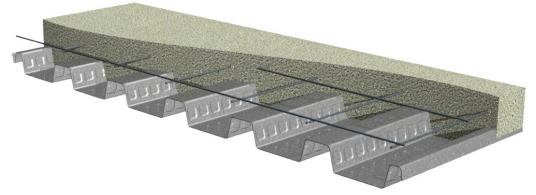


# 1.5VLR-36 COMPOSITE DECK GRADE 50 STEEL

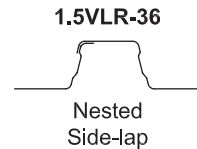
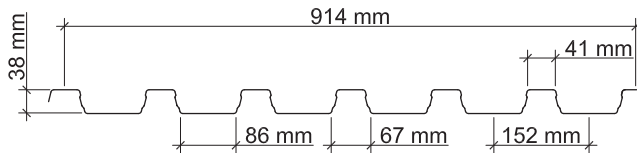
Metric  
LSD

## 1.5VLR COMPOSITE DECK

- 1.5VLR-36 Deck used with Side-lap Screws



### Nominal Dimensions



### Section Properties

Deck Gage	Deck Weight $w_{dd}$ (kg/m <sup>2</sup> )	Base Metal Thickness $t$ (mm)	Yield Strength $F_y$ (MPa)	Effective Moment of Inertia at Service Load* $I_d = (2I_e + I_y)/3$		Effective Section Modulus* at $F_y = 345$ MPa		Factored Moment*		Vertical Web Shear* $\phi V_n$ (kN)
				$I_{d+}$ (mm <sup>4</sup> x10 <sup>3</sup> )	$I_{d-}$ (mm <sup>4</sup> x10 <sup>3</sup> )	$S_{e+}$ (mm <sup>3</sup> x10 <sup>3</sup> )	$S_{e-}$ (mm <sup>3</sup> x10 <sup>3</sup> )	$\phi M_{n+}$ (N-m)	$\phi M_{n-}$ (N-m)	
22	7.81	0.75	345	243.1	211.7	9.62	9.09	2987	2818	50
20	9.76	0.91	345	296.3	269.0	12.31	12.04	3819	3735	60
18	12.69	1.20	345	396.0	378.3	17.10	16.45	5305	5104	79
16	16.11	1.52	345	501.2	497.1	21.61	21.13	6706	6558	98

\*Physical Properties per meter (m) of width

### Factored Reactions at Supports Based on Web Crippling, $\phi R_n$ (kN/m)

Deck Gage	Bearing Length of Webs (mm)											
	One-Flange Loading						Two-Flange Loading					
	End Bearing				Interior Bearing		End Bearing				Interior Bearing	
	40	50	75	100	75	100	40	50	75	100	75	100
22	16.3	17.5	20.2	22.1	28.2	30.7	15.7	16.6	18.6	20.1	34.9	38.2
20	23.2	24.9	28.6	31.2	40.6	43.9	23.7	25.0	27.9	30.0	50.7	55.2
18	38.9	41.6	47.3	51.4	68.4	73.4	42.7	45.0	49.7	53.1	86.6	93.5
16	59.5	63.5	71.9	77.4	105.2	112.1	69.0	72.4	79.6	84.4	134.4	144.1

### Standard Features

- ASTM A653/A653M SS GR50 Min., with Z275/G90 galvanized or ZF75/A25 galvanealed
- Standard lengths – 1.83 m to 12.8 m
- ULC Listed
- Cold-formed steel deck conforms to CAN/CSA S136-16 and meets the guidelines of CSSBI 12M-2018.

### Optional Features

- Inquire regarding cost and lead times for:
  - Short cuts < 1.83 m
  - Sheet Lengths > 12.8 m
  - Alternative metallic and painted finishes

