	212	197	183	170	159	149	140
39 PSF	1.5VL18	8'-1	10'-5	10'-7	400	400	400	378	344	316	291	245	226	210	195	182	170	159	149
	1.5VL16	8'-3	10'-5	10'-9	400	400	400	377	343	315	291	244	225	209	194	181	169	159	149
	1.5VL22	5'-2	7'-0	7'-0	400	400	367	329	297	270	247	227	209	193	179	166	155	145	135
5.75	1.5VL20	6'-2	8'-4	8'-5	400	400	400	362	327	298	272	250	231	214	199	185	172	161	151
(t=4.25)	1.5VL19	7'-0	9'-2	9'-6	400	400	400	400	383	322	295	271	250	232	215	201	187	175	165
46 PSF	1.5VL18	7'-7	9'-10	10'-0	400	400	400	400	400	372	314	289	267	247	230	214	200	188	176
	1.5VL16	7'-9	9'-10	10'-2	400	400	400	400	400	371	312	287	265	246	229	213	199	187	175

Notes:
1. Minimum exterior bearing length required is 1.50 inches. Minimum interior bearing length required is 3.00 inches. If these minimum lengths are not provided, web crippling must be checked.
2. Always contact Vulcraft when using loads in excess of 200 psf. Such loads often result from concentrated, dynamic, or long term load cases for which reductions due to bond breakage, concrete creep, etc. should be evaluated.
3. All fire rated assemblies are subject to an upper live load limit of 250 psf.

1.5 VLR

Maximum Sheet Length 42'-0
Extra Charge for Lengths Under 6'-0



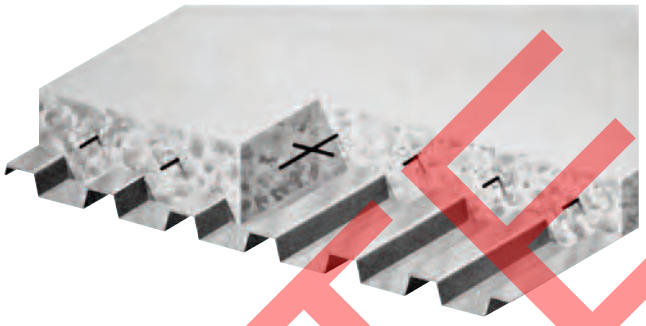
STEEL SECTION PROPERTIES

Deck Type	Design Thickness in	Deck Weight psf	Section Properties I_p in⁴/ft	S_p in³/ft	I_n in⁴/ft	S_n in³/ft	V_a lbs/ft	F_y ksi
1.5VLR22	0.0295	1.78	0.177	0.179	0.143	0.169	2754	50
1.5VLR20	0.0358	2.14	0.222	0.231	0.186	0.224	3322	50
1.5VLR19	0.0418	2.49	0.260	0.282	0.230	0.271	3857	50
1.5VLR18	0.0474	2.82	0.295	0.324	0.272	0.311	4350	50
1.5VLR16	0.0598	3.54	0.373	0.411	0.373	0.404	4336	40

(N=9.35) NORMAL WEIGHT CONCRETE (145 PCF)

TOTAL SLAB DEPTH	DECK TYPE	SDI Max. Unshored Clear Span 1 SPAN	2 SPAN	3 SPAN	Superimposed Live Load, PSF Clear Span (ft.-in.) 5'-0	5'-6	6'-0	6'-6	7'-0	7'-6	8'-0	8'-6	9'-0	9'-6	10'-0	10'-6	11'-0	11'-6	12'-0
	1.5VLR22	5'-9	7'-8	7'-9	314	279	227	203	183	166	151	138	127	117	108	100	92	86	77
3.50	1.5VLR20	6'-10	8'-9	9'-1	345	306	275	249	203	184	168	154	141	130	120	112	104	94	83
(t=2.00)	1.5VLR19	7'-8	9'-8	9'-11	372	330	296	268	244	224	182	167	154	142	132	122	114	100	88
38 PSF	1.5VLR18	8'-5	10'-3	10'-8	395	351	315	285	260	238	220	179	165	152	141	131	119	105	92
	1.5VLR16	8'-5	10'-5	10'-9	397	353	316	286	261	239	221	180	165	153	142	132	123	115	101
	1.5VLR22	5'-6	7'-3	7'-5	366	325	264	236	213	193	176	161	147	136	125	116	107	100	93
4.00	1.5VLR20	6'-5	8'-4	8'-8	400	356	319	261	236	214	195	179	164	151	140	130	121	112	105
(t=2.50)	1.5VLR19	7'-3	9'-2	9'-6	400	383	344	311	283	232	212	194	179	165	153	142	132	123	115
44 PSF	1.5VLR18	7'-11	9'-9	10'-1	400	400	365	330	301	276	226	207	191	177	164	152	142	132	124
	1.5VLR16	7'-11	9'-11	10'-3	400	400	365	330	301	276	226	207	191	176	164	152	142	132	124
	1.5VLR22	5'-3	6'-11	7'-1	400	342	303	271	245	222	202	185	170	156	144	133	124	115	107
4.50	1.5VLR20	6'-2	8'-0	8'-3	400	400	366	300	270	245	224	205	188	174	161	149	139	129	120
(t=3.00)	1.5VLR19	6'-11	8'-9	9'-1	400	400	393	356	293	266	243	223	205	189	175	163	151	141	132
50 PSF	1.5VLR18	7'-6	9'-4	9'-8	400	400	400	378	344	316	259	238	219	202	188	174	163	152	142
	1.5VLR16	7'-7	9'-6	9'-10	400	400	400	377	344	315	258	237	218	202	187	174	162	151	141
	1.5VLR22	5'-0	6'-8	6'-10	400	387	344	308	277	251	229	209	192	177	164	151	140	130	121
5.00	1.5VLR20	5'-10	7'-8	7'-11	400	400	379	339	306	278	254	232	214	197	182	169	157	146	136
(t=3.50)	1.5VLR19	6'-7	8'-5	8'-8	400	400	400	400	331	301	275	252	232	214	199	184	172	160	149
56 PSF	1.5VLR18	7'-2	9'-0	9'-3	400	400	400	400	389	321	293	269	248	229	213	198	184	172	161
	1.5VLR16	7'-3	9'-1	9'-5	400	400	400	400	388	320	292	268	247	228	212	197	183	171	160
	1.5VLR22	4'-10	6'-5	6'-7	400	400	385	344	310	281	256	235	216	199	183	170	157	146	136
5.50	1.5VLR20	5'-8	7'-4	7'-7	400	400	400	380	343	311	284	260	239	221	204	190	176	164	153
(t=4.00)	1.5VLR19	6'-4	8'-1	8'-4	400	400	400	400	371	337	308	282	260	240	222	207	192	179	168
62 PSF	1.5VLR18	6'-11	8'-8	8'-11	400	400	400	400	395	359	328	301	278	257	238	221	206	193	180
	1.5VLR16	6'-11	8'-9	9'-1	400	400	400	400	393	357	327	300	276	255	237	220	205	192	179
	1.5VLR22	4'-8	6'-2	6'-4	400	400	400	382	344	312	284	260	239	220	204	188	175	162	151
6.00	1.5VLR20	5'-6	7'-1	7'-4	400	400	400	400	380	345	315	289	265	245	227	210	196	182	170
(t=4.50)	1.5VLR19	6'-2	7'-10	8'-1	400	400	400	400	400	374	341	313	288	266	247	229	213	199	186
68 PSF	1.5VLR18	6'-9	8'-4	8'-7	400	400	400	400	400	398	364	334	308	285	264	245	229	214	200
	1.5VLR16	6'-9	8'-6	8'-9	400	400	400	400	400	396	362	332	306	283	262	244	228	213	199

Notes:
1. Minimum exterior bearing length required is 1.50 inches. Minimum interior bearing length required is 3.00 inches. If these minimum lengths are not provided, web crippling must be checked.
2. Always contact Vulcraft when using loads in excess of 200 psf. Such loads often result from concentrated, dynamic, or long term load cases for which reductions due to bond breakage, concrete creep, etc. should be evaluated.
3. All fire rated assemblies are subject to an upper live load limit of 250 psf.



SLAB INFORMATION

Total Slab Depth, in.	Theo. Concrete Volume Yd^3 / 100 ft^2	ft^3 / ft^2	Recommended Welded Wire Fabric
3 1/2	0.92	0.247	6x6 - W1.4xW1.4
4	1.07	0.289	6x6 - W1.4xW1.4
4 1/2	1.22	0.331	6x6 - W1.4xW1.4
4 3/4	1.30	0.352	6x6 - W1.4xW1.4
5	1.38	0.372	6x6 - W2.1xW2.1
5 1/2	1.53	0.414	6x6 - W2.1xW2.1
5 3/4	1.61	0.435	6x6 - W2.1xW2.1
6	1.69	0.456	6x6 - W2.1xW2.1

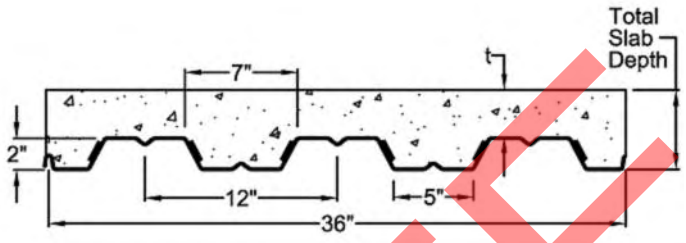
(N=14.15) LIGHTWEIGHT CONCRETE (110 PCF)

TOTAL SLAB DEPTH	DECK TYPE	SDI Max. Unshored Clear Span			Superimposed Live Load, PSF Clear Span (ft.-in.)														
		1 SPAN	2 SPAN	3 SPAN	5'-0	5'-6	6'-0	6'-6	7'-0	7'-6	8'-0	8'-6	9'-0	9'-6	10'-0	10'-6	11'-0	11'-6	12'-0
	1.5VLR22	6'-4	8'-2	8'-5	278	247	222	182	164	149	136	125	115	103	88	76	66	58	51
3.50	1.5VLR20	7'-5	9'-5	9'-9	305	271	243	220	201	165	151	139	128	110	94	82	71	62	55
(t=2.00)	1.5VLR19	8'-6	10'-5	10'-9	329	292	262	237	216	198	183	163	137	117	100	86	75	66	58
30 PSF	1.5VLR18	9'-3	11'-1	11'-6	350	311	279	252	230	211	195	171	144	123	105	91	79	69	61
	1.5VLR16	9'-3	11'-3	11'-8	352	312	280	253	231	212	195	181	158	135	115	100	87	76	67
	1.5VLR22	6'-0	7'-11	8'-1	324	288	258	212	192	174	159	146	134	124	115	106	98	86	76
4.00	1.5VLR20	7'-1	9'-1	9'-5	355	315	283	256	233	192	176	161	149	137	127	119	105	92	81
(t=2.50)	1.5VLR19	8'-0	10'-0	10'-4	382	339	304	275	251	230	212	175	161	149	139	128	111	97	85
34 PSF	1.5VLR18	8'-9	10'-8	11'-0	400	360	323	292	266	244	225	209	172	160	148	134	116	102	90
	1.5VLR16	8'-9	10'-10	11'-2	400	360	323	292	266	244	225	209	172	159	148	138	128	112	98
	1.5VLR22	5'-9	7'-7	7'-9	372	330	272	244	220	200	183	167	154	142	132	122	114	106	99
4.50	1.5VLR20	6'-9	8'-9	9'-0	400	361	324	293	243	221	202	185	171	158	146	136	127	118	111
(t=3.00)	1.5VLR19	7'-8	9'-7	9'-11	400	388	348	315	287	264	219	201	185	171	159	148	138	129	120
39 PSF	1.5VLR18	8'-4	10'-3	10'-7	400	400	369	334	305	279	258	214	198	183	170	158	148	138	126
	1.5VLR16	8'-4	10'-4	10'-9	400	400	369	334	304	279	257	213	197	182	169	158	147	138	129
	1.5VLR22	5'-8	7'-6	7'-7	396	352	290	260	235	213	195	178	164	152	141	130	121	113	106
4.75	1.5VLR20	6'-7	8'-7	8'-10	400	385	345	312	259	235	215	198	182	168	156	145	135	126	118
(t=3.25)	1.5VLR19	7'-6	9'-5	9'-9	400	400	371	336	306	281	233	214	197	183	170	158	147	138	129
41 PSF	1.5VLR18	8'-2	10'-1	10'-5	400	400	393	356	324	298	274	228	211	195	181	169	158	147	138
	1.5VLR16	8'-2	10'-2	10'-6	400	400	392	355	324	297	274	227	210	194	180	168	157	147	138
	1.5VLR22	5'-6	7'-4	7'-6	400	374	308	276	250	227	207	190	175	161	149	139	129	120	112
5.00	1.5VLR20	6'-6	8'-5	8'-8	400	400	367	332	275	250	229	210	193	179	166	154	144	134	126
(t=3.50)	1.5VLR19	7'-4	9'-3	9'-6	400	400	394	356	325	271	248	227	210	194	180	168	157	146	137
43 PSF	1.5VLR18	8'-0	9'-10	10'-2	400	400	400	378	344	316	291	242	224	207	192	179	167	157	147
	1.5VLR16	8'-0	10'-0	10'-4	400	400	400	377	343	315	291	241	223	206	192	178	167	156	146
	1.5VLR22	5'-3	6'-11	7'-1	400	400	364	326	295	268	244	224	206	191	177	164	153	142	133
5.75	1.5VLR20	6'-2	8'-0	8'-3	400	400	400	360	325	295	270	248	229	211	196	182	170	159	149
(t=4.25)	1.5VLR19	6'-11	8'-9	9'-1	400	400	400	400	351	319	292	268	248	229	213	198	185	173	162
50 PSF	1.5VLR18	7'-6	9'-4	9'-8	400	400	400	400	400	372	311	286	264	245	227	212	198	185	174
	1.5VLR16	7'-7	9'-6	9'-10	400	400	400	400	400	371	309	284	263	243	226	211	197	184	173

Notes:
1. Minimum exterior bearing length required is 1.50 inches. Minimum interior bearing length required is 3.00 inches. If these minimum lengths are not provided, web crippling must be checked.
2. Always contact Vulcraft when using loads in excess of 200 psf. Such loads often result from concentrated, dynamic, or long term load cases for which reductions due to bond breakage, concrete creep, etc. should be evaluated.
3. All fire rated assemblies are subject to an upper live load limit of 250 psf.

2 VLI

Maximum Sheet Length 42'-0
Extra Charge for Lengths Under 6'-0
ICBO Approved (No. 3415)



Interlocking side lap is not drawn to show actual detail.

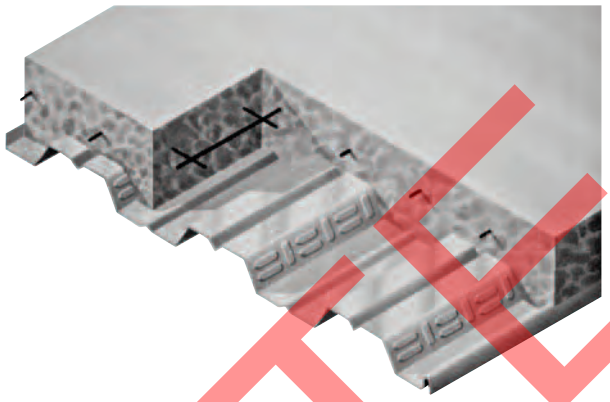
STEEL SECTION PROPERTIES

Deck Type	Design Thickness in	Deck Weight psf	Section Properties I_p in^4/ft	S_p in^3/ft	I_n in^4/ft	S_n in^3/ft	V_a lbs/ft	F_y ksi
2VLI22	0.0295	1.62	0.324	0.263	0.321	0.266	1832	50
2VLI20	0.0358	1.97	0.409	0.341	0.406	0.346	2698	50
2VLI19	0.0418	2.30	0.492	0.420	0.489	0.426	3190	50
2VLI18	0.0474	2.61	0.559	0.495	0.558	0.504	3608	50
2VLI16	0.0598	3.29	0.704	0.653	0.704	0.653	3618	40

(N=9.35) NORMAL WEIGHT CONCRETE (145 PCF)

TOTAL SLAB DEPTH	DECK TYPE	SDI Max. Unshored Clear Span 1 SPAN	2 SPAN	3 SPAN	Superimposed Live Load, PSF Clear Span (ft.-in.) 5'-6	6'-0	6'-6	7'-0	7'-6	8'-0	8'-6	9'-0	9'-6	10'-0	10'-6	11'-0	11'-6	12'-0	12'-6
	2VLI22	7'-4	9'-6	9'-9	274	239	211	188	145	129	115	104	94	85	78	71	65	59	54
4.00	2VLI20	8'-7	10'-10	11'-2	310	269	236	210	188	170	155	117	106	96	87	80	73	67	61
(t=2.00)	2VLI19	9'-9	11'-11	12'-4	344	298	261	231	207	186	169	155	142	106	97	88	81	74	68
39 PSF	2VLI18	10'-9	12'-9	12'-9	373	324	285	253	228	206	188	172	159	147	137	103	95	87	81
	2VLI16	11'-1	13'-2	13'-5	400	376	330	292	261	235	214	195	180	166	154	143	109	100	93
	2VLI22	6'-11	9'-0	9'-4	319	278	245	190	168	150	134	121	109	99	90	83	76	69	63
4.50	2VLI20	8'-2	10'-3	10'-7	361	313	275	244	219	198	152	136	123	112	102	93	85	78	72
(t=2.50)	2VLI19	9'-2	11'-5	11'-9	400	346	303	268	240	216	196	180	136	124	113	103	94	86	79
45 PSF	2VLI18	10'-2	12'-4	12'-4	400	376	331	295	264	239	218	200	184	171	130	119	110	102	94
	2VLI16	10'-5	12'-6	12'-11	400	400	383	339	303	274	248	227	209	193	150	137	126	117	108
	2VLI22	6'-7	8'-7	8'-11	364	317	279	217	192	171	153	138	125	113	103	94	86	79	72
5.00	2VLI20	7'-9	9'-10	10'-2	400	356	313	278	249	193	173	156	141	128	116	106	97	89	82
(t=3.00)	2VLI19	8'-9	10'-11	11'-3	400	394	345	306	273	247	224	172	156	141	128	117	107	99	91
51 PSF	2VLI18	9'-7	11'-10	11'-11	400	400	377	336	301	273	249	228	210	162	148	136	126	116	107
	2VLI16	9'-11	12'-0	12'-4	400	400	400	386	346	312	283	259	238	187	171	157	144	133	123
	2VLI22	6'-4	8'-0	8'-6	400	355	278	244	216	192	172	155	140	127	116	106	97	89	81
5.50	2VLI20	7'-5	9'-5	9'-9	400	400	351	312	244	217	194	175	158	143	131	119	109	100	92
(t=3.50)	2VLI19	8'-4	10'-5	10'-9	400	400	388	343	307	277	215	193	175	159	144	132	121	111	102
57 PSF	2VLI18	9'-2	11'-4	11'-7	400	400	400	377	338	306	279	256	199	182	167	153	141	130	121
	2VLI16	9'-5	11'-6	11'-10	400	400	400	400	388	350	318	290	230	210	192	176	162	150	138
	2VLI22	6'-1	7'-5	8'-2	400	394	308	270	239	213	191	172	156	141	129	118	108	99	90
6.00	2VLI20	7'-1	9'-1	9'-4	400	400	390	346	271	241	215	194	175	159	145	132	121	111	102
(t=4.00)	2VLI19	8'-0	10'-1	10'-5	400	400	400	381	340	307	239	215	194	176	160	146	134	123	113
63 PSF	2VLI18	8'-10	10'-11	11'-3	400	400	400	400	375	339	309	243	221	202	185	170	157	145	134
	2VLI16	9'-1	11'-1	11'-5	400	400	400	400	400	388	352	322	255	233	213	195	180	166	154
	2VLI22	5'-11	6'-11	7'-11	400	390	339	297	263	234	210	189	171	155	141	129	118	108	99
6.50	2VLI20	6'-11	8'-9	9'-0	400	400	400	337	297	264	237	213	193	175	159	145	133	122	112
(t=4.50)	2VLI19	7'-10	9'-8	10'-0	400	400	400	400	374	293	262	236	213	193	176	161	147	135	124
69 PSF	2VLI18	8'-7	10'-6	10'-11	400	400	400	400	400	373	340	268	243	222	203	187	172	159	147
	2VLI16	8'-10	10'-8	11'-0	400	400	400	400	400	400	387	309	280	256	234	215	198	183	169

Notes:
1. Minimum exterior bearing length required is 2.00 inches. Minimum interior bearing length required is 4.00 inches. If these minimum lengths are not provided, web crippling must be checked.
2. Always contact Vulcraft when using loads in excess of 200 psf. Such loads often result from concentrated, dynamic, or long term load cases for which reductions due to bond breakage, concrete creep, etc. should be evaluated.
3. All fire rated assemblies are subject to an upper live load limit of 250 psf.



SLAB INFORMATION

Total Slab Depth, in.	Theo. Concrete Volume Yd^3 / 100 ft^2	ft^3 / ft^2	Recommended Welded Wire Fabric
4	0.93	0.250	6x6 - W1.4xW1.4
4 1/2	1.08	0.292	6x6 - W1.4xW1.4
5	1.23	0.333	6x6 - W1.4xW1.4
5 1/4	1.31	0.354	6x6 - W1.4xW1.4
5 1/2	1.39	0.375	6x6 - W2.1xW2.1
6	1.54	0.417	6x6 - W2.1xW2.1
6 1/4	1.62	0.438	6x6 - W2.1xW2.1
6 1/2	1.70	0.458	6x6 - W2.1xW2.1

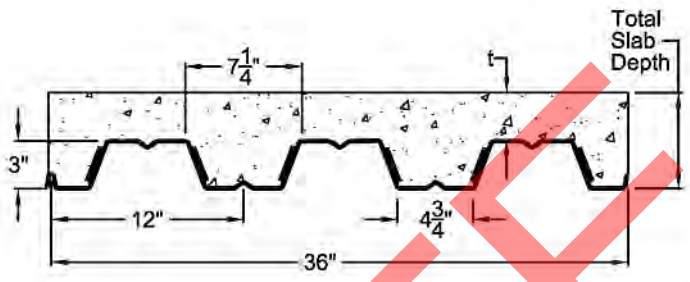
(N=14.15) LIGHTWEIGHT CONCRETE (110 PCF)

TOTAL SLAB DEPTH	DECK TYPE	SDI Max. Unshored Clear Span			Superimposed Live Load, PSF Clear Span (ft.-in.)														
		1 SPAN	2 SPAN	3 SPAN	6'-0	6'-6	7'-0	7'-6	8'-0	8'-6	9'-0	9'-6	10'-0	10'-6	11'-0	11'-6	12'-0	12'-6	13'-0
	2VLI22	8'-1	10'-3	10'-7	238	209	186	167	152	120	108	98	90	82	75	69	64	59	55
4.00	2VLI20	9'-6	11'-8	12'-1	268	235	209	187	169	153	140	129	101	92	84	78	72	66	61
(t=2.00)	2VLI19	10'-10	13'-0	13'-2	297	260	230	206	185	168	153	141	130	121	93	86	79	73	68
30 PSF	2VLI18	11'-7	13'-7	13'-7	324	285	253	227	205	187	171	158	146	136	127	119	92	86	80
	2VLI16	12'-3	14'-3	14'-4	377	330	292	261	235	214	195	179	165	153	143	133	118	98	91
	2VLI22	7'-8	9'-10	10'-2	276	243	216	194	155	139	126	114	104	96	88	81	75	69	64
4.50	2VLI20	9'-0	11'-3	11'-7	312	273	243	217	196	178	163	128	117	107	98	90	83	77	72
(t=2.50)	2VLI19	10'-3	12'-5	12'-9	346	302	268	239	215	195	178	164	151	118	108	100	92	85	79
35 PSF	2VLI18	11'-2	13'-1	13'-1	376	331	294	264	238	217	199	183	170	158	147	116	107	100	93
	2VLI16	11'-7	13'-8	13'-10	400	384	340	303	273	248	227	208	192	178	166	155	123	114	106
	2VLI22	7'-4	9'-5	9'-9	315	277	247	197	176	159	143	130	119	109	100	92	85	79	73
5.00	2VLI20	8'-7	10'-9	11'-2	355	312	276	248	224	203	161	146	133	122	112	103	95	88	82
(t=3.00)	2VLI19	9'-9	11'-11	12'-4	394	345	305	272	245	223	203	187	147	135	124	114	105	97	90
39 PSF	2VLI18	10'-9	12'-9	12'-9	400	377	335	300	272	247	227	209	193	180	143	132	122	114	106
	2VLI16	11'-0	13'-1	13'-5	400	400	387	346	311	283	258	237	219	203	189	151	140	130	121
	2VLI22	7'-2	9'-3	9'-7	334	294	262	209	187	168	152	138	126	116	106	98	90	84	78
5.25	2VLI20	8'-5	10'-7	10'-11	377	331	293	263	237	190	171	155	142	130	119	110	101	94	87
(t=3.25)	2VLI19	9'-6	11'-8	12'-1	400	366	324	289	260	236	216	198	156	143	131	121	111	103	95
42 PSF	2VLI18	10'-6	12'-7	12'-7	400	400	355	319	288	263	241	222	205	191	151	140	130	121	113
	2VLI16	10'-9	12'-10	13'-3	400	400	400	367	330	300	274	252	232	215	173	160	148	138	128
	2VLI22	7'-0	9'-1	9'-5	353	311	277	222	198	178	161	147	134	122	113	104	96	89	82
5.50	2VLI20	8'-3	10'-4	10'-9	399	350	310	278	251	201	181	165	150	137	126	116	107	99	92
(t=3.50)	2VLI19	9'-4	11'-6	11'-10	400	387	342	306	275	250	228	182	165	151	139	128	118	109	101
44 PSF	2VLI18	10'-3	12'-5	12'-5	400	400	376	337	305	278	254	234	217	174	160	148	138	128	119
	2VLI16	10'-6	12'-7	13'-0	400	400	400	388	350	317	290	266	246	228	184	170	157	146	136
	2VLI22	6'-8	8'-7	8'-11	400	362	291	258	231	208	188	171	156	143	131	121	112	103	96
6.25	2VLI20	7'-9	9'-10	10'-2	400	400	361	323	260	234	211	192	175	160	147	135	125	115	107
(t=4.25)	2VLI19	8'-9	10'-11	11'-3	400	400	398	356	320	291	233	212	193	176	162	149	137	127	118
51 PSF	2VLI18	9'-8	11'-10	11'-11	400	400	400	392	355	323	296	273	220	202	187	173	160	149	139
	2VLI16	9'-11	12'-0	12'-5	400	400	400	400	400	369	337	310	253	232	214	198	183	170	158

Notes:
1. Minimum exterior bearing length required is 2.00 inches. Minimum interior bearing length required is 4.00 inches. If these minimum lengths are not provided, web crippling must be checked.
2. Always contact Vulcraft when using loads in excess of 200 psf. Such loads often result from concentrated, dynamic, or long term load cases for which reductions due to bond breakage, concrete creep, etc. should be evaluated.
3. All fire rated assemblies are subject to an upper live load limit of 250 psf.

3 VLI

Maximum Sheet Length 42'-0
Extra Charge for Lengths Under 6'-0
ICBO Approved (No. 3415)



Interlocking side lap is not drawn to show actual detail.

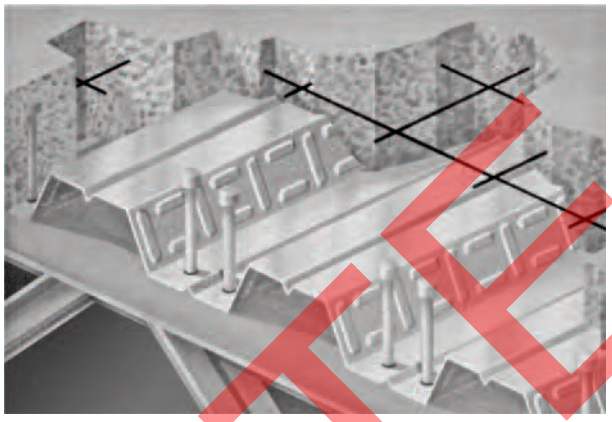
STEEL SECTION PROPERTIES

Deck Type	Design Thickness in	Deck Weight psf	Section Properties I_p in^4/ft	S_p in^3/ft	I_n in^4/ft	S_n in^3/ft	V_a lbs/ft	F_y ksi
3VLI22	0.0295	1.77	0.730	0.414	0.729	0.426	1528	50
3VLI20	0.0358	2.14	0.920	0.534	0.919	0.551	2698	50
3VLI19	0.0418	2.50	1.104	0.654	1.102	0.676	3678	50
3VLI18	0.0474	2.84	1.254	0.770	1.252	0.797	4729	50
3VLI16	0.0598	3.58	1.580	1.013	1.580	1.013	5309	40

(N=9.35) NORMAL WEIGHT CONCRETE (145 PCF)

TOTAL SLAB DEPTH	DECK TYPE	SDI Max. Unshored Clear Span 1 SPAN	2 SPAN	3 SPAN	Superimposed Live Load, PSF Clear Span (ft.-in.) 7'-0	7'-6	8'-0	8'-6	9'-0	9'-6	10'-0	10'-6	11'-0	11'-6	12'-0	12'-6	13'-0	13'-6	14'-0
	3VLI22	9'-2	10'-7	11'-8	216	195	176	161	148	109	99	90	83	76	70	64	59	54	50
5.00	3VLI20	10'-8	12'-11	13'-4	241	216	196	178	163	150	139	129	93	85	78	72	66	61	57
(t=2.00)	3VLI19	12'-0	14'-4	14'-7	265	237	214	194	178	163	151	140	131	122	115	79	73	67	62
45 PSF	3VLI18	12'-10	15'-1	15'-1	289	261	238	218	201	186	173	161	151	142	134	127	92	86	80
	3VLI16	13'-5	15'-7	15'-11	327	294	267	243	223	206	191	178	167	156	147	139	132	96	89
	3VLI22	8'-9	9'-8	10'-11	247	222	201	184	137	124	113	103	94	87	80	73	67	62	57
5.50	3VLI20	10'-1	12'-4	12'-9	275	247	223	203	186	171	159	116	106	97	89	82	76	70	65
(t=2.50)	3VLI19	11'-4	13'-8	14'-2	302	270	244	222	203	186	172	160	149	107	98	90	83	77	71
51 PSF	3VLI18	12'-5	14'-7	14'-7	330	298	271	248	229	212	197	184	173	162	153	112	105	98	92
	3VLI16	12'-9	14'-11	15'-5	373	335	304	277	255	235	218	203	190	178	168	159	117	109	102
	3VLI22	8'-4	8'-10	10'-1	277	249	226	171	154	140	127	116	106	97	89	82	76	70	65
6.00	3VLI20	9'-8	11'-10	12'-3	309	277	250	228	209	193	143	130	119	109	100	92	85	79	73
(t=3.00)	3VLI19	10'-10	13'-2	13'-7	339	304	274	249	227	209	193	179	131	120	110	102	94	87	80
57 PSF	3VLI18	11'-10	14'-2	14'-2	370	334	304	279	257	238	221	207	194	182	136	126	118	110	103
	3VLI16	12'-2	14'-4	14'-10	400	376	341	311	286	264	245	228	213	200	189	141	132	123	115
	3VLI22	8'-0	8'-3	9'-4	307	277	251	190	171	155	141	129	118	108	99	91	84	78	72
6.50	3VLI20	9'-3	11'-5	11'-9	343	307	278	253	232	174	158	144	132	121	111	103	95	87	81
(t=3.50)	3VLI19	10'-4	12'-8	13'-1	377	337	304	276	252	232	214	159	146	134	123	113	104	96	89
63 PSF	3VLI18	11'-4	13'-9	13'-10	400	371	338	309	285	264	246	229	215	162	151	140	131	122	115
	3VLI16	11'-7	13'-10	14'-3	400	400	378	345	317	293	272	253	237	222	169	157	146	136	128
	3VLI22	7'-9	7'-8	8'-8	338	304	233	209	188	171	155	142	130	119	109	101	93	86	79
7.00	3VLI20	9'-0	10'-11	11'-4	377	338	305	278	255	192	174	159	145	133	122	113	104	96	89
(t=4.00)	3VLI19	10'-1	12'-3	12'-7	400	370	334	303	277	255	236	175	160	147	135	124	115	106	98
69 PSF	3VLI18	11'-0	13'-3	13'-6	400	400	371	340	313	290	270	252	236	178	166	154	144	135	126
	3VLI16	11'-4	13'-4	13'-9	400	400	400	379	348	322	298	278	260	200	185	172	161	150	140
	3VLI22	7'-7	7'-2	8'-2	368	331	254	228	205	186	169	154	141	130	119	110	101	93	86
7.50	3VLI20	8'-9	10'-2	11'-0	400	368	333	303	231	209	190	173	158	145	134	123	113	105	97
(t=4.50)	3VLI19	9'-10	11'-10	12'-2	400	400	364	331	302	278	209	191	175	160	147	136	125	116	107
75 PSF	3VLI18	10'-9	12'-10	13'-3	400	400	400	370	341	316	294	275	210	195	181	168	157	147	138
	3VLI16	11'-0	12'-11	13'-4	400	400	400	400	380	351	325	303	283	218	202	188	175	164	153

Notes:
1. Minimum exterior bearing length required is 2.50 inches. Minimum interior bearing length required is 5.00 inches. If these minimum lengths are not provided, web crippling must be checked.
2. Always contact Vulcraft when using loads in excess of 200 psf. Such loads often result from concentrated, dynamic, or long term load cases for which reductions due to bond breakage, concrete creep, etc. should be evaluated.
3. All fire rated assemblies are subject to an upper live load limit of 250 psf.



