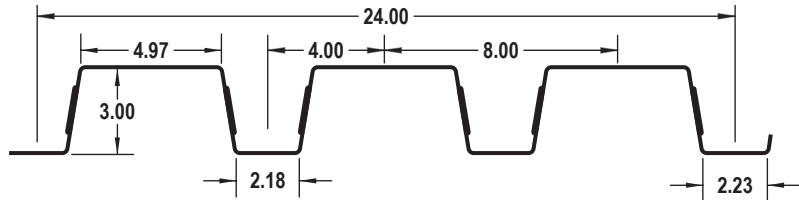




# WF-324 COMPOSITE DECK

IMPERIAL



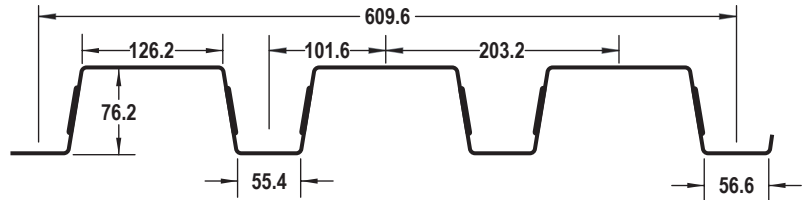
STEEL DECK SECTION PROPERTIES (Per foot of width)							COMPOSITE SLAB PROPERTIES (Per foot of width)									
Base Steel Thickness (in.)	Yield Stress (ksi)	Weight (psf)	Area (in <sup>2</sup> )	Section Modulus (in <sup>3</sup> )		Deflection Inertia (in <sup>4</sup> )	Overall Slab Depth, D (in.)									
				Midspan	Support		5.0	5.5	6.0	6.5	7.0					
0.030	40	2.15	0.615	0.366	0.391	0.656	Slab Weight (psf)									
0.036	40	2.57	0.738	0.472	0.494	0.856	41.4	47.7	53.9	60.2	66.4	Concrete Volume (yd <sup>3</sup> /100ft <sup>2</sup> )				
0.048	40	3.40	0.984	0.661	0.710	1.24	0.92	1.07	1.23	1.38	1.54					
0.060	40	4.24	1.23	0.845	0.894	1.62										
Maximum Specified Uniformly Distributed Loads (psf)																
Slab Depth, D (in.)		5.0			5.5			6.0			6.5			7.0		
Base (in.)	Span (ft)	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
0.030	9'0"	129	129	129	150	150	150	170	170	170	191	191	191	200	200	200
	9'6"	116	116	116	135	135	135	153	153	153	171	171	171	190	190	190
	10'0"	105	105	105	121	121	121	138	138	138	155	155	155	171	171	171
	10'6"	95	95	95	110	110	110	125	125	125	140	140	140	155	155	155
	11'0"	87	87	87	100	100	100	114	114	114	128	128	128	142	142	142
	11'6"	79	79	79	92	92	92	104	104	104	117	117	117	129	129	129
12'0"	73	73	73	84	84	84	96	96	96	107	107	107	119	119	119	
0.036	10'0"	121	121	121	140	140	140	159	159	159	178	178	178	197	197	197
	10'6"	110	110	110	128	128	128	145	145	145	162	162	162	180	180	180
	11'0"	101	101	101	117	117	117	133	133	133	149	149	149	165	165	165
	11'6"	93	93	93	107	107	107	122	122	122	137	137	137	151	151	151
	12'0"	86	86	86	99	99	99	113	113	113	126	126	126	140	140	140
	12'6"	79	79	79	92	92	92	104	104	104	117	117	117	129	129	129
13'0"	74	74	74	85	85	85	97	97	97	108	108	108	120	120	120	
0.048	10'6"	179	179	179	207	207	207	235	235	235	264	264	264	292	292	292
	11'0"	166	166	166	192	192	192	219	219	219	245	245	245	271	271	271
	11'6"	155	155	155	179	179	179	204	204	204	228	228	228	253	253	253
	12'0"	145	145	145	168	168	168	191	191	191	214	214	214	237	237	237
	12'6"	136	136	136	157	157	157	179	179	179	201	201	201	222	222	222
	13'0"	128	128	128	148	148	148	168	168	168	189	189	189	209	209	209
	13'6"	121	121	121	140	140	140	159	159	159	178	178	178	197	197	197
	14'0"	114	114	114	132	132	132	150	150	150	168	168	168	187	187	187
	14'6"	108	108	108	125	125	125	143	143	143	160	160	160	177	177	177
	15'0"	103	103	103	119	119	119	135	135	135	152	152	152	168	168	168
0.060	11'0"	165	165	165	192	192	192	218	218	218	244	244	244	271	271	271
	11'6"	154	154	154	179	179	179	203	203	203	228	228	228	253	253	253
	12'0"	144	144	144	167	167	167	190	190	190	213	213	213	236	236	236
	12'6"	135	135	135	157	157	157	179	179	179	200	200	200	222	222	222
	13'0"	127	127	127	148	148	148	168	168	168	188	188	188	209	209	209
	13'6"	120	120	120	139	139	139	159	159	159	178	178	178	197	197	197
	14'0"	114	114	114	132	132	132	150	150	150	168	168	168	186	186	186
	14'6"	108	108	108	125	125	125	142	142	142	159	159	159	177	177	177
	15'0"	102	102	102	119	119	119	135	135	135	151	151	151	168	168	168
15'6"	98	98	98	113	113	113	129	129	129	144	144	144	160	160	160	
0.030	DP	101			134			174			220			276		
0.036	DP	108			143			185			235			294		
0.048	DP	121			159			206			261			326		
0.060	DP	132			174			225			285			356		