# 1.5VLR-36 COMPOSITE DECK-SLABS

## NORMAL WEIGHT CONCRETE (2325 kg/m<sup>3</sup>)

Metric  
LSD

Slab Depth		Maximum Unshored Spans			Composite Deck-Slab Properties				
Total (mm)	Topping (mm)	Deck Gage	Maximum Unshored Construction Clear Span (mm)			Concrete + Deck (kPa)	Deflection $I_d = (I_{cr} + I_u)/2$ (mm <sup>4</sup> × 10 <sup>9</sup> /m)	Moment $\phi M_{no}$ (kN-m/m)	Shear $\phi V_{no}$ (kN/m)
			1	2	3				
90	52	22	2179	2435	2515	1.8	4805.53	16.35	68
		20	2334	2795	2792	1.8	5156.13	19.39	68
		18	2558	3254	3111	1.9	5746.71	24.76	68
		16	2751	3657	3388	1.9	6304.28	30.16	68
125	87	22	1936	2164	2210	2.6	12069.22	23.15	101
		20	2070	2486	2476	2.6	12897.63	27.59	103
		18	2272	2897	2764	2.7	14303.21	35.54	103
		16	2448	3271	3015	2.7	15649.44	43.67	103
150	112	22	1808	2017	2057	3.2	20184.53	29.48	112
		20	1940	2318	2320	3.2	21504.45	35.22	122
		18	2130	2704	2591	3.2	23758.91	45.54	125
		16	2296	3055	2828	3.3	25939.07	56.15	125

**Note:**

- Maximum unshored spans do not consider web-crippling. Required bearing should be determined based on specific span conditions.

### Superimposed Factored Load, $\phi W_n$ , / Deflection at L/360 (kPa)

NWC (2325 kg/m<sup>3</sup>),  $f'_c = 20$  MPa

Total Slab Depth	Deck Gage	Span (mm)							
		1200	1500	1800	2100	2400	2700	3000	3600
90	22	88.6/120.7	55.8/61.8	38.1/35.7	27.4/22.5	20.4/15.1	15.7/10.6	12.3/7.7	7.8/4.5
	20	105.4/129.5	66.6/66.3	45.5/38.4	32.8/24.1	24.6/16.2	19/11.3	14.9/8.3	9.6/4.8
	18	111.7/144.3	85.7/73.9	58.7/42.7	42.6/26.9	32/18	24.8/12.6	19.6/9.2	12.9/5.3
	16	111.7/158.3	88.9/81	72.1/46.9	52.3/29.5	39.5/19.8	30.7/13.9	24.4/10.1	16.2/5.8
125	22	125.3/303	79/155.1	53.9/89.8	38.7/56.5	28.8/37.9	22.1/26.6	17.3/19.4	11/11.2
	20	150/323.9	94.8/165.8	64.8/96	46.7/60.4	35/40.5	27/28.4	21.2/20.7	13.7/12
	18	167.5/359.1	123/183.9	84.4/106.4	61.1/67	46/44.9	35.6/31.5	28.2/23	18.6/13.3
	16	167.4/393	133.3/201.2	104.4/116.4	75.8/73.3	57.3/49.1	44.5/34.5	35.4/25.1	23.6/14.5
150	22	159.8/506.8	100.8/259.5	68.8/150.2	49.5/94.6	36.9/63.3	28.3/44.5	22.2/32.4	14.2/18.8
	20	191.7/539.9	121.2/276.5	82.9/160	59.9/100.7	44.9/67.5	34.6/47.4	27.3/34.5	17.7/20
	18	204.3/596.6	157.9/305.4	108.4/176.7	78.5/111.3	59.2/74.5	45.9/52.3	36.4/38.2	24/22.1
	16	204.2/651.3	162.6/333.5	134.5/193	97.8/121.5	73.9/81.4	57.5/57.2	45.8/41.7	30.5/24.1

**Notes:**

- The composite deck-slab design is based on tested performance and engineering analysis in accordance Section 7.6.1 of CSSBI 12M-2018.
- For high loads long term concrete creep should be considered.
- Use Composite Deck-Slab Strength Web Based Solutions for alternate slabs.