SLAB INFORMATION

Total Slab Depth, in.	Theo. Concrete Volume Yd^3 / 100 ft^2	Theo. Concrete Volume ft^3 / ft^2	Recommended Welded Wire Fabric
5	1.08	0.292	6x6 - W1.4xW1.4
5 1/2	1.23	0.333	6x6 - W1.4xW1.4
6	1.39	0.375	6x6 - W1.4xW1.4
6 1/4	1.47	0.396	6x6 - W1.4xW1.4
6 1/2	1.54	0.417	6x6 - W2.1xW2.1
7	1.70	0.458	6x6 - W2.1xW2.1
7 1/4	1.77	0.479	6x6 - W2.1xW2.1
7 1/2	1.85	0.500	6x6 - W2.1xW2.1

(N=14.15) LIGHTWEIGHT CONCRETE (110 PCF)

TOTAL SLAB DEPTH	DECK TYPE	SDI Max. Unshored Clear Span			Superimposed Live Load, PSF Clear Span (ft.-in.)														
		1 SPAN	2 SPAN	3 SPAN	8'-0	8'-6	9'-0	9'-6	10'-0	10'-6	11'-0	11'-6	12'-0	12'-6	13'-0	13'-6	14'-0	14'-6	15'-0
	3VLI22	10'-2	12'-4	12'-9	141	127	115	105	96	67	60	54	49	45	40				
5.00	3VLI20	11'-11	14'-2	14'-7	163	147	133	121	110	102	94	87	59	54	49	44	40		
(t=2.00)	3VLI19	13'-4	15'-7	15'-7	185	166	150	136	124	114	105	97	90	84	79	52	47	43	
35 PSF	3VLI18	13'-9	16'-1	16'-1	244	222	204	188	174	162	151	142	133	126	119	112	85	79	75
	3VLI16	14'-5	16'-11	16'-11	277	254	234	217	202	189	177	166	157	149	141	134	127	99	94
	3VLI22	9'-8	11'-7	12'-2	161	145	131	120	85	77	69	62	56	51	46	42			
5.50	3VLI20	11'-3	13'-7	14'-0	186	167	151	138	126	116	107	74	67	61	56	51	46	42	
(t=2.50)	3VLI19	12'-8	15'-0	15'-1	211	189	171	155	142	130	120	111	103	96	65	59	54	49	45
39 PSF	3VLI18	13'-4	15'-7	15'-7	278	253	232	214	198	184	172	161	152	143	135	103	97	91	85
	3VLI16	14'-0	16'-4	16'-5	316	289	267	247	230	215	202	190	179	170	161	153	146	114	107
	3VLI22	9'-3	10'-9	11'-9	181	163	147	107	96	86	78	70	63	57	52	47	43		
6.00	3VLI20	10'-9	13'-1	13'-6	209	188	170	155	141	130	93	84	76	69	63	57	52	47	43
(t=3.00)	3VLI19	12'-1	14'-5	14'-8	237	212	192	174	159	146	135	125	116	80	73	67	61	56	51
44 PSF	3VLI18	12'-11	15'-2	15'-2	312	284	261	240	223	207	193	181	170	161	124	116	109	102	96
	3VLI16	13'-7	15'-9	16'-0	354	325	299	277	258	241	226	213	201	190	181	172	135	128	121
	3VLI22	9'-1	10'-4	11'-6	191	172	155	113	101	91	82	74	67	60	55	50	45	41	
6.25	3VLI20	10'-6	12'-10	13'-3	221	198	179	163	149	137	98	88	80	73	66	60	55	50	46
(t=3.25)	3VLI19	11'-10	14'-2	14'-6	250	224	202	184	168	154	142	131	93	84	77	70	64	59	54
46 PSF	3VLI18	12'-9	15'-0	15'-0	329	300	275	253	235	218	204	191	180	169	131	122	115	108	101
	3VLI16	13'-4	15'-6	15'-10	374	343	316	293	272	254	239	225	212	201	190	151	143	135	128
	3VLI22	8'-11	10'-0	11'-4	200	180	134	119	107	96	86	78	70	64	58	52	47	43	
6.50	3VLI20	10'-4	12'-7	13'-0	232	209	189	172	157	114	103	93	84	77	70	63	58	53	48
(t=3.50)	3VLI19	11'-7	14'-0	14'-4	263	236	213	193	176	162	149	138	98	89	81	74	68	62	57
48 PSF	3VLI18	12'-7	14'-9	14'-9	346	316	289	267	247	230	215	201	189	178	138	129	121	113	107
	3VLI16	13'-0	15'-2	15'-7	393	360	332	308	286	268	251	236	223	211	200	159	150	142	134
	3VLI22	8'-5	9'-1	10'-4	230	173	153	137	122	110	99	89	81	73	66	60	55	49	45
7.25	3VLI20	9'-9	12'-0	12'-5	267	240	217	197	146	131	118	107	97	88	80	73	66	61	55
(t=4.25)	3VLI19	10'-11	13'-4	13'-9	302	271	244	222	203	186	137	124	112	102	93	85	78	71	65
55 PSF	3VLI18	12'-0	14'-4	14'-4	398	362	332	306	284	264	246	231	217	169	158	148	139	130	123
	3VLI16	12'-4	14'-6	15'-0	400	400	381	353	329	307	288	271	256	207	194	183	173	163	154

Notes:
1. Minimum exterior bearing length required is 2.50 inches. Minimum interior bearing length required is 5.00 inches. If these minimum lengths are not provided, web crippling must be checked.
2. Always contact Vulcraft when using loads in excess of 200 psf. Such loads often result from concentrated, dynamic, or long term load cases for which reductions due to bond breakage, concrete creep, etc. should be evaluated.
3. All fire rated assemblies are subject to an upper live load limit of 250 psf.

ANSI/SDI-C1.0 Standard for Composite Steel Floor Deck

1. General

1.1 Scope:

A. This specification for Composite Steel Deck shall govern the materials, design, and erection of cold formed steel deck which acts as a permanent form and as positive reinforcement for a structural concrete slab.

B. Commentary shall not be considered part of the mandatory document.

1.2 Reference Codes, Standards and Documents:

A. Codes and Standards: For purposes of this Standard, comply with applicable provisions of the following Codes and Standards:

1. American Iron and Steel Institute (AISI) Standard-North American Specification for the Design of Cold-Formed Steel Structural Members, 2001 Edition with Supplement 2004
2. American Welding Society-ANSI/AWS D1.3 Structural Welding Code/Sheet Steel-98 Structural Welding Code-Sheet Steel
3. American Society for Testing and Materials (ASTM) A653 (A653M)-06, A924 (A924M)-06, A1008 (A1008M)-06, A820 (A820M)-06, C1399 (C1399M)-04, Test Method E2322-03, ASTM Subcommittee CO9.42
4. American Concrete Institute (ACI) Building Code Requirements for Reinforced Concrete – ACI 318-05
5. American Society of Civil Engineering (ASCE)-SEI/ASCE7-05
6. American Institute of Steel Construction (AISC)-Specification for Structural Steel Buildings, 13th Edition
7. Underwriters Laboratories (UL) Fire Resistance Directory-http://www.ul.com/database 2006

Commentary: Many fire related assemblies that use composite floor decks are available. In the Underwriters Laboratories Fire Resistance Directory, the composite deck constructions show hourly ratings for restrained and unrestrained assemblies. ASTM E119 provides information in appendix X3 called "Guide for Determining Conditions of Restraint for Floor and Roof Assemblies and for Individual Beams".

B. Reference Documents: Refer to the following documents:

1. SDI Composite Deck Design Handbook-CDD2-1997
2. SDI Manual of Construction with Steel Deck-MOC2-2006
3. SDI Standard Practice Details-SPD2-2001
4. SDI Diaphragm Design Manual-DDMO3-2004

2. Products

2.1 Material:

A. Sheet steel for galvanized deck shall conform to ASTM A653 (A653M) Structural Quality, with a minimum yield strength of 33 ksi (230 MPa).

B. Sheet steel for uncoated or phosphatized top/painted bottom deck shall conform to ASTM A1008 (A1008M) with a minimum yield strength of 33 ksi (230 MPa). Other structural sheet steels or high strength low alloy steels are acceptable, and shall be selected from the *North American Specification for the Design of Cold-Formed Steel Structural Members.*

C. Sheet steel for accessories shall conform to ASTM A653 (A653M)-minimum yield strength of 33 ksi (230 MPa). Structural Quality for structural accessories, ASTM A653 (A653M) Commercial Quality for non-structural accessories, or ASTM A1008 (A1008M) for either structural or non-structural accessories. Other structural sheet steels or high strength low alloy steels are acceptable, and shall be selected from the *North American Specification for the Design of Cold-Formed Steel Structural Members.*

D. The deck type (profile) and thickness (gage) shall be as shown on the plans.

Commentary: Most composite steel floor deck is manufactured from steel conforming to ASTM Designation A1008 (A1008M), Grades 33 and 40, or from A653 (A653M), Structural Sheet Steel. When specifying alternative steels, certain restrictions apply (See *North American Specification for the Design of Cold-Formed Steel Structural Members* Section A 2-3.2). 2.1A refers to the use of galvanized deck while 2.1B refers to the use of uncoated or phosphatized top/painted underside deck. In most cases the designer will choose one finish or the other. However, both types of finish may be used on a job, in which case the designer must indicate on the plans and project specifications the areas in which each is used. (Refer to Section 2.3 and the commentary of these specifications). In section 2.1D, the deck type is the particular profile of deck chosen by the designer.

2.2 Tolerance:

A. Uncoated thickness shall not be less than 95% of the design thickness as listed in Table 2.2.1:

Table 2.2.1

Gage No.	Design Thickness		Minimum Thickness	
	in.	mm.	in.	mm.
22	0.0295	0.75	0.028	0.71
21	0.0329	0.84	0.031	0.79
20	0.0358	0.91	0.034	0.86
19	0.0418	1.06	0.040	1.01
18	0.0474	1.20	0.045	1.14
17	0.0538	1.37	0.051	1.30
16	0.0598	1.52	0.057	1.44

B. Panel length shall be within plus or minus 1/2 inch (12 mm) of specified length.

C. Panel cover width shall be no greater than minus 3/8 inch (10 mm), plus 3/4 inch (20 mm).

D. Panel camber and/or sweep shall be no greater than 1/4 inch in 10 foot length (6 mm in 3 m).

E. Panel end out of square shall not be greater than 1/8 inch per foot of panel width (10 mm per m).

2.3 Finish:

A. Galvanizing shall conform to ASTM A653 (A653M).

B. Uncoated or phosphatized topside with painted underside shall be applied to steel sheet conforming to ASTM A1008 (A1008M).

C. The finish on the steel composite deck shall be suitable for the environment of the structure.

Commentary: The finish on the steel composite deck shall be as specified by the designer and be suitable for the environment of the structure. Since the composite deck is the positive bending reinforcement for the slab, it must be designed to last the life of the structure. A galvanized finish equal to ASTM A653 (A653M)-G30 minimum is recommended. When composite deck with a phosphatized top and painted bottom is used, the primer coat is intended to protect the steel for only a short period of exposure in ordinary atmospheric conditions and shall be considered an impermanent and provisional coating.

2.4 Design:

A. Deck as a form

1. The section properties for the steel floor deck unit (as a form in bending) shall be computed in accordance with the *North American Specification for the Design of Cold-Formed Steel Structural Members.*

2. Allowable Stress Design (ASD): Bending stress shall not exceed 0.60 times the yield strength, nor exceed 36 ksi (250MPa) under the combined loads of wet concrete, deck weight, and the following construction live loads: 20 pounds per square foot (1 kPa) uniform load or 150 pound concentrated load on a 1'-0" (300 mm) wide section of deck (2.2 kN per m). The interaction of shear and bending shall be considered in the calculations. (See Figure 1-Attachment C1)

3. Load and Resistance Factor Design (LRFD): The load combinations for construction are as shown in Attachment C1. Load factors shall be in accordance with ASCE 7 (See Section 1.2.A.5). The resistance factors and nominal resistances shall be in accordance with *North American Specification for the Design of Cold-Formed Steel Structural Members.*

Commentary: The loading shown in Figure 1 of Attachment C1 is representative of the sequential loading of wet concrete on the deck. The 150 pound load (per foot of width) is the result of distributing a 300 pound (1.33 kN) man over a 2 foot (600 mm) width. Experience has shown this to be a conservative distribution. The metric equivalent of the 150 pound load is 2.2 kN per meter of width. For single span deck conditions, the ability to control the concrete placement may be restricted and an amplification factor of 1.5 is applied to the concrete load to address this condition; however, in order to keep this 50% load increase within a reasonable limit, the increase is not to exceed 30 psf (1.44 kPa). In LRFD, a load factor for construction of 1.4 is applied to this load. Whenever possible, the deck shall be multi-span and not require shoring during concrete placement.

4. Deck Deflection: Calculated deflections of the deck, as a form, shall be based on the load of the wet concrete as determined by the design slab thickness and the weight of the steel deck, uniformly loaded on all spans, and shall be limited to 1/180 of the clear span or 3/4 inch (20 mm), whichever is smaller. Calculated deflections shall be relative to supporting members.

Commentary: The deflection calculations do not take into account construction loads because these are considered temporary loads. The deck is designed to always be in the elastic range so removal of temporary loads should allow the deck to recover. The structural steel also deflects under the loading of the wet concrete.

The designer is urged to check the deflection of the total system, especially if composite beams and girders are being used. If the designer wants to include additional concrete loading on the deck because of frame deflection, the additional load should be shown on the design drawings or stated in the deck section of the job specifications.

5. Minimum Bearing: Minimum interior bearing lengths shall be determined in accordance with the web crippling provisions of the *North American Specification for the Design of Cold-Formed Steel Structural Members*; a uniform

loading case of wet concrete, plus the weight of the steel deck, plus 20 psf (1 kPa) construction load shall be used. (See Figure 3-Attachment C1)

Commentary: Experience has shown that 1-1/2 inches (38 mm) of bearing is sufficient for composite floor decks. If less than 1-1/2 inches (38 mm) of end bearing is available, or if high support reactions are expected, the design professional should check the deck web crippling capacity. The deck must be adequately attached to the structure to prevent slip off.

6. Diaphragm Shear Capacity: Diaphragms without concrete shall be designed in accordance with the SDI *Diaphragm Design Manual*, or from tests conducted by an independent professional engineer.

Commentary: Calculations of diaphragm strength and stiffness should be made using the SDI *Diaphragm Design Manual*. If testing is used as the means for determining the diaphragm strength and stiffness, then it should follow the AISI TS 7-02 test protocol.

B. Deck and Concrete as a Composite Slab:

1. General: The "SDI Method" (refer to SDI *Composite Deck Design Handbook*) shall be limited to galvanized or topside uncoated steel decks with embossments. The embossment patterns shall be typical of the manufactured steel deck with the depth of the embossment not less than 90% of the tested embossment depth. (Refer to Attachment C4 for further limitations).

The composite slab shall be designed as a reinforced concrete slab with the steel deck acting as the positive reinforcement. The deck must be suitable to develop composite interaction. Justification of this requires full scale testing as per ASTM E2322, or calculations based upon testing.

a. Allowable Strength Design (ASD) shall be permitted as an alternate design method. (See SDI *Composite Deck Design Handbook.*)

b. Standard reinforced concrete design procedures shall be used to determine ultimate load capacity. The allowable superimposed load shall then be determined by deducting the weight of the slab and the deck. Attachment C4, *Strength and Serviceability Determination of Composite Deck Slab* shall be used for strength determination.

Commentary: High concentrated loads, diaphragm loads, etc. require additional analysis. Horizontal load capacities can be determined by referring to the SDI *Diaphragm Design Manual*. Concentrated loads can be analyzed by the methods shown in the SDI *Composite Deck Design Handbook.* Most published live load tables are based on simple span analysis of the composite system; that is, the slab is assumed to crack over each support.

2. Load Determination: Using standard reinforced concrete design procedures, the allowable superimposed load shall be found by using appropriate load and resistance design factors (LRFD) and applicable reduction factors based on the presence, absence, or spacing of shear studs on beams perpendicular to the deck. (Refer to Attachment C4 and C5)

Commentary: By using the reference analysis techniques or test results, the deck manufacturer determines the live loads that can be applied to the composite deck slab combination. The results are usually published as uniform load tables. For most applications, the deck thickness and profile is selected so that shoring is not required; the live load capacity of the composite system is usually more than adequate for the superimposed live loads. In calculating the section properties of the deck, the AISI provisions may require that compression zones in the deck be reduced to an "effective width," but as tensile reinforcement, the total area of the cross section may be used. (See attachment C5)

Coatings other than those tested may be investigated, and if there is evidence that their performance is better than that of the tested product, additional testing may not be required.

3. Concrete: Concrete design shall be in accordance with the ACI Building Code Requirements for Reinforced Concrete. Minimum compressive strength (f'c) shall be a minimum of 3 ksi (20 MPa) or as required for fire ratings or durability. Admixtures containing chloride salts shall not be used.

Commentary: Load tables are generally calculated by using a concrete strength of 3 ksi (20 MPa). Composite slab capacities are not greatly affected by variations in concrete compressive strength; but, if the strength falls below 3 ksi (20 MPa) it would be advisable to check shear stud strengths. Fire rating requirements may dictate the minimum concrete strength. The use of admixtures containing chloride salts is not allowed because the salts will corrode the steel deck.

a. Minimum Cover: The minimum concrete thickness above the top of the steel deck shall be 2 inches (50 mm). When additional (negative bending) reinforcement is placed in the slab, the minimum cover of concrete above the reinforcing shall be in accordance with the ACI *Building Code Requirements for Reinforced Concrete.*

4. Deflection: Deflection of the composite slab shall not exceed 1/360 of the clear span under the superimposed live load.

Commentary: Live load deflections are seldom a design factor. The deflection of the slab/deck combination can be predicted by using the average of the cracked and uncracked moments of inertia as determined by the transformed section method of analysis. Refer to Attachment C5 of this specification or the SDI Composite Deck Design Handbook.

5. Suspended Loads: All suspended loads must be included in the analysis and calculations for strength and deflection.

Commentary: The designer must take into account the sequence of loading. Suspended loads may include ceilings, light fixtures, ducts or other utilities. The designer must be informed of any loads applied after the composite slab has been installed.

Care should be used during the placement of loads on all types of hanger tabs or other hanging devices for the support of ceilings so that an approximate uniform loading is maintained. The individual manufacturer should be consulted for allowable loading on single hanger tabs. Improper use of hanger tabs or other hanging devices could result in the overstressing of tabs and/or the overloading of the composite deck slab.

6. Reinforcement:

a. Temperature and shrinkage reinforcement, consisting of welded wire fabric or reinforcing bars, shall have a minimum area of 0.00075 times the area of the concrete above the deck (per foot or meter of width), but shall not be less than the area provided by 6x6-W1.4 x W1.4 welded wire fabric.

Fibers shall be permitted as a suitable alternative to the welded wire fabric specified for temperature and shrinkage reinforcement. Cold-drawn steel fibers meeting the criteria of ASTM A820, at a minimum addition rate of 25 lb/cu yd (14.8 kg/cu meter), or macro synthetic fibers "Coarse fibers" (per ASTM Subcommittee CO9.42), made from virgin polyolefin, shall have an equivalent diameter between 0.4 mm (0.016 in.) and 1.25 mm (0.05 in.), having a minimum aspect ratio (length/equivalent diameter) of 50, at a minimum addition rate of 4 lb./cu yd (2.4 kg/m3) are suitable to be used as minimum temperature and shrinkage reinforcement.

Commentary: Neither welded wire fabric or fibers will prevent cracking; however, they have been shown to do a good job of crack control. The welded wire fabric must be placed near the top of the slab [3/4 to 1 inch cover (20 to 25 mm)] at supports and draped toward the center of the deck span. If a welded wire fabric is used with a steel area given by the above formula, it will not be sufficient as the total negative reinforcement. If the minimum quantity of steel fibers, or macro synthetic fibers, are used for shrinkage and temperature reinforcement, they will not be sufficient as a total negative reinforcement.

b. Negative: When negative moment exists, the deck shall be designed to act only as a permanent form.

Commentary: Composite steel deck does not function as compression reinforcing steel in areas of negative moment. If the designer wants a continuous slab, then negative bending reinforcing should be designed using conventional reinforced concrete design techniques in compliance with the ACI Building Code Requirements for Reinforced Concrete. The welded wire fabric, chosen for temperature reinforcing, may not supply enough area for continuity. The deck is not considered to be compression reinforcement. Typically negative reinforcement is required at all cantilevered slabs, or if a continuous slab is desired.

c. Distribution: When localized loads exceed the published uniform composite deck load tables, the designer shall proportion distribution reinforcement using conventional concrete design methods.

Commentary: Distribution steel may be required in addition to the welded wire fabric or steel fibers. Concentrated loads, either during construction or in-service, are the most common example of this requirement. Concentrated loads may be analyzed by the methods in the latest SDI Composite Deck Design Handbook.

7. Cantilever Loads: When cantilevered slabs are encountered, the deck acts only as a permanent form; top reinforcing steel shall be proportioned by the designer. For construction loads, the deck shall be designed for the more severe of (a) deck plus slab weight plus 20 psf (1 kPa) construction load on both cantilever and adjacent span, or (b) deck plus slab weight on

both cantilever and adjacent span plus a 150 pound (665N) concentrated load per foot of width at end of cantilever. The load factors for bending, shear, and interior bearing shall be as required by ASCE 7. Resistance factors for bending, shear, and interior bearing shall be in accordance with the *North American Specification for the Design of Cold Formed Structural Members.*

The maximum cantilever deflection as a form, under deck plus slab weight, shall be a/90 where "a" is the cantilever length, and shall not exceed 3/4 inches (19 mm).

Side laps shall be attached at the end of the cantilever and a maximum spacing of 12 inches (300 mm) o.c. from the cantilever end. Each corrugation shall be fastened at both the perimeter support and the first interior support. The deck shall be completely attached to the supports and at the side laps before any load is applied to the cantilever. Concrete shall not be placed on the cantilever until after placement on the adjacent span.

8. Diaphragm Shear Capacity: Diaphragms with concrete shall be designed in accordance with the SDI *Diaphragm Design Manual*, or from tests conducted by an independent professional engineer.

Commentary: Calculations of diaphragm strength and stiffness should be made using the SDI *Diaphragm Design Manual.* If testing is used as the means for determining the diaphragm strength and stiffness, then it should follow the AISI TS 7-02 test protocol.

2.5 Accessories:

A. Pour stops, column closures, end closures, cover plates, and girder fillers shall be the type suitable for the application. Pour stop minimum gages shall be in accordance with the Steel Deck Institute. (See *Pour Stop Selection Table*, Attachment C2)

B. Mechanical fasteners or welds shall be permitted for deck and accessory attachment.

3. Execution

3.1 Installation/ General:

A. Support framing and field conditions shall be examined for compliance with installation tolerances and other conditions affecting performance of work of this section. All OSHA rules for erection shall be followed.

B. Deck panels shall be installed on a concrete support structure only after the concrete has attained 75% of its specified design strength.

C. Deck panels and accessories shall be installed according to the SDI *Manual of Construction with Steel Deck*, placement plans, and requirements of this Section.

D. Temporary shoring, if required, shall be installed before placing deck panels. Temporary shoring shall be designed to resist a minimum uniform load of 50 psf (2.4 kPa), and loading criteria indicated on Attachment C1. Shoring shall be securely in place before the floor deck erection begins. The shoring shall be designed and installed in accordance with the ACI Building Code Requirements for Reinforced Concrete and shall be left in place until the slab attains 75% of its specified design strength and a minimum of seven (7) days.

E. Deck panels shall be placed on structural supports and adjusted to final position with ends aligned, and attached securely to the supports immediately after placement in order to form a safe working platform. All deck sheets shall have adequate bearing and fastening to all supports to prevent slip off during construction. Deck ends over supports shall be installed with a minimum end bearing of 1-1/2 inches (38 mm). Deck areas subject to heavy or repeated traffic, concentrated loads, impact loads, wheel loads, etc. shall be adequately protected by planking or other approved means to avoid overloading and/or damage.

F. Butted Ends: Deck ends shall be butted over supports.

Commentary: Lapping composite deck ends can be difficult because shear lugs (web embossment) or profile shape can prevent a tight metal to metal fit. The space between lapped sheets can make welded attachments more difficult. Gaps are acceptable up to 1" (25 mm) at butted ends.

G. Deck units and accessories shall be cut and neatly fit around scheduled openings and other work projecting through or adjacent to the decking.

Commentary: It is the responsibility of the designer to designate holes/openings to be decked over in compliance with applicable federal and state OSHA directives. Care should be taken to analyze spans between supports at openings when determining those holes/openings to be decked over. When a framed opening span exceeds the maximum deck span limits for

construction loads, the opening must be detailed around instead of decked over. (Minimum floor construction load 50 lbs./sq. ft. (2.4 kPa), unless specific requirements dictate otherwise).

When a framed hole/opening in floor deck is shown and dimensioned on the structural design drawings, pour stop (screed) angle is required to top of slab. When specified, cell closure angle will be provided at the open ends of deck in standard 10'-0" (3 m) lengths to be field sized, cut and installed. Alternate means to dam concrete may be used in lieu of cell closure, at the discretion of the installer, if approved by the designer.

When a hole/opening is not shown and dimensioned on the structural design drawings, no provisions for concrete retainage will be provided by the metal deck manufacturer/supplier. Metal floor decking holes and openings to be cut after the concrete pour shall not be field cut until concrete has reached 75% of its design strength and a minimum of seven (7) days.

H. Trades that subsequently cut unscheduled openings through the deck shall be responsible for reinforcing these openings based upon an approved engineered design.

3.2 Installation/Anchorage:

A. Floor deck units shall be anchored to steel supporting members including perimeter support steel and/or bearing walls by arc spot puddle welds of the following diameter and spacing, fillet welds of equal strength, or mechanical fasteners.

1. All welding of deck shall be in strict accordance with ANSI/AWS D1.3, *Structural Welding Code-Sheet Steel*. Each welder shall demonstrate an ability to produce satisfactory welds using a procedure such as shown in the SDI *Manual of Construction with Steel Deck*, or as described in ANSI/AWS D1.3.
2. A minimum visible 5/8 inch (15 mm) diameter arc puddle weld shall be used. Weld metal shall penetrate all layers of deck material, and shall have good fusion to the supporting members.
3. Edge ribs of panels shall be welded at each support. Space additional welds an average of 12 inches (300 mm) apart but not more than 18 inches (460 mm).
4. When used, fillet welds shall be at least 1-1/2 inches (38 mm) long.
5. Mechanical fasteners, either powder actuated, pneumatically driven, or screws, shall be permitted in lieu of welding to fasten deck to supporting framing if fasteners meet all project service requirements. When the fasteners are powder actuated or pneumatically driven, the load value per fastener used to determine the maximum fastener spacing is based on a minimum structural support thickness of not less than 1/8 inch (3 mm) and on the fastener providing a minimum 5/16 inch (8 mm) diameter bearing surface (fastener head size). When the structural support thickness is less than 1/8 inch (3 mm), powder actuated or pneumatically driven fasteners shall not be used, but screws are acceptable.

Commentary: Mechanical fasteners (screws, powder or pneumatically driven fasteners, etc.) are recognized as viable anchoring methods, provided the type and spacing of the fastener satisfies the design criteria. Documentation in the form of test data, design calculations, or design charts should be submitted by the fastener manufacturer as the basis for obtaining approval.

6. For deck units with spans greater than 5 feet (1.5 m), side laps and perimeter edges of units between span supports shall be fastened at intervals not exceeding 36 inches (1 m) on center, using one of the following methods:
   a. #10 self drilling screws
   b. Crimp or button punch
   c. Arc puddle welds 5/8 inch (15 mm) minimum visible diameter, or minimum 1 inch (25 mm) long fillet weld.