- NOTES: 1. One shore support required at midspan in shaded areas.  
 2. Slab weight of steel deck and concrete slab has been accounted for in the load table.  
 3. Shoring was based on Light Duty uniform construction live load of **20 psf**.  
 4. DP = deflection parameter.  
 5. See composite slab notes and design example.  
 6. Prepared by Dr. R.M. Schuster, Distinguished Professor Emeritus, University of Waterloo.





# WF-324 COMPOSITE DECK



## METRIC

STEEL DECK SECTION PROPERTIES (Per metre of width)							COMPOSITE SLAB PROPERTIES (Per metre of width)									
Base Steel Thickness (mm)	Yield Stress (MPa)	Mass (kg/m <sup>2</sup> )	Area (mm <sup>2</sup> )	Section Modulus (x10 <sup>3</sup> mm <sup>3</sup> )		Deflection Inertia (x10 <sup>6</sup> mm <sup>4</sup> )	Overall Slab Depth, D (mm)									
				Midspan	Support		130	140	150	160	170					
0.762	275	10.5	1300	19.7	21.0	0.897	1.98	2.20	2.43	2.65	2.88					
0.914	275	12.5	1560	25.4	26.6	1.17	Concrete Volume (m <sup>3</sup> /10m <sup>2</sup> )									
1.22	275	16.6	2080	35.6	38.2	1.69	0.79	0.89	0.99	1.09	1.19					
1.52	275	20.7	2600	45.4	48.1	2.21										
Maximum Specified Uniformly Distributed Loads (kPa)																
Slab Depth, D (mm)		130			140			150			160			170		
Base (mm)	Span (m)	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
0.762	2.5	7.8	7.8	7.8	8.7	8.7	8.7	9.6	9.6	9.6	10.6	10.6	10.6	11.5	11.5	11.5
	2.6	7.2	7.2	7.2	8.0	8.0	8.0	8.9	8.9	8.9	9.8	9.8	9.8	10.6	10.6	10.6
	2.8	6.2	6.2	6.2	6.9	6.9	6.9	7.7	7.7	7.7	8.4	8.4	8.4	9.2	9.2	9.2
	3.0	5.4	5.4	5.4	6.0	6.0	6.0	6.7	6.7	6.7	7.3	7.3	7.3	8.0	8.0	8.0
	3.2	4.7	4.7	4.7	5.3	5.3	5.3	5.9	5.9	5.9	6.4	6.4	6.4	7.0	7.0	7.0
	3.4	4.2	4.2	4.2	4.7	4.7	4.7	5.2	5.2	5.2	5.7	5.7	5.7	6.2	6.2	6.2
	3.5	4.0	4.0	4.0	4.4	4.4	4.4	4.9	4.9	4.9	5.4	5.4	5.4	5.9	5.9	5.9
3.6	3.7	3.7	3.7	4.2	4.2	4.2	4.6	4.6	4.6	5.1	5.1	5.1	5.5	5.5	5.5	
0.914	2.6	8.1	8.1	8.1	9.1	9.1	9.1	10.1	10.1	10.1	11.1	11.1	11.1	12.0	12.0	12.0
