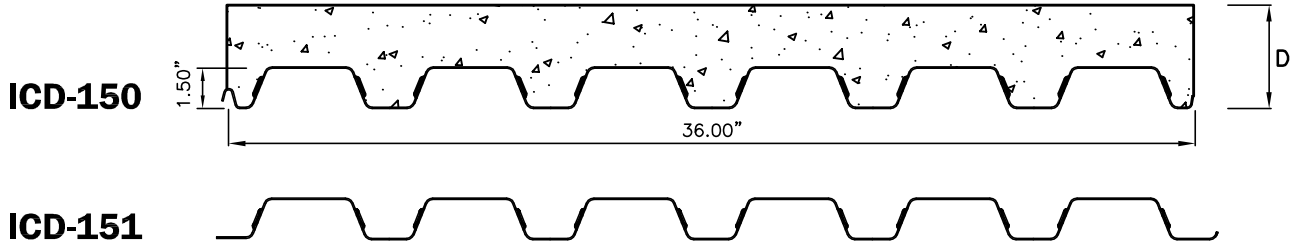


# ICD-150 and ICD-151

## Composite Floor Deck

**IMPERIAL**
**G90 Galvanized**


STEEL PROFILE SECTION PROPERTIES (per foot of width)					
Base Steel Thickness (in.)	Area of Steel (in. <sup>2</sup> )	Weight G90 (psf)	Section Modulus		Deflection Inertia (in. <sup>4</sup> )
			Midspan (in. <sup>3</sup> )	Support (in. <sup>3</sup> )	
0.030	0.481	1.69	0.189	0.193	0.167
0.036	0.577	2.02	0.230	0.242	0.208
0.048	0.769	2.67	0.313	0.319	0.288

COMPOSITE SLAB SECTION PROPERTIES (per foot of width)					
Slab Depth, D (in.)					
4.0	4.5	5.0	5.5	6.0	
Slab weight (psf)					
41.0	47.3	53.5	59.8	66.0	
Concrete Volume (yd <sup>3</sup> /100ft <sup>2</sup> )					
0.95	1.10	1.26	1.41	1.56	

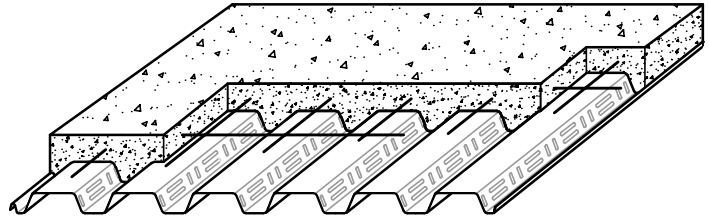
MAXIMUM SPECIFIED UNIFORMLY DISTRIBUTED LOADS (psf)																
Slab Depth, D (in.)		4.0			4.5			5.0			5.5			6.0		
Base Steel Thickness (in.)	Slab Span (ft)	Deck Span			Deck Span			Deck Span			Deck Span			Deck Span		
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
0.030	5'-0"	500	500	500	581	581	581	662	662	662	743	743	743	823	823	823
	5'-6"	423	423	423	491	491	491	560	560	560	628	628	628	696	696	696
	6'-0"	364	364	364	422	422	422	481	481	481	540	540	540	599	599	599
	6'-6"	317	317	317	368	368	368	419	419	419	470	470	470	521	521	521
	7'-0"	279	279	279	324	324	324	369	369	369	414	414	414	459	459	459
	7'-6"	248	248	248	289	289	289	329	329	329	369	369	369	409	409	409
	8'-0"	223	223	223	259	259	259	295	295	295	331	331	331	367	367	367
	8'-6"	202	202	202	234	234	234	267	267	267	299	299	299	332	332	332
	9'-0"	178	178	178	212	212	212	243	243	243	272	272	272	302	302	302
	9'-6"	156	156	156	186	186	186	216	216	216	246	246	246	276	276	276
10'-0"	138	138	138	164	164	164	191	191	191	217	217	217	244	244	244	
0.036	5'-0"	546	546	546	634	634	634	722	722	722	810	810	810	898	898	898
	5'-6"	467	467	467	543	543	543	618	618	618	694	694	694	769	769	769
	6'-0"	406	406	406	472	472	472	537	537	537	603	603	603	669	669	669
	6'-6"	358	358	358	415	415	415	473	473	473	531	531	531	589	589	589
	7'-0"	318	318	318	370	370	370	421	421	421	473	473	473	524	524	524
	7'-6"	286	286	286	332	332	332	379	379	379	425	425	425	471	471	471
	8'-0"	259	259	259	301	301	301	343	343	343	385	385	385	427	427	427
	8'-6"	236	236	236	274	274	274	313	313	313	351	351	351	389	389	389
	9'-0"	212	212	212	252	252	252	287	287	287	322	322	322	357	357	357
	9'-6"	187	187	187	224	224	224	261	261	261	297	297	297	329	329	329
10'-0"	165	165	165	198	198	198	231	231	231	264	264	264	297	297	297	
0.048	5'-0"	600	600	600	697	697	697	795	795	795	892	892	892	989	989	989
	5'-6"	522	522	522	607	607	607	691	691	691	776	776	776	860	860	860
	6'-0"	461	461	461	536	536	536	610	610	610	685	685	685	759	759	759
	6'-6"	411	411	411	478	478	478	545	545	545	611	611	611	678	678	678
	7'-0"	371	371	371	431	431	431	491	491	491	551	551	551	611	611	611
	7'-6"	337	337	337	392	392	392	447	447	447	501	501	501	556	556	556
	8'-0"	309	309	309	359	359	359	409	409	409	459	459	459	509	509	509
	8'-6"	285	285	285	331	331	331	377	377	377	423	423	423	469	469	469
	9'-0"	264	264	264	306	306	306	349	349	349	392	392	392	434	434	434
	9'-6"	241	241	241	285	285	285	325	325	325	365	365	365	404	404	404
10'-0"	210	210	210	259	259	259	304	304	304	341	341	341	378	378	378	