Commentary: The above side lap spacing is a minimum. Service loads or diaphragm design may require closer spacing or larger side lap welds. Good metal to metal contact is necessary for a good side lap weld. Burn holes are to be expected.

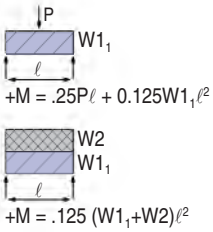
B. Accessory Attachment:

1. Pour Stop and Girder Fillers: Pour stops and girder fillers shall be fastened to supporting structure in accordance with the SDI *Standard Practice Details, and Attachment C2*.
2. Floor Deck Closures: Column closures, cell closures, girder closures and Z closures shall be fastened to provide tight fitting closures at open ends of ribs and sides of decking. Fasten cell closures at changes of direction of floor deck units unless otherwise directed.

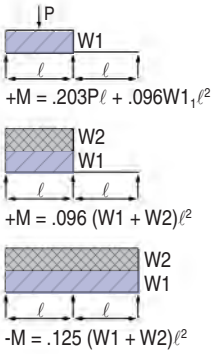
ANSI/SDI-C-1.0 ATTACHMENT C1
Composite Deck Construction Loading Diagrams

FIGURE 1
Loading Diagrams and Bending Moments

Simple Span Condition



Double Span Condition



Triple Span Condition

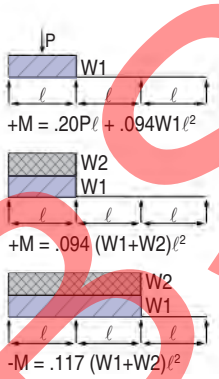
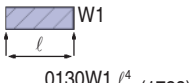


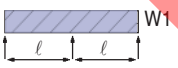
FIGURE 2
Loading Diagrams and Deflections

Simple Span Condition



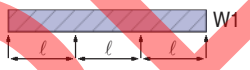
$$\Delta = \frac{.0130 W1\ \ell^4}{E\ I} \quad (1728)$$

Double Span Condition



$$\Delta = \frac{.0054 W1\ \ell^4}{E\ I} \quad (1728)$$

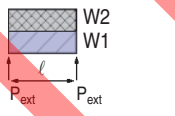
Triple Span Condition



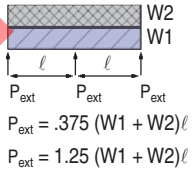
$$\Delta = \frac{.0069 W1\ \ell^4}{E\ I} \quad (1728)$$

FIGURE 3
Loading Diagrams and Support Reactions

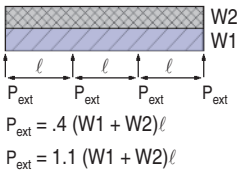
Simple Span Condition



Double Span Condition



Triple Span Condition



Notes for Figures 1 and 2 — **LRFD Load Factors**

P	=	150 pound concentrated load	1.4
I	=	in⁴/ft. - deck moment of inertia	
W1	=	slab weight	1.6
		+ deck weight	1.2
W2	=	20 pounds per square foot construction load	1.4
E	=	29.5 x 10⁶ psi	
ℓ	=	clear span length (ft.)	
$W1_1$	=	1.5 x slab weight + deck weight ≤ slab weight + 30 + deck weight	

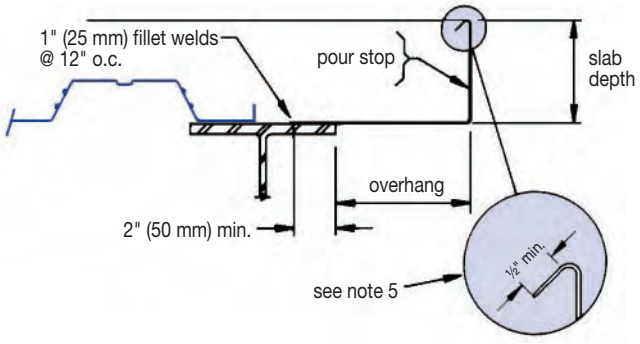
Dimensional check shows the need for the 1728 factor when calculating deflections using pound inch units.

Note: In addition to an analysis of slab weight plus construction surcharge, the deck must be independently investigated for a total construction load of 50 psf. The step loads in figures 1 through 3 shall be used.

ANSI/SDI-C-1.0 ATTACHMENT C2
SDI Pour Stop Selection Table

SLAB DEPTH (INCHES)	OVERHANG (INCHES)												
	0	1	2	3	4	5	6	7	8	9	10	11	12
	POUR STOP TYPES												
4.00	20	20	20	20	18	18	16	14	12	12	12	10	10
4.25	20	20	20	18	18	16	16	14	12	12	12	10	10
4.50	20	20	20	18	18	16	16	14	12	12	12	10	10
4.75	20	20	18	18	16	16	14	14	12	12	10	10	10
5.00	20	20	18	18	16	16	14	14	12	12	10	10	
5.25	20	18	18	16	16	14	14	12	12	12	10	10	
5.50	20	18	18	16	16	14	14	12	12	12	10	10	
5.75	20	18	16	16	14	14	12	12	12	12	10	10	
6.00	18	18	16	16	14	14	12	12	12	10	10	10	
6.25	18	18	16	14	14	12	12	12	12	10	10		
6.50	18	16	16	14	14	12	12	12	12	10	10		
6.75	18	16	14	14	14	12	12	12	10	10	10		
7.00	18	16	14	14	12	12	12	12	10	10	10		
7.25	16	16	14	14	12	12	12	10	10	10			
7.50	16	14	14	12	12	12	12	10	10	10			
7.75	16	14	14	12	12	12	10	10	10	10			
8.00	14	14	12	12	12	12	10	10	10				
8.25	14	14	12	12	12	10	10	10	10				
8.50	14	12	12	12	12	10	10	10					
8.75	14	12	12	12	12	10	10	10					
9.00	14	12	12	12	10	10	10						
9.25	12	12	12	12	10	10	10						
9.50	12	12	12	10	10	10							
9.75	12	12	12	10	10	10							
10.00	12	12	10	10	10	10							
10.25	12	12	10	10	10								
10.50	12	12	10	10	10								
10.75	12	10	10	10									
11.00	12	10	10	10									
11.25	12	10	10										
11.50	10	10	10										
11.75	10	10											
12.00	10	10											

TYPES	DESIGN THICKNESS
20	0.0358
18	0.0474
16	0.0598
14	0.0747
12	0.1046
10	0.1345



NOTES: This Selection Chart is based on following criteria:

1. Normal weight concrete (150 PCF).
2. Horizontal and vertical deflection is limited to ¼" maximum for concrete dead load.
3. Design stress is limited to 20 KSI for concrete dead load temporarily increased by one-third for the construction live load of 20 PSF.
4. Pour Stop Selection Chart does not consider the effect of the performance, deflection, or rotation of the pour stop support which may include both the supporting composite deck and/or the frame.
5. Vertical leg return lip is recommended for all types (gages).

ANSI/SDI-C-1.0 ATTACHMENT C3
SI Pour Units Conversion Tables

	TO CHANGE	MULTIPLY BY
LENGTH	in to mm ft to mm ft to m	25.4 (exact) 304.8 (exact) 0.3048 (exact)
AREA	in^2 to mm^2 ft^2 to m^2	645.16 (exact) 0.092903
MASS	lb to kg 2000 lb to 1000 kg lb/ft to kg/m lb/ft^3 to kg/m^3 lb/yd^3 to kg/m^3	0.453592 0.907185 1.48816 16.0185 0.593276
FORCE	lb to N kip to kN lb/in to N/m lb/ft to N/m kip/ft to kN/m psf to kN/m^2	4.44822 4.44822 175.127 14.5939 14.5939 47.880
PRESSURE	lb/in^2 to kPa lb/ft^2 to kPa kip/in^2 to MPa	6.89476 0.04788 6.89476
SECTION MODULUS	in^3 to mm^3 in^3/ft to mm^3/m	16387.1 53763.5
MOMENT OF INERTIA	in^4 to mm^4 in^4/ft to mm^4/m	416231 1365587

ANSI/SDI-C-1.0 ATTACHMENT C4
Strength and Serviceability Determination of Composite Deck-Slab

Unless composite deck-slabs are designed for continuity, the load affects are assumed to act on simple spans.

C4.1 Strength for Bending
This section is used to determine the bending strength of the composite deck-slab.

A. SDI Method - With No Shear Studs on Beams
This method is used if there are no shear studs present on the beam supporting the composite steel deck.

The resisting moment, Mno, of the composite section is determined based on a cracked section analysis. Refer to attachment C5 for calculation of the transformed section properties.

$$\phi M_{no} = \phi F_y \left(\frac{I_{cr}}{h - y_{cc}} \right) = \phi S_c F_y$$

where

F_y = yield stress of steel deck ≤ 60 ksi

h = slab depth

I_{cr} = cracked section moment of inertia

M_{no} = nominal resisting moment

Y_{cc} = distance from top of slab to neutral axis of cracked section

ϕ =0.85 and is the resistance factor

1) Limitations
The "SDI Method" shall be limited to galvanized or topside uncoated steel decks with embossments. The embossment patterns shall be typical of the manufactured steel deck with the depth of the embossment not less than 90% of the tested embossment depth. The web angle, θ, shall be limited to values between 55° and 90° and the webs shall have no reentrant bends in their flat width. The steel section depth, d_d, is limited to 3 in. (75 mm). The concrete design compressive strengths shall be between 2500 psi (17 MPa) and 6000 psi (40 MPa). The minimum concrete thickness above the steel deck shall be 2 inches (50 mm).

The usable slab capacity is limited to decks with thickness 0.0474 inches (1.20 mm) unless sufficient test data is available to support the use of the method with deck of greater thickness.

2) Continuity Over Supports
In continuous slabs, those sections subjected to negative moments shall be designed as conventionally reinforced concrete slabs. In composite slabs, moments and shears shall be calculated by an analysis or, if applicable, by the coefficients of Chapter 8 of ACI *Building Code Requirements for Reinforced Concrete*, ACI 318.

3) Allowable Stress Design
Allowable stress design (ASD) is acceptable as an alternate design method. See the SDI *Composite Deck Design Handbook.*

B. SDI Method - With Shear Studs on Beams
This method is to be used if there are shear studs present on the beam supporting the composite steel deck in sufficient quantity to develop the ultimate capacity of the section in bending, or if tests on a particular deck profile have shown that the deck is capable of developing the full ultimate moment without shear studs.

$$\phi M_{nf} = \phi A_s F_y (d - a/2)$$

where

A_s = steel deck area per unit width of steel deck

$a = \frac{A_s F_y}{0.85 f'_c b}$ = developed depth of concrete in the compression zone

b = unit width

d = distance from the top of the slab to the centroid of the steel deck

F_y = steel yield strength, not to exceed 60 ksi (415 MPa)

M_{nf} = nominal (ultimate) moment capacity with studs on beam

ϕ =0.85 and is the resistance factor

This method is limited to constructions where the number of shear studs present equals or exceeds N_s, the minimum number of shear studs per foot of deck width to develop the full cross section of the steel deck.

$$N_s = \frac{F_y}{Q_n} \left(A_s - \frac{A_{webs}}{2} - A_{bf} \right), \text{studs/unit width}$$

where

A_{bf} = deck bottom flange area per unit width of steel deck

A_{sc} = cross-sectional area of stud shear connector, in² (mm²) 1/2" and 3/4" diameter studs are acceptable

A_{webs} = deck web area per unit width of steel deck

f'_c = concrete strength, ksi (MPa)

E_c = modulus of elasticity of concrete =

$w_c^{1.5} \sqrt{f'_c}$, ksi $(0.043 w_c^{1.5} \sqrt{f'_c}$, MPa)

$Q_n = 0.5 A_{sc} \sqrt{f'_c E_c} \le 0.75 A_{sc} F_u$

= nominal strength of one stud shear connector in solid concrete

ANSI/SDI-C-1.0 ATTACHMENT C4
Strength and Serviceability Determination of Composite Deck-Slab

The value, N_s, is to be installed along each beam. At butted end laps, studs shall be staggered to arrest both ends of the deck at the common joint. At perimeter conditions or openings (where slabs are discontinuous) all studs must engage the deck end. The value, Q_n, is subject to reduction when considering composite beam action and the stud is installed through deck. Reduction does not apply to the determination of N_s.

The following is to be used when the shear studs are present on the beam supporting the composite steel deck, but are not present in sufficient quantity to develop the ultimate capacity of the section in bending.

$$M_{np} = M_{no} + (M_{nf} - M_{no})\frac{N_s'}{N_s} \leq M_{nf}$$

Use ϕM_{np} for the factored resistance in design.

where
M_{no} is determined from Section C4.1.A

M_{nf} as determined from Section C4.1.B

M_{np}= useable nominal moment capacity at stud density = N_s'

N_s' = the number of shear studs actually present along the beam per unit width of steel deck – 1/2" and 3/4" diameter studs are acceptable

N_s' is determined from Section C4.1.B

ϕ=0.85 and is the resistance factor

C. Alternate Methods
Other rational methods for establishing composite slab strength can be used if the pertinent parameters contributing to composite slab strength (including deck cross section; steel thickness; concrete weight, strength, and type; shear transfer devices; method of loading; etc.) are considered. These analyses can include nonlinear relationships between various parameters. Sufficient tests shall be made to establish the method-test variability.

C4.2 Strength for Shear
This section is used to determine the shear strength of the composite deck-slab.

$$V_n = V_c + V_D \leq 4\sqrt{f_c'}A_c$$

where

V_c = $2\beta_c\sqrt{f_c'}A_c$, shear resistance of concrete per unit width

V_D = shear strength of the steel deck section per unit width calculated per AISI

A_c = concrete area available to resist shear, see Figure C1

β_c = 1.0 if concrete density exceeds 130 lbs/ft3, 0.75 otherwise

C4.3 Deflection
The deflection of the composite slab shall not exceed span/360 under superimposed load. The deflection can be predicted using the average of the cracked and uncracked moment of inertia as determined from the transformed section method of analysis.

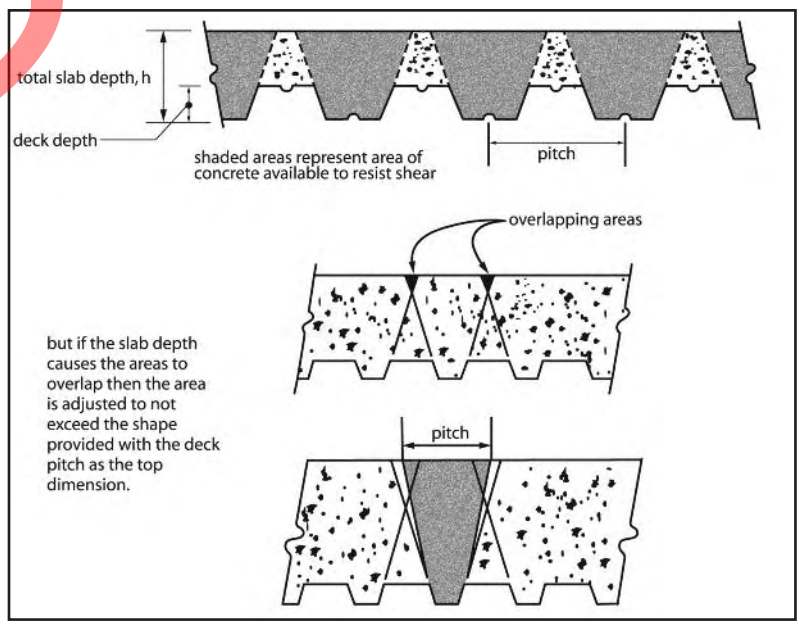


Figure C

ANSI/SDI-C-1.0 ATTACHMENT C5
Section Properties of Composite Deck-Slabs

C5.1 Transformed Composite Neutral Axis

The distance y_{cc} from the extreme compression fiber of the concrete to the neutral axis of the transformed composite section shall be determined from Figure C5.1 and Equation C5-1.

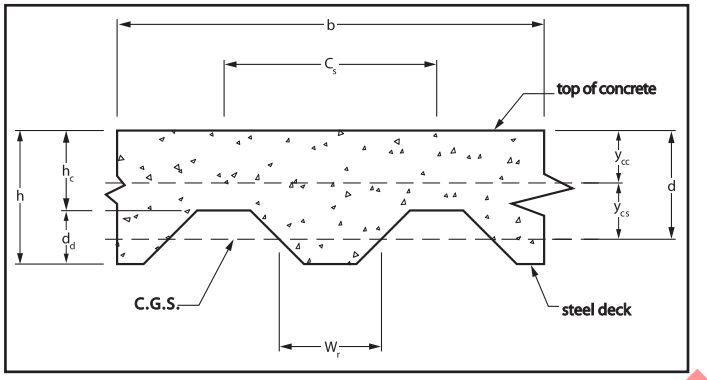


Figure C5.1 - Composite Section

Note: 1. Section shows non-cellular deck. Section shall be either cellular, a blend of cellular and non-cellular deck, or non-cellular deck

2. C.G.S. = centroidal axis of full cross section of steel deck

3. Cs = pitch

4. N.A. = neutral axis of transformed composite section

5. Wr = average rib width

C5.2 Moment of Inertia of Cracked Section

When y_{cc} is equal to or less than the depth of concrete, h_c, above the top of steel deck, that is, $y_{cc} \le h_c$, then

$$y_{cc} = d\left\{\sqrt{2\rho n + (\rho n)^2} - \rho n\right\} \qquad \text{C5.1}$$

where

$\rho = \dfrac{A_s}{bd}$

A_s = area of steel deck per unit slab width

b = unit slab width (12 inches in imperial units)

d = distance from top of concrete to centroid of steel deck

n = modular ratio $= \dfrac{E_s}{E_c}$ $\quad E_s = 29500$ ksi

$E_c = \gamma^{1.5}\sqrt{f'_c}$ ksi

γ = concrete density, lbs/ft^3

f'_c = concrete strength, ksi

If $y_{cc} > h_c$ use $y_{cc} = h_c$.

The cracked moment of inertia I_c is

$y_{cs} = d - y_{cc}$ (Use y_{cc} from Equation C5-1.)

$$I_{cr} = \frac{b}{3n}y_{cc}^3 + A_s y_{cs}^2 + I_{sf} \qquad \text{C5.2}$$

where

I_{sf} is the moment of inertia of the full (unreduced) steel deck per unit slab width.

C5.3 Moment of Inertia of Uncracked Section

For the uncracked moment of inertia

$$y_{cc} = \frac{0.5bh_c^2 + nA_s d + W_r d_d (h - 0.5d_d)\dfrac{b}{C_s}}{bh_c + nA_s + W_r d_d \dfrac{b}{C_s}} \qquad \text{C5.3}$$

The uncracked moment of inertia is

$y_{cs} = d - y_{cc}$ (Use y_{cc} from Equation C5-3.)

$$I_u = \frac{bh_c^3}{12n} + \frac{bh_c}{n}(y_{cc} - 0.5h_c)^2 + I_{sf} + A_s y_{cs}^2 + \frac{W_r bd_d}{nC_s}\left[\frac{d_d^2}{12} + (h - y_{cc} - 0.5d_d)^2\right] \qquad \text{C5.4}$$

C5.4 Moment of Inertia of Composite Section

The moment of inertia of composite section considered effective for deflective computations is given by

$$I_d = \frac{I_u + I_{cr}}{2} \text{ (Transformed to steel)} \qquad \text{C5.4}$$

Short Form Specifications

For Composite Floor Deck

1. General

1.1 Related Documents

Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

1.2 Summary

This section pertains to composite steel floor deck.

A. Related Sections
   1. Division 3 Section "Cast in Place Concrete" for concrete fill and reinforcing steel.
   2. Division 5 Section "Structural Steel" for structural steel supporting the deck.

1.3 Submittals

A. General: Submit each item in this Article according to the conditions of the Contract and Division 1 Specification Sections.

B. Product Data for each type of decking specified, including dimensions of individual components, profiles, and finishes.

C. Shop Drawings showing location of deck units, anchorage details, and other information required for a thorough review.

D. Product Certificates (if required) signed by the manufacturer of the steel deck certifying that the supplied products comply with specified requirements.

E. Welder Certificates signed by Contractor certifying that welders comply with requirements specified under "Quality Assurance" Article 1.4. If mechanical fasteners are used, independent test reports shall be provided by the fastener manufacturer.

1.4 Quality Assurance

A. Codes and Standards: Comply with applicable provisions of the following specifications:
   1. American Iron and Steel Institute (AISI);
   2. American Welding Society (ANSI/AWS D1.3 Structural Welding Code/Sheet Steel);
   3. Steel Deck Institute (SDI).

B. Certify that each welder has satisfactorily passed A.W.S. qualification tests for welding processes involved, and, if applicable, has undergone recertification.

C. Fire Resistance Assemblies: Provide steel deck units classified by Underwriters Laboratories (UL) in the "Fire Resistance Directory" for design number ____. (If a fire rated assembly is required.)
   1. Identify steel deck bundles with labels bearing the UL mark.

1.5 Delivery, Storage, and Handling

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage and handling.

B. If ground storage is needed, the deck bundles must be stored off the ground, with one end elevated to provide drainage. Bundles must be protected against condensation with a ventilated waterproof covering. Bundles must be stacked so there is no danger of tipping, sliding, rolling, shifting or material damage. Bundles must be periodically checked for tightness, and retightened as necessary so wind cannot loosen sheets.

C. Deck bundles placed on the building frame must be placed near a main supporting beam at a column or wall. In no case are the bundles to be placed on unbolted frames or on unattached and/or unbridged joists. The structural frame must be properly braced to receive the bundles.

2. Products

2.1 A manufacturer offering deck products to be incorporated into the work must be a member of the Steel Deck Institute.

2.2 Materials [The specifier must choose the appropriate section(s) and eliminate those not applicable.]

A. Sheet steel for deck and accessories shall conform to ASTM A653 Structural Quality, with a minimum yield strength of 33 ksi (230 MPa).
   1. Galvanizing shall conform to ASTM A924 with a minimum coating class of G30 (Z090) as defined in ASTM A653.

or

B. Sheet steel for deck and accessories shall conform to ASTM A1008 with a minimum yield strength of 33 ksi (230 MPa).

C. The deck type and thickness shall be as shown on the plans.

or

D. The deck shall be ___ with a minimum metal thickness of ___.

or

E. The deck shall be selected to provide the load capacities shown on the drawings and as determined using the Steel Deck Institute construction loading criteria.

F. Whenever possible, the deck shall be multi-span and not require shoring during the concrete placement procedure.

G. The deck type provided shall be capable of supporting the superimposed live loads as shown on the plans.

2.3 Accessories

A. Pour stops, column closures, end closures, cover plates, and girder fillers shall be the type required by the Steel Deck Institute.

B. Mechanical fasteners or welds are acceptable for accessory attachments.

3. Execution

3.1 Examine support framing and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance of work of this section. All OSHA rules for erection must be followed.

3.2 Preparation

A. Place deck in accordance with approved placement plans.

B. Do not place deck panels on concrete support structure until concrete has cured and is dry.

C. Locate deck bundles to prevent overloading of support members.

3.3 Installation, General

A. Install deck panels and accessories according to Steel Deck Institute specifications and recommendations, and in accordance with the placement plans and requirements of this Section.

B. Install temporary shoring, if required, before placing deck panels.

C. Place deck panels on structural supports and adjust to final position with ends aligned. Attach firmly to the supports immediately after placement in order to form a safe working platform.

D. Cut and neatly fit deck units and accessories around openings and other work projecting through or adjacent to the decking.

E. Trades that subsequently cut unscheduled openings through the deck are responsible for reinforcing the openings.

3.4 Installation, Floor Deck

A. Anchor floor deck units to steel supporting members by arc spot puddle welds of the following diameter and spacing or fillet welds of equal strength.

1. Weld diameter: Minimum visible 5/8 inch (15 mm).
2. Weld spacing: Weld edge ribs of panels at each support. Space additional welds an average of 12 inches (300 mm) apart but not more than 18 inches (460 mm).
3. Mechanical fasteners, either powder actuated, pneumatically driven, or screws, may be used in lieu of welding to fasten deck to supporting framing, provided they have been specifically approved.
4. For deck units with spans greater than five feet (1.5 m) fasten side laps and perimeter edges of units between supports at intervals not exceeding 36 inches (1 m) on center, using one of the following methods.
   a. #10 self drilling screws.
   b. crimp or button punch.
   c. arc puddle welds 5/8 inch (15 mm) minimum visible diameter, or 1 inch (25 mm) long fillet.

B. End Bearing: Install deck ends over supports with a minimum end bearing of 1.5 inches (38 mm).

C. Pour Stops and Girder Fillers: Fasten pour stops and girder fillers to supporting structure in accordance with the SDI Standard Practice Details and Attachment C2.

D. Floor Deck Closures: Fasten column closures, cell closures, and Z closures to deck to provide tight fitting closures at open ends of ribs and sides of decking. Fasten cell closures at changes of direction of floor deck units unless otherwise directed.

3.5 Repairs

Before concrete placement, the deck shall be inspected for tears, dents, or other damage that may prevent the deck from acting as a tight and substantial form. The need for the repair or temporary shoring of the damaged deck shall be determined by the architect or engineer of record.

FLOOR-CEILING ASSEMBLIES WITH COMPOSITE DECK

Vulcraft Decks have been tested by Underwriters Laboratories Inc. for their Fire Resistance Ratings. In as much as new listings are continually being added, please contact the factory if your required design is not listed below. The cellular decks listed comply with U.L. 209 for use as Electrical Raceways.

Restrained Assembly Rating	Type of Protection	Concrete Thickness & Type (1)	U.L. Design No. (2,3,4)	Classified Deck Type		Unrestrained Beam Rating
				Fluted Deck	Cellular Deck (5)	
3/4 Hr.	Unprotected Deck	2 1/2" LW	D914 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1 Hr.
			D916 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5,2,3 Hr.
1 Hr.	Exposed Grid	2 1/2" NW	D216 +	1.5VL,1.5VLI,2VLI,3VLI	2VLP, 3VLP	2,3 Hr.
	Cementitious	2" NW&LW	D743 *	2VLI,3VLI	2VLP, 3VLP	1,1.5,2,3 Hr.
		2 1/2" NW&LW	D703 *	1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1.5 Hr.
			D712 *	3VLI	3VLP	2 Hr.
			D722 *	2VLI,3VLI	2VLP, 3VLP	1,1.5,2 Hr.
			D739 *	1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5,2,3,4 Hr.
			D759	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5,2,3 Hr.
	Sprayed Fiber	2" NW&LW	D859 *	2VLI,3VLI	2VLP, 3VLP	1,1.5,2,3 Hr.
		2 1/2" NW&LW	D832 *	1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5,2,3 Hr.
			D847 *	2VLI,3VLI	3VLP	1,1.5,3 Hr.
			D858 *	2VLI,3VLI	2VLP, 3VLP	1,1.5,2,4 Hr.
			D871 *	2VLI,3VLI	2VLP, 3VLP	1,1.5,2,3 Hr.
	Unprotected Deck	2 1/2" LW	D902 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5 Hr.
			D914 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1 Hr.
			D916 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5,2,3 Hr.
			D918 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5 Hr.
			D919 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5 Hr.
		3 1/2" NW	D902 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5 Hr.
			D916 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5,2,3 Hr.
			D918 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5 Hr.
			D919 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5 Hr.
1 1/2 Hr.	Gypsum Board	2 1/2" NW	D502 *	1.5VL,1.5VLI,2VLI,3VLI	2VLP, 3VLP	1.5,2 Hr.
	Cementitious	2" NW&LW	D743 *	2VLI,3VLI	2VLP, 3VLP	1,1.5,2,3 Hr.
		2 1/2" NW&LW	D703 *	1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1.5 Hr.
			D712 *	3VLI	3VLP	2 Hr.
			D722 *	2VLI,3VLI	2VLP, 3VLP	1,1.5,2 Hr.
			D739 *	1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5,2,3,4 Hr.
			D759	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5,2,3 Hr.
	Sprayed Fiber	2" NW&LW	D859 *	2VLI,3VLI	2VLP, 3VLP	1,1.5,2,3 Hr.
		2 1/2" NW&LW	D832 *	1.5VLI,2VLI,3VLI	3VLP	1,1.5,2,3 Hr.
			D847 *	2VLI,3VLI	3VLP	1,1.5,3 Hr.
			D858 *	2VLI,3VLI	2VLP, 3VLP	1,1.5,2,4 Hr.
			D871 *	2VLI,3VLI	2VLP, 3VLP	1,1.5,2,3 Hr.
	Unprotected Deck	3" LW	D902 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5 Hr.
			D916 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5,2,3 Hr.
			D919 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5 Hr.
		4" NW	D902 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5 Hr.
			D916 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5,2,3 Hr.
			D918 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5 Hr.
			D919 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5 Hr.
2 Hr.	Exposed Grid	2 1/2" NW	D216 +	1.5VL,1.5VLI,2VLI,3VLI	2VLP, 3VLP	2,3 Hr.
	Gypsum Board	2 1/2" NW	D502 +	1.5VL,1.5VLI,2VLI,3VLI	2VLP, 3VLP	1.5,2 Hr.
	Cementitious	2" NW&LW	D743 *	2VLI,3VLI	2VLP, 3VLP	1,1.5,2,3 Hr.
		2 1/2" LW	D746 *	1.5VLI		1,1.5,2,3 Hr.
			D752 *	1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5,2, Hr.
		2 1/2" NW&LW	D703 *	1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1.5 Hr.
			D712 *	3VLI	3VLP	2 Hr.
			D716 *	1.5VLI,2VLI,3VLI	2VLP, 3VLP	1.5,2 Hr.
			D722 *	2VLI,3VLI	2VLP, 3VLP	1,1.5,2 Hr.
			D739 *	1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5,2,3,4 Hr.
			D745 *	2VLI,3VLI		1,1.5,2, Hr.
			D750 *	1.5VLI,2VLI,3VLI		1.5,2 Hr.
			D755	1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5,2,3 Hr.
			D759	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5,2,3 Hr.
			D760 *	2VLI,3VLI		1,1.5,2,3,4 Hr.
		2 1/2" NW	D730 *	2VLI,3VLI	2VLP, 3VLP	1.5,2 Hr.
			D742 *	1.5VLI,2VLI,3VLI		1,1.5 Hr.