# 1.5VLR-36 COMPOSITE DECK-SLABS

## LIGHT WEIGHT CONCRETE (1840 kg/m<sup>3</sup>)

Metric  
LSD

Slab Depth		Maximum Unshored Spans				Composite Deck-Slab Properties			
Total (mm)	Topping (mm)	Deck Gage	Maximum Unshored Construction Clear Span (mm)			Concrete + Deck (kPa)	Deflection $I_d = (I_{cr} + I_u)/2$ (mm <sup>4</sup> × 10 <sup>9</sup> /m)	Moment $\phi M_{no}$ (kN-m/m)	Shear $\phi V_{no}$ (kN/m)
			1	2	3				
90	52	22	2331	2597	2684	1.5	4137.79	15.96	77
		20	2512	2980	3004	1.5	4457.03	18.88	77
		18	2749	3467	3344	1.5	4989.78	24.03	77
		16	2952	3856	3627	1.5	5486.93	29.19	77
100	62	22	2251	2513	2591	1.6	5544.42	17.80	82
		20	2418	2884	2891	1.7	5966.82	21.09	87
		18	2648	3357	3220	1.7	6672.07	26.91	87
		16	2845	3751	3504	1.7	7332.13	32.77	87
120	82	22	2116	2366	2438	2.0	9218.54	21.56	90
		20	2264	2717	2707	2.0	9902.92	25.62	101
		18	2482	3164	3019	2.0	11050.79	32.83	109
		16	2670	3569	3289	2.1	12134.18	40.14	109

**Note:**

- Maximum unshored spans do not consider web-crippling. Required bearing should be determined based on specific span conditions.

### Superimposed Factored Load, $\phi W_n$ , / Deflection at L/360 (kPa)

LWC (1840 kg/m<sup>3</sup>),  $f'_c = 25$  MPa

Total Slab Depth	Deck Gage	Span (mm)							
		1200	1500	1800	2100	2400	2700	3000	3600
90	22	86.9/103.9	54.9/53.2	37.6/30.7	27.1/19.3	20.3/13	15.7/9.1	12.4/6.6	8/3.8
	20	103/111.9	65.3/57.3	44.8/33.1	32.4/20.9	24.4/14	18.9/9.8	14.9/7.1	9.8/4.1
	18	125.6/125.3	83.6/64.1	57.5/37.1	41.7/23.4	31.5/15.7	24.5/11	19.4/8	12.9/4.6
	16	125.6/137.8	100.1/70.5	70.1/40.8	51/25.7	38.6/17.2	30.1/12.1	24/8.8	16.1/5.1
100	22	96.8/139.2	61.2/71.2	41.9/41.2	30.2/26	22.6/17.4	17.5/12.2	13.7/8.9	8.9/5.1
	20	115.1/149.8	72.9/76.7	50/44.4	36.1/27.9	27.2/18.7	21.1/13.1	16.7/9.6	10.9/5.5
	18	142.7/167.5	93.6/85.8	64.3/49.6	46.7/31.2	35.2/20.9	27.4/14.7	21.8/10.7	14.5/6.2
	16	142.7/184.1	113.7/94.2	78.7/54.5	57.3/34.3	43.3/23	33.8/16.1	27/11.8	18.1/6.8
120	22	117.2/231.5	74.1/118.5	50.7/68.6	36.6/43.2	27.4/28.9	21.1/20.3	16.7/14.8	10.8/8.6
	20	139.8/248.6	88.5/127.3	60.7/73.6	43.9/46.4	33/31.1	25.6/21.8	20.2/15.9	13.3/9.2
	18	178.9/277.5	114.1/142.1	78.5/82.2	57/51.8	43/34.7	33.4/24.3	26.6/17.7	17.7/10.2
	16	178.8/304.7	140.1/156	96.5/90.3	70.2/56.8	53.1/38.1	41.4/26.7	33/19.5	22.2/11.3

**Notes:**

- The composite deck-slab design is based on tested performance and engineering analysis in accordance Section 7.6.1 of CSSBI 12M-2018.
- For high loads long term concrete creep should be considered.
- Use Composite Deck-Slab Strength Web Based Solutions for alternate slabs.

# 1.5VLR-36 COMPOSITE DECK-SLABS

Metric  
LSD

## 1.5VLR-36 Composite Deck-Slab Information

Total Slab Depth (mm)	Cover Depth (mm)	Theoretical Concrete Volume (m <sup>3</sup> /m <sup>2</sup> )	Min. A <sub>s</sub> for T&S (mm <sup>2</sup> /m)	Recommended WWR for Temperature and Shrinkage
<b>Normal Weight Concrete (2325 kg/m<sup>3</sup>)</b>				
90	52	0.076	60	152x152-MW9.1xMW9.1
100	62	0.088	60	152x152-MW9.1xMW9.1
115	77	0.100	60	152x152-MW9.1xMW9.1
125	87	0.114	81	152x152-MW13.3xMW13.3
140	102	0.126	126	152x152-MW18.7xMW18.7
150	112	0.139	150	152x152-MW25.8xMW25.8
<b>Light Weight Concrete (1840 kg/m<sup>3</sup>)</b>				
90	52	0.076	60	152x152-MW9.1xMW9.1
100	62	0.088	60	152x152-MW9.1xMW9.1
115	77	0.100	60	152x152-MW9.1xMW9.1
120	82	0.107	66	152x152-MW11.1xMW11.1
125	87	0.114	81	152x152-MW13.3xMW13.3
145	107	0.132	141	152x152-MW22.6xMW22.6

