

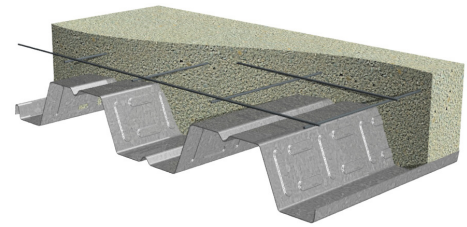
# 3VLI-24 COMPOSITE DECKS

## GRADE 50 STEEL

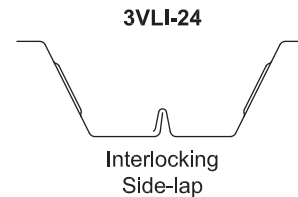
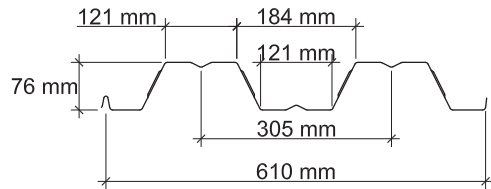
Metric  
LSD

### 3VLI COMPOSITE DECKS

- 3VLI-24 Deck used with TSWs or BPs



### 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	8.30	0.75	345	999.6	1006.4	20.81	22.04	6457	6838	26
20	10.25	0.91	345	1255.0	1257.7	27.53	28.98	8539	8992	46
18	13.18	1.20	345	1711.1	1711.1	40.91	42.69	12695	13243	81
16	17.09	1.52	345	2157.6	2157.6	54.46	54.46	16898	16898	114

\*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	100	200	40	50	75	100	100	200
22	7.1	7.7	8.8	9.8	14.9	17.4	6.2	6.6	7.4	8.0	17.3	20.5
20	10.3	11.0	12.6	14.0	21.4	26.6	9.6	10.2	11.3	12.3	25.3	31.9
18	17.4	18.6	21.2	23.4	35.9	44.9	17.9	18.8	20.8	22.5	43.4	55.2
16	26.9	28.7	32.5	35.8	55.0	68.2	29.5	31.0	34.1	36.7	67.6	85.2

### 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
- Factory Hanger Tabs

# 3VLI-24 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				
127	51	22	3346	3372	3636	2.1	10189.20	21.58	64
		20	3599	4103	4219	2.1	10867.90	25.65	75
		18	3876	4828	4541	2.2	12027.00	32.83	75
		16	4089	5094	4791	2.2	13158.00	40.11	75
165	89	22	2983	2672	3036	3.0	21494.99	28.42	79.58
		20	3212	3641	3761	3.0	22841.50	33.87	99.72
		18	3550	4437	4174	3.0	25132.42	43.47	106.61
		16	3763	4687	4409	3.1	27366.55	53.26	106.61
190	114	22	2801	2351	2672	3.5	32337.05	33.25	91.04
		20	3030	3409	3521	3.6	34294.25	39.69	111.18
		18	3351	4166	3997	3.6	37631.80	51.09	129.51
		16	3606	4491	4224	3.6	40899.90	62.75	129.51

**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)							
		2400	2700	3000	3300	3600	3900	4200	4800
127	22	27.3/31.9	21/22.5	16.5/16.3	13.2/12.3	10.7/9.4	8.7/7.4	7.1/5.9	4.8/4
	20	32.9/34.1	25.5/23.9	20.1/17.4	16.2/13.1	13.2/10.1	10.8/7.9	9/6.3	6.2/4.3
	18	42.9/37.7	33.3/26.5	26.5/19.3	21.4/14.5	17.5/11.2	14.6/8.8	12.2/7	8.7/4.7
	16	53/41.3	41.3/29	32.9/21.1	26.7/15.8	22/12.2	18.3/9.6	15.4/7.7	11.2/5.1
165	22	35.7/67.5	27.4/47.4	21.5/34.5	17.1/26	13.8/20	11.2/15.7	9.1/12.5	6.1/8.4
	20	43.3/71.7	33.4/50.3	26.3/36.7	21.1/27.6	17.1/21.2	14/16.7	11.6/13.4	8/9
	18	56.6/78.9	43.9/55.4	34.9/40.4	28.2/30.3	23/23.4	19.1/18.3	15.9/14.7	11.3/9.8
	16	70.1/85.9	54.6/60.3	43.5/44	35.3/33	29/25.4	24.2/20	20.3/16	14.7/10.7
190	22	41.7/101.5	32/71.2	25.1/52	20/39	16.1/30.1	13/23.7	10.6/18.9	7.1/12.6
	20	50.7/107.6	39.1/75.6	30.8/55.1	24.7/41.4	20/31.9	16.4/25	13.5/20.1	9.3/13.5
	18	66.5/118.1	51.6/82.9	40.9/60.5	33/45.4	27/35	22.4/27.5	18.7/22	13.2/14.7
	16	82.6/128.4	64.3/90.2	51.2/65.7	41.5/49.4	34.2/38	28.4/29.9	23.9/23.9	17.2/16