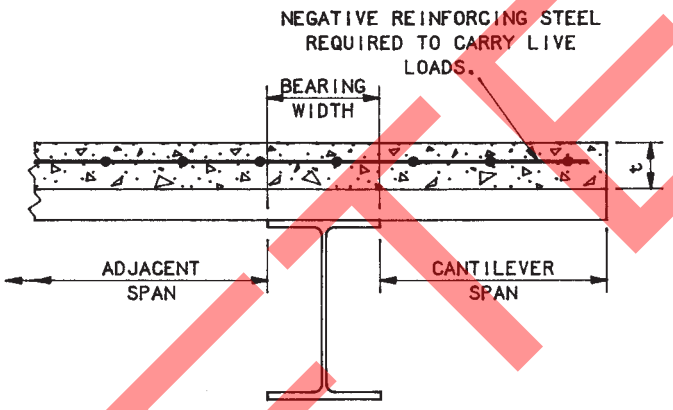
Restrained Assembly Rating	Type of Protection	Concrete Thickness & Type (1)	U.L. Design No. (2,3,4)	Classified Deck Type		Unrestrained Beam Rating
				Fluted Deck	Cellular Deck (5)	
2 Hr. (continued)	Sprayed Fiber	2" NW&LW	D859 *	2VLI,3VLI	2VLP, 3VLP	1,1.5,2,3 Hr.
		2 1/2" NW&LW	D822 *	2VLI,3VLI	2VLP, 3VLP	1 Hr.
			D825 *	1.5VLI,2VLI,3VLI	2VLP, 3VLP	1,1.5,2 Hr.
			D831 *	2VLI,3VLI	2VLP, 3VLP	1,1.5,2 Hr.
			D832 *	1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5,2,3 Hr.
			D833 *	1.5VLI,2VLI,3VLI	2VLP, 3VLP	1.5 Hr.
			D847 *	2VLI,3VLI	3VLP	1,1.5,3 Hr.
			D858 *	2VLI,3VLI	2VLP, 3VLP	1,1.5,2,4 Hr.
			D861 *	12VLI,3VLI		1,1.5 Hr.
			D870 *	1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,2 Hr.
			D871 *	2VLI,3VLI	2VLP, 3VLP	1,1.5,2,3 Hr.
		2 1/2" LW	D862 *	2VLI,3VLI		1 Hr.
		2 1/2" NW	D864 *	3VLI	3VLP	1.5 Hr.
		3 1/4" LW	D860 *	2VLI,3VLI		1,1.5,2 Hr.
	Unprotected Deck	3 1/4" LW	D733 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5Hr.
			D826 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5,2 Hr.
			D840 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5 Hr.
			D902 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5 Hr.
			D907 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,2 Hr.
			D913 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1 Hr.
			D916 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5,2,3 Hr.
			D918 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5 Hr.
			D919 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5 Hr.
			D920 #	2VLI,3VLI	2VLP, 3VLP	1.5 Hr.
		4 1/2" NW	D902 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5 Hr.
			D916 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5,2,3 Hr.
			D918 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5 Hr.
			D919 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5 Hr.
3 Hr.	Exposed Grid	3 1/4" NW	D216 +	1.5VL,1.5VLI,2VLI,3VLI	2VLP, 3VLP	2,3 Hr.
	Cementitious	2" NW&LW	D743 *	2VLI,3VLI	2VLP, 3VLP	1,1.5,2,3 Hr.
		2 1/2" LW	D746 *	1.5VLI		1,1.5,2,3 Hr.
		2 1/2" NW&LW	D703 *	1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1.5 Hr.
			D708 *	1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1.5,3 Hr.
			D739 *	1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5,2,3,4 Hr.
			D755	1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5,2,3 Hr.
			D759	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5,2,3 Hr.
			D760 *	2VLI,3VLI		1,1.5,2,3,4 Hr.
		3 1/4" LW	D754 *	1.5VLI,2VLI,3VLI		1.5,2 Hr.
		3 1/4" NW	D742 *	1.5VLI,2VLI,3VLI		1,1.5 Hr.
	Sprayed Fiber	2" NW&LW	D859 *	2VLI,3VLI	2VLP, 3VLP	1,1.5,2,3 Hr.
		2 1/2" NW&LW	D816 *	1.5VLI,2VLI,3VLI	2VLP, 3VLP	1.5,2 Hr.
			D831 *	2VLI,3VLI	2VLP, 3VLP	1,1.5,2 Hr.
			D832 *	1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5,2,3 Hr.
			D833 *	1.5VLI,2VLI,3VLI	2VLP, 3VLP	1.5 Hr.
			D858	2VLI,3VLI	2VLP, 3VLP	1,1.5,2,4 Hr.
			D871 *	2VLI,3VLI	2VLP, 3VLP	1,1.5,2,3 Hr.
		2 1/2" NW	D864	3VLI	3VLP	1.5 Hr.
		3 1/4" LW	D860 *	2VLI,3VLI		1,1.5,2 Hr.
	Unprotected Deck	4 3/16" LW	D902 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5 Hr.
			D916 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5,2,3 Hr.
			D918 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5 Hr.
			D919 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5 Hr.
		5 1/4" NW	D902 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5 Hr.
			D916 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5,2,3 Hr.
			D918 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5 Hr.
			D919 #	1.5VL,1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5 Hr.
4 Hr.	Cementitious	2 1/2" NW&LW	D760	2VLI,3VLI		1,1.5,2,3,4 Hr.
			D739	1.5VLI,2VLI,3VLI	1.5VLP, 2VLP, 3VLP	1,1.5,2,3,4 Hr.
		3 1/4" LW	D754	1.5VLI,2VLI,3VLI		1.5,2 Hr.
	Sprayed Fiber	2 1/2" NW&LW	D858	2VLI,3VLI	2VLP, 3VLP	1,1.5,2,4 Hr.
		3 1/4" LW	D860	2VLI,3VLI		1,1.5,2 Hr.

NOTES:
1. Concrete thickness is thickness of slab above deck, in.
2. Refer to the U.L. "Fire Resistance Directory" for the necessary construction details.
3. Cellular deck finish shall be galvanized.
4. Fluted deck finish shall be galvanized unless noted otherwise.
   + Denotes fluted deck finish is not critical when used in D2-- & D5-- Series designs. Deck finish shall be galvanized or phosphatized/painted.
   * Fluted deck finish is critical for fire resistance. Fluted deck finish shall be galvanized or phosphatized/painted. This paint is a special type of paint and is compatible with the spray-applied fire protection and is U.L. approved for use in the denoted D7-- & D8-- Series designs.
   # Denotes fluted deck finish is not critical for fire resistance. Fluted deck finish shall be galvanized or phosphatized/painted.
5. Vulcraft cellular deck units are approved by U.L. for use as electrical raceways under U.L Standard 209.

Maximum Cantilever Spans

For Vulcraft Composite Floor Decks
Under Construction Loading

Deck	Es=29500KSI t	W=W+Wc, PSF W	22	21	20	19	18	17	16
1.5VL	2.00	33	2'-0	2'-3	2'-6	2'-10	3'-2	3'-6	3'-9
	2.50	39	1'-11	2'-2	2'-5	2'-9	3'-1	3'-4	3'-8
	3.00	45	1'-11	2'-2	2'-4	2'-8	2'-11	3'-3	3'-6
	3.50	51	1'-10	2'-1	2'-3	2'-7	2'-10	3'-2	3'-5
	4.00	57	1'-10	2'-0	2'-2	2'-6	2'-9	3'-1	3'-3
	4.50	63	1'-9	2'-0	2'-2	2'-6	2'-9	3'-0	3'-2
1.5VLR	2.00	38	1'-10	2'-2	2'-4	2'-8	3'-0	3'-4	3'-7
	2.50	44	1'-10	2'-1	2'-3	2'-7	2'-11	3'-2	3'-6
	3.00	50	1'-9	2'-0	2'-2	2'-6	2'-10	3'-1	3'-4
	3.50	56	1'-9	2'-0	2'-2	2'-5	2'-9	3'-0	3'-3
	4.00	62	1'-8	1'-11	2'-1	2'-5	2'-8	2'-11	3'-2
	4.50	68	1'-8	1'-11	2'-1	2'-4	2'-7	2'-10	3'-1
2VLI	2.00	39	2'-8	3'-0	3'-4	3'-11	4'-4	4'-9	5'-1
	2.50	45	2'-7	2'-11	3'-2	3'-9	4'-2	4'-7	4'-11
	3.00	51	2'-6	2'-10	3'-1	3'-7	4'-0	4'-5	4'-9
	3.50	57	2'-6	2'-9	3'-0	3'-6	3'-11	4'-3	4'-7
	4.00	63	2'-5	2'-8	2'-11	3'-5	3'-9	4'-1	4'-5
	4.50	69	2'-4	2'-7	2'-10	3'-4	3'-8	4'-0	4'-3
3VLI	2.00	44	3'-9	4'-2	4'-6	5'-2	5'-8	6'-2	6'-8
	2.50	50	3'-7	4'-0	4'-4	5'-0	5'-6	5'-11	6'-4
	3.00	57	3'-6	3'-11	4'-2	4'-10	5'-3	5'-9	6'-1
	3.50	63	3'-5	3'-9	4'-1	4'-8	5'-1	5'-6	5'-11
	4.00	69	3'-4	3'-8	3'-11	4'-6	4'-11	5'-4	5'-9
	4.50	75	3'-3	3'-7	3'-10	4'-5	4'-10	5'-2	5'-7



1. Allowable bending stress of 0.6 Fy.
2. Assumed bearing width for web crippling:
   1.5VL & VLR 3"
   2VL 4"
   3VL 6"
3. Cantilever deflection is based on a fixed end cantilever. Limited to l/120.
4. Loading conditions:
   a) Conc. + Deck + 20 PSF
   or
   b) Conc. + Deck + 150 lbs. Concentrated Load.
5. If cantilever span exceeds 1/3 of the adjacent span contact Vulcraft

WEB CRIPPLING VALUES

Deck Type	Reaction Type	Web Crippling Values Allowable Reactions, lbs/ft Bearing Length, inches 1.5	2	2.5	3	3.5	4	4.5	5	6
1.5VL22	Ext.	818	899	971	1035	1095	1121	1121	1121	1121
	Int.	1222	1325	1417	1499	1575	1609	1609	1609	1609
1.5VL20	Ext.	1168	1279	1378	1467	1549	1582	1582	1582	1582
	Int.	1768	1912	2038	2152	2257	2299	2299	2299	2299
1.5VL19	Ext.	1552	1696	1823	1938	2043	2081	2081	2081	2081
	Int.	2375	2560	2723	2871	3007	3056	3056	3056	3056
1.5VL18	Ext.	1955	2132	2288	2428	2558	2600	2600	2600	2600
	Int.	3015	3244	3444	3626	3793	3847	3847	3847	3847
1.5VL16	Ext.	2397	2603	2784	2949	3099	3136	3136	3136	3136
	Int.	3750	4017	4252	4464	4660	4707	4707	4707	4707
2VLI22	Ext.	363	399	431	460	486	511	534	556	596
	Int.	570	618	661	699	735	767	798	828	882
2VLI20	Ext.	522	572	616	655	692	726	758	788	844
	Int.	825	892	951	1004	1053	1099	1141	1182	1257
2VLI19	Ext.	696	761	818	869	916	960	1002	1041	1114
	Int.	1108	1195	1271	1340	1403	1462	1517	1570	1667
2VLI18	Ext.	879	959	1029	1092	1151	1205	1256	1304	1393
	Int.	1407	1514	1608	1692	1770	1843	1911	1975	2095
2VLI16	Ext.	1083	1176	1258	1333	1401	1464	1524	1580	1685
	Int.	1750	1875	1985	2084	2175	2260	2340	2415	2555
3VLI22	Ext.	353	388	419	447	472	496	518	540	579
	Int.	581	631	674	713	749	783	814	844	900
3VLI20	Ext.	510	559	602	640	676	709	741	770	825
	Int.	842	910	970	1025	1075	1121	1165	1206	1283
3VLI19	Ext.	683	747	803	853	899	943	983	1022	1093
	Int.	1131	1220	1297	1368	1432	1493	1549	1603	1702
3VLI18	Ext.	866	944	1013	1075	1133	1186	1236	1284	1372
	Int.	1437	1545	1641	1728	1807	1881	1951	2017	2139
3VLI16	Ext.	1071	1164	1245	1318	1386	1449	1508	1563	1667
	Int.	1787	1914	2026	2127	2221	2307	2389	2466	2609

Code of Standard Practice

For Composite Deck, Form Deck and Roof Deck Construction

1. General

1.1 Scope: This Code is intended to promote safety and quality construction in accordance with good engineering practice. It is designed to assist in the preparation of the sales contract by providing contract details which can be adopted by reference.

1.2 Application: This Code shall govern where building codes, architects' and engineers' plans and specifications or contracts are not complete or clear. There shall be no conflict between this code and any legal building regulation; it shall only supplement and amplify such laws.

1.3 Design: In the absence of ordinances or specifications to the contrary, design shall be in accordance with the current Specifications of the Steel Deck Institute. Steel roof deck and floor deck, both composite and non-composite, may be used in a variety of ways, some of which do not lend themselves to a standard "steel deck" analysis for span and loading. In these cases, other criteria must be considered in addition to those given by the Steel Deck Institute. Make sure that this investigation starts with a review of the applicable codes and that any special conditions are included in the design.

1.4 Plans and Specifications for Bidding: Plans and specifications shall clearly show details and shall be complete as to the extent of deck and accessories to be furnished by the seller. All dimensions necessary to perform an accurate estimate of the required quantity of materials shall be provided on the structural drawings. Accurately scaled plans may be provided as an alternate to fully dimensioned ones. Acceptance of an estimate based on scaled plans is the responsibility of the buyer.

1.5 Responsibility for Design: When details of design are specified, the seller shall assume no responsibility other than to furnish materials as specified. When details of design are not specified, the seller shall furnish all materials required in accordance with Section 1.3 of this code.

2. Bidding

2.1 Base Bids:

2.1.1 Roof Deck: Base bids shall include roof deck as shown in plan on structural drawings. Base bid shall also include ridge and valley plates and sump pans per architectural drawings and specifications. No other deck or accessories shall be included unless specified.

2.1.2 Composite Floor Deck and Non-Composite Floor Deck: Base bids shall include deck as shown in plan and only those accessories specifically designated on the structural drawings and called for in the appropriate division of the specifications. No other deck or accessories shall be included unless specified.

2.2 Incomplete Plans and Specifications: Incomplete plans and specifications shall be bid on the basis that the seller shall provide material in agreement with the provisions of this code.

2.3 Special Details: Any material required to support the steel deck shall not be included. The design of deck supports shall be the responsibility of the architect and/or engineer of record. Deck shall be furnished in sheet lengths of 6 feet (2.0 m) or greater. Any deck sheets requiring lengths less than 6 feet (2.0 m) shall be field cut by others unless special arrangements are made with individual manufacturers.

3. Drawings and Specifications

3.1 Furnished by the Buyer: The buyer shall furnish complete architectural plans and specifications, structural steel drawings, and purlin placing plans, all correctly dimensioned.

3.2 Furnished by Seller: The seller shall furnish erection layouts, clearly showing the location of all deck sheets. It is standard for the seller to provide the buyer with one reproducible and three prints of drawings for "approval" and again for "field use". If additional copies are required or desired, they will be provided at an additional cost at the discretion of the seller.

3.3 Discrepancies: The architect's plans shall be assumed to be correct in the absence of written notice from the buyer to the contrary. When structural steel or purlin placing plans do not agree with the architect's plans, the structural plans shall be considered as a written notice of change of plans.

3.4 Approval: The erection layouts shall be submitted to the buyer for approval unless the buyer

instructs the seller to submit same directly to the architect or waives his right of approval. The buyer (or architect) shall return one copy marked with his approval or with such corrections as he may deem necessary. **Resubmission of approval drawings, if required, shall be made only after all requested dimensions and information are provided by the approving body.** The seller shall not start shop work prior to final approval of his drawings unless such approval is waived.

The deck manufacturer is not responsible for putting a professional seal or signature on erection drawings. Erection drawings are made to show the deck products as an overlay on the structural or architectural plans and as such the drawings interpret the job requirements set forth by the designer. If the deck manufacturer were to check and seal erection drawings, it would subvert that important function.

3.5 Changes by Buyer After Approval: When changes in the project scope as contracted are made via revised contract drawings, steel erection drawings, modified approval drawings, response to RFI's, etc., an extra for material and/or redetailing costs shall be paid by the buyer at a price agreed upon by the buyer and seller.

Although certain collateral materials are not supplied by the steel deck manufacturer, it is the desire of the Steel Deck Institute to have certain principles followed in specifying and furnishing these collateral materials in order to provide a satisfactory deck assembly. This code is not intended to encroach upon the standard practices of the related industries, but is intended to supplement and amplify specifications pertaining to their products.

3.6 As Built Drawings: When included in the purchase agreement, erection layouts will be provided by the deck manufacturer based upon complete specifications, architectural and structural plans, and steel erection plans supplied by the buyer. The erection layouts shall be submitted to the buyer for approval unless the buyer instructs the seller to submit same directly to the architect or waives his right of approval. The buyer (or architect) shall return one copy marked with his approval or with such corrections as he may deem necessary. The seller shall not start shop work prior to final approval of his drawings unless such approval is waived. Once final approval drawings or a waiver has been received, distribution (field use) drawings will be prepared, and deck fabrication may commence. Changes to the scope of work or to the deck and/or related accessories subsequent to the issuance of distribution drawings, shall be incorporated into the erection layouts, by those making the changes. The deck manufacturer is not responsible for "as built" drawings.

4. General Provisions

4.1 Insulation: All steel roof decks shall be covered with a material of sufficient insulating value to prevent condensation under normal occupancy conditions. Insulation shall be adequately attached to the steel roof deck by adhesives or mechanical fasteners. Insulation materials shall be protected from the elements at all times during their storage and installation.

Phenolic foam insulation in contact with steel deck can be very corrosive when water is present. Phenolic foam insulation is not recommended for use with steel deck.

Polystyrene foam insulation applied directly to steel deck without a thermal barrier may require sprinklers to meet fire rating requirements. Consult the local codes for this construction.

4.2 Acoustical Batts: When open rib acoustical deck is provided, any sound absorbing acoustical batts shall be installed in the field by the roofing contractor. Batts shall be shipped and stored at the jobsite in such a manner as to ensure protection until installation. If acoustical batts become wet, they shall be allowed to thoroughly dry without being compressed before installation or replaced if contaminated.

A. Mold & Fungi Resistance of Insulating Materials (Fiberglass)

Fiberglass does not breed or promote fungal growth. All fiberglass typically utilized by member companies is resistant to fungal growth and complies with ASTM C1338, "Standard Test Method for Determining Fungi Resistance of Insulating Materials and Facings."

Since mold spores exist in almost every environment, according to the Environmental Protection Agency, the key to mold control is moisture control.

Proper care should be taken prior to installation. Insulation should be kept dry, off the ground, and protected from water in accordance with ASTM C1320 recommendations.

Please review the North American Insulation Manufacturer's Association's (NAIMA) Insulation Facts # 70, ***"Fiber Glass Building Insulation Products: The Facts About Mold Growth".*** For additional information on this subject, visit their website at www.naima.org.

4.3 Roof Coverings: A suitable roof covering shall be applied over the insulation.

4.4 Sheet Metal Work: All closures, flashing, etc., used in deck construction, unless otherwise specified, shall be detailed and furnished by the sheet metal contractor.

4.5 Field Painting: In some instances, field painting applied either as a full finish coat or as a touch-up may be a requirement. If field painting is intended, it is recommended that the steel surface, whether galvanized or primer painted, be checked for compatibility by the painting contractor, following the recommendations of the field coating manufacturer, particularly with regard to ambient application temperatures and humidity, cleanliness, surface moisture and surface preparation if required.

In most cases, deck welds are removed from a corrosive environment when the roof is installed and no weld touch up paint or cold galvanizing is necessary. In these instances where the welds are left exposed to a corrosive atmosphere, the weld should be wire brushed and coated with an approved substance.

A typical procedure for field painting should include:

- Surfaces must be clean, dry, and free of oil, grease and dirt.
- Test-patch an area to assure compatibility.
- Apply paint following the manufacturer's recommendations.

Note: Field Painting is the sole responsibility of the painting contractor to assure that the surface is properly prepared and that the coating is properly applied. The deck manufacturer will not accept responsibility for adhesion or compatibility of the field coating or for other causes leading to unsatisfactory painting results.

4.6 Shear Connectors: None of the member companies of the Steel Deck Institute (SDI) manufacture or furnish shear studs. As manufacturers of steel deck, the SDI members are not in a position to properly design the shear connectors to meet the building designer's intent. Consequently, the layout, design, numbering or sizing of shear connectors is not the responsibility of the deck manufacturer.

It is the Engineer of Record's responsibility to determine the quantity of shear connectors required for each compositely designed beam and show that quantity on the project drawings. The determination of shear connector quantities for purlin beams must take into account the profile of the steel deck. Shear connector quantities for girder beams must also consider the steel deck profile. The steel deck rib height, average opening width, and the stud length and placement are the key factors to determine whether a reduction factor must be applied to the shear connector strength. The AISC *Specification for Structural Steel Buildings* provides the design method to determine any reduction factors to be considered when using shear connectors in conjunction with steel deck. Table A is a summary of the "minimum" average rib width and width/height ratios of all SDI members. This average width value can be safely used in the AISC shear connector strength reduction formulas.

The deck detailers for member companies of the SDI will assume the shear connector strength reduction factors have already been incorporated into the design when detailing composite deck projects. Since the steel deck manufacturer doesn't furnish the shear connectors, they normally are not shown on the deck erection drawings. If a deck detailer does prepare a separate stud installation drawing, the detailer shall indicate the number of studs shown on the contract documents. The deck detailer shall not make adjustments without revised contract drawings.

Compliance with this criteria will ensure the correct number of shear connectors will be specified to meet the requirements of the building design.

COMPOSITE DECK PROFILE	W_r	W_r/h_r
1.5" x 6"	2.125"	1.417
1.5" x 12"	6"	4.000
2" x 12"	6"	3.000
3" x 12"	6"	2.000
Inverted 1.5" x 6"	3.875"	2.583
2" Keystone	4.60"	2.300

TABLE A

4.7 Oil Canning: Steel sheets of thicknesses typically used in the manufacture of steel deck products may exhibit a degree of waviness in their flat surfaces. This is a condition commonly referred to as **"oil canning."**

Oil canning is an inherent condition with light gage cold-formed metal products, and can result from residual stresses induced or redistributed during coil production, slitting, perforating, forming, or fabrication of steel deck. Improper deck handling, installation, or attachment to misaligned steel supports can also cause oil canning.

In general, oil canning is an aesthetic condition with no effect on the structural integrity of the deck. Since many uncontrollable factors can lead to oil canning, the manufacturer assumes no responsibility for the cost of actions taken in response to an oil canning condition. Oil canning shall not be a cause for rejection of steel deck products.

4.8 Treated Lumber: Fire retardant treated wood contains chemicals that can develop a corrosive environment when adequate moisture and heat are present. Precautionary measures should be taken by the designer to prevent such an environment when using fire retardant treated wood with steel deck.

Corrosion of steel deck products in direct contact with pressure treated lumber has become an issue due to the change in products used in treating pressure treated lumber.

The pressure treated lumber industry now treats lumber with products referred to as ACQ (Alkaline Copper Quat) and CA-A or CA-B (Copper-azole). Pressure treated lumber treated with these products have shown to be highly corrosive when in direct contact with sheet steel.

The Steel Deck Institute recommends a barrier of Water and Ice Shield or equivalent be used between pressure treated lumber and steel deck products or accessories.

4.9 Weld Washers: The capacity values for welds used in the *Diaphragm Design Manual* tables provided by SDI are **based on welds without washers** for material thickness equal or greater than .028 in. (0.71 mm). The appropriate safety and resistance factors allow for normal inconsistency in workmanship.

Welding and other types of **attachments should always be monitored on site** to verify that the proper size attachment is provided and the proper procedures are followed to produce attachments that will behave in accordance with their theoretical capacity.

Furthermore the use of washers for welded attachment to steel supports can be detrimental for the following reasons:

- The size of the washers provided by the deck installer may not allow proper contact at the bottom of the standard flutes;
- There are no washers that will allow welding to the support on either side of an interlocking side lap which is a very important attachment since it is often a controlling failure mode for diaphragm action;
- Welding with washers requires special welding procedures that require more welding time in order to produce the proper fusion between weld material, steel washer, steel deck, and steel support.

For those reasons, the **SDI does not recommend the use of welding washers to weld steel deck to support for sheet material thickness equal or greater than .028 in. (0.71 mm).**

4.10 Conduits In Deck Slabs: Conduits are permitted in deck slabs subject to local code requirements and fire rating considerations. When conduit sizes are 1" (25 mm) or less in diameter, or less than 1/3 the concrete cover, and no crossovers occur, and conduit is spaced at least 18" (457 mm) apart with 3/4" (19 mm) minimum cover, conduit may be permitted in the slab unless further restricted by the design documents.

4.11 Fire Ratings: Many fire rated assemblies that use composite floor decks are available. Consult a SDI member or manufacturer for a list or ratings.

In the Underwriters Laboratories *Fire Resistance Directory*, the composite deck constructions show hourly ratings for restrained and *unrestrained* assemblies. ASTM E119 provides information in appendix X3 called *Guide for Determining Conditions of Restraint for Floor and Roof Assemblies and for Individual Beams.* After a careful review of this guide, the Steel Deck Institute determined that all interior and exterior spans of multispan deck properly attached to bearing walls are restrained.

In fact, there is almost no realistic condition that a composite deck-slab could not be considered to be restrained - except perhaps a single span deck system which is unattached to framing or a wall in order to provide a removable slab.

4.12 Fireproofing: The steel deck manufacturer shall not be responsible for ensuring the bonding of fireproofing. The adherence of fireproofing materials is dependent on many variables; the deck manufacturer (supplier) is not responsible for the adhesion or adhesive ability of the fireproofing.

4.13 Acceptable Steels: Historically SDI has stated that steel shall conform to ASTM designation A1008 for cold-rolled products (painted or non-galvanized) or A653 for galvanized products. The discontinued predecessors of these ASTM specifications, e.g. A245, A611, and A446, were noted in earlier SDI publications. The AISI Standard, "North American Specification for the Design of Cold-Formed Steel Structural Members," governs the design of steel roof deck, composite steel floor deck, and non-composite steel form deck. Other structural steels (SS) or high-strength low-alloy steels (HSLAS or HSLAS-F) listed in Section A2.1 of the AISI Standard's 2001 Edition are permitted in the manufacture of decking products. The 2004 Supplement to the AISI Standard applies. The following also apply:

1. The acceptable steel grades are limited in the AISI Section A2.1 table.
2. Ductility limits (AISI Section A2.3) apply when specifying structural steel not listed in Section A2.1.
3. The use of Grade 80 steel conforming to ASTM A653, A1008, A792, and A875 and other steel is permitted in roof and floor decking (AISI Section A2.3.2). Certain design restrictions apply to all decking and particularly to composite floor deck.
4. Consider the suitability of metallic finishes for the particular decking application, e.g. SDI does not recommend aluminized steels or aluminum-zinc alloy coated steels in composite floor deck, and some fire rating applications require galvanized steel. (These examples would preclude A792 and A875 in floor deck; however, these same steels may be suitable in roof deck applications.)
5. Limit design to the specified and ordered minimum yield strength and not that indicated by mill reports.
6. The design thickness limit is specified in the SDI Design Manual and the AISI Standard (AISI Section A2.4).

4.14 Parking Garages: Composite floor deck has been used successfully in many parking structures around the country; however, the following precautions should be observed:

1. Slabs should be designed as continuous spans with negative bending reinforcing over the supports;
2. Additional reinforcing should be included to deter cracking caused by large temperature differences and to provide load distribution; and,
3. In areas where salt water; either brought into the structure by cars in winter or carried by the wind in coastal areas, may deteriorate the deck, protective measures must be taken. The top surface of the slab must be effectively sealed so that the salt water cannot migrate through the slab to the steel deck. A minimum G90 (Z275) galvanizing is recommended, and, the exposed bottom surface of the deck should be protected with a durable paint. The protective measures must be maintained for the life of the building. If the protective measures cannot be assured, the steel deck can be used as a stay in place form and the concrete can be reinforced with mesh or bars as required.

5. Construction Practice

5.1 Site Storage: It is the position of the Steel Deck Institute (SDI) that the deck manufacturer cannot assume responsibility for damage to steel deck resulting from improper storage protection in the field when the deck is no longer under the manufacturer's control. Neither will the deck manufacturer accept responsibility for steel deck that is delivered to the site and stored for an excessive length of time. This applies whether the steel deck was stored properly or not.

The SDI Manual of Construction with Steel Deck (MOC2) provides the basic guideline for proper storage of steel deck:

Code of Standard Practice

Steel deck shall be stored off the ground with one end elevated to provide drainage, and shall be protected from the elements with a waterproof covering, ventilated to avoid condensation.

For more information on this issue, please see the SDI White Paper entitled "JOBSITE STORAGE REQUIREMENTS FOR STEEL DECK".

If aesthetics of the erected product is an important consideration, special care must be taken to protect the steel deck during the pre-erection storage as well as throughout the installation process.

5.2 Coil Ordering Practices: The steel deck industry adopted the Voluntary Lubricant Compliance Program (VLCP) developed by the Steel Coalition which consists of manufacturers of sheet steel products used for construction. The VLCP requires the removal of lubricants from the surfaces of all steel decks, regardless of finish, to minimize the slip hazard during the construction process.

Prior to the VLCP, it was common practice to order sheet steel coils with a light film of lubricant to protect the steel from moisture during coil storage and to provide lubrication during the roll-forming process. An additional benefit of the light lubricant film was additional protection of the deck finish while stored in bundles at the jobsite.

With the removal of lubricants from the steel deck surfaces, proper jobsite storage of steel deck has become even more critical.

5.3 Protection After Erection: Steel deck shall be protected to avoid any deterioration of the structural integrity of the deck. This protection shall include avoiding extended exposure to aggressive atmospheric conditions, protection from erection traffic and/or handling that might be abrasive to the deck finish, and protection against interior conditions that would cause excess moisture to form on the underside of the deck. Deck protection after erection and any cost associated shall be "by others" and is not the responsibility of the deck manufacturer.

Some steel decks are utilized as "finished ceiling" products and shall be protected from moisture and must never be subjected to corrosive substances such as salts, fertilizers or other chemicals or to prolonged contact with dissimilar materials. All steel decks must be protected from erection operations or during site storage that could distort the panel's configuration.

Acoustical steel decks utilize fiberglass insulation batts for sound absorption; hence, protection from moisture, rain, snow, dirt, mud, etc. is necessary. Do not install (field applied) loose insulation batts in the flutes of decking until just before roof system installation. Likewise, cellular acoustical deck with shop-installed insulation batts requires proper site storage and special protection after deck erection before installation of the roofing system.

5.4 Anchorage: The deck contractor should not leave unattached deck at the end of the day as the wind may displace sheets and cause injury to persons or property. If studs are being welded to the top flange of the beams, deck sheets should be butted over the supports.

NOTES

NOTES

DIAPHRAGM SHEAR STRENGTH AND STIFFNESS

The following information is based upon the **Steel Deck Institute's Third Edition of the Diaphragm Design Manual** prepared by Larry D. Luttrell, Ph.D., P.E. Dr. Luttrell has been involved in testing of diaphragms at West Virginia University since 1965.