### Notes:

1. Recommended temperature and shrinkage reinforcement in accordance with CSSBI S3-08, Table 2.

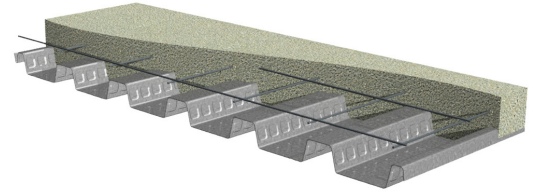
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# 1.5VLR-36 COMPOSITE DECK GRADE 50 STEEL

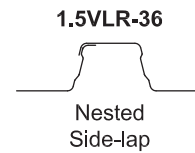
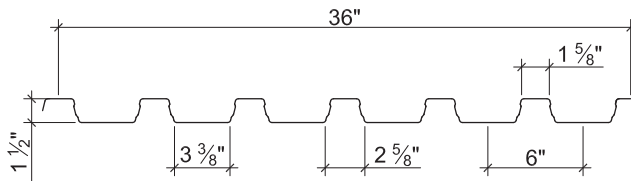
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## 1.5VLR COMPOSITE DECK

- 1.5VLR-36 Deck used with Side-lap Screws



### Nominal Dimensions



### Section Properties

Deck Gage	Deck Weight $w_{dd}$ (psf)	Base Metal Thickness $t$ (in.)	Yield Strength $F_y$ (ksi)	Effective Moment of Inertia at Service Load $I_d = (2I_e + I_o)/3$		Effective Section Modulus at $F_y = 50$ ksi		Factored Moment		Vertical Web Shear $\phi V_n$ (lb/ft)
				$I_{d+}$ (in <sup>4</sup> /ft)	$I_{d-}$ (in <sup>4</sup> /ft)	$S_{e+}$ (in <sup>3</sup> /ft)	$S_{e-}$ (in <sup>3</sup> /ft)	$\phi M_{n+}$ (lb-ft/ft)	$\phi M_{n-}$ (lb-ft/ft)	
22	1.6	0.0295	50	0.178	0.155	0.179	0.169	671	634	3398
20	2.0	0.0358	50	0.217	0.197	0.229	0.224	859	840	4105
18	2.6	0.0474	50	0.290	0.277	0.318	0.306	1193	1148	5388
16	3.3	0.0598	50	0.367	0.364	0.393	0.402	1474	1508	6734

### Factored Reactions at Supports Based on Web Crippling, $\phi R_n$ (lb/ft)

Deck Gage	Bearing Length of Webs											
	One-Flange Loading						Two-Flange Loading					
	End Bearing				Interior Bearing		End Bearing				Interior Bearing	
	1 1/2"	2"	3"	4"	3"	4"	1 1/2"	2"	3"	4"	3"	4"
22	1098	1207	1389	1517	1945	2103	1061	1143	1281	1377	2407	2617
20	1567	1717	1969	2140	2792	3005	1605	1723	1921	2057	3494	3782
18	2626	2863	3261	3519	4707	5029	2894	3092	3423	3637	5966	6410
16	4023	4369	4949	5304	7241	7685	4679	4977	5477	5783	9253	9874

### Standard Features

- ASTM A653/A653M SS GR50 Min., with Z275/G90 galvanized or ZF75/A25 galvanized
- Standard lengths – 6'-0" to 42'-0"
- ULC Listed
- Cold-formed steel deck conforms to CAN/CSA S136-16 and meets the guidelines of CSSBI 12M-2018.