**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.

# 3VLI-24 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				
127	51	22	3604	3787	3910	1.7	8697.10	21.07	57.81
		20	3804	4399	4459	1.7	9330.05	25.00	77.95
		18	4094	5099	4796	1.7	10405.39	31.91	84.07
		16	4314	5374	5054	1.8	11448.27	38.89	84.07
140	64	22	3452	3575	3751	1.9	11439.82	23.26	62.12
		20	3683	4227	4318	1.9	12251.75	27.62	82.26
		18	3966	4940	4646	2.0	13625.04	35.26	95.57
		16	4182	5209	4900	2.0	14952.05	42.99	95.57
160	84	22	3259	3205	3539	2.3	16719.13	26.88	69.15
		20	3506	3997	4129	2.3	17874.04	31.96	89.29
		18	3802	4736	4455	2.3	19823.69	40.87	114.31
		16	4013	4998	4701	2.4	21706.61	49.91	114.31

**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)							
		2400	2700	3000	3300	3600	3900	4200	4800
127	22	27.1/27.3	21/19.2	16.6/13.9	13.4/10.5	10.9/8	9/6.3	7.4/5.1	5.2/3.4
	20	32.6/29.3	25.3/20.5	20.1/15	16.2/11.3	13.3/8.7	11/6.8	9.2/5.5	6.5/3.6
	18	42.1/32.7	32.8/22.9	26.2/16.7	21.3/12.5	17.5/9.7	14.6/7.6	12.3/6.1	8.9/4.1
	16	51.8/35.9	40.5/25.2	32.3/18.4	26.3/13.8	21.8/10.6	18.2/8.3	15.4/6.7	11.3/4.5
140	22	29.9/35.9	23.1/25.2	18.2/18.3	14.7/13.8	11.9/10.6	9.8/8.3	8.1/6.7	5.6/4.5
	20	35.9/38.4	27.9/27	22.1/19.7	17.9/14.7	14.6/11.3	12.1/9	10.1/7.1	7.1/4.8
	18	46.5/42.8	36.2/30	28.9/21.9	23.4/16.4	19.3/12.6	16/10	13.5/7.9	9.8/5.3
	16	57.2/46.9	44.6/32.9	35.7/24	29.1/18.1	24/13.9	20.1/10.9	16.9/8.7	12.4/5.8
160	22	34.5/52.5	26.6/36.8	21/26.9	16.9/20.2	13.7/15.5	11.3/12.2	9.3/9.8	6.5/6.6
	20	41.5/56.1	32.2/39.4	25.5/28.7	20.6/21.5	16.8/16.6	13.9/13.1	11.6/10.4	8.2/7
	18	53.8/62.2	41.9/43.7	33.4/31.8	27.1/23.9	22.3/18.4	18.6/14.5	15.6/11.6	11.3/7.8
	16	66.3/68.1	51.8/47.8	41.4/34.9	33.7/26.2	27.8/20.2	23.3/15.8	19.6/12.7	14.4/8.5

**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.

## 3VLI-24 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>				
127	51	0.089	60	152x152-MW9.1xMW9.1
140	64	0.101	60	152x152-MW9.1xMW9.1
150	74	0.114	60	152x152-MW9.1xMW9.1
165	89	0.127	87	152x152-MW13.3xMW13.3
180	104	0.140	132	152x152-MW22.6xMW22.6
190	114	0.152	162	152x152-MW25.8xMW25.8
<b>Light Weight Concrete (1840 kg/m<sup>3</sup>)</b>				
127	51	0.089	60	152x152-MW9.1xMW9.1
140	64	0.101	60	152x152-MW9.1xMW9.1
150	74	0.114	60	152x152-MW9.1xMW9.1
160	84	0.121	72	152x152-MW11.1xMW11.1
165	89	0.127	87	152x152-MW13.3xMW13.3
185	109	0.146	147	152x152-MW22.6xMW22.6