The following limiting conditions are taken from this book. "The quality of a diaphragm can be limited by inattention to detail particularly at end and edge terminations."

End Laps

"At interior positions, panels must be sufficiently overlapped to provide adequate end distances for the connector used. A minimum end distance for fasteners used should be one inch requiring an end lap not less than two inches. Within the system, end laps may be staggered or on a continuous line without particular effect on the diaphragm strength. However, greater care must be exercised in making connections through multiple layers of deck at the panel corners on the end lap. If panels are butted at their ends rather than end lapped, as is common with floor decks, then each panel must be individually connected at its ends with the specified pattern."

Side Laps

"The overlapping edges of panels should be in close contact to allow minimum eccentricity on fasteners in the lap. When **stitch fasteners** connect adjacent panels between supports, equivalent or superior fasteners should be used on the edgemost panel at the diaphragm perimeter to ensure the transfer of maximum diaphragm shear along the perimeter member."

Welds

"Welds should be made by qualified operators following AWS D1.3 Specifications. An approximate field check on quality control is described in Section 4.2.1.1. Welding thin material usually requires a much lower power setting and lower burn-off rate than in heavy steel units. Particular care is required when welding deck to joists in order to avoid damage to joist chords."

Screws

"Screws must be installed using properly calibrated tools to avoid overdriving which can strip the threads at side-laps or sever the screw when it is placed into heavier support steel."

Power Driven Fasteners

"These fasteners must be installed following the manufacturer's recommendations. Care must be exercised in setting the driving force to obtain the proper depth of penetration. Once driven properly, these nail-like fasteners are very resistant to extraction by uplift forces. In uplift tests on sheet material, the usual mode of failure is one of tearing the sheet around the head or washer leaving the fastener in place."

Split Panels

"Finishing out a diaphragm at its edge may require a split panel at what usually is a higher shear zone in the structure. Formulas of this section may be used to evaluate this special case noting the partial panel width w. Such a partial panel should be connected in every valley at all supports regardless of adjacent fastener patterns. Extra stitch connectors should be considered at the split panel sidelap. Full panel may be back-lapped and used to finish out the edge"

Longitudinal Edges

"In applications where joists terminate on a shear wall, the edge-most diaphragm panel may not contact the wall. If intermediate stitch fasteners have been required on side-laps, similar intermediate stitch fasteners must exist at the edge. These can be accommodated by installing a block-like spacer on the wall, to match the joist elevation, and then making connections to the block. A "collecting angle" may also be used as in Example Problem 6 of Appendix III."

Mixed Panel Lengths

"When decks are installed with multiple spans, occasional shorter panels may be required. In a large diaphragm area, the shear strength can be determined satisfactorily by using the typical 3 span panel length."

Load Tables

The following load tables are based upon Vulcraft's various types of steel floor and roof deck.

The Steel deck Institute has done testing that allows prediction of deck-fill combinations. One combination is lightweight insulating fill. Type I fill, with vermiculite aggregate, 2½ inches deep, has been shown to exhibit some greater strength than a bare diaphragm while Type II with a rigid insulation board imbedded with two or more inches of vermiculite concrete over the top has an even higher value.

Both lightweight and normal weight structural concrete on composite and non-composite deck are presented here. A minimum value for 2½ inches of concrete over the top of the deck has been computed in the tables.

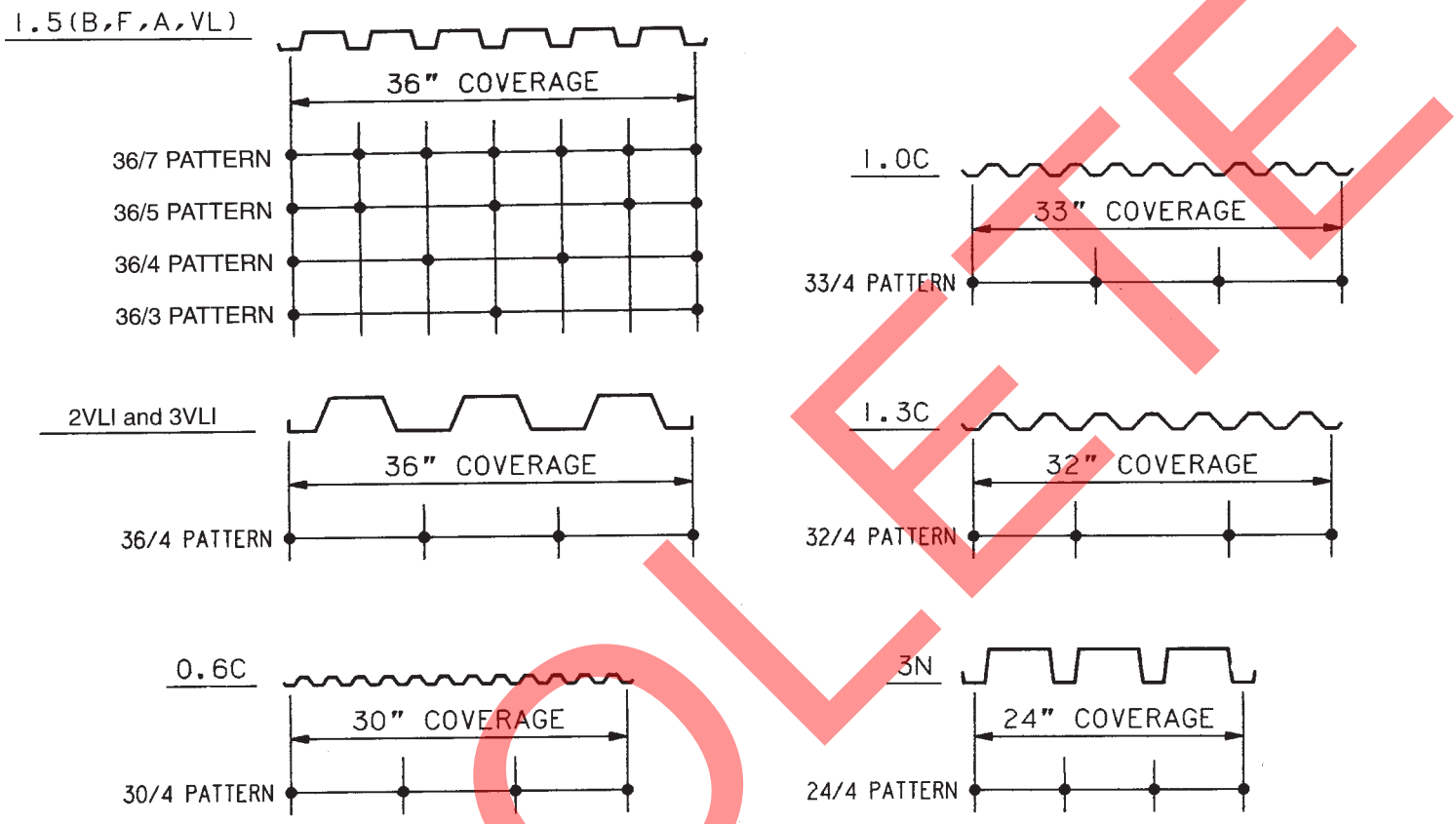
On some of the light-gage shallow decks, you will notice that as the spans get long the shear strength reaches some maximum value. This is caused from "plate-like shear buckling". As the thickness of the deck gets smaller and the spans get longer for shallow decks, buckling can result as the shear strength increases. See Section 2.3 Stability Checks of DDM03.

This catalog is not presented as an alternative to the use of the Third Edition of the Diaphragm Design Manual (DDM03), but as an extension to it for our decks. We have given you the shear strength and stiffness of our various decks, but not the backup data behind these calculations. DDM03 does a good job of supplying that information. We hope that you will contact the SDI about ordering your own copy of DDM03. Steel Deck Institute, P.O. Box 25, Fox River Grove, IL 60021-0025.

These tables were derived making the following assumptions.

1. The number of fasteners are the same at both end members and interior supports. Example: 36/7 means 36 inch wide deck with 7 fasteners per support. One in each flute.
2. The number of intermediate sidelap stitch connectors is assumed to be the same as the number of extreme edge fasteners.
3. The values printed have the factor of safety applied. 3.25 for filled diaphragms, 2.35 when any of a bare diaphragm is welded, and 2.35 when a bare diaphragm is mechanically fastened. The factor of safety listed is based on wind loading. If seismic or other loading is required the factor of safety shall be modified. Refer to North American Specification for the Design of Cold-Formed Steel Structural Members, 2001 Edition with 2004 Supplement. Contact Vulcraft for further information.
4. All values are for a three span condition. Greater values are available for a 1 or 2 span condition since you will have more fasteners to count in the calculation of strength.
5. Where welded sidelaps are shown, either use a 5/8" puddle weld or a 3/8" x 1¼" arc seam weld. The Steel Deck Institute recommends not welding the sidelaps if the thickness of the deck is 0.0295" or less.
6. Where welds are shown at the supports, the Steel Deck Institute recommends using welding washers only on deck thicknesses less than 0.028". These should be 16 gage with a 3/8" hole in them.
7. Lightweight fill (vermiculite) should be placed only on slot vented deck (type CSV).
8. The column shown as "# OF SIDELAP FASTENERS", contains the number of sidelap fasteners per span. That is, if the line that is selected has 4 and the span is five feet, then it will be one fastener per foot in the sidelap.
9. The Steel Deck Institute does not recognize button punched sidelaps, with interlocking deck, as a valid sidelap fastener for developing diaphragm shear strength.
10. Refer to the North American specification for Design of Cold-Formed Steel Structural Members, 2001 Edition with 2004 Supplement.

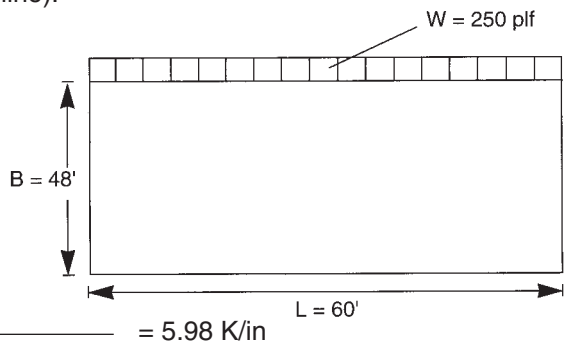
TYPICAL FASTENER LAYOUT



DIAPHRAGM SHEAR STRENGTH AND STIFFNESS DESIGN EXAMPLE

For roof plan shown, calculate the deflection of diaphragm (Δ_{C_L} center line).

Joist spacing = 5'-0"
Deck: 1.5B 22 (WR) in 15'-0" panels
(3 span condition)
Fasteners: Support – 36/3 pattern
W/ 5/8" puddle welds
Sidelap – 1 #10 TEK



From diaphragm strength tables: $K_1 = 0.617$, $D_B = 2209$, and $K_2 = 870$

$$G' = \frac{K_2}{3.78 + \frac{0.3D_B}{\text{Span}} + 3K_1\ \text{Span}} = \frac{870}{3.78 + \frac{0.3(2209)}{5} + 3(0.617)\ (5)} = 5.98\ \text{K/in}$$

$$\Delta_{C_L} = \frac{WL^2}{8xBxG'} = \frac{0.250\ (60)^2}{8\ (48)\ (5.98)} = 0.39\ \text{in}$$

Strength Check
$R = WL/2 = \frac{250\ (60)}{2} = 7500$ lbs $\quad S = \frac{7500}{48} = 156$ plf < 224 plf (from page 86) OK

1.5 (B, BI) 22 ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)

SUPPORT FASTENERS: 3/4" puddle welds

SIDELAP FASTENERS: welded[1]

Factor of safety = 2.35

	# 0F SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	K1
	0	585	509	443	391	350	316	288	264	244	226	210	197	186	177	168	0.486
	1	734	643	572	514	461	417	380									0.287
	2	866	766	685	619	563	517	473	435	402	374	349	328	310			0.204
	3	982	877	790	717	656	603	558	519	481	448	419	384	343	308	278	0.158
	4	1083	977	886	808	742	685	635	592	554	494	434	384	343	308	278	0.129
36/7	5	1169	1064	972	892	823	762	709	657	567	494	434	384	343	308	278	0.109
	6	1244	1142	1050	969	898	835	771	657	567	494	434	384	343	308	278	0.094
	7	1308	1210	1120	1039	967	902	771	657	567	494	434	384	343	308	278	0.083
	8	1362	1269	1182	1103	1030	918	771	657	567	494	434	384	343	308	278	0.074
	9	1409	1321	1238	1160	1088	918	771	657	567	494	434	384	343	308	278	0.067
	10	1450	1367	1287	1212	1111	918	771	657	567	494	434	384	343	308	278	0.061
		D_B = 129								K2= 870							
	0	518	455	405	361	323	292	266	244	225	208	194	182	172	163	155	0.583
	1	641	572	514	466	426	392	358									0.319
	2	741	670	609	557	512	473	439	410	383	356	333	312	295			0.219
	3	821	752	691	637	590	548	511	478	449	423	399	378	343	308	278	0.167
	4	884	820	760	707	658	615	576	541	510	481	434	384	343	308	278	0.135
36/5	5	934	875	819	767	719	675	635	599	566	494	434	384	343	308	278	0.113
	6	974	920	868	818	772	728	688	652	567	494	434	384	343	308	278	0.098
	7	1006	957	909	862	818	775	736	657	567	494	434	384	343	308	278	0.086
	8	1032	988	944	900	858	817	771	657	567	494	434	384	343	308	278	0.076
	9	1054	1014	973	933	893	854	771	657	567	494	434	384	343	308	278	0.069
	10	1071	1035	998	960	923	886	771	657	567	494	434	384	343	308	278	0.063
		D_B = 758								K2= 870							
	0	396	349	310	273	244	219	199	182	168	155	144	135	127	121	115	0.728
	1	514	461	416	379	347	320	292									0.358
	2	602	550	504	463	428	397	370	346	324	303	283	266	251			0.237
	3	666	618	574	534	497	465	436	409	386	364	345	328	312	296	278	0.177
	4	714	671	630	592	556	523	493	466	441	418	397	378	343	308	278	0.142
36/4	5	749	712	674	639	605	573	543	516	490	467	434	384	343	308	278	0.118
	6	776	743	710	677	645	615	586	559	534	494	434	384	343	308	278	0.101
	7	796	767	738	708	679	651	623	597	567	494	434	384	343	308	278	0.088
	8	812	787	761	734	707	681	655	630	567	494	434	384	343	308	278	0.078
	9	824	802	779	755	731	706	682	657	567	494	434	384	343	308	278	0.071
	10	834	815	794	773	750	728	706	657	567	494	434	384	343	308	278	0.064
		D_B = 1072								K2= 870							
	0	331	296	267	242	217	195	177	162	149	137	128	119	113	107	101	0.971
	1	417	383	353	326	302	281	262									0.408
	2	471	442	414	389	365	343	323	305	288	273	259	247	235			0.258
	3	506	482	458	435	413	392	372	354	337	321	307	293	280	269	258	0.189
	4	529	509	489	469	449	430	412	394	378	362	347	333	320	308	278	0.149
36/3	5	544	528	512	494	477	460	443	427	411	396	382	368	343	308	278	0.123
	6	555	542	528	513	498	483	468	453	439	424	411	384	343	308	278	0.105
	7	563	552	540	528	515	501	488	474	461	448	434	384	343	308	278	0.091
	8	569	560	550	539	527	516	504	492	479	467	434	384	343	308	278	0.081
	9	573	566	557	548	538	527	517	506	495	484	434	384	343	308	278	0.072
	10	577	570	563	555	546	537	527	517	507	494	434	384	343	308	278	0.066
		D_B = 2209								K2= 870							

[1] The shaded values do not comply with the minimum spacing requirements for sidelap connections and shall not be used except with properly spaced button-punched sidelaps with 1.5BI deck.

$$G' = \frac{K_2}{3.78 + \frac{0.3*D_B}{SPAN} + 3*K_1* SPAN}, \text{ Kips/inch}$$

SPAN is in feet

1.5 (B, BI, F, A) 22 ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)

SUPPORT FASTENERS: 5/8" puddle welds[1]

SIDELAP FASTENERS: welded[2]

Factor of safety = 2.35

	# 0F SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	K1
	0	484	420	366	323	289	261	238	218	201	187	174	163	154	146	139	0.486
	1	630	554	493	443	400	362	330									0.287
	2	757	673	604	546	498	457	423	389	360	335	313	283	252			0.204
	3	865	778	704	641	587	542	502	467	417	363	319	283	252	226	204	0.158
	4	956	869	793	727	670	620	568	484	417	363	319	283	252	226	204	0.129
36/7	5	1031	947	871	804	745	676	568	484	417	363	319	283	252	226	204	0.109
	6	1093	1013	940	873	813	676	568	484	417	363	319	283	252	226	204	0.094
	7	1145	1070	999	934	818	676	568	484	417	363	319	283	252	226	204	0.083
	8	1188	1118	1051	988	818	676	568	484	417	363	319	283	252	226	204	0.074
	9	1224	1160	1097	1009	818	676	568	484	417	363	319	283	252	226	204	0.067
	10	1254	1195	1136	1009	818	676	568	484	417	363	319	283	252	226	204	0.061
				D_B = 129			D_F = 226		D_A = 356			K2= 870					
	0	428	376	335	299	267	241	220	201	186	172	160	150	142	134	128	0.583
	1	549	491	443	402	368	338	312									0.319
	2	642	584	533	489	451	418	388	363	340	320	299	281	252			0.219
	3	713	658	608	564	524	488	457	428	403	363	319	283	252	226	204	0.167
	4	766	716	670	626	586	550	517	484	417	363	319	283	252	226	204	0.135
36/5	5	807	762	719	678	640	604	568	484	417	363	319	283	252	226	204	0.113
	6	838	798	759	721	685	650	568	484	417	363	319	283	252	226	204	0.098
	7	862	827	792	757	723	676	568	484	417	363	319	283	252	226	204	0.086
	8	881	850	819	787	755	676	568	484	417	363	319	283	252	226	204	0.076
	9	896	869	841	812	782	676	568	484	417	363	319	283	252	226	204	0.069
	10	908	884	859	832	806	676	568	484	417	363	319	283	252	226	204	0.063
				D_B = 758			D_F = 886		D_A = 974			K2= 870					
	0	328	288	256	226	201	181	165	151	139	128	119	112	105	100	95	0.728
	1	442	398	361	329	302	278	257									0.358
	2	522	480	442	409	379	353	329	309	290	273	258	242	229			0.237
	3	577	540	505	472	443	415	391	368	348	330	313	283	252	226	204	0.177
	4	615	583	552	522	494	467	443	420	399	363	319	283	252	226	204	0.142
36/4	5	642	615	588	561	535	510	486	464	417	363	319	283	252	226	204	0.118
	6	662	639	615	591	568	545	522	484	417	363	319	283	252	226	204	0.101
	7	676	657	636	615	594	573	552	484	417	363	319	283	252	226	204	0.088
	8	687	670	653	634	615	596	568	484	417	363	319	283	252	226	204	0.078
	9	695	681	666	649	633	615	568	484	417	363	319	283	252	226	204	0.071
	10	702	690	676	662	647	631	568	484	417	363	319	283	252	226	204	0.064
				D_B = 1072			D_F = 1216		D_A = 1282			K2= 870					
	0	274	245	221	200	179	161	147	134	123	114	105	99	93	88	84	0.971
	1	356	329	304	281	261	244	228									0.408
	2	403	381	359	339	320	302	285	270	256	243	231	221	211			0.258
	3	431	413	396	378	361	345	329	314	300	287	275	264	252	226	204	0.189
	4	448	434	420	406	391	377	363	349	336	323	311	283	252	226	204	0.149
36/3	5	459	448	437	425	413	400	388	375	363	352	319	283	252	226	204	0.123
	6	467	458	449	439	428	418	407	396	385	363	319	283	252	226	204	0.105
	7	472	465	457	449	440	431	422	412	403	363	319	283	252	226	204	0.091
	8	476	470	464	457	449	441	433	425	416	363	319	283	252	226	204	0.081
	9	479	474	469	463	456	449	442	435	417	363	319	283	252	226	204	0.072
	10	481	477	472	467	462	456	449	443	417	363	319	283	252	226	204	0.066
				D_B = 2209			D_F = 2428		D_A = 2442			K2= 870					

[1] A 3/8" x 1-1/4" arc seam weld shall be used with F deck or A deck.

[2] The shaded values do not comply with the minimum spacing requirements for sidelap connections and shall not be used except with properly spaced button-punched sidelaps with 1.5BI deck.

$$G' = \frac{K_2}{3.78 + \frac{0.3 * D_X}{SPAN} + 3 * K_1 * SPAN}, \text{ Kips/inch}$$

SPAN is in feet

Substitute D_B, D_F, or D_A for D_X

1.5 (B, F, A) 22 ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)

SUPPORT FASTENERS: 5/8" puddle welds[1]

SIDELAP FASTENERS: #10 TEK screws

Factor of safety = 2.35

	# 0F SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	K1
	0	484	420	366	323	289											0.486
	1	557	487	432	383	343	310	283									0.377
	2	626	550	489	440	397	359	328	301	278	259	241	227	214			0.308
	3	691	610	545	491	447	408	373	343	317	295	275	258	244	226	204	0.261
	4	751	667	598	541	493	452	418	384	355	330	309	283	252	226	204	0.226
36/7	5	806	720	648	588	537	494	457	425	394	363	319	283	252	226	204	0.199
	6	857	769	696	633	580	534	495	461	417	363	319	283	252	226	204	0.178
	7	903	816	741	676	621	574	532	484	417	363	319	283	252	226	204	0.161
	8	946	859	783	717	661	611	568	484	417	363	319	283	252	226	204	0.147
	9	985	899	823	757	698	648	568	484	417	363	319	283	252	226	204	0.135
	10	1021	936	860	794	735	676	568	484	417	363	319	283	252	226	204	0.125

D_B = 129 D_F = 226 D_A = 356 K2= 870

	0	428	376	335	299	267											0.583
	1	490	435	389	352	321	290	265									0.433
	2	546	488	440	399	365	336	309	284	263	244	228	214	202			0.345
	3	594	536	486	443	407	376	348	325	301	280	261	245	232	220	204	0.286
	4	637	579	529	485	446	413	384	359	336	316	295	277	252	226	204	0.245
36/5	5	675	618	567	523	483	449	419	392	368	346	319	283	252	226	204	0.214
	6	707	652	602	558	518	483	451	423	398	363	319	283	252	226	204	0.190
	7	736	683	634	590	550	514	482	453	417	363	319	283	252	226	204	0.171
	8	761	710	663	619	580	544	511	481	417	363	319	283	252	226	204	0.155
	9	782	735	689	647	607	571	538	484	417	363	319	283	252	226	204	0.142
	10	801	756	713	671	633	597	564	484	417	363	319	283	252	226	204	0.131

D_B = 758 D_F = 886 D_A = 974 K2= 870

	0	328	288	256	226	201											0.728
	1	388	345	310	281	255	230	210									0.509
	2	439	395	358	326	299	276	255	234	216	200	186	175	165			0.391
	3	482	438	400	367	339	314	292	272	254	236	220	207	195	185	176	0.318
	4	518	476	438	405	375	349	325	305	286	270	254	238	225	213	203	0.267
36/4	5	548	508	471	438	408	381	357	335	316	298	282	268	252	226	204	0.231
	6	573	535	500	467	438	411	386	364	343	325	308	283	252	226	204	0.203
	7	594	559	525	494	464	437	413	390	369	350	319	283	252	226	204	0.181
	8	611	579	547	517	489	462	437	415	394	363	319	283	252	226	204	0.164
	9	626	596	567	538	510	484	460	437	416	363	319	283	252	226	204	0.149
	10	639	611	583	556	530	504	481	458	417	363	319	283	252	226	204	0.137

D_B = 1072 D_F = 1216 D_A = 1282 K2= 870

	0	274	245	221	200	179											0.971
	1	319	290	265	243	224	207	191									0.617
	2	354	327	302	279	260	242	226	212	199	185	173	162	153			0.452
	3	381	356	332	310	290	272	256	241	228	215	204	194	183	173	165	0.356
	4	401	378	357	336	317	299	282	267	253	240	229	218	208	199	190	0.294
36/3	5	417	397	377	358	339	322	306	290	276	263	251	240	230	220	204	0.251
	6	429	411	393	375	358	342	326	311	297	284	272	260	250	226	204	0.218
	7	439	423	407	390	374	359	344	329	316	303	290	279	252	226	204	0.193
	8	446	432	418	403	388	373	359	345	332	319	307	283	252	226	204	0.173
	9	453	440	427	414	400	386	373	360	347	334	319	283	252	226	204	0.157
	10	458	447	435	423	410	397	385	372	360	348	319	283	252	226	204	0.144

D_B = 2209 D_F = 2428 D_A = 2442 K2= 870

[1] A 3/8" x 1-1/4" arc seam weld shall be used with F deck or A deck.

$$G' = \frac{K_2}{3.78 + \frac{0.3 * D_X}{SPAN} + 3 * K_1 * SPAN}, \text{ Kips/inch}$$

SPAN is in feet

Substitute D_B, D_F, or D_A for D_X

1.5 (B, F, A) 22 ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)

SUPPORT FASTENERS: #12 TEK screws

SIDELAP FASTENERS: #10 TEK screws

Factor of safety = 2.35

	# 0F SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	K1
	0	283	246	214	189	169											0.549
	1	355	311	276	248	223	202	184									0.414
	2	419	371	332	299	273	250	229	210	195	181	169	159	150			0.333
	3	475	424	382	347	317	292	270	251	233	217	203	190	180	170	162	0.278
	4	524	473	429	391	359	332	308	287	268	252	236	222	210	199	189	0.239
36/7	5	566	515	471	432	398	369	343	321	301	283	267	253	240	226	204	0.209
	6	602	553	508	469	435	404	377	353	332	313	295	280	252	226	204	0.186
	7	633	585	542	503	468	437	409	384	361	341	319	283	252	226	204	0.168
	8	659	614	572	534	499	467	439	413	389	363	319	283	252	226	204	0.152
	9	682	639	599	562	527	495	466	440	416	363	319	283	252	226	204	0.140
	10	701	661	623	587	553	521	492	466	417	363	319	283	252	226	204	0.129
				D_B = 129		D_F = 226		D_A = 356			K2= 870						
	0	250	220	196	175	156											0.659
	1	310	276	249	225	206	189	173									0.474
	2	358	324	295	269	248	229	213	198	185	172	161	151	143			0.370
	3	397	364	334	308	285	265	247	231	217	205	193	183	173	164	155	0.304
	4	427	396	368	342	319	298	279	262	247	233	221	209	199	190	181	0.257
36/5	5	452	423	396	371	348	327	307	290	274	260	246	234	223	213	204	0.223
	6	471	445	420	396	373	352	333	315	299	284	270	258	246	226	204	0.197
	7	486	463	440	417	396	375	356	339	322	307	293	280	252	226	204	0.177
	8	499	478	456	435	415	395	377	359	343	328	314	283	252	226	204	0.160
	9	509	490	471	451	432	413	395	378	362	347	319	283	252	226	204	0.146
	10	518	500	483	464	446	429	412	395	379	363	319	283	252	226	204	0.134
				D_B = 758		D_F = 886		D_A = 974			K2= 870						
	0	191	169	150	132	118											0.823
	1	248	223	201	183	168	155	141									0.554
	2	291	266	244	224	207	192	179	167	157	147	137	129	121			0.417
	3	322	299	278	258	241	225	211	198	187	176	167	159	151	143	136	0.334
	4	345	325	305	286	269	253	239	226	214	202	192	183	175	167	160	0.279
36/4	5	362	344	326	309	293	277	263	250	237	226	215	206	197	188	181	0.240
	6	375	359	343	328	312	298	284	271	259	247	236	226	217	208	200	0.210
	7	385	371	357	343	329	315	302	289	277	266	255	245	235	226	204	0.187
	8	392	380	368	355	342	329	317	305	293	282	272	262	252	226	204	0.168
	9	398	388	377	365	353	342	330	319	308	297	287	277	252	226	204	0.153
	10	403	394	384	373	363	352	341	331	320	310	300	283	252	226	204	0.140
				D_B = 1072		D_F = 1216		D_A = 1282			K2= 870						
	0	160	143	129	117	105											1.098
	1	202	185	171	157	146	136	127									0.665
	2	228	214	200	188	176	166	156	147	139	132	126	119	114			0.477
	3	245	233	222	210	200	190	180	171	163	156	148	142	136	130	125	0.372
	4	255	246	236	227	217	208	199	191	183	175	168	161	155	149	143	0.305
36/3	5	263	255	247	239	231	222	214	207	199	192	185	178	172	166	160	0.258
	6	268	262	255	248	241	234	226	219	212	205	199	192	186	180	175	0.224
	7	272	267	261	255	249	242	236	229	223	217	210	204	198	193	187	0.198
	8	275	270	266	260	255	249	244	238	232	226	220	215	209	204	198	0.177
	9	277	273	269	265	260	255	250	245	239	234	229	223	218	213	204	0.160
	10	279	275	272	268	264	259	255	250	245	240	236	231	226	221	204	0.146
				D_B = 2209		D_F = 2428		D_A = 2442			K2= 870						

$$G' = \frac{K_2}{3.78 + \frac{0.3*D_X}{SPAN} + 3*K_1*SPAN}, \text{ Kips/inch}$$

SPAN is in feet

Substitute D_B, D_F, or D_A for D_X

1.5 (B, BI) 20 ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)

SUPPORT FASTENERS: 3/4" puddle welds

SIDELAP FASTENERS: welded[1]