Note: Shoring required at midspan in shaded areas.

## TECHNICAL NOTES

### Material Properties

1. The composite steel deck **ICD-150** is the **IRD-150** 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 S136-01 (Supplement 2004).
3. Steel conforms to ASTM A653 SS Grade 33 and A653M SS Grade 230 with Z275 (G90) and ZF75 (A25) surface coatings.
4. Concrete is based on normal density of 2300 kg/m<sup>3</sup> (145 pcf) and having a minimum compressive strength of 20 MPa (3 ksi).



### EXAMPLE (Imperial)

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

#### Given:

- Steel deck thickness = 0.048 in.
- Yield strength = 33 ksi
- Normal density concrete = 145 lb/ft<sup>3</sup>
- Overall slab depth = 4.5 in.
- Double span, each = 10 ft
- Specified superimposed dead load, DL = 32 psf

#### Solution:

The maximum specified load in (**psf**) from load table must be  $\geq [LL + (1.25/1.5)DL]$ ,

where

LL = specified live load

DL = specified superimposed dead load

From load table under 10 ft span, the maximum specified load is **259 psf**, therefore,  
 $259 \geq [LL + (1.25/1.5)32]$  and solving for LL,

$$LL = \underline{232 \text{ psf}}$$

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.**

**-Minimum Bearing Length "n" at end support is 1.5 x height of deck = 2.25".**

**-At middle support use n=4".**

### Load Tables

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  $\geq [LL + 0.833DL]$ ;  
Where LL = specified live load;  
DL = specified dead load; 0.833 = 1.25/1.5
2. Loads greater than **10 kPa (200 psf)** are commonly the result of large **concentrated moving loads**. **In such cases, appropriate design consideration should be used by the structural engineers.**
3. The **ICD-150** 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, a minimum steel wire mesh of 152 x 152 – MW9.1/MW9.1 (6 x 6 - 10/10) is recommended as per CSSBI S3-03.
4. Shoring requirements shown in shaded areas of the load table were established in accordance with CSSBI 12M-06.
5. To establish the shear-bond capacity of the composite slab system, laboratory tests were carried out at the Structural Testing and Research laboratory (STAR), Cambridge, Ontario in accordance with CSSBI S2-02.
6. All technical information and load tables were prepared by Dr. R.M. Schuster, Professor Emeritus of Structural Engineering, University of Waterloo, Ontario.