	2.8	7.1	7.1	7.1	7.9	7.9	7.9	8.8	8.8	8.8	9.6	9.6	9.6	10.4	10.4	10.4
	3.0	6.2	6.2	6.2	6.9	6.9	6.9	7.7	7.7	7.7	8.4	8.4	8.4	9.2	9.2	9.2
	3.2	5.5	5.5	5.5	6.1	6.1	6.1	6.8	6.8	6.8	7.4	7.4	7.4	8.1	8.1	8.1
	3.4	4.9	4.9	4.9	5.5	5.5	5.5	6.1	6.1	6.1	6.6	6.6	6.6	7.2	7.2	7.2
	3.5	4.6	4.6	4.6	5.2	5.2	5.2	5.7	5.7	5.7	6.3	6.3	6.3	6.8	6.8	6.8
	3.6	4.4	4.4	4.4	4.9	4.9	4.9	5.4	5.4	5.4	6.0	6.0	6.0	6.5	6.5	6.5
3.8	4.0	4.0	4.0	4.4	4.4	4.4	4.9	4.9	4.9	5.4	5.4	5.4	5.9	5.9	5.9	
1.22	2.8	11.0	11.0	11.0	12.3	12.3	12.3	13.6	13.6	13.6	15.0	15.0	15.0	16.3	16.3	16.3
	3.0	9.8	9.8	9.8	11.0	11.0	11.0	12.2	12.2	12.2	13.4	13.4	13.4	14.6	14.6	14.6
	3.2	8.9	8.9	8.9	9.9	9.9	9.9	11.0	11.0	11.0	12.1	12.1	12.1	13.1	13.1	13.1
	3.4	8.1	8.1	8.1	9.0	9.0	9.0	10.0	10.0	10.0	11.0	11.0	11.0	11.9	11.9	11.9
	3.5	7.7	7.7	7.7	8.6	8.6	8.6	9.6	9.6	9.6	10.5	10.5	10.5	11.4	11.4	11.4
	3.6	7.4	7.4	7.4	8.3	8.3	8.3	9.1	9.1	9.1	10.0	10.0	10.0	10.9	10.9	10.9
	3.8	6.8	6.8	6.8	7.6	7.6	7.6	8.4	8.4	8.4	9.2	9.2	9.2	10.0	10.0	10.0
	4.0	6.3	6.3	6.3	7.0	7.0	7.0	7.8	7.8	7.8	8.5	8.5	8.5	9.3	9.3	9.3
	4.2	5.8	5.8	5.8	6.5	6.5	6.5	7.2	7.2	7.2	7.9	7.9	7.9	8.6	8.6	8.6
	4.4	5.4	5.4	5.4	6.1	6.1	6.1	6.7	6.7	6.7	7.4	7.4	7.4	8.0	8.0	8.0
1.52	3.4	8.0	8.0	8.0	9.0	9.0	9.0	10.0	10.0	10.0	11.0	11.0	11.0	11.9	11.9	11.9
	3.5	7.7	7.7	7.7	8.6	8.6	8.6	9.5	9.5	9.5	10.5	10.5	10.5	11.4	11.4	11.4
	3.6	7.4	7.4	7.4	8.2	8.2	8.2	9.1	9.1	9.1	10.0	10.0	10.0	10.9	10.9	10.9
	3.8	6.8	6.8	6.8	7.6	7.6	7.6	8.4	8.4	8.4	9.2	9.2	9.2	10.0	10.0	10.0
	4.0	6.2	6.2	6.2	7.0	7.0	7.0	7.8	7.8	7.8	8.5	8.5	8.5	9.3	9.3	9.3
	4.2	5.8	5.8	5.8	6.5	6.5	6.5	7.2	7.2	7.2	7.9	7.9	7.9	8.6	8.6	8.6
	4.4	5.4	5.4	5.4	6.1	6.1	6.1	6.7	6.7	6.7	7.4	7.4	7.4	8.0	8.0	8.0
	4.5	5.2	5.2	5.2	5.9	5.9	5.9	6.5	6.5	6.5	7.1	7.1	7.1	7.7	7.7	7.7
	4.6	5.1	5.1	5.1	5.7	5.7	5.7	6.3	6.3	6.3	6.9	6.9	6.9	7.5	7.5	7.5
	4.8	4.7	4.7	4.7	5.3	5.3	5.3	5.9	5.9	5.9	6.5	6.5	6.5	7.0	7.0	7.0
0.762	DP	145			180			221			268			322		
0.914	DP	155			193			236			286			343		
1.22	DP	173			215			263			319			382		
1.52	DP	190			235			288			348			417		