Factor of safety = 2.35

	# OF SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	K1
36/7	0	704	612	535	473	423	382	349	320	295	274	256	239	225	212	202	0.535
	1	882	773	687	618	556	504	460									0.317
	2	1041	921	824	744	677	621	571	525	486	452	422	396	373			0.225
	3	1180	1055	950	862	788	725	671	623	581	541	505	474	447	422	381	0.174
	4	1302	1174	1065	972	892	823	764	712	666	625	589	527	470	422	381	0.142
	5	1406	1279	1169	1073	989	916	852	796	746	676	595	527	470	422	381	0.120
	6	1495	1373	1263	1165	1079	1003	936	876	777	676	595	527	470	422	381	0.104
	7	1572	1454	1346	1249	1162	1084	1014	901	777	676	595	527	470	422	381	0.092
	8	1638	1526	1421	1325	1238	1159	1057	901	777	676	595	527	470	422	381	0.082
	9	1694	1589	1488	1394	1308	1229	1057	901	777	676	595	527	470	422	381	0.074
	10	1743	1644	1548	1457	1372	1258	1057	901	777	676	595	527	470	422	381	0.068
		D_B = 97									K2= 1056						
	0	623	548	488	437	391	353	322	295	273	253	236	220	207	196	186	0.642
	1	771	688	618	561	512	471	433									0.351
	2	891	806	733	670	616	569	528	492	461	431	402	377	355			0.242
	3	987	904	831	766	709	658	614	574	539	508	480	455	429	406	381	0.184
	4	1063	985	914	849	791	739	692	650	613	579	548	520	470	422	381	0.149
36/5	5	1123	1052	984	922	864	811	763	720	680	644	595	527	470	422	381	0.125
	6	1171	1106	1043	983	927	875	827	783	743	676	595	527	470	422	381	0.108
	7	1210	1151	1093	1037	983	932	885	841	777	676	595	527	470	422	381	0.094
	8	1241	1188	1135	1082	1031	982	936	893	777	676	595	527	470	422	381	0.084
	9	1267	1219	1170	1121	1073	1027	982	901	777	676	595	527	470	422	381	0.076
	10	1288	1245	1200	1155	1110	1065	1023	901	777	676	595	527	470	422	381	0.069
		D_B = 567									K2= 1056						
	0	477	420	374	331	295	266	242	222	204	189	176	164	154	145	138	0.802
	1	618	554	501	456	417	384	353									0.394
	2	723	661	606	557	515	477	445	416	390	367	342	321	302			0.261
	3	801	743	690	642	598	559	524	492	464	438	415	394	375	356	338	0.195
	4	858	807	757	711	668	629	593	560	530	503	477	455	433	414	381	0.156
36/4	5	901	856	811	768	727	689	653	620	589	561	535	511	470	422	381	0.130
	6	933	893	853	814	776	740	705	672	642	613	587	527	470	422	381	0.111
	7	957	923	887	852	817	782	749	718	688	660	595	527	470	422	381	0.097
	8	976	946	915	883	850	819	788	758	729	676	595	527	470	422	381	0.086
	9	991	965	937	908	879	849	820	792	764	676	595	527	470	422	381	0.078
	10	1003	980	955	929	902	875	848	822	777	676	595	527	470	422	381	0.071
		D_B = 802									K2= 1056						
	0	398	356	321	292	264	237	216	197	181	168	156	145	136	129	122	1.070
	1	502	461	424	392	363	337	315									0.450
	2	567	532	498	467	439	412	388	366	346	328	312	297	283			0.285
	3	608	580	551	523	496	471	448	426	405	386	369	352	337	323	310	0.208
	4	636	612	588	564	540	517	495	474	454	435	417	401	385	370	356	0.164
36/3	5	654	635	615	594	574	553	533	513	494	476	459	442	426	411	381	0.135
	6	668	652	635	617	599	581	563	545	527	510	494	478	462	422	381	0.115
	7	677	664	650	635	619	603	587	570	554	538	523	508	470	422	381	0.100
	8	684	673	661	648	634	620	606	591	576	562	547	527	470	422	381	0.089
	9	690	680	670	659	647	634	621	608	595	582	568	527	470	422	381	0.080
	10	694	686	677	667	656	645	634	622	610	598	586	527	470	422	381	0.072
		D_B = 1652									K2= 1056						

[1] The shaded values do not comply with the minimum spacing requirements for sidelap connections and shall not be used except with properly spaced button-punched sidelaps with 1.5BI deck.

$$G' = \frac{K_2}{3.78 + \frac{0.3 * D_B}{SPAN} + 3 * K_1 * SPAN}, \text{ Kips/inch}$$

SPAN is in feet

1.5 (B, BI, F, A) 20 ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)

SUPPORT FASTENERS: 5/8" puddle welds[1]

SIDELAP FASTENERS: welded[2]

Factor of safety = 2.35

	# 0F SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	K1
	0	581	505	441	390	349	316	288	264	244	226	211	197	185	175	167	0.535
	1	757	665	592	532	482	437	399									0.317
	2	910	808	725	656	598	549	507	469	434	404	377	354	333			0.225
	3	1039	934	845	770	705	650	602	561	524	492	437	387	345	310	279	0.174
	4	1148	1043	952	873	804	744	692	646	570	497	437	387	345	310	279	0.142
36/7	5	1238	1137	1046	966	894	832	776	661	570	497	437	387	345	310	279	0.120
	6	1313	1217	1128	1048	976	912	776	661	570	497	437	387	345	310	279	0.104
	7	1375	1285	1200	1122	1050	924	776	661	570	497	437	387	345	310	279	0.092
	8	1426	1343	1262	1187	1116	924	776	661	570	497	437	387	345	310	279	0.082
	9	1470	1392	1317	1244	1118	924	776	661	570	497	437	387	345	310	279	0.074
	10	1506	1435	1364	1295	1118	924	776	661	570	497	437	387	345	310	279	0.068
				D_B = 97		D_F = 169		D_A = 266			K2= 1056						
	0	514	452	402	361	323	292	266	244	225	209	194	182	171	161	153	0.642
	1	659	589	531	483	441	406	376									0.351
	2	771	701	640	587	542	501	466	436	408	384	361	339	319			0.242
	3	856	790	730	677	629	586	548	514	484	457	432	387	345	310	279	0.184
	4	920	860	804	752	704	661	621	585	553	497	437	387	345	310	279	0.149
36/5	5	968	915	863	814	768	725	686	649	570	497	437	387	345	310	279	0.125
	6	1006	959	912	866	822	781	742	661	570	497	437	387	345	310	279	0.108
	7	1035	993	951	909	868	829	776	661	570	497	437	387	345	310	279	0.094
	8	1058	1021	983	945	907	870	776	661	570	497	437	387	345	310	279	0.084
	9	1076	1043	1009	974	939	905	776	661	570	497	437	387	345	310	279	0.076
	10	1091	1062	1031	1000	967	924	776	661	570	497	437	387	345	310	279	0.069
				D_B = 567		D_F = 663		D_A = 728			K2= 1056						
	0	393	346	309	273	244	220	200	183	168	156	145	135	127	120	114	0.802
	1	530	478	433	395	362	334	310									0.394
	2	626	576	531	491	455	423	395	370	348	328	310	292	275			0.261
	3	693	648	606	567	531	499	469	442	418	396	376	357	340	310	279	0.195
	4	738	700	663	627	593	561	532	504	479	456	434	387	345	310	279	0.156
36/4	5	771	739	706	674	642	612	584	557	532	497	437	387	345	310	279	0.130
	6	794	767	739	710	682	654	627	602	570	497	437	387	345	310	279	0.111
	7	812	788	764	739	713	688	663	639	570	497	437	387	345	310	279	0.097
	8	825	805	784	761	739	716	693	661	570	497	437	387	345	310	279	0.086
	9	835	818	799	780	759	739	718	661	570	497	437	387	345	310	279	0.078
	10	843	828	812	794	776	758	739	661	570	497	437	387	345	310	279	0.071
				D_B = 802		D_F = 909		D_A = 959			K2= 1056						
	0	329	294	265	241	217	196	178	163	150	138	129	120	112	106	101	1.070
	1	427	395	365	338	314	293	274									0.450
	2	484	457	431	407	384	362	342	324	307	292	278	265	253			0.285
	3	517	496	475	454	434	414	395	378	361	345	330	317	304	292	279	0.208
	4	538	522	505	487	470	452	435	419	403	388	374	360	345	310	279	0.164
36/3	5	551	538	525	510	495	480	466	451	436	422	409	387	345	310	279	0.135
	6	560	550	539	527	514	502	489	476	463	450	437	387	345	310	279	0.115
	7	567	558	549	539	529	518	506	495	483	472	437	387	345	310	279	0.100
	8	572	565	557	548	539	530	520	510	500	489	437	387	345	310	279	0.089
	9	575	569	563	555	548	539	531	522	513	497	437	387	345	310	279	0.080
	10	578	573	567	561	554	547	540	532	524	497	437	387	345	310	279	0.072
				D_B = 1652		D_F = 1816		D_A = 1827			K2= 1056						

[1] A 3/8" x 1-1/4" arc seam weld shall be used with F deck or A deck.

[2] The shaded values do not comply with the minimum spacing requirements for sidelap connections and shall not be used except with properly spaced button-punched sidelaps with 1.5BI deck.

$$G' = \frac{K_2}{3.78 + \frac{0.3 * D_X}{SPAN} + 3 * K_1 * SPAN}, \text{ Kips/inch}$$

SPAN is in feet

Substitute D_B, D_F, or D_A for D_X

1.5 (B, F, A) 20 ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)

SUPPORT FASTENERS: 5/8" puddle welds[1]

SIDELAP FASTENERS: #10 TEK screws

Factor of safety = 2.35

	# 0F SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	K1
	0	581	505	441	390	349											0.535
	1	670	585	519	463	414	375	342									0.415
	2	754	662	589	530	480	434	397	365	337	313	293	274	258			0.340
	3	832	735	656	592	538	493	451	415	384	357	333	313	294	279	265	0.287
	4	904	803	720	652	594	545	504	465	431	401	374	351	331	310	279	0.249
36/7	5	971	867	781	709	648	596	551	512	477	444	415	387	345	310	279	0.219
	6	1032	927	839	764	700	645	597	556	520	488	437	387	345	310	279	0.196
	7	1089	983	893	816	749	692	642	599	560	497	437	387	345	310	279	0.178
	8	1140	1036	944	866	797	738	686	640	570	497	437	387	345	310	279	0.162
	9	1187	1084	993	913	843	782	728	661	570	497	437	387	345	310	279	0.149
	10	1230	1129	1038	957	886	824	769	661	570	497	437	387	345	310	279	0.138
				D_B = 97		D_F = 169		D_A = 266			K2= 1056						
	0	514	452	402	361	323											0.642
	1	589	523	468	423	386	351	320									0.477
	2	656	587	529	481	439	404	374	344	318	296	276	259	243			0.380
	3	715	645	585	534	490	452	420	391	365	339	317	297	280	265	251	0.315
	4	767	697	637	584	538	498	463	433	405	381	358	336	316	299	279	0.270
36/5	5	812	744	683	630	583	541	505	472	443	418	394	374	345	310	279	0.236
	6	852	786	726	672	624	582	544	510	480	453	428	387	345	310	279	0.209
	7	886	823	764	711	663	620	581	546	515	486	437	387	345	310	279	0.188
	8	916	856	799	747	699	656	616	580	548	497	437	387	345	310	279	0.171
	9	942	885	830	779	732	689	649	613	570	497	437	387	345	310	279	0.156
	10	965	911	858	809	763	720	680	644	570	497	437	387	345	310	279	0.144
				D_B = 567		D_F = 663		D_A = 728			K2= 1056						
	0	393	346	309	273	244											0.802
	1	466	415	373	338	308	279	254									0.561
	2	528	476	431	393	360	332	308	284	262	243	227	212	199			0.431
	3	580	528	482	443	408	378	352	328	308	287	268	251	236	223	212	0.350
	4	623	573	528	488	452	420	392	368	345	326	308	289	272	258	245	0.294
36/4	5	659	612	568	528	492	459	430	404	381	360	341	323	308	292	277	0.254
	6	689	645	603	563	528	495	466	439	414	392	372	354	337	310	279	0.224
	7	715	673	633	595	560	528	498	471	446	423	402	383	345	310	279	0.200
	8	736	697	659	623	589	557	528	500	475	452	430	387	345	310	279	0.180
	9	753	718	682	648	615	584	555	527	502	479	437	387	345	310	279	0.164
	10	768	736	702	670	638	608	580	553	527	497	437	387	345	310	279	0.151
				D_B = 802		D_F = 909		D_A = 959			K2= 1056						
	0	329	294	265	241	217											1.070
	1	384	349	319	292	269	249	232									0.679
	2	426	393	363	336	312	291	272	255	240	226	210	197	185			0.498
	3	458	428	400	374	350	328	308	290	274	260	246	234	221	209	199	0.393
	4	482	455	429	405	381	360	340	322	305	290	276	263	251	240	230	0.324
36/3	5	501	477	454	431	408	388	368	350	333	317	303	289	277	265	255	0.276
	6	516	495	473	452	431	412	393	375	358	342	328	314	301	289	278	0.240
	7	527	509	489	470	451	432	414	397	380	365	350	336	323	310	279	0.213
	8	537	520	503	485	467	450	433	416	400	385	371	357	344	310	279	0.191
	9	544	529	514	498	481	465	449	433	418	403	389	376	345	310	279	0.173
	10	550	537	523	508	493	478	463	448	434	419	406	387	345	310	279	0.158
				D_B = 1652		D_F = 1816		D_A = 1827			K2= 1056						

[1] A 3/8" x 1-1/4" arc seam weld shall be used with F deck or A deck.

$$G' = \frac{K_2}{3.78 + \frac{0.3 * D_X}{SPAN} + 3 * K_1 * SPAN}, \text{ Kips/inch}$$

SPAN is in feet

Substitute D_B, D_F, or D_A for D_X

1.5 (B, F, A) 20 ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)

SUPPORT FASTENERS: #12 TEK screws

SIDELAP FASTENERS: #10 TEK screws

Factor of safety = 2.35

	# 0F SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	K1
	0	343	298	261	230	206											0.605
	1	430	377	335	301	272	246	224									0.456
	2	508	450	402	363	331	303	279	257	237	221	206	193	182			0.366
	3	576	515	464	421	385	354	328	305	284	264	247	232	218	207	196	0.306
	4	636	573	520	475	436	402	373	348	325	306	288	270	255	241	229	0.263
36/7	5	687	625	571	524	483	448	417	389	365	343	324	306	291	276	262	0.230
	6	730	671	617	569	527	490	458	428	402	379	358	340	323	307	279	0.205
	7	768	710	658	611	568	530	496	466	438	414	392	372	345	310	279	0.185
	8	800	745	694	648	605	567	532	501	473	447	424	387	345	310	279	0.168
	9	827	776	727	681	639	601	566	534	505	478	437	387	345	310	279	0.154
	10	851	803	756	712	671	632	597	565	536	497	437	387	345	310	279	0.142
				D_B = 97		D_F = 169		D_A = 266			K2= 1056						
	0	304	267	238	213	191											0.726
	1	376	335	302	274	250	230	211									0.522
	2	435	393	358	327	301	278	258	241	225	210	197	184	173			0.408
	3	482	441	406	374	346	322	300	281	264	248	235	222	210	199	189	0.334
	4	519	481	446	415	387	361	338	318	299	283	268	254	242	230	220	0.283
36/5	5	548	513	481	450	422	396	373	352	333	315	299	284	271	259	247	0.246
	6	572	540	509	480	453	428	404	383	363	345	328	313	299	286	274	0.217
	7	590	562	534	506	480	455	432	411	391	372	355	339	325	310	279	0.195
	8	606	580	554	528	504	480	457	436	416	398	380	364	345	310	279	0.176
	9	618	595	571	547	524	501	480	459	440	421	404	387	345	310	279	0.161
	10	628	607	586	564	542	520	500	480	460	442	425	387	345	310	279	0.148
				D_B = 567		D_F = 663		D_A = 728			K2= 1056						
	0	232	205	182	161	144											0.907
	1	301	270	244	222	204	188	173									0.610
	2	353	323	296	272	251	233	217	203	191	179	167	157	148			0.459
	3	391	363	337	313	292	273	256	240	227	214	203	192	183	174	165	0.368
	4	419	394	370	347	327	307	290	274	259	246	233	222	212	203	194	0.307
36/4	5	439	418	396	375	355	337	319	303	288	274	261	250	239	229	219	0.264
	6	455	436	417	397	379	361	344	329	314	300	287	275	263	253	243	0.231
	7	467	450	433	416	399	382	366	351	336	323	310	297	286	275	265	0.206
	8	476	461	446	431	415	400	385	370	356	343	330	318	306	295	279	0.185
	9	483	471	457	443	429	415	401	387	373	361	348	336	325	310	279	0.168
	10	489	478	466	453	440	427	414	401	389	376	364	353	341	310	279	0.154
				D_B = 802		D_F = 909		D_A = 959			K2= 1056						
	0	194	174	156	142	128											1.209
	1	245	225	207	191	177	165	154									0.733
	2	276	259	243	228	214	201	190	179	169	160	152	145	138			0.526
	3	297	283	269	255	242	230	219	208	198	189	180	172	165	158	152	0.410
	4	310	299	287	275	264	253	242	232	222	213	204	196	188	181	174	0.336
36/3	5	319	310	300	290	280	270	260	251	241	233	224	216	208	201	194	0.285
	6	325	318	310	301	292	284	275	266	257	249	241	233	226	219	212	0.247
	7	330	324	317	310	302	294	286	278	271	263	255	248	241	234	227	0.218
	8	334	328	322	316	309	303	296	289	281	274	267	260	254	247	241	0.195
	9	336	332	327	321	315	309	303	297	290	284	277	271	265	258	252	0.177
	10	338	334	330	325	320	315	309	304	298	292	286	280	274	268	262	0.161
				D_B = 1652		D_F = 1816		D_A = 1827			K2= 1056						

$$G' = \frac{K_2}{3.78 + \frac{0.3*D_X}{SPAN} + 3*K_1*SPAN}, \text{ Kips/inch}$$

SPAN is in feet

Substitute D_B, D_F, or D_A for D_X

1.5 (B, BI) 18 ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)

SUPPORT FASTENERS: 3/4" puddle welds

SIDELAP FASTENERS: welded[1]

Factor of safety = 2.35

	# 0F SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	K1
	0	917	797	701	620	555	502	458	421	389	361	337	315	296	279	264	0.615
	1	1148	1007	894	804	728	660	602									0.364
	2	1355	1199	1072	968	881	808	746	687	636	592	553	519	489			0.259
	3	1536	1372	1236	1121	1025	943	872	811	757	707	661	621	585	553	524	0.200
	4	1693	1527	1385	1264	1160	1071	993	925	866	813	766	723	681	644	597	0.164
36/7	5	1829	1664	1520	1395	1286	1191	1108	1035	970	912	861	815	737	662	597	0.138
	6	1946	1785	1642	1515	1403	1304	1217	1139	1070	1008	933	827	737	662	597	0.120
	7	2046	1892	1751	1624	1511	1409	1319	1238	1165	1062	933	827	737	662	597	0.106
	8	2131	1985	1849	1724	1610	1507	1415	1331	1219	1062	933	827	737	662	597	0.094
	9	2205	2067	1936	1814	1701	1598	1505	1413	1219	1062	933	827	737	662	597	0.085
	10	2268	2138	2013	1895	1784	1682	1588	1413	1219	1062	933	827	737	662	597	0.078
		D_B = 63							K2= 1398								
	0	812	714	635	572	514	464	423	389	359	333	311	291	273	258	243	0.739
	1	1003	895	805	730	667	613	567									0.404
	2	1159	1049	953	872	801	740	687	641	600	564	527	495	466			0.278
	3	1284	1177	1081	996	922	856	798	747	702	661	624	591	561	531	503	0.212
	4	1383	1282	1189	1105	1029	961	900	846	797	752	712	676	643	613	585	0.171
36/5	5	1462	1369	1281	1199	1124	1055	993	936	885	838	795	756	721	662	597	0.144
	6	1525	1440	1358	1279	1206	1139	1076	1018	966	917	873	827	737	662	597	0.124
	7	1575	1498	1422	1349	1279	1212	1151	1093	1040	991	933	827	737	662	597	0.109
	8	1616	1547	1477	1408	1341	1278	1218	1161	1108	1058	933	827	737	662	597	0.097
	9	1649	1587	1523	1459	1396	1335	1277	1222	1169	1062	933	827	737	662	597	0.087
	10	1677	1620	1562	1503	1444	1386	1330	1277	1219	1062	933	827	737	662	597	0.080
		D_B = 372							K2= 1398								
	0	621	547	487	435	389	351	320	293	270	250	233	218	204	192	181	0.923
	1	804	721	652	593	543	500	463									0.454
	2	941	860	788	725	669	621	578	541	507	477	449	421	396			0.301
	3	1043	967	898	835	778	727	681	640	603	570	539	512	487	464	441	0.225
	4	1117	1050	986	925	869	818	771	728	689	653	621	591	564	538	515	0.180
36/4	5	1172	1113	1055	999	946	896	849	806	766	729	695	664	635	608	583	0.150
	6	1214	1163	1111	1059	1010	962	917	874	835	797	763	730	700	662	597	0.128
	7	1246	1201	1155	1108	1062	1018	975	934	895	858	823	791	737	662	597	0.112
	8	1271	1232	1190	1149	1107	1065	1025	985	948	912	878	827	737	662	597	0.099
	9	1290	1256	1219	1182	1143	1105	1067	1030	994	960	926	827	737	662	597	0.090
	10	1306	1276	1243	1209	1174	1139	1104	1069	1035	1002	933	827	737	662	597	0.081
		D_B = 526							K2= 1398								
	0	519	464	418	380	347	313	285	261	240	223	207	193	181	170	160	1.231
	1	653	600	552	510	472	439	410									0.517
	2	738	692	649	608	571	536	505	477	451	427	406	386	368			0.327
	3	792	754	717	681	646	613	582	554	527	502	479	458	438	420	403	0.239
	4	828	797	766	734	703	673	644	617	591	566	543	521	500	481	463	0.189
36/3	5	852	827	801	774	747	720	693	668	643	619	597	575	554	535	517	0.156
	6	869	849	826	803	780	756	732	709	686	664	642	621	601	582	564	0.133
	7	882	864	846	826	806	785	763	742	721	700	680	660	641	623	597	0.115
	8	891	877	861	844	826	807	788	769	750	731	712	694	676	658	597	0.102
	9	898	886	872	857	842	825	809	792	774	757	739	722	705	662	597	0.092
	10	904	893	881	868	855	840	825	810	794	778	762	746	730	662	597	0.083
		D_B = 1084							K2= 1398								

[1] The shaded values do not comply with the minimum spacing requirements for sidelap connections and shall not be used except with properly spaced button-punched sidelaps with 1.5BI deck.

$$G' = \frac{K_2}{3.78 + \frac{0.3 * D_B}{SPAN} + 3 * K_1 * SPAN}, \text{ Kips/inch}$$

SPAN is in feet

1.5 (B, BI, F, A) 18 ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)

SUPPORT FASTENERS: 5/8" puddle welds[1]

SIDELAP FASTENERS: welded[2]

Factor of safety = 2.35

	# OF SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	K1
	0	754	655	576	510	456	413	377	346	320	297	277	259	244	230	217	0.615
	1	982	863	768	691	627	570	521									0.364
	2	1181	1049	941	851	776	713	658	612	567	528	493	463	436			0.259
	3	1349	1212	1097	999	916	844	782	728	681	639	601	565	532	484	437	0.200
	4	1490	1354	1236	1133	1044	966	898	839	786	739	683	605	540	484	437	0.164
36/7	5	1607	1475	1358	1253	1161	1079	1007	943	886	777	683	605	540	484	437	0.138
	6	1704	1579	1465	1361	1267	1183	1108	1034	892	777	683	605	540	484	437	0.120
	7	1784	1668	1558	1456	1363	1278	1202	1034	892	777	683	605	540	484	437	0.106
	8	1852	1743	1639	1540	1449	1365	1214	1034	892	777	683	605	540	484	437	0.094
	9	1908	1807	1709	1615	1526	1443	1214	1034	892	777	683	605	540	484	437	0.085
	10	1955	1862	1770	1681	1595	1445	1214	1034	892	777	683	605	540	484	437	0.078
				D_B = 63		D_F = 111		D_A = 175			K2= 1398						
	0	667	587	522	470	422	382	348	320	295	274	256	239	225	212	200	0.739
	1	855	765	690	626	573	527	488									0.404
	2	1000	910	831	763	703	651	605	565	530	498	470	443	417			0.278
	3	1111	1025	948	878	816	761	712	668	628	593	561	532	505	482	437	0.212
	4	1194	1116	1043	976	914	857	806	760	718	680	645	605	540	484	437	0.171
36/5	5	1257	1188	1121	1057	997	941	890	843	799	759	683	605	540	484	437	0.144
	6	1306	1244	1183	1124	1067	1014	963	916	872	777	683	605	540	484	437	0.124
	7	1343	1289	1234	1180	1127	1076	1027	981	892	777	683	605	540	484	437	0.109
	8	1373	1325	1276	1226	1177	1129	1082	1034	892	777	683	605	540	484	437	0.097
	9	1397	1354	1310	1265	1219	1174	1131	1034	892	777	683	605	540	484	437	0.087
	10	1416	1378	1338	1297	1256	1214	1172	1034	892	777	683	605	540	484	437	0.080
				D_B = 372		D_F = 435		D_A = 478			K2= 1398						
	0	511	450	401	358	320	289	263	241	222	206	192	179	168	158	149	0.923
	1	688	620	562	512	470	434	402									0.454
	2	813	748	689	637	591	550	513	481	452	426	403	382	360			0.301
	3	899	841	787	736	690	648	609	574	543	514	488	464	442	422	403	0.225
	4	958	909	860	814	770	729	690	655	622	592	564	538	514	484	437	0.180
36/4	5	1001	959	916	874	834	795	758	723	690	660	631	605	540	484	437	0.150
	6	1031	995	959	922	885	849	814	781	749	719	683	605	540	484	437	0.128
	7	1053	1023	992	959	926	893	861	830	799	770	683	605	540	484	437	0.112
	8	1071	1045	1017	988	959	929	900	871	842	777	683	605	540	484	437	0.099
	9	1084	1061	1037	1012	986	959	932	905	879	777	683	605	540	484	437	0.090
	10	1094	1075	1054	1031	1008	984	959	934	892	777	683	605	540	484	437	0.081
				D_B = 526		D_F = 597		D_A = 630			K2= 1398						
	0	427	381	344	312	285	258	234	215	198	183	170	159	149	140	132	1.231
	1	555	512	473	439	408	380	355									0.517
	2	628	594	560	528	498	470	444	421	399	379	361	344	328			0.327
	3	671	644	617	590	563	537	513	490	468	448	429	411	394	379	364	0.239
	4	698	677	655	632	609	587	565	544	523	504	485	467	450	434	419	0.189
36/3	5	716	699	681	662	643	624	604	585	566	548	531	513	497	481	437	0.156
	6	727	714	699	684	668	651	634	617	600	584	567	552	536	484	437	0.133
	7	736	725	713	700	686	672	657	642	627	612	597	583	540	484	437	0.115
	8	742	733	723	712	700	688	675	662	649	635	622	605	540	484	437	0.102
	9	746	739	730	721	711	700	689	678	666	654	642	605	540	484	437	0.092
	10	750	743	736	728	719	710	700	690	680	669	658	605	540	484	437	0.083
				D_B = 1084		D_F = 1192		D_A = 1199			K2= 1398						

[1] A 3/8" x 1-1/4" arc seam weld shall be used with F deck or A deck.