### Notes:

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

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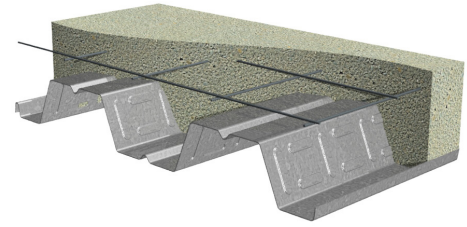
# 3VLI-24 COMPOSITE DECKS

## GRADE 50 STEEL

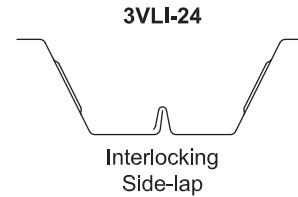
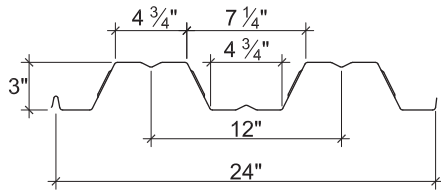
Imperial  
LSD

### 3VLI COMPOSITE DECKS

- 3VLI-24 Deck used with TSWs or BPs



### 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 $I_d = (2I_e + I_g)/3$		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	1.7	0.0295	50	0.732	0.737	0.387	0.410	1452	1537	1801
20	2.1	0.0358	50	0.919	0.921	0.512	0.539	1920	2021	3181
18	2.7	0.0474	50	1.253	1.253	0.761	0.794	2854	2977	5582
16	3.5	0.0598	50	1.580	1.580	1.013	1.013	3799	3799	7842

### 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"	4"	8"	1 1/2"	2"	3"	4"	4"	8"
22	480	527	607	674	1027	1194	420	452	507	553	1194	1401
20	693	760	871	965	1471	1822	653	701	781	849	1743	2189
18	1177	1284	1462	1613	2469	3092	1213	1296	1434	1551	2991	3806
16	1822	1978	2241	2463	3786	4698	2002	2129	2343	2524	4654	5873

### 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
- Factory Hanger Tabs



# 3VLI-24 COMPOSITE DECK-SLABS

## NORMAL WEIGHT CONCRETE (145 pcf)

Slab Depth		Maximum Unshored Spans			Composite Deck-Slab Properties				
		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				
5"	2"	22	11'-0"	11'-1"	11'-11"	44.0	7.54	4.86	4.42
		20	11'-10"	13'-5"	13'-10"	44.4	8.04	5.78	5.24
		18	12'-9"	15'-10"	14'-11"	45.0	8.89	7.39	5.24
		16	13'-5"	16'-9"	15'-9"	45.8	9.72	9.03	5.24
6½"	3½"	22	9'-9"	8'-9"	9'-11"	62.1	15.94	6.40	5.52
		20	10'-6"	11'-11"	12'-4"	62.5	16.93	7.63	6.90
		18	11'-8"	14'-7"	13'-8"	63.1	18.62	9.80	7.43
		16	12'-4"	15'-5"	14'-6"	63.9	20.27	12.00	7.43
7½"	4½"	22	9'-2"	7'-8"	8'-9"	74.2	24.12	7.51	6.33
		20	9'-11"	11'-2"	11'-6"	74.6	25.57	8.96	7.71
		18	11'-0"	13'-8"	13'-1"	75.2	28.04	11.54	9.06
		16	11'-10"	14'-9"	13'-10"	76.0	30.47	14.17	9.06

**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.)							
		8'-0"	9'-0"	10'-0"	11'-0"	12'-0"	13'-0"	14'-0"	16'-0"
5"	22	552/643	424/451	333/329	266/247	214/190	174/149	143/120	96/80
	20	666/686	514/481	406/351	326/263	265/203	217/159	180/128	125/85
	18	867/758	673/533	535/388	432/291	354/224	293/176	245/141	174/94
	16	1072/829	835/582	665/424	540/319	444/245	370/193	311/154	225/103
6½"	22	722/1360	554/955	434/696	345/523	278/403	225/317	183/253	122/170
	20	875/1445	675/1014	532/739	426/555	345/428	283/336	233/269	160/180
	18	1145/1589	888/1116	704/813	568/611	465/470	384/370	320/296	227/198
	16	1420/1729	1105/1214	880/885	713/665	586/512	488/403	410/322	295/216
7½"	22	845/2059	648/1446	507/1054	403/792	324/610	262/479	213/384	141/257
	20	1027/2182	791/1533	623/1117	499/839	404/646	330/508	272/407	186/272
	18	1348/2393	1045/1681	828/1225	668/920	546/709	452/557	376/446	266/299
	16	1676/2600	1304/1826	1038/1331	842/1000	692/770	575/606	483/485	347/325