### Optional Features

- Inquire regarding cost and lead times for:
  - Short cuts < 6'-0"
  - Sheet Lengths > 42'-0"
  - Alternative metallic and painted finishes

# 1.5VLR-36 COMPOSITE DECK-SLABS NORMAL WEIGHT CONCRETE (145 pcf)

		Maximum Unshored Spans			Composite Deck-Slab Properties				
Slab Depth		Deck Gage	Maximum Unshored Construction Clear Span			Concrete + Deck (psf)	Deflection $I_d = (I_{cr} + I_u)/2$ (in <sup>4</sup> /ft)	Moment $\phi M_{no}$ (kip-ft/ft)	Shear $\phi V_{no}$ (kip/ft)
Total	Topping		1	2	3				
3½"	2"	22	7'-2"	8'-0"	8'-3"	37.5	3.43	3.64	4.70
		20	7'-8"	9'-2"	9'-2"	37.9	3.68	4.31	4.70
		18	8'-5"	10'-9"	10'-3"	38.5	4.11	5.50	4.70
		16	9'-1"	12'-1"	11'-2"	39.2	4.50	6.71	4.70
5"	3½"	22	6'-4"	7'-1"	7'-3"	55.6	9.34	5.32	7.04
		20	6'-9"	8'-1"	8'-1"	56.0	9.97	6.35	7.29
		18	7'-5"	9'-5"	9'-0"	56.6	11.05	8.18	7.29
		16	8'-0"	10'-8"	9'-10"	57.3	12.09	10.06	7.29
6"	4½"	22	5'-11"	6'-7"	6'-9"	67.7	15.62	6.77	7.83
		20	6'-4"	7'-7"	7'-7"	68.1	16.63	8.09	8.53
		18	6'-11"	8'-10"	8'-5"	68.7	18.36	10.47	8.86
		16	7'-6"	9'-11"	9'-3"	69.4	20.03	12.92	8.86

**Note:**

- Maximum unshored spans do not consider web-crippling. Required bearing should be determined based on specific span conditions.

		Superimposed Factored Load, $\phi W_n$ , / Deflection at L/360 (psf)					NWC (145 pcf), $f'_c = 3000$ psi			
Total Slab Depth	Deck Gage	Span (ft.-in.)								
		4'-0"	5'-0"	6'-0"	7'-0"	8'-0"	9'-0"	10'-0"	12'-0"	
3½"	22	1771/2344	1116/1200	761/694	546/437	407/293	312/205	244/150	155/86	
	20	2107/2515	1332/1287	910/745	656/469	491/314	378/220	297/160	192/93	
	18	2301/2803	1713/1435	1175/830	850/523	639/350	495/246	392/179	257/103	
	16	2300/3074	1830/1574	1441/911	1045/573	789/384	613/269	487/196	323/113	
5"	22	2591/6375	1633/3264	1113/1889	799/1189	595/796	456/559	356/408	226/236	
	20	3103/6809	1960/3486	1340/2017	966/1270	723/851	556/597	437/435	282/252	
	18	3572/7546	2546/3863	1746/2235	1264/1408	951/943	737/662	583/482	383/279	
	16	3571/8253	2843/4225	2162/2445	1570/1539	1185/1031	921/724	732/528	487/305	
6"	22	3301/10667	2082/5461	1420/3160	1021/1990	762/1333	584/936	457/682	291/395	
	20	3962/11357	2505/5815	1713/3365	1236/2119	926/1419	714/997	562/726	364/420	
	18	4343/12537	3264/6419	2240/3714	1623/2339	1222/1567	948/1100	751/802	495/464	
	16	4342/13681	3456/7004	2783/4053	2021/2552	1527/1710	1188/1201	946/875	630/506	

**Notes:**

- The composite deck-slab design is based on tested performance and engineering analysis in accordance Section 7.6.1 of CSSBI 12M-2018.
- For high loads long term concrete creep should be considered.
- Use Composite Deck-Slab Strength Web Based Solutions for alternate slabs.