[2] The shaded values do not comply with the minimum spacing requirements for sidelap connections and shall not be used except with properly spaced button-punched sidelaps with 1.5BI deck.

$$G' = \frac{K_2}{3.78 + \frac{0.3 * D_X}{SPAN} + 3 * K_1 * SPAN}, \text{ Kips/inch}$$

SPAN is in feet

Substitute D_B, D_F, or D_A for D_X

1.5 (B, F, A) 18 ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)

SUPPORT FASTENERS: 5/8" puddle welds[1]

SIDELAP FASTENERS: #10 TEK screws

Factor of safety = 2.35

	# 0F SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	K1
	0	754	655	576	510	456											0.615
	1	872	762	675	606	543	492	449									0.478
	2	983	863	768	691	627	570	521	479	443	412	385	361	340			0.391
	3	1086	959	857	773	703	644	593	546	505	470	439	412	388	366	347	0.330
	4	1181	1049	941	852	777	713	659	612	567	528	493	463	436	412	390	0.286
36/7	5	1269	1134	1022	927	848	780	721	671	627	586	548	514	484	458	434	0.253
	6	1349	1213	1097	1000	916	844	782	728	681	639	602	565	532	484	437	0.226
	7	1423	1286	1169	1068	982	907	842	785	734	690	650	605	540	484	437	0.204
	8	1490	1354	1236	1134	1044	967	899	839	787	740	683	605	540	484	437	0.187
	9	1552	1418	1299	1195	1104	1025	954	892	837	777	683	605	540	484	437	0.172
	10	1607	1476	1358	1254	1162	1080	1008	944	887	777	683	605	540	484	437	0.159
				D_B = 63		D_F = 111		D_A = 175			K2= 1398						
	0	667	587	522	470	422											0.739
	1	767	680	609	551	502	460	420									0.549
	2	855	765	690	627	573	527	488	453	419	390	364	341	321			0.437
	3	933	842	764	697	640	591	548	511	478	447	418	392	369	349	330	0.363
	4	1001	910	831	763	703	651	606	566	530	499	471	443	417	394	373	0.310
36/5	5	1060	972	893	823	762	708	660	618	580	547	516	489	465	440	417	0.271
	6	1111	1026	948	879	817	761	712	668	628	593	561	532	506	482	437	0.241
	7	1155	1074	999	930	867	811	761	715	674	637	604	573	540	484	437	0.216
	8	1194	1117	1044	976	914	858	807	760	718	680	645	605	540	484	437	0.196
	9	1228	1155	1085	1019	958	901	850	803	760	721	683	605	540	484	437	0.180
	10	1257	1188	1121	1057	997	942	890	843	800	760	683	605	540	484	437	0.166
				D_B = 372		D_F = 435		D_A = 478			K2= 1398						
	0	511	450	401	358	320											0.923
	1	607	541	486	440	402	367	335									0.645
	2	689	620	562	513	470	434	402	374	346	321	300	281	264			0.496
	3	757	689	630	578	533	494	460	429	403	379	354	332	312	295	279	0.403
	4	813	748	690	637	591	550	514	481	452	426	403	382	360	340	322	0.339
36/4	5	860	799	742	690	643	601	563	529	499	471	446	424	403	384	365	0.293
	6	899	842	787	737	690	648	609	575	543	514	488	464	442	422	403	0.257
	7	932	878	827	778	732	690	652	616	584	554	527	502	479	458	437	0.230
	8	959	909	861	814	770	729	691	655	622	592	564	538	514	484	437	0.207
	9	981	936	891	846	804	764	726	691	658	627	599	573	540	484	437	0.189
	10	1001	959	917	875	834	795	758	724	691	660	632	605	540	484	437	0.174
				D_B = 526		D_F = 597		D_A = 630			K2= 1398						
	0	427	381	344	312	285											1.231
	1	499	454	415	381	351	325	302									0.782
	2	555	512	474	439	408	380	355	333	314	296	278	261	245			0.573
	3	597	558	521	488	457	428	403	380	359	339	322	306	292	277	262	0.452
	4	628	594	560	528	498	470	445	421	399	379	361	344	329	314	301	0.373
36/3	5	653	622	592	562	533	507	481	458	436	415	397	379	363	348	334	0.318
	6	672	645	617	590	563	538	513	490	469	448	429	411	394	379	364	0.277
	7	686	663	638	613	588	564	541	519	498	478	459	441	424	408	393	0.245
	8	698	677	655	632	610	587	565	544	523	504	485	467	450	434	419	0.220
	9	708	689	669	649	628	607	586	566	546	527	509	492	475	459	437	0.199
	10	716	699	681	662	643	624	604	585	567	548	531	514	497	482	437	0.182
				D_B = 1084		D_F = 1192		D_A = 1199			K2= 1398						

[1] A 3/8" x 1-1/4" arc seam weld shall be used with F deck or A deck.

$$G' = \frac{K_2}{3.78 + \frac{0.3 * D_X}{SPAN} + 3 * K_1 * SPAN}, \text{ Kips/inch}$$

SPAN is in feet

Substitute D_B, D_F, or D_A for D_X

1.5 (B, F, A) 18 ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)

SUPPORT FASTENERS: #12 TEK screws

SIDELAP FASTENERS: #10 TEK screws

Factor of safety = 2.35

	# 0F SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	K1
	0	454	395	347	307	275											0.696
	1	570	500	444	399	362	327	299									0.525
	2	673	596	533	481	438	402	371	342	316	294	275	258	243			0.422
	3	763	682	614	558	510	469	434	403	377	352	329	309	291	275	261	0.352
	4	842	759	689	629	577	533	494	461	431	405	381	360	339	321	304	0.303
36/7	5	909	828	756	694	640	593	552	515	483	454	429	406	385	366	347	0.265
	6	967	888	817	754	698	649	606	567	533	502	475	450	427	407	388	0.236
	7	1016	941	871	808	752	702	657	617	580	548	519	492	468	446	426	0.212
	8	1059	987	919	858	801	751	705	663	626	592	561	533	507	484	437	0.193
	9	1095	1027	963	902	847	796	749	707	669	634	602	572	540	484	437	0.177
	10	1126	1063	1001	942	888	837	791	748	709	673	640	605	540	484	437	0.164
				D_B = 63		D_F = 111		D_A = 175			K2= 1398						
	0	402	353	315	283	254											0.835
	1	498	444	399	362	331	304	281									0.601
	2	576	521	474	433	398	368	341	318	298	280	262	246	232			0.469
	3	638	585	537	495	458	426	397	372	349	329	311	294	279	264	250	0.385
	4	687	637	591	549	512	478	448	421	396	374	355	337	320	305	291	0.326
36/5	5	726	680	636	596	559	525	494	466	440	417	396	377	359	343	328	0.283
	6	757	715	675	636	600	566	535	507	481	457	435	414	396	378	362	0.250
	7	782	744	706	670	636	603	573	544	518	493	470	449	430	412	395	0.224
	8	802	768	733	700	667	635	606	578	551	527	504	482	462	444	426	0.203
	9	818	788	756	725	694	664	635	608	582	557	535	513	493	474	437	0.185
	10	832	804	775	746	717	689	661	635	610	586	563	541	521	484	437	0.170
				D_B = 372		D_F = 435		D_A = 478			K2= 1398						
	0	308	271	241	215	193											1.044
	1	399	358	324	294	270	248	230									0.702
	2	467	427	391	360	333	309	288	269	252	237	224	210	197			0.528
	3	518	480	446	415	387	362	339	318	300	283	268	255	242	231	220	0.424
	4	555	521	490	460	432	407	384	362	343	325	309	294	281	268	257	0.354
36/4	5	582	553	524	497	470	446	423	401	381	363	346	331	316	303	290	0.304
	6	602	577	552	526	502	478	456	435	415	397	380	364	349	335	322	0.266
	7	618	596	573	550	528	506	485	465	445	427	410	394	378	364	351	0.237
	8	630	611	591	570	550	529	509	490	471	454	437	421	405	391	377	0.213
	9	640	623	605	587	568	549	530	512	494	477	461	445	430	416	402	0.194
	10	648	633	617	600	583	566	548	531	515	498	482	467	452	438	424	0.178
				D_B = 526		D_F = 597		D_A = 630			K2= 1398						
	0	257	230	207	188	172											1.392
	1	324	298	274	253	234	218	204									0.843
	2	366	344	322	302	283	267	251	237	224	212	202	192	183			0.605
	3	393	374	356	338	321	305	290	275	262	250	238	228	218	209	201	0.472
	4	410	395	380	365	349	334	320	307	294	281	270	259	249	240	231	0.387
36/3	5	422	410	397	384	371	357	344	332	320	308	297	286	276	266	257	0.327
	6	431	421	410	399	387	375	364	352	341	330	319	309	299	290	280	0.284
	7	437	429	419	410	400	389	379	369	358	348	338	328	319	310	301	0.251
	8	442	434	427	418	410	401	391	382	373	363	354	345	336	327	319	0.224
	9	445	439	432	425	418	410	401	393	384	376	367	359	350	342	334	0.203
	10	448	443	437	431	424	417	409	402	394	386	379	371	363	355	348	0.186
				D_B = 1084		D_F = 1192		D_A = 1199			K2= 1398						

$$G' = \frac{K_2}{3.78 + \frac{0.3*D_X}{SPAN} + 3*K_1*SPAN}, \text{ Kips/inch}$$

SPAN is in feet

Substitute D_B, D_F, or D_A for D_X

3 (N, NI) ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)

SUPPORT FASTENERS: 3/4" puddle welds

SIDELAP FASTENERS: welded[1]

Factor of safety = 2.35

	# 0F SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 8.00	8.50	9.00	9.50	10.00	10.50	11.00	11.50	12.00	12.50	13.00	13.50	14.00	14.50	15.00	K1
Type 22	0	143	135	127	121	115	109	104	100	96	92	88	85	82	79	76	1.093
	2	282	266	251													0.356
	3	352	331	313	296	281	268	256	245	234							0.266
	4	421	396	374	354	337	321	306	293	281	269	259	249	241	232	225	0.213
	5	479	454	432	411	392	374	357	341	327	314	302	291	280	271	262	0.177
24/4	6	534	507	483	460	440	421	404	388	373	358	344	332	320	309	299	0.152
	7	586	558	532	508	486	466	447	429	413	398	384	371	359	347	336	0.133
	8	635	606	578	553	530	508	488	470	452	436	421	407	394	381	370	0.118
	9	681	651	622	596	572	549	528	509	490	473	457	442	428	399	373	0.106
	10	724	693	664	637	612	589	567	546	527	509	492	461	428	399	373	0.096
	11	764	733	703	676	650	626	604	582	562	537	497	461	428	399	373	0.088
					D_{3N} =	653					K2 = 870						
Type 20	0	173	162	153	145	138	131	125	120	115	110	106	102	99	95	92	1.204
	2	339	319	301													0.392
	3	422	398	376	356	338	322	307	294	282							0.293
	4	506	476	450	426	405	385	368	352	337	324	311	300	289	279	270	0.234
	5	576	546	519	494	471	449	428	410	393	377	363	349	337	325	314	0.195
24/4	6	642	610	580	553	529	506	485	466	448	430	414	398	384	371	359	0.167
	7	704	670	639	610	584	559	537	516	497	478	462	446	431	417	403	0.146
	8	763	728	695	665	637	611	587	564	544	524	506	489	473	458	444	0.130
	9	818	782	748	716	687	660	635	611	589	569	549	531	514	498	483	0.117
	10	870	833	798	766	735	707	681	656	633	612	591	572	554	537	510	0.106
	11	918	881	845	812	781	752	725	700	676	653	632	612	585	545	510	0.097
					D_{3N} =	448					K2 = 1056						
Type 18	0	225	212	200	189	180	171	163	156	150	144	138	133	128	124	120	1.385
	2	441	415	392													0.451
	3	549	517	488	462	439	418	399	382	366							0.337
	4	657	619	584	553	526	501	478	457	438	421	404	389	376	363	351	0.269
	5	748	709	674	642	612	583	557	532	510	490	471	454	437	422	408	0.224
24/4	6	834	792	754	719	687	658	630	605	582	559	538	518	499	482	466	0.192
	7	915	871	830	793	759	727	698	670	645	622	600	579	560	542	524	0.168
	8	992	946	903	864	827	794	762	733	706	681	658	635	615	595	577	0.149
	9	1064	1016	972	931	893	858	825	794	766	739	714	690	668	647	628	0.134
	10	1131	1082	1037	995	956	919	885	853	823	795	768	743	720	698	677	0.122
	11	1194	1145	1099	1056	1015	978	942	909	878	849	821	795	771	747	726	0.112
					D_{3N} =	321					K2 = 1398						
Type 16	0	279	262	248	235	223	212	203	194	186	178	171	165	159	154	149	1.556
	2	546	513	485													0.507
	3	679	639	604	572	543	517	494	472	453							0.379
	4	812	765	722	684	650	619	591	565	542	520	500	481	464	448	433	0.303
	5	925	877	833	794	757	721	688	658	631	605	582	561	541	522	505	0.252
24/4	6	1031	980	932	889	849	813	779	748	720	691	664	640	617	596	576	0.216
	7	1132	1077	1027	980	938	899	862	829	797	768	741	716	692	669	647	0.189
	8	1227	1169	1117	1068	1023	981	943	907	873	842	813	785	760	736	713	0.168
	9	1315	1256	1202	1151	1104	1060	1020	982	946	913	882	853	826	800	776	0.151
	10	1399	1338	1282	1230	1182	1136	1094	1054	1017	982	950	919	890	863	837	0.137
	11	1476	1415	1359	1305	1255	1209	1165	1124	1085	1049	1015	983	952	924	897	0.126
					D_{3N} =	226					K2 = 1764						

[1] The shaded values do not comply with the minimum spacing requirements for sidelap connections and shall not be used except with properly spaced button-punched sidelaps with 3NI deck.

$$G' = \frac{K_2}{4.31 + \frac{0.3*D_N}{SPAN} + 3*K_1* SPAN}, \text{ Kips/inch}$$

SPAN is in feet

3 (N, NI) ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)

SUPPORT FASTENERS: 5/8" puddle welds

SIDELAP FASTENERS: welded[1]

Factor of safety = 2.35

	# 0F SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 8.00	8.50	9.00	9.50	10.00	10.50	11.00	11.50	12.00	12.50	13.00	13.50	14.00	14.50	15.00	K1
Type 22	0	119	112	105	100	95	90	86	82	79	76	73	70	68	65	63	1.093
	2	257	242	229													0.356
	3	327	307	290	275	261	249	238	227	218							0.266
	4	388	368	350	333	317	302	288	276	264	253	244	235	226	219	211	0.213
	5	444	421	401	383	366	350	336	322	310	298	286	276	266	257	248	0.177
24/4	6	495	471	450	430	411	394	378	364	350	337	326	314	304	294	285	0.152
	7	543	518	495	474	455	436	419	404	389	375	362	350	339	328	318	0.133
	8	587	562	538	516	495	476	458	442	426	411	398	385	373	361	350	0.118
	9	628	602	578	555	534	514	496	478	462	446	432	418	405	393	373	0.106
	10	665	639	615	592	570	550	531	513	496	480	464	450	428	399	373	0.096
	11	699	674	649	626	604	584	564	545	528	511	496	461	428	399	373	0.088
					D_{3N} =	653					K2 = 870						
Type 20	0	142	134	127	120	114	108	104	99	95	91	88	84	81	79	76	1.204
	2	309	291	275													0.392
	3	392	369	349	330	314	299	285	273	262							0.293
	4	466	442	420	400	380	362	346	331	317	304	293	282	272	262	254	0.234
	5	533	506	482	459	439	420	403	387	372	358	344	331	319	308	298	0.195
24/4	6	595	566	540	516	494	473	454	437	420	405	391	378	365	353	342	0.167
	7	652	622	595	569	546	524	504	485	467	450	435	420	407	394	382	0.146
	8	705	675	646	620	595	572	550	530	512	494	477	462	447	434	421	0.130
	9	754	723	694	667	641	617	595	574	554	536	518	502	486	472	458	0.117
	10	799	768	738	711	685	660	637	616	595	576	558	540	524	509	494	0.106
	11	840	809	779	752	725	701	677	655	634	614	595	577	560	544	510	0.097
					D_{3N} =	448					K2 = 1056						
Type 18	0	185	174	164	156	148	141	134	129	123	118	114	109	106	102	99	1.385
	2	401	377														0.451
	3	509	479	453	429	407	388	370	354	339							0.337
	4	605	574	545	519	494	470	449	429	412	395	380	366	353	341	329	0.269
	5	691	657	625	596	570	545	523	502	483	464	446	430	415	400	387	0.224
24/4	6	772	735	701	670	641	614	590	567	546	526	507	490	474	459	444	0.192
	7	846	808	772	739	708	680	654	629	606	585	565	546	528	512	496	0.168
	8	915	876	839	804	772	742	714	688	664	641	620	600	581	563	546	0.149
	9	979	938	901	865	832	801	772	745	720	695	673	651	631	612	594	0.134
	10	1037	996	958	922	889	857	827	799	772	747	724	701	680	660	641	0.122
	11	1090	1050	1012	976	942	909	879	850	823	797	773	749	727	707	687	0.112
					D_{3N} =	321					K2 = 1398						
Type 16	0	228	215	203	192	182	174	166	159	152	146	140	135	130	126	122	1.556
	2	495	466	440													0.507
	3	629	592	559	529	503	479	457	437	419							0.379
	4	747	708	673	641	610	581	554	530	508	488	469	452	435	420	406	0.303
	5	854	811	772	736	703	673	646	620	596	573	551	531	512	494	478	0.252
24/4	6	953	907	865	827	791	758	728	700	674	649	626	605	585	566	549	0.216
	7	1045	997	953	912	874	839	807	776	748	722	697	674	652	631	612	0.189
	8	1130	1081	1035	993	953	916	882	850	820	792	765	740	717	695	674	0.168
	9	1208	1158	1112	1068	1028	989	953	920	888	859	831	804	779	756	734	0.151
	10	1280	1230	1183	1139	1097	1058	1021	986	954	923	894	866	840	815	792	0.137
	11	1345	1296	1249	1204	1162	1123	1085	1049	1016	984	954	925	898	872	848	0.126
					D_{3N} =	226					K2 = 1764						

[1] The shaded values do not comply with the minimum spacing requirements for sidelap connections and shall not be used except with properly spaced button-punched sidelaps with 3NI deck.

$$G' = \frac{K_2}{4.31 + \frac{0.3*D_{3N}}{SPAN} + 3*K_1*SPAN}$$, Kips/inch

SPAN is in feet

3N ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)

SUPPORT FASTENERS: 5/8" puddle welds

SIDELAP FASTENERS: #10 TEK screws

Factor of safety = 2.35

	# 0F SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 8.00	8.50	9.00	9.50	10.00	10.50	11.00	11.50	12.00	12.50	13.00	13.50	14.00	14.50	15.00	K1
Type 22	2	186	175	165													0.587
	3	220	207	195	185	176	167	160	153	146							0.476
	4	253	238	225	213	203	193	184	176	169	162	156	150	145	140	135	0.401
	5	287	270	255	242	230	219	209	200	191	184	177	170	164	158	153	0.346
24/4	6	321	302	285	270	257	244	233	223	214	205	197	190	183	177	171	0.305
	7	353	334	315	298	284	270	258	247	236	227	218	210	203	196	189	0.272
	8	382	362	344	327	310	296	282	270	259	248	239	230	222	214	207	0.246
	9	409	388	369	352	336	321	307	293	281	270	260	250	241	233	225	0.224
	10	436	414	394	376	359	343	329	316	304	291	280	270	260	251	243	0.206
	11	462	439	418	399	381	365	350	337	324	312	301	290	280	270	261	0.190
					D_{3N} =	653					K2 = 870						
Type 20	2	224	211	199													0.646
	3	265	249	236	223	212	202	193	184	177							0.525
	4	306	288	272	258	245	233	222	213	204	196	188	181	175	169	163	0.442
	5	347	326	308	292	277	264	252	241	231	222	213	205	198	191	185	0.381
24/4	6	388	365	345	326	310	295	282	270	258	248	239	230	222	214	207	0.335
	7	427	403	381	361	343	327	312	298	286	274	264	254	245	236	229	0.299
	8	461	437	415	395	376	358	341	327	313	300	289	278	268	259	250	0.270
	9	495	469	446	425	406	388	371	355	340	327	314	302	292	282	272	0.247
	10	527	500	476	454	434	415	398	382	367	353	339	327	315	304	294	0.227
	11	558	530	505	482	461	442	424	407	391	377	364	351	338	327	316	0.210
					D_{3N} =	448					K2 = 1056						
Type 18	2	293	276	260													0.744
	3	347	327	309	292	278	264	252	241	231							0.604
	4	401	378	357	338	321	306	292	279	268	257	247	238	229	221	214	0.508
	5	455	429	405	384	364	347	331	317	304	291	280	270	260	251	243	0.439
24/4	6	510	480	453	429	408	388	371	354	340	326	314	302	291	281	272	0.386
	7	561	531	501	475	451	429	410	392	376	361	347	334	322	311	301	0.345
	8	606	574	545	519	494	471	449	430	412	395	380	366	353	341	330	0.311
	9	650	616	586	559	533	510	489	467	448	430	414	398	384	371	358	0.284
	10	692	657	626	597	570	546	523	503	483	465	447	430	415	401	387	0.261
	11	733	697	664	634	606	581	557	535	515	496	478	462	446	430	416	0.241
					D_{3N} =	321					K2 = 1398						
Type 16	2	365	343	324													0.835
	3	433	407	385	365	346	330	315	301	289							0.678
	4	501	472	446	422	401	382	365	349	334	321	308	297	286	277	267	0.571
	5	570	536	506	480	456	434	414	396	380	365	350	338	325	314	304	0.493
24/4	6	638	600	567	537	510	486	464	444	425	408	393	378	364	352	340	0.434
	7	701	664	628	595	565	538	514	491	471	452	435	418	404	390	377	0.387
	8	757	718	682	650	620	590	563	539	516	496	477	459	443	427	413	0.350
	9	812	771	733	699	667	639	612	586	562	539	519	499	482	465	449	0.319
	10	865	822	783	747	714	683	655	629	605	583	561	540	521	503	486	0.293
	11	917	872	831	793	759	727	698	670	645	621	599	579	560	540	522	0.271
					D_{3N} =	226					K2 = 1764						

$$G' = \frac{K_2}{4.31 + \frac{0.3*D_{3N}}{SPAN} + 3*K_1*SPAN}, \text{ Kips/inch}$$

SPAN is in feet

3N ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)

SUPPORT FASTENERS: #12 TEK screws

SIDELAP FASTENERS: #10 TEK screws

Factor of safety = 2.35

	# 0F SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 8.00	8.50	9.00	9.50	10.00	10.50	11.00	11.50	12.00	12.50	13.00	13.50	14.00	14.50	15.00	K1
Type 22	2	137	129	121													0.625
	3	170	160	151	143	136	130	124	118	114							0.502
	4	204	192	181	172	163	155	148	142	136	131	126	121	117	113	109	0.419
	5	232	220	209	199	190	181	173	165	158	152	146	141	136	131	127	0.359
24/4	6	259	246	234	223	213	204	196	188	181	174	167	161	155	150	145	0.315
	7	284	270	258	246	235	226	217	208	200	193	186	180	174	168	163	0.280
	8	308	293	280	268	257	246	237	228	219	212	204	197	191	185	179	0.252
	9	330	315	302	289	277	266	256	247	238	229	222	214	208	201	195	0.229
	10	351	336	322	309	297	285	275	265	256	247	239	231	224	217	210	0.210
	11	370	355	341	328	315	303	293	282	273	264	255	247	239	232	225	0.194
					D_{3N} =	653						K2 = 870					
Type 20	2	166	156	147													0.689
	3	207	195	184	174	165	157	150	144	138							0.552
	4	247	233	220	208	198	189	180	172	165	158	152	147	141	137	132	0.461
	5	282	267	254	242	231	220	210	201	192	185	178	171	165	159	154	0.396
24/4	6	314	298	284	271	259	248	237	228	219	211	203	195	188	182	176	0.347
	7	345	328	313	299	286	274	263	253	243	234	226	218	211	204	197	0.308
	8	373	356	340	325	312	299	287	276	266	257	248	239	232	224	217	0.278
	9	400	383	366	351	336	323	311	299	289	278	269	260	252	244	237	0.253
	10	426	407	391	375	360	346	333	321	310	299	290	280	271	263	255	0.232
	11	449	431	414	398	382	368	355	343	331	320	309	300	290	282	274	0.214
					D_{3N} =	448						K2 = 1056					
Type 18	2	220	207	195													0.793
	3	274	258	243	230	219	209	199	190	182							0.636
	4	328	309	291	276	262	250	238	228	219	210	202	194	187	181	175	0.531
	5	373	354	336	320	305	291	278	266	255	244	235	226	218	211	204	0.455
24/4	6	416	395	376	359	343	328	314	302	290	279	268	258	249	241	233	0.399
	7	456	434	414	395	378	363	348	334	322	310	299	289	279	270	261	0.355
	8	494	471	450	431	413	396	380	366	352	340	328	317	307	297	288	0.319
	9	530	507	485	464	445	428	411	396	382	369	356	344	333	323	313	0.291
	10	564	539	517	496	477	458	441	425	411	397	383	371	359	348	338	0.266
	11	595	570	548	526	506	488	470	454	438	423	410	397	385	373	362	0.246
					D_{3N} =	321						K2 = 1398					
Type 16	2	277	261	246													0.890
	3	345	325	307	291	276	263	251	240	230							0.714
	4	413	389	368	348	331	315	301	288	276	265	255	245	236	228	221	0.596
	5	470	446	424	404	385	367	350	335	321	308	297	286	275	266	257	0.512
24/4	6	525	498	474	452	432	414	397	381	366	352	339	326	314	304	293	0.448
	7	576	548	522	499	477	457	439	422	406	391	377	365	353	341	330	0.399
	8	624	595	568	543	521	499	480	462	445	429	414	400	387	375	363	0.359
	9	669	639	611	586	562	540	519	500	482	465	449	435	421	408	395	0.326
	10	711	681	652	626	601	578	557	537	518	500	484	468	453	440	426	0.299
	11	750	720	691	664	639	615	593	572	553	534	517	501	485	471	457	0.276
					D_{3N} =	226						K2 = 1764					

$$G' = \frac{K_2}{4.31 + \frac{0.3*D_{3N}}{SPAN} + 3*K_1*SPAN}, \text{ Kips/inch}$$

SPAN is in feet

0.6C, 1.0C, & 1.3C DECK WITH NORMAL WEIGHT CONCRETE
ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)

SUPPORT FASTENERS: Welds with welding washers
SIDELAP FASTENERS: #10 TEK screws

γ_{conc} = 145 pcf
f'_c = 3000 psi
t_{min} = 2.5" (min.)
Factor of safety = 3.25

	# 0F SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	K1
Type 28	0	1873	1782	1728	1691	1665	1646	1630	1618			0.621
	1	1939	1832	1767	1724	1693	1670	1652	1638	1626	1617	0.434
	2	2005	1881	1806	1757	1721	1695	1674	1658	1644	1633	0.334
30/4 for 0.6C	3	2070	1930	1846	1790	1750	1719	1696	1677	1662	1649	0.271
33/4 for 1.0C	4	2136	1979	1885	1822	1778	1744	1718	1697	1680	1666	0.228
	5	2202	2028	1925	1855	1806	1769	1740	1717	1698	1682	0.197
		K2 = 440								K3 = 2380		
Type 26	0	1981	1863	1792	1745	1711	1686	1666	1651			0.681
	1	2060	1922	1839	1784	1745	1715	1693	1674	1659	1647	0.476
	2	2138	1981	1887	1824	1779	1745	1719	1698	1681	1666	0.366
30/4 for 0.6C	3	2217	2040	1934	1863	1813	1775	1745	1721	1702	1686	0.297
33/4 for 1.0C	4	2296	2099	1981	1903	1846	1804	1771	1745	1724	1706	0.250
32/4 for 1.3C	5	2375	2158	2029	1942	1880	1834	1798	1769	1745	1725	0.216
		K2 = 530								K3 = 2380		
Type 24	0	2229	2049	1941	1869	1818	1779	1749	1725			0.787
	1	2335	2128	2004	1922	1863	1819	1784	1757	1734	1715	0.550
	2	2440	2207	2068	1974	1908	1858	1819	1788	1763	1742	0.422
30/4 for 0.6C	3	2545	2286	2131	2027	1953	1898	1854	1820	1792	1768	0.343
33/4 for 1.0C	4	2650	2365	2194	2080	1998	1937	1890	1851	1820	1794	0.289
32/4 for 1.3C	5	2756	2444	2257	2132	2043	1977	1925	1883	1849	1821	0.249
		K2 = 700								K3 = 2380		

0.6C, 1.0C, & 1.3C DECK WITH NORMAL WEIGHT CONCRETE
ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)

SUPPORT FASTENERS: #12 TEK screws
SIDELAP FASTENERS: #10 TEK screws

γ_{conc} = 145 pcf
f'_c = 3000 psi
t_{min} = 2.5" (min.)
Factor of safety = 3.25

	# 0F SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	K1
Type 28	0	1781	1713	1672	1645	1625	1611	1600	1591	1583	1577	0.702
	1	1846	1762	1711	1678	1654	1636	1621	1610	1601	1593	0.472
	2	1912	1811	1751	1710	1682	1660	1643	1630	1619	1610	0.356
30/4 for 0.6C	3	1978	1860	1790	1743	1710	1685	1665	1650	1637	1626	0.285
33/4 for 1.0C	4	2043	1910	1830	1776	1738	1709	1687	1669	1655	1643	0.238
	5	2109	1959	1869	1809	1766	1734	1709	1689	1673	1659	0.204
		K2 = 440								K3 = 2380		
Type 26	0	1835	1754	1705	1672	1649	1631	1618	1607	1598	1591	0.770
	1	1914	1813	1752	1712	1683	1661	1644	1631	1620	1610	0.517
	2	1993	1872	1799	1751	1716	1691	1670	1654	1641	1630	0.390
30/4 for 0.6C	3	2072	1931	1847	1790	1750	1720	1697	1678	1663	1650	0.313
33/4 for 1.0C	4	2151	1990	1894	1830	1784	1750	1723	1702	1684	1669	0.261
32/4 for 1.3C	5	2230	2049	1941	1869	1818	1779	1749	1725	1706	1689	0.224
		K2 = 530								K3 = 2380		
Type 24	0	1945	1836	1770	1727	1696	1672	1654	1640	1628	1618	0.889
	1	2050	1915	1834	1780	1741	1712	1689	1671	1657	1644	0.598
	2	2155	1994	1897	1832	1786	1751	1724	1703	1685	1671	0.450
30/4 for 0.6C	3	2261	2073	1960	1885	1831	1791	1760	1734	1714	1697	0.361
33/4 for 1.0C	4	2366	2152	2023	1937	1876	1830	1795	1766	1743	1723	0.301
32/4 for 1.3C	5	2471	2231	2086	1990	1921	1870	1830	1798	1771	1750	0.259
		K2 = 700								K3 = 2380		

$$G' = \frac{K_2}{3.20 + 3*K_1* \text{SPAN}} + K_3, \text{ Kips/inch}$$

SPAN is in feet

0.6C, 1.0C, & 1.3C DECK WITH LIGHTWEIGHT CONCRETE
ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)

SUPPORT FASTENERS: Welds with welding washers
SIDELAP FASTENERS: #10 TEK screws

γ_{conc} = 110 pcf
f'_c = 3000 psi
t_{min} = 2.5" (min.)
Factor of safety = 3.25

	# 0F SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	K1
Type 28	0	1361	1270	1216	1179	1153	1134	1119	1106			0.621
	1	1427	1320	1255	1212	1181	1158	1140	1126	1114	1105	0.434
	2	1493	1369	1294	1245	1210	1183	1162	1146	1132	1121	0.334
30/4 for 0.6C	3	1558	1418	1334	1278	1238	1208	1184	1165	1150	1137	0.271
33/4 for 1.0C	4	1624	1467	1373	1311	1266	1232	1206	1185	1168	1154	0.228
	5	1690	1516	1413	1343	1294	1257	1228	1205	1186	1170	0.197
		K2 = 440								K3 = 2380		
Type 26	0	1469	1351	1280	1233	1199	1174	1154	1139			0.681
	1	1548	1410	1327	1272	1233	1204	1181	1162	1147	1135	0.476
	2	1626	1469	1375	1312	1267	1233	1207	1186	1169	1154	0.366
30/4 for 0.6C	3	1705	1528	1422	1351	1301	1263	1233	1210	1190	1174	0.297
33/4 for 1.0C	4	1784	1587	1469	1391	1334	1292	1259	1233	1212	1194	0.250
32/4 for 1.3C	5	1863	1646	1517	1430	1368	1322	1286	1257	1233	1214	0.216
		K2 = 530								K3 = 2380		
Type 24	0	1717	1537	1429	1357	1306	1267	1237	1213			0.787
	1	1823	1616	1492	1410	1351	1307	1272	1245	1222	1204	0.550
	2	1928	1695	1556	1463	1396	1346	1307	1276	1251	1230	0.422
30/4 for 0.6C	3	2033	1774	1619	1515	1441	1386	1342	1308	1280	1256	0.343
33/4 for 1.0C	4	2139	1853	1682	1568	1486	1425	1378	1340	1308	1282	0.289
32/4 for 1.3C	5	2244	1932	1745	1620	1531	1465	1413	1371	1337	1309	0.249
		K2 = 700								K3 = 2380		

0.6C, 1.0C, & 1.3C DECK WITH LIGHTWEIGHT CONCRETE
ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)