**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.

# 3VLI-24 COMPOSITE DECK-SLABS

## LIGHT WEIGHT CONCRETE (115 pcf)

Imperial  
LSD

		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)	
		1	2	3					
5"	2"	22	11'-10"	12'-5"	12'-10"	35.2	6.58	4.76	4.07
		20	12'-6"	14'-5"	14'-8"	35.6	7.05	5.65	5.45
		18	13'-5"	16'-9"	15'-9"	36.2	7.85	7.22	6.05
		16	14'-2"	17'-8"	16'-7"	37.0	8.63	8.80	6.05
5½"	2½"	22	11'-4"	11'-9"	12'-4"	40.0	8.61	5.24	4.37
		20	12'-1"	13'-10"	14'-2"	40.4	9.21	6.23	5.75
		18	13'-0"	16'-3"	15'-3"	41.0	10.23	7.96	6.86
		16	13'-9"	17'-1"	16'-1"	41.8	11.21	9.71	6.86
6¼"	3¼"	22	10'-9"	10'-7"	11'-8"	47.2	12.39	6.02	4.85
		20	11'-6"	13'-2"	13'-7"	47.6	13.23	7.16	6.23
		18	12'-6"	15'-7"	14'-8"	48.2	14.65	9.16	8.14
		16	13'-2"	16'-5"	15'-6"	49.0	16.03	11.19	8.14

**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)					LWC (115 pcf), $f'_c = 4000$ psi			
Total Slab Depth	Deck Gage	Span (ft-in.)								
		8'-0"	9'-0"	10'-0"	11'-0"	12'-0"	13'-0"	14'-0"	16'-0"	
5"	22	551/561	426/394	336/287	270/216	220/166	181/130	150/104	104/70	
	20	662/602	513/422	407/308	329/231	269/178	223/140	186/112	132/75	
	18	856/670	667/470	532/343	431/257	355/198	296/156	249/125	180/83	
	16	1054/736	823/517	657/377	535/283	442/218	370/171	312/137	228/92	
5½"	22	605/734	467/516	369/376	296/282	241/217	198/171	164/137	113/91	
	20	728/786	564/552	447/402	361/302	295/232	244/183	203/146	144/98	
	18	943/873	734/613	585/446	474/335	390/258	325/203	273/162	197/109	
	16	1161/957	906/672	724/490	589/368	487/283	407/223	343/178	251/119	
6¼"	22	693/1057	535/742	422/541	338/406	275/313	225/246	186/197	129/132	
	20	835/1128	647/792	513/578	413/434	338/334	279/263	232/210	164/141	
	18	1084/1250	844/878	672/640	545/481	448/370	373/291	313/233	226/156	
	16	1337/1367	1044/960	834/700	678/526	560/405	468/318	395/255	288/170	

**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.

## 3VLI-24 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>				
5	2	1.08	0.028	6x6-W1.4xW1.4
5½	2½	1.23	0.028	6x6-W1.4xW1.4
6	3	1.39	0.028	6x6-W1.4xW1.4
6½	3½	1.54	0.041	6x6-W2.1xW2.1
7	4	1.70	0.062	6x6-W3.5xW3.5
7½	4½	1.85	0.077	6x6-W4.0xW4.0
<b>Light Weight Concrete (110 pcf)</b>				
5	2	1.08	0.028	6x6-W1.4xW1.4
5½	2½	1.23	0.028	6x6-W1.4xW1.4
6	3	1.39	0.028	6x6-W1.4xW1.4
6¼	3¼	1.47	0.034	6x6-W1.7xW1.7
6½	3½	1.54	0.041	6x6-W2.1xW2.1
7¼	4¼	1.77	0.069	6x6-W3.5xW3.5

### Notes:

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

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