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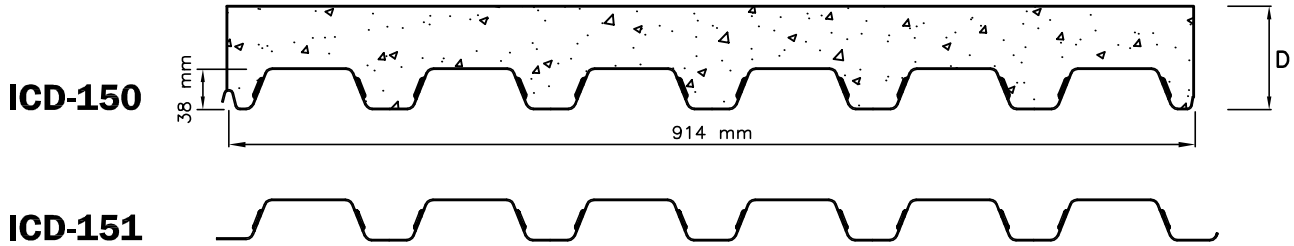
Toronto Manufacturing Facility  
223 Corporation Drive  
Brampton, Ont., Canada  
L6S 6G5

# ICD-150 and ICD-151

## Composite Floor Deck

**METRIC**

**Z275 Galvanized**



STEEL PROFILE SECTION PROPERTIES (per metre of width)					
Base Steel Thickness (mm)	Area of Steel (mm <sup>2</sup> )	Mass Z275 (kg/m <sup>2</sup> )	Section Modulus		Deflection Inertia (x10 <sup>6</sup> mm <sup>4</sup> )
			Midspan (x10 <sup>3</sup> mm <sup>3</sup> )	Support (x10 <sup>3</sup> mm <sup>3</sup> )	
0.762	1017	8.26	10.2	10.4	0.236
0.914	1221	9.86	12.4	13.0	0.293
1.22	1628	13.1	16.9	17.2	0.397

COMPOSITE SLAB SECTION PROPERTIES (per metre of width)					
Slab Depth, D (mm)					
100	110	120	130	140	
Slab weight (kPa)					
1.88	2.11	2.33	2.56	2.78	
Concrete Volume (m <sup>3</sup> /10m <sup>2</sup> )					
0.76	0.86	0.96	1.06	1.16	