# 1.5VLR-36 COMPOSITE DECK-SLABS

## LIGHT WEIGHT CONCRETE (115 pcf)

Slab Depth		Maximum Unshored Spans			Composite Deck-Slab Properties				
Total	Topping	Deck Gage	Maximum Unshored Construction Clear Span			Concrete + Deck (psf)	Deflection $I_d = (I_{cr} + I_u)/2$ (in <sup>4</sup> /ft)	Moment $\phi M_{no}$ (kip-ft/ft)	Shear $\phi V_{no}$ (kip/ft)
			1	2	3				
3½"	2"	22	7'-8"	8'-6"	8'-10"	30.1	3.02	3.56	5.43
		20	8'-3"	9'-10"	9'-11"	30.5	3.25	4.22	5.43
		18	9'-1"	11'-5"	11'-0"	31.1	3.64	5.37	5.43
		16	9'-9"	12'-8"	11'-11"	31.8	4.00	6.52	5.43
4"	2½"	22	7'-4"	8'-2"	8'-6"	34.9	4.38	4.09	5.79
		20	7'-11"	9'-5"	9'-5"	35.3	4.71	4.85	6.38
		18	8'-8"	10'-11"	10'-6"	35.9	5.26	6.19	6.38
		16	9'-3"	12'-3"	11'-5"	36.6	5.78	7.55	6.38
4¾"	3¼"	22	6'-11"	7'-9"	8'-0"	42.0	7.08	4.90	6.36
		20	7'-5"	8'-11"	8'-10"	42.4	7.60	5.82	7.06
		18	8'-1"	10'-4"	9'-11"	43.0	8.47	7.46	7.89
		16	8'-9"	11'-8"	10'-9"	43.7	9.29	9.14	7.89

**Note:**

- Maximum unshored spans do not consider web-crippling. Required bearing should be determined based on specific span conditions.

Total Slab Depth	Deck Gage	Superimposed Factored Load, $\phi W_n$ / Deflection at L/360 (psf)								LWC (115 pcf), $f'_c = 4000$ psi
		Span (ft-in.)								
		4'-0"	5'-0"	6'-0"	7'-0"	8'-0"	9'-0"	10'-0"	12'-0"	
3½"	22	1743/2063	1102/1056	754/611	544/384	407/257	314/181	247/132	160/76	
	20	2069/2221	1310/1137	898/658	650/414	488/277	378/194	299/142	196/82	
	18	2645/2484	1678/1272	1154/736	837/463	632/310	491/218	390/159	259/92	
	16	2673/2731	2047/1398	1409/809	1025/509	775/341	604/239	482/174	322/101	
4"	22	2001/2991	1265/1531	865/886	624/558	467/373	360/262	283/191	183/110	
	20	2380/3215	1507/1646	1033/952	747/600	562/401	434/282	343/205	225/119	
	18	3051/3592	1937/1839	1331/1064	966/670	729/449	566/315	450/229	299/133	
	16	3143/3945	2369/2020	1631/1169	1186/736	897/493	699/346	558/252	373/146	
4¾"	22	2395/4833	1514/2474	1035/1432	746/901	559/604	430/424	339/309	219/179	
	20	2857/5187	1809/2655	1240/1536	897/967	674/648	521/455	412/331	270/192	
	18	3678/5782	2334/2960	1604/1713	1164/1078	879/722	683/507	543/370	360/214	
	16	3889/6345	2870/3248	1976/1880	1437/1183	1087/793	848/557	676/406	453/235	

**Notes:**

- The composite deck-slab design is based on tested performance and engineering analysis in accordance Section 7.6.1 of CSSBI 12M-2018.
- For high loads long term concrete creep should be considered.
- Use Composite Deck-Slab Strength Web Based Solutions for alternate slabs.

# 1.5VLR-36 COMPOSITE DECK-SLABS

## 1.5VLR-36 Composite Deck-Slab Information

Total Slab Depth (in.)	Cover Depth (in.)	Theoretical Concrete Volume (yd <sup>3</sup> /100 ft <sup>2</sup> )	Min. A <sub>s</sub> for T&S (in. <sup>2</sup> )	Recommended WWR for Temperature and Shrinkage
<b>Normal Weight Concrete (145 pcf)</b>				
3½	2	0.92	0.028	6x6-W1.4xW1.4
4	2½	1.07	0.028	6x6-W1.4xW1.4
4½	3	1.22	0.028	6x6-W1.4xW1.4
5	3½	1.38	0.038	6x6-W2.1xW2.1
5½	4	1.53	0.060	6x6-W2.9xW2.9
6	4½	1.69	0.074	6x6-W4.0xW4.0
<b>Light Weight Concrete (110 pcf)</b>				
3½	2	0.92	0.028	6x6-W1.4xW1.4
4	2½	1.07	0.028	6x6-W1.4xW1.4
4½	3	1.22	0.028	6x6-W1.4xW1.4
4¾	3¼	1.3	0.031	6x6-W1.7xW1.7
5	3½	1.38	0.038	6x6-W2.1xW2.1
5¾	4¼	1.61	0.067	6x6-W3.5xW3.5

### Notes:

1. Recommended temperature and shrinkage reinforcement in accordance with CSSBI S3-08, Table 2.

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