- NOTES: 1. One shore support required at midspan in shaded areas.  
 2. Slab weight of steel deck and concrete slab has been accounted for in the load table.  
 3. Shoring was based on Light Duty uniform construction live load of **1 kPa**.  
 4. DP = deflection parameter.  
 5. See composite slab notes and design example.  
 6. Prepared by Dr. R.M. Schuster, Distinguished Professor Emeritus, University of Waterloo.



## WF-324 NORMAL COMPOSITE SLAB TECHNICAL NOTES (IMPERIAL UNITS)

### Material Properties

1. The composite steel deck WF-324 Normal is the WF-324 roof deck with embossments rolled into the web elements to achieve the composite interlocking capacity between the steel deck and concrete.
2. Steel deck section properties were calculated in accordance with CSA S136-16.
3. Steel conforms to ASTM A653 SS Grade 40 with G90 surface coatings.
4. Concrete is based on normal density of 145 pcf and having a minimum compressive strength of 3 ksi.

### Load Table

1. Loads are maximum specified uniformly distributed loads resulting from human occupancy and should not be used for concentrated loads.  
Maximum specified load from load table must be  $\geq [LL + (1.25/1.5)DL]$ ;  
Where LL = specified live load;  
DL = specified dead load;
2. Loads greater than **400 psf** are commonly the result of large concentrated moving loads. In such cases, contact **WESTFORM METALS**.
3. The WF-324 steel deck provides the positive reinforcement for the simply supported composite slab and no additional reinforcing steel is required. To control shrinkage and temperature cracking, it is the responsibility of the design engineer to provide the minimum shrinkage and temperature reinforcement as specified in CSSBI S3-2019.
4. *Shoring requirements shown in shaded areas of the load table were established in accordance with CSSBI 12M-24 and are based on a Light Duty uniform construction live load of 20 psf. For Medium or Heavy Duty construction live loads contact **WESTFORM METALS** for the maximum unshored spans. Minimum bearing length at end support is 3 in. and at mid-support 6 in.*
5. To establish the shear-bond capacity of the composite slab system, laboratory tests were carried out at the Structural Testing and Research laboratory, Cambridge, Ontario in accordance with CSSBI S2-02.
6. Use of deflection parameter, DP  

$$W_d = \frac{DP \times 10^6}{DC \times (L)^3}$$
 where:  
 $W_d$  = Maximum specified deflection load in psf  
 DP = Deflection parameter from load table  
 DC = Deflection constant such as 360  
 L = Span length in feet



7. All technical information and load tables were prepared by Dr. R.M. Schuster, P.Eng. Distinguished Professor Emeritus, University of Waterloo, Ontario.

### EXAMPLE

Determine the specified uniformly distributed live load that can be placed on the WF-324 Normal composite floor slab, given the following information:

#### Given:

- Steel deck thickness = 0.036 in.
- Yield stress = 40 ksi
- Overall slab depth = 5.5 in.
- Double span, each = 12 ft
- Specified superimposed dead load, DL = 30 psf

#### Check Strength:

The maximum specified load in (**psf**) from load table must be  $\geq [LL + 0.833(DL)]$ ,

where:

LL = specified live load

DL = specified superimposed dead load

From load table under 12 ft span, the maximum specified load is **99 psf**, therefore,  
 $99 \geq [LL + 0.833(30)]$  and solving for LL,

$$LL = \underline{74 \text{ psf}}$$

Since this is in the shaded area, one shore support is required at mid-span in each span.