SUPPORT FASTENERS: #12 TEK screws
SIDELAP FASTENERS: #10 TEK screws

γ_{conc} = 110 pcf
f'_c = 3000 psi
t_{min} = 2.5" (min.)
Factor of safety = 3.25

	# 0F SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	K1
Type 28	0	1269	1201	1160	1133	1114	1099	1088	1079			0.702
	1	1334	1250	1199	1166	1142	1124	1110	1098	1089	1081	0.472
	2	1400	1299	1239	1199	1170	1148	1131	1118	1107	1098	0.356
30/4 for 0.6C	3	1466	1348	1278	1231	1198	1173	1153	1138	1125	1114	0.285
33/4 for 1.0C	4	1531	1398	1318	1264	1226	1197	1175	1157	1143	1131	0.238
	5	1597	1447	1357	1297	1254	1222	1197	1177	1161	1147	0.204
		K2 = 440								K3 = 2380		
Type 26	0	1323	1242	1193	1160	1137	1119	1106	1095			0.770
	1	1402	1301	1240	1200	1171	1149	1132	1119	1108	1098	0.517
	2	1481	1360	1288	1239	1205	1179	1158	1142	1129	1118	0.390
30/4 for 0.6C	3	1560	1419	1335	1279	1238	1208	1185	1166	1151	1138	0.313
33/4 for 1.0C	4	1639	1478	1382	1318	1272	1238	1211	1190	1172	1158	0.261
32/4 for 1.3C	5	1718	1538	1429	1357	1306	1267	1237	1213	1194	1177	0.224
		K2 = 530								K3 = 2380		
Type 24	0	1433	1324	1259	1215	1184	1161	1142	1128			0.889
	1	1538	1403	1322	1268	1229	1200	1177	1159	1145	1132	0.598
	2	1643	1482	1385	1320	1274	1239	1213	1191	1173	1159	0.450
30/4 for 0.6C	3	1749	1561	1448	1373	1319	1279	1248	1223	1202	1185	0.361
33/4 for 1.0C	4	1854	1640	1511	1425	1364	1318	1283	1254	1231	1211	0.301
32/4 for 1.3C	5	1959	1719	1574	1478	1409	1358	1318	1286	1259	1238	0.259
		K2 = 700								K3 = 2380		

$$G' = \frac{K_2}{3.20 + 3*K_1* \text{SPAN}} + K_3, \text{ Kips/inch}$$

SPAN is in feet

0.6C & 1.0C DECK WITH TYPE I INSULATING FILL
ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)
SUPPORT FASTENERS: Welds
SIDELAP FASTENERS: #10 TEK screws

f'_c = 125 psi
t_{min} = 2.5" (min.) Factor of safety = 3.25

	# 0F SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	K1 0.6CSV	1.0CSV
Type 28	0	502	411	356	320	294	274	259	247			0.621	0.565
	1	568	460	396	353	322	299	281	267	255	245	0.434	0.395
weld washers	2	633	509	435	385	350	323	303	286	273	262	0.334	0.303
30/4 for 0.6C	3	699	559	474	418	378	348	325	306	291	278	0.271	0.246
33/4 for 1.0C	4	764	608	514	451	406	373	347	326	309	294	0.228	0.207
	5	830	657	553	484	434	397	368	345	326	311	0.197	0.179
		K2 = 440								K3 = 260			
Type 26	0	609	491	421	373	340	314	295	279			0.681	0.619
	1	688	551	468	413	374	344	321	303	288	275	0.476	0.432
weld washers	2	767	610	515	452	407	374	347	326	309	295	0.366	0.332
30/4 for 0.6C	3	846	669	563	492	441	403	374	350	331	315	0.297	0.270
33/4 for 1.0C	4	925	728	610	531	475	433	400	374	352	334	0.250	0.227
	5	1003	787	657	571	509	462	426	397	374	354	0.216	0.196
		K2 = 530								K3 = 260			
Type 24	0	858	678	570	498	446	408	378	354			0.787	0.715
	1	963	757	633	550	491	447	413	385	363	344	0.550	0.500
weld washers	2	1069	836	696	603	537	487	448	417	391	370	0.422	0.384
30/4 for 0.6C	3	1174	915	759	656	582	526	483	448	420	397	0.343	0.312
33/4 for 1.0C	4	1279	994	822	708	627	566	518	480	449	423	0.289	0.262
	5	1384	1073	886	761	672	605	553	512	478	449	0.249	0.227
		K2 = 700								K3 = 260			
Type 22	0	666	534	455	402	364	336	314	296			0.874	0.795
	1	796	631	533	467	420	385	357	335	317	302	0.611	0.555
5/8" spot welds	2	926	729	611	532	475	433	400	374	353	335	0.469	0.427
30/4 for 0.6C	3	1056	826	689	597	531	482	444	413	388	367	0.381	0.346
33/4 for 1.0C	4	1186	924	767	662	587	531	487	452	423	400	0.321	0.292
	5	1316	1021	844	727	643	579	530	491	459	432	0.277	0.252
		K2 = 870								K3 = 260			

1.3C DECK WITH TYPE I INSULATING FILL
ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)
SUPPORT FASTENERS: Welds
SIDELAP FASTENERS: #10 TEK screws

f'_c = 125 psi
t_{min} = 2.5" (min.) Factor of safety = 3.25

	# 0F SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	K1
Type 26	0	640	514	439	389	353	326	305	288			0.596
	1	719	574	486	428	387	356	331	312	296	283	0.425
weld washers	2	798	633	534	468	421	385	358	336	318	303	0.330
32/4 for 1.3C	3	877	692	581	507	454	415	384	359	339	322	0.270
	4	955	751	628	547	488	444	410	383	361	342	0.228
	5	1034	810	676	586	522	474	436	407	382	362	0.198
		K2 = 530								K3 = 260		
Type 24	0	905	713	598	521	467	425	393	368			0.688
	1	1010	792	661	574	512	465	429	399	376	356	0.491
weld washers	2	1116	871	724	627	557	504	464	431	404	382	0.381
32/4 for 1.3C	3	1221	950	788	679	602	544	499	463	433	408	0.312
	4	1326	1029	851	732	647	583	534	494	462	435	0.264
	5	1431	1108	914	784	692	623	569	526	490	461	0.229
		K2 = 700								K3 = 260		
Type 22	0	701	560	475	419	379	349	325	307			0.765
	1	831	657	553	484	435	397	369	345	327	311	0.545
5/8" spot welds	2	960	755	631	549	490	446	412	384	362	343	0.424
32/4 for 1.3C	3	1090	852	709	614	546	495	455	423	397	376	0.346
	4	1220	950	787	679	602	544	499	462	433	408	0.293
	5	1350	1047	865	744	657	592	542	501	468	441	0.254
		K2 = 870								K3 = 260		
Type 20	0	814	645	543	476	427	391	363	340			0.842
	1	971	763	638	554	495	450	416	388	365	346	0.601
5/8" spot welds	2	1129	881	732	633	562	509	468	435	408	385	0.467
32/4 for 1.3C	3	1287	999	827	712	630	569	521	482	451	425	0.382
	4	1444	1118	922	791	698	628	573	530	494	464	0.323
	5	1602	1236	1016	870	765	687	626	577	537	504	0.280
		K2 = 1056								K3 = 260		

$$G' = \frac{K_2}{3.20 + 3*K_1* \text{SPAN}} + K_3, \text{ Kips/inch}$$

SPAN is in feet

0.6C & 1.0C DECK WITH TYPE I INSULATING FILL
ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)
SUPPORT FASTENERS: #12 TEK screws
SIDELAP FASTENERS: #10 TEK screws

f'_c = 125 psi
t_{min} = 2.5" (min.) Factor of safety = 3.25

	# 0F SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	K1 0.6CSV	1.0CSV
Type 28	0	409	341	301	273	254	239	228	219			0.702	0.638
	1	475	391	340	306	282	264	250	239	230	222	0.472	0.429
	2	541	440	379	339	310	289	272	258	247	238	0.356	0.323
30/4 for 0.6C	3	606	489	419	372	338	313	294	278	265	255	0.285	0.259
33/4 for 1.0C	4	672	538	458	405	367	338	316	298	283	271	0.238	0.216
	5	737	587	497	438	395	363	338	318	301	288	0.204	0.186
		K2 = 440								K3 = 260			
Type 26	0	464	382	333	301	277	260	246	236			0.770	0.700
	1	543	442	381	340	311	290	273	259	248	239	0.517	0.470
	2	622	501	428	380	345	319	299	283	270	259	0.390	0.354
30/4 for 0.6C	3	700	560	475	419	379	349	325	306	291	278	0.313	0.284
33/4 for 1.0C	4	779	619	523	458	413	378	352	330	313	298	0.261	0.237
	5	858	678	570	498	446	408	378	354	334	318	0.224	0.204
		K2 = 530								K3 = 260			
Type 24	0	573	464	399	355	324	301	283	268			0.889	0.808
	1	679	543	462	408	369	340	318	300	285	273	0.598	0.544
	2	784	622	525	461	415	380	353	331	314	299	0.450	0.409
30/4 for 0.6C	3	889	701	589	513	460	419	388	363	343	325	0.361	0.328
33/4 for 1.0C	4	994	780	652	566	505	459	423	395	371	352	0.301	0.274
	5	1100	859	715	619	550	498	458	426	400	378	0.259	0.235
		K2 = 700								K3 = 260			
Type 22	0	675	541	460	407	368	339	317	299			0.988	0.898
	1	805	638	538	472	424	388	360	338	320	305	0.664	0.604
	2	935	736	616	536	479	437	404	377	355	337	0.500	0.455
30/4 for 0.6C	3	1065	833	694	601	535	485	447	416	391	370	0.401	0.365
33/4 for 1.0C	4	1195	931	772	666	591	534	490	455	426	402	0.335	0.304
	5	1325	1028	850	731	647	583	533	494	461	434	0.287	0.261
		K2 = 870								K3 = 260			

1.3C DECK WITH TYPE I INSULATING FILL
ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)
SUPPORT FASTENERS: #12 TEK screws
SIDELAP FASTENERS: #10 TEK screws

f'_c = 125 psi
t_{min} = 2.5" (min.) Factor of safety = 3.25

	# 0F SIDELAP FASTENERS	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	K1
Type 26	0	485	398	346	311	287	268	254	242			0.673
	1	564	458	394	351	320	298	280	266	254	244	0.463
	2	643	517	441	390	354	327	306	289	275	264	0.353
32/4 for 1.3C	3	722	576	488	430	388	357	332	313	297	284	0.285
	4	801	635	535	469	422	386	359	337	318	303	0.239
	5	879	694	583	509	456	416	385	360	340	323	0.206
		K2 = 530								K3 = 260		
Type 24	0	602	486	416	370	337	312	292	277			0.778
	1	707	565	479	422	382	351	327	308	293	280	0.535
	2	812	644	542	475	427	391	363	340	322	306	0.407
32/4 for 1.3C	3	918	723	606	528	472	430	398	372	350	333	0.329
	4	1023	802	669	580	517	470	433	403	379	359	0.276
	5	1128	881	732	633	562	509	468	435	408	385	0.238
		K2 = 700								K3 = 260		
Type 22	0	711	567	481	424	383	352	329	310			0.865
	1	841	665	559	489	439	401	372	348	329	313	0.594
	2	970	762	637	554	495	450	415	387	365	346	0.453
32/4 for 1.3C	3	1100	860	715	619	550	499	459	426	400	378	0.366
	4	1230	957	793	684	606	547	502	465	436	411	0.307
	5	1360	1055	871	749	662	596	545	504	471	443	0.264
		K2 = 870								K3 = 260		
Type 20	0	833	659	555	485	436	398	369	346			0.952
	1	991	777	649	564	503	458	422	394	370	351	0.655
	2	1148	896	744	643	571	517	475	441	413	390	0.499
32/4 for 1.3C	3	1306	1014	839	722	638	576	527	488	456	430	0.403
	4	1464	1132	933	801	706	635	580	535	499	469	0.338
	5	1621	1250	1028	879	773	694	632	583	542	509	0.291
		K2 = 1056								K3 = 260		

$$G' = \frac{K_2}{3.20 + 3*K_1* \text{SPAN}} + K_3, \text{ Kips/inch}$$

SPAN is in feet

0.6C & 1.0C DECK WITH TYPE II INSULATING FILL
ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)
SUPPORT FASTENERS: Welds
SIDELAP FASTENERS: #10 TEK screws

f'_c = 125 psi
t_{min} = 2.5" (min.) Factor of safety = 3.25

	# 0F SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	K1 0.6CSV	1.0CSV
Type 28	0	585	493	439	402	376	357	342	329			0.621	0.565
	1	650	543	478	435	404	381	364	349	337	328	0.434	0.395
weld washers	2	716	592	518	468	433	406	385	369	355	344	0.334	0.303
30/4 for 0.6C	3	781	641	557	501	461	431	407	389	373	360	0.271	0.246
33/4 for 1.0C	4	847	690	596	534	489	455	429	408	391	377	0.228	0.207
	5	913	740	636	566	517	480	451	428	409	393	0.197	0.179
		K2 = 440							K3 = 260				
Type 26	0	692	574	503	456	422	397	377	362			0.681	0.619
	1	771	633	550	495	456	427	404	385	370	358	0.476	0.432
weld washers	2	850	692	598	535	490	456	430	409	392	378	0.366	0.332
30/4 for 0.6C	3	928	751	645	574	524	486	456	433	413	397	0.297	0.270
33/4 for 1.0C	4	1007	810	692	614	557	515	483	456	435	417	0.250	0.227
	5	1086	870	740	653	591	545	509	480	456	437	0.216	0.196
		K2 = 530							K3 = 260				
Type 24	0	941	760	652	580	529	490	460	436			0.787	0.715
	1	1046	839	716	633	574	530	495	468	445	427	0.550	0.500
weld washers	2	1151	918	779	686	619	569	530	499	474	453	0.422	0.384
30/4 for 0.6C	3	1256	997	842	738	664	609	566	531	503	479	0.343	0.312
33/4 for 1.0C	4	1362	1076	905	791	709	648	601	563	531	506	0.289	0.262
	5	1467	1155	968	844	754	688	636	594	560	532	0.249	0.227
		K2 = 700							K3 = 260				
Type 22	0	749	617	537	484	447	418	396	379			0.874	0.795
	1	879	714	615	549	502	467	440	418	400	385	0.611	0.555
5/8" spot welds	2	1009	811	693	614	558	516	483	457	435	417	0.469	0.427
30/4 for 0.6C	3	1138	909	771	679	614	565	526	496	471	450	0.381	0.346
33/4 for 1.0C	4	1268	1006	849	744	669	613	570	535	506	482	0.321	0.292
	5	1398	1104	927	809	725	662	613	574	541	515	0.277	0.252
		K2 = 870							K3 = 260				

1.3C DECK WITH TYPE II INSULATING FILL
ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)
SUPPORT FASTENERS: Welds
SIDELAP FASTENERS: #10 TEK screws

f'_c = 125 psi
t_{min} = 2.5" (min.) Factor of safety = 3.25

	# 0F SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	K1
Type 26	0	723	597	522	471	436	409	388	371			0.596
	1	802	656	569	511	469	438	414	395	379	366	0.425
weld washers	2	880	715	616	550	503	468	440	418	400	385	0.330
32/4 for 1.3C	3	959	774	664	590	537	497	467	442	422	405	0.270
	4	1038	834	711	629	571	527	493	466	443	425	0.228
	5	1117	893	758	669	604	556	519	489	465	444	0.198
		K2 = 530							K3 = 260			
Type 24	0	988	796	681	604	549	508	476	450			0.688
	1	1093	875	744	657	594	547	511	482	458	438	0.491
weld washers	2	1198	954	807	709	639	587	546	514	487	465	0.381
32/4 for 1.3C	3	1303	1033	870	762	684	626	581	545	516	491	0.312
	4	1409	1112	933	814	730	666	616	577	544	517	0.264
	5	1514	1190	996	867	775	705	651	608	573	544	0.229
		K2 = 700							K3 = 260			
Type 22	0	783	642	558	502	461	431	408	389			0.765
	1	913	740	636	567	517	480	451	428	409	393	0.545
5/8" spot welds	2	1043	837	714	632	573	529	494	467	445	426	0.424
32/4 for 1.3C	3	1173	935	792	697	629	577	538	506	480	458	0.346
	4	1303	1032	870	762	684	626	581	545	515	491	0.293
	5	1433	1130	948	826	740	675	624	584	551	523	0.254
		K2 = 870							K3 = 260			
Type 20	0	896	727	626	558	510	474	446	423			0.842
	1	1054	845	720	637	577	533	498	470	448	429	0.601
5/8" spot welds	2	1212	964	815	716	645	592	551	518	491	468	0.467
32/4 for 1.3C	3	1369	1082	910	795	713	651	603	565	534	507	0.382
	4	1527	1200	1004	874	780	710	656	612	577	547	0.323
	5	1685	1318	1099	952	848	769	708	659	620	586	0.280
		K2 = 1056							K3 = 260			

$$G' = \frac{K_2}{3.20 + 3*K_1* \text{SPAN}} + K_3, \text{ Kips/inch}$$

SPAN is in feet

0.6C & 1.0C DECK WITH TYPE II INSULATING FILL
ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)
SUPPORT FASTENERS: #12 TEK screws
SIDELAP FASTENERS: #10 TEK screws

f'_c = 125 psi
t_{min} = 2.5" (min.) Factor of safety = 3.25

	# 0F SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	K1 0.6CSV	1.0CSV
Type 28	0	492	424	383	356	337	322	311	302			0.702	0.638
	1	557	473	423	389	365	347	333	321	312	304	0.472	0.429
	2	623	522	462	422	393	371	354	341	330	321	0.356	0.323
30/4 for 0.6C	3	689	572	501	454	421	396	376	361	348	337	0.285	0.259
33/4 for 1.0C	4	754	621	541	487	449	420	398	380	366	354	0.238	0.216
	5	820	670	580	520	477	445	420	400	384	370	0.204	0.186
		K2 = 440								K3 = 260			
Type 26	0	547	465	416	383	360	343	329	318			0.770	0.700
	1	625	524	463	423	394	372	355	342	331	321	0.517	0.470
	2	704	583	511	462	428	402	382	365	352	341	0.390	0.354
30/4 for 0.6C	3	783	642	558	502	461	431	408	389	374	361	0.313	0.284
33/4 for 1.0C	4	862	701	605	541	495	461	434	413	395	381	0.261	0.237
	5	941	761	653	580	529	490	460	436	417	400	0.224	0.204
		K2 = 530								K3 = 260			
Type 24	0	656	547	482	438	407	384	365	351			0.889	0.808
	1	761	626	545	491	452	423	401	382	368	355	0.598	0.544
	2	866	705	608	543	497	463	436	414	396	382	0.450	0.409
30/4 for 0.6C	3	972	784	671	596	542	502	471	446	425	408	0.361	0.328
33/4 for 1.0C	4	1077	863	734	649	587	541	506	477	454	434	0.301	0.274
	5	1182	942	797	701	632	581	541	509	483	461	0.259	0.235
		K2 = 700								K3 = 260			
Type 22	0	758	624	543	489	451	422	399	382			0.988	0.898
	1	888	721	621	554	506	471	443	421	402	387	0.664	0.604
	2	1018	818	699	619	562	519	486	459	438	420	0.500	0.455
30/4 for 0.6C	3	1148	916	777	684	618	568	529	498	473	452	0.401	0.365
33/4 for 1.0C	4	1278	1013	855	749	673	617	573	537	509	485	0.335	0.304
	5	1408	1111	933	814	729	665	616	576	544	517	0.287	0.261
		K2 = 870								K3 = 260			

1.3C DECK WITH TYPE II INSULATING FILL
ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)
SUPPORT FASTENERS: #12 TEK screws
SIDELAP FASTENERS: #10 TEK screws

f'_c = 125 psi
t_{min} = 2.5" (min.) Factor of safety = 3.25

	# 0F SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	K1
Type 26	0	568	481	429	394	369	351	336	324			0.673
	1	647	540	476	433	403	380	362	348	336	327	0.463
	2	726	599	523	473	437	410	389	372	358	347	0.353
32/4 for 1.3C	3	804	658	571	512	471	439	415	395	379	366	0.285
	4	883	717	618	552	504	469	441	419	401	386	0.239
	5	962	777	665	591	538	498	467	443	422	406	0.206
		K2 = 530								K3 = 260		
Type 24	0	684	568	499	452	419	394	375	359			0.778
	1	790	647	562	505	464	434	410	391	375	363	0.535
	2	895	726	625	558	509	473	445	423	404	389	0.407
32/4 for 1.3C	3	1000	805	688	610	554	513	480	454	433	415	0.329
	4	1105	884	751	663	600	552	515	486	462	441	0.276
	5	1211	963	814	715	645	592	550	517	490	468	0.238
		K2 = 700								K3 = 260		
Type 22	0	793	650	564	507	466	435	411	392			0.865
	1	923	747	642	572	521	484	454	431	412	396	0.594
	2	1053	845	720	637	577	532	498	470	447	428	0.453
32/4 for 1.3C	3	1183	942	798	702	633	581	541	509	483	461	0.366
	4	1313	1040	876	767	688	630	584	548	518	493	0.307
	5	1443	1137	954	831	744	679	628	587	554	526	0.264
		K2 = 870								K3 = 260		
Type 20	0	916	742	637	568	518	481	452	429			0.952
	1	1073	860	732	647	586	540	505	476	453	433	0.655
	2	1231	978	827	726	653	599	557	523	496	473	0.499
32/4 for 1.3C	3	1389	1096	921	804	721	658	610	571	539	512	0.403
	4	1546	1215	1016	883	788	717	662	618	582	552	0.338
	5	1704	1333	1110	962	856	777	715	665	625	591	0.291
		K2 = 1056								K3 = 260		

$$G' = \frac{K_2}{3.20 + 3*K_1* \text{SPAN}} + K_3, \text{ Kips/inch}$$

SPAN is in feet

1.5, 2 & 3 COMPOSITE DECK WITH NORMAL WEIGHT CONCRETE
ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)
SUPPORT FASTENERS: 5/8" puddle welds
SIDELAP FASTENERS: welded[1]

γ_{conc} = 145 pcf
f'_c = 3000 psi
t_{min} = 2.5" (min.)
Factor of safety = 3.25

	# 0F SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	K1
Type 22	0	1641	1622	1608	1597	1588	1581	1575	1570	1566	1562	0.728
	1	1708										0.358
	2	1775	1737	1708	1686							0.237
	3	1842	1794	1759	1731	1709	1691	1675				0.177
	4	1909	1852	1809	1775	1749	1727	1709	1693	1680	1669	0.142
36/4	5	1976	1909	1859	1820	1789	1764	1742	1724	1709	1696	0.118
	6	2042	1966	1909	1865	1829	1800	1776	1755	1738	1722	0.101
	7	2109	2024	1959	1909	1869	1836	1809	1786	1766	1749	0.088
	8	2176	2081	2009	1954	1909	1873	1843	1817	1795	1776	0.078
	9	2243	2138	2060	1998	1950	1909	1876	1848	1824	1803	0.071
	10	2310	2196	2110	2043	1990	1946	1910	1879	1852	1829	0.064
		K2= 870							K3= 2380			
Type 20	0	1668	1645	1628	1615	1604	1596	1588	1582	1577	1572	0.802
	1	1748										0.394
	2	1828	1783	1748	1722							0.261
	3	1909	1852	1809	1775	1749	1727	1709				0.195
	4	1989	1920	1869	1829	1797	1771	1749	1731	1715	1701	0.156
36/4	5	2069	1989	1929	1883	1845	1815	1789	1768	1749	1733	0.130
	6	2150	2058	1989	1936	1893	1858	1829	1805	1784	1765	0.111
	7	2230	2127	2050	1990	1942	1902	1869	1842	1818	1797	0.097
	8	2310	2196	2110	2043	1990	1946	1910	1879	1852	1829	0.086
	9	2391	2265	2170	2097	2038	1990	1950	1916	1887	1862	0.078
	10	2471	2333	2230	2150	2086	2034	1990	1953	1921	1894	0.071
		K2= 1056							K3= 2380			
Type 18	0	1715	1686	1663	1646	1633	1621	1612	1604	1597	1591	0.923
	1	1819										0.454
	2	1923	1864	1820	1785							0.301
	3	2028	1954	1898	1855	1820	1792	1768				0.225
	4	2132	2043	1976	1924	1883	1849	1820	1797	1776	1758	0.180
36/4	5	2236	2132	2054	1994	1945	1906	1873	1845	1821	1800	0.150
	6	2340	2222	2133	2063	2008	1963	1925	1893	1865	1842	0.128
	7	2445	2311	2211	2133	2070	2019	1977	1941	1910	1883	0.112
	8	2549	2400	2289	2202	2133	2076	2029	1989	1955	1925	0.099
	9	2653	2490	2367	2272	2196	2133	2081	2037	1999	1967	0.090
	10	2757	2579	2445	2341	2258	2190	2133	2085	2044	2008	0.081
		K2= 1398							K3= 2380			
Type 16	0	1763	1727	1700	1678	1662	1648	1636	1626	1618	1611	1.037
	1	1892										0.510
	2	2021	1948	1893	1850							0.338
	3	2149	2058	1989	1936	1893	1858	1829				0.253
	4	2278	2168	2086	2022	1970	1928	1894	1864	1839	1817	0.202
36/4	5	2407	2278	2182	2107	2048	1999	1958	1923	1894	1868	0.168
	6	2535	2389	2279	2193	2125	2069	2022	1983	1949	1920	0.144
	7	2664	2499	2375	2279	2202	2139	2087	2042	2004	1971	0.126
	8	2793	2609	2472	2365	2279	2209	2151	2102	2059	2023	0.112
	9	2921	2720	2568	2451	2357	2279	2215	2161	2114	2074	0.101
	10	3050	2830	2665	2536	2434	2350	2280	2220	2170	2125	0.091
		K2= 1764							K3= 2380			

[1] The shaded values do not comply with the minimum spacing requirements for sidelap connections and shall not be used except with properly spaced button-punched sidelaps with 1.5VLI, 2VLI and 3VLI deck.

$$G' = \frac{K_2}{3.50 + 3*K_1 * \text{SPAN}} + K_3, \text{ Kips/inch}$$

SPAN is in feet

1.5, 2 & 3 COMPOSITE DECK WITH LIGHTWEIGHT CONCRETE ALLOWABLE DIAPHRAGM SHEAR STRENGTH (PLF)

SUPPORT FASTENERS: 5/8" puddle welds

SIDELAP FASTENERS: welded[1]

γ_{conc} = 110 pcf
f'_c = 3000 psi
t_{min} = 2.5" (min.)
Factor of safety = 3.25

	# 0F SIDELAP FASTENERS	DIAPHRAGM SHEAR STRENGTH (PLF) DECK SPAN (FT.-IN.) 6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	K1
Type 22	0	1129	1110	1096	1085	1076	1069	1063	1058	1054	1050	0.728
	1	1196										0.358
	2	1263	1225	1197	1174							0.237
	3	1330	1282	1247	1219	1197	1179	1163				0.177
	4	1397	1340	1297	1264	1237	1215	1197	1182	1168	1157	0.142
36/4	5	1464	1397	1347	1308	1277	1252	1230	1212	1197	1184	0.118
	6	1531	1454	1397	1353	1317	1288	1264	1243	1226	1210	0.101
	7	1597	1512	1447	1397	1357	1325	1297	1274	1254	1237	0.088
	8	1664	1569	1498	1442	1397	1361	1331	1305	1283	1264	0.078
	9	1731	1626	1548	1487	1438	1398	1364	1336	1312	1291	0.071
	10	1798	1684	1598	1531	1478	1434	1398	1367	1340	1317	0.064
		K2= 870							K3= 2380			
Type 20	0	1156	1133	1116	1103	1092	1084	1076	1070	1065	1061	0.802
	1	1236										0.394
	2	1316	1271	1237	1210							0.261
	3	1397	1340	1297	1263	1237	1215	1197				0.195
	4	1477	1408	1357	1317	1285	1259	1237	1219	1203	1189	0.156
36/4	5	1557	1477	1417	1371	1333	1303	1277	1256	1237	1221	0.130
	6	1638	1546	1477	1424	1381	1346	1317	1293	1272	1253	0.111
	7	1718	1615	1538	1478	1430	1390	1358	1330	1306	1285	0.097
	8	1798	1684	1598	1531	1478	1434	1398	1367	1340	1318	0.086
	9	1879	1753	1658	1585	1526	1478	1438	1404	1375	1350	0.078
	10	1959	1822	1718	1638	1574	1522	1478	1441	1409	1382	0.071
		K2= 1056							K3= 2380			
Type 18	0	1203	1174	1152	1134	1121	1109	1100	1092	1085	1079	0.923
	1	1307										0.454
	2	1412	1352	1308	1273							0.301
	3	1516	1442	1386	1343	1308	1280	1256				0.225
	4	1620	1531	1464	1412	1371	1337	1309	1285	1264	1246	0.180
36/4	5	1724	1620	1542	1482	1433	1394	1361	1333	1309	1288	0.150
	6	1828	1710	1621	1551	1496	1451	1413	1381	1353	1330	0.128
	7	1933	1799	1699	1621	1558	1507	1465	1429	1398	1371	0.112
	8	2037	1888	1777	1690	1621	1564	1517	1477	1443	1413	0.099
	9	2141	1978	1855	1760	1684	1621	1569	1525	1487	1455	0.090
	10	2245	2067	1933	1829	1746	1678	1621	1573	1532	1496	0.081
		K2= 1398							K3= 2380			
Type 16	0	1251	1215	1188	1167	1150	1136	1124	1114	1106	1099	1.037
	1	1380										0.510
	2	1509	1436	1381	1338							0.338
	3	1637	1546	1477	1424	1381	1346	1317				0.253
	4	1766	1656	1574	1510	1458	1417	1382	1352	1327	1305	0.202
36/4	5	1895	1767	1670	1596	1536	1487	1446	1411	1382	1356	0.168
	6	2023	1877	1767	1681	1613	1557	1510	1471	1437	1408	0.144
	7	2152	1987	1863	1767	1690	1627	1575	1530	1492	1459	0.126
	8	2281	2097	1960	1853	1767	1697	1639	1590	1547	1511	0.112
	9	2410	2208	2056	1939	1845	1768	1703	1649	1602	1562	0.101
	10	2538	2318	2153	2025	1922	1838	1768	1708	1658	1614	0.091
		K2= 1764							K3= 2380			

[1] The shaded values do not comply with the minimum spacing requirements for sidelap connections and shall not be used except with properly spaced button-punched sidelaps with 1.5VLI, 2VLI and 3VLI deck.

$$G' = \frac{K_2}{3.50 + 3*K_1* \text{SPAN}} + K_3, \text{ Kips/inch}$$

SPAN is in feet

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PUBLICATIONS

VULCRAFT – (Refer to back cover for address and telephone number of division nearest you)

VULCRAFT STEEL JOISTS AND JOIST GIRDERS 2007

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James Fisher, Ph.D., P.E., Michael West, P.E., AIA, Julius P. Van de Pas, P.E.
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42nd EDITION CATALOG OF STANDARD SPECIFICATIONS AND LOAD TABLES FOR STEEL JOISTS AND JOIST GIRDERS.

SEVENTY-FIVE YEAR MANUAL. 1928-2003

FIRST EDITION COMPOSIT STEEL JOIST CATALOG. 2007

TECHNICAL DIGEST #3 - Ponding (June 2007)

TECHNICAL DIGEST #5 - Vibration (March 1988)

TECHNICAL DIGEST #6 - Uplift Loading (Revised to July 2003)

TECHNICAL DIGEST #8 - Welding of Open Web Steel Joists (August 1983)

TECHNICAL DIGEST #9 - Handling and Erection (March 2008)

TECHNICAL DIGEST #10 - Fire Resistance (2003)

TECHNICAL DIGEST #11 - Lateral Load Resisting Frames (November 2007)

TECHNICAL DIGEST #12 - Evaluation and Modification of Steel Joists (2007)

COMPUTER VIBRATION PROGRAM Ver. 1.0 (Used in Conjunction With Technical Digest #5)

SJI VIDEO - Introduction to Steel Joists

SJI VIDEO - Safe Erection of Open Web Steel Joists and Joist Girders

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