#### Note:

**The self-weight of the steel deck and concrete slab have already been accounted for in the maximum specified uniformly distributed load given in the composite slab load table.**

#### Check Deflection:

From table DP = 143 and assuming DC = 360

$$W_d = 143 \times 10^6 / 360 / (12)^3 = \underline{230 \text{ psf}}$$

Since this is greater than 74 psf, strength controls.

## WF-324 NORMAL COMPOSITE SLAB TECHNICAL NOTES (METRIC UNITS)

### Material Properties

1. The composite steel deck WF-324 Normal is the WF-324 roof deck with embossments rolled into the web elements to achieve the composite interlocking capacity between the steel deck and concrete.
2. Steel deck section properties were calculated in accordance with CSA S136-16.
3. Steel conforms to ASTM A653M SS Grade 275 with Z275 surface coatings.
4. Concrete is based on normal density of 2300 kg/m<sup>3</sup> and having a minimum compressive strength of 20 MPa.

### Load Table

1. Loads are maximum specified uniformly distributed loads resulting from human occupancy and should not be used for concentrated loads.  
Maximum specified load from load table must be  $\geq [LL + (1.25/1.5)DL]$ ;  
Where LL = specified live load;  
DL = specified dead load;
2. Loads greater than **20 kPa** are commonly the result of large concentrated moving loads. In such cases, contact **WESTFORM METALS**.
3. The WF-324 steel deck provides the positive reinforcement for the simply supported composite slab and no additional reinforcing steel is required. To control shrinkage and temperature cracking, it is the responsibility of the design engineer to provide the minimum shrinkage and temperature reinforcement as specified in CSSBI S3-2019.
4. *Shoring requirements shown in shaded areas of the load table were established in accordance with CSSBI 12M-24 and are based on a Light Duty uniform construction live load of 1 kPa. For Medium or Heavy Duty construction live loads contact **WESTFORM METALS** for the maximum unshored spans. Minimum bearing length at end support is 75 mm and at mid-support 150 mm.*
5. To establish the shear-bond capacity of the composite slab system, laboratory tests were carried out at the Structural Testing and Research laboratory, Cambridge, Ontario in accordance with CSSBI S2-02.
6. Use of deflection parameter, DP  
$$W_d = \frac{DP \times 10^3}{DC \times (L)^3}$$
where:  
W<sub>d</sub> = Maximum specified deflection load in kPa  
DP = Deflection parameter from load table  
DC = Deflection constant such as 360  
L = Span length in meters



7. All technical information and load tables were prepared by Dr. R.M. Schuster, P.Eng. Distinguished Professor Emeritus, University of Waterloo, Ontario.

### EXAMPLE

Determine the specified uniformly distributed live load that can be placed on the WF-324 Normal composite floor slab, given the following information:

#### Given:

- Steel deck thickness = 1.22 mm
- Yield stress = 275 MPa
- Overall slab depth = 140 mm
- Double span, each = 4.0 m
- Specified superimposed dead load, DL = 1.2 kPa

#### Check Strength:

The maximum specified load in (kPa) from load table must be  $\geq [LL + 0.833(DL)]$ ,

where:

LL = specified live load

DL = specified superimposed dead load

From load table under 4 m span, the maximum specified load is **7.0 kPa**, therefore,  
 $7.0 \geq [LL + 0.833(1.2)]$  and solving for LL,

**LL = 6.0 kPa**

Since this is in the shaded area, one shore support is required at mid-span in each span.

#### Note:

**The self-weight of the steel deck and concrete slab have already been accounted for in the maximum specified uniformly distributed load given in the composite slab load table.**

#### Check Deflection:

From table DP = 215 and assuming DC = 360

$W_d = 215 \times 10^3 / 360 / (4)^3 = \mathbf{9.33 \text{ kPa}}$

Since this is greater than 6.0 kPa, strength controls.