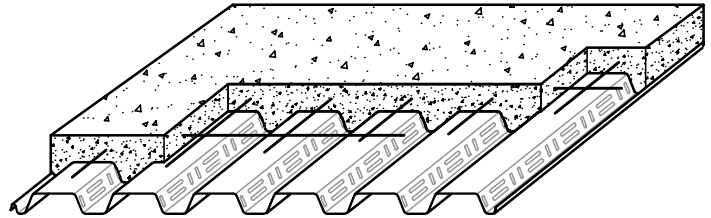
MAXIMUM SPECIFIED UNIFORMLY DISTRIBUTED LOADS (kPa)																
Slab Depth, D (mm)		100			110			120			130			140		
Base Steel Thickness (mm)	Slab Span (m)	Deck Span			Deck Span			Deck Span			Deck Span			Deck Span		
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
0.762	1.5	24.2	24.2	24.2	27.3	27.3	27.3	30.4	30.4	30.4	33.6	33.6	33.6	36.7	36.7	36.7
	1.6	21.6	21.6	21.6	24.4	24.4	24.4	27.2	27.2	27.2	30.0	30.0	30.0	32.8	32.8	32.8
	1.8	17.6	17.6	17.6	19.8	19.8	19.8	22.1	22.1	22.1	24.4	24.4	24.4	26.7	26.7	26.7
	2.0	14.6	14.6	14.6	16.5	16.5	16.5	18.4	18.4	18.4	20.3	20.3	20.3	22.2	22.2	22.2
	2.2	12.4	12.4	12.4	14.1	14.1	14.1	15.7	15.7	15.7	17.3	17.3	17.3	18.9	18.9	18.9
	2.4	10.8	10.8	10.8	12.1	12.1	12.1	13.5	13.5	13.5	14.9	14.9	14.9	16.3	16.3	16.3
	2.5	10.0	10.0	10.0	11.3	11.3	11.3	12.7	12.7	12.7	14.0	14.0	14.0	15.3	15.3	15.3
	2.6	9.4	9.4	9.4	10.6	10.6	10.6	11.9	11.9	11.9	13.1	13.1	13.1	14.3	14.3	14.3
	2.8	8.0	8.0	8.0	9.2	9.2	9.2	10.5	10.5	10.5	11.6	11.6	11.6	12.7	12.7	12.7
	3.0	6.8	6.8	6.8	7.8	7.8	7.8	8.9	8.9	8.9	10.0	10.0	10.0	11.0	11.0	11.0
3.2	5.8	5.8	5.8	6.7	6.7	6.7	7.6	7.6	7.6	8.5	8.5	8.5	9.4	9.4	9.4	
0.914	1.5	26.2	26.2	26.2	29.6	29.6	29.6	33.0	33.0	33.0	36.4	36.4	36.4	39.8	39.8	39.8
	1.6	23.6	23.6	23.6	26.6	26.6	26.6	29.7	29.7	29.7	32.8	32.8	32.8	35.8	35.8	35.8
	1.8	19.5	19.5	19.5	22.0	22.0	22.0	24.6	24.6	24.6	27.1	27.1	27.1	29.6	29.6	29.6
	2.0	16.5	16.5	16.5	18.6	18.6	18.6	20.8	20.8	20.8	22.9	22.9	22.9	25.1	25.1	25.1
	2.2	14.2	14.2	14.2	16.1	16.1	16.1	17.9	17.9	17.9	19.7	19.7	19.7	21.6	21.6	21.6
	2.4	12.4	12.4	12.4	14.0	14.0	14.0	15.7	15.7	15.7	17.3	17.3	17.3	18.9	18.9	18.9
	2.5	11.7	11.7	11.7	13.2	13.2	13.2	14.7	14.7	14.7	16.2	16.2	16.2	17.7	17.7	17.7
	2.6	11.0	11.0	11.0	12.4	12.4	12.4	13.9	13.9	13.9	15.3	15.3	15.3	16.7	16.7	16.7
	2.8	9.5	9.5	9.5	11.0	11.0	11.0	12.4	12.4	12.4	13.7	13.7	13.7	15.0	15.0	15.0
	3.0	8.1	8.1	8.1	9.4	9.4	9.4	10.7	10.7	10.7	12.0	12.0	12.0	13.3	13.3	13.3
3.2	6.9	6.9	6.9	8.1	8.1	8.1	9.2	9.2	9.2	10.3	10.3	10.3	11.4	11.4	11.4	
1.22	1.5	28.8	28.8	28.8	32.5	32.5	32.5	36.2	36.2	36.2	40.0	40.0	40.0	43.7	43.7	43.7
	1.6	26.2	26.2	26.2	29.6	29.6	29.6	33.0	33.0	33.0	36.4	36.4	36.4	39.8	39.8	39.8
	1.8	22.1	22.1	22.1	24.9	24.9	24.9	27.8	27.8	27.8	30.7	30.7	30.7	33.5	33.5	33.5
	2.0	19.0	19.0	19.0	21.5	21.5	21.5	24.0	24.0	24.0	26.4	26.4	26.4	28.9	28.9	28.9
	2.2	16.6	16.6	16.6	18.8	18.8	18.8	21.0	21.0	21.0	23.1	23.1	23.1	25.3	25.3	25.3
	2.4	14.8	14.8	14.8	16.7	16.7	16.7	18.6	18.6	18.6	20.5	20.5	20.5	22.5	22.5	22.5
	2.5	14.0	14.0	14.0	15.8	15.8	15.8	17.6	17.6	17.6	19.4	19.4	19.4	21.3	21.3	21.3
	2.6	13.3	13.3	13.3	15.0	15.0	15.0	16.7	16.7	16.7	18.4	18.4	18.4	20.2	20.2	20.2
	2.8	12.0	12.0	12.0	13.6	13.6	13.6	15.1	15.1	15.1	16.7	16.7	16.7	18.3	18.3	18.3
	3.0	9.9	9.9	9.9	12.2	12.2	12.2	13.8	13.8	13.8	15.2	15.2	15.2	16.7	16.7	16.7
3.2	8.2	8.2	8.2	10.5	10.5	10.5	12.1	12.1	12.1	13.6	13.6	13.6	15.2	15.2	15.2	

Note: Shoring required at midspan in shaded areas.

## TECHNICAL NOTES

### Material Properties

1. The composite steel deck **ICD-150** is the **IRD-150** 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 S136-01 (Supplement 2004).
3. Steel conforms to ASTM A653 SS Grade 33 and A653M SS Grade 230 with Z275 (G90) and ZF75 (A25) surface coatings.
4. Concrete is based on normal density of 2300 kg/m<sup>3</sup> (145 pcf) and having a minimum compressive strength of 20 MPa (3 ksi).



### EXAMPLE (Metric)

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

#### Given:

- Steel deck thickness = 1.22 mm
- Yield strength = 230 MPa
- Normal density concrete = 2300 kg/m<sup>3</sup>
- Overall slab depth = 120 mm
- Double span, each = 3.0 m
- Specified superimposed dead load, DL = 1.55 kPa

#### Solution:

The maximum specified load in (kPa) from load table must be  $\geq [LL + (1.25/1.5)DL]$ ,

where

LL = specified live load

DL = specified superimposed dead load

From load table under 3.0 m span, the maximum specified load is **13.8 kPa**, therefore,  
 $13.8 \geq [LL + (1.25/1.5)1.55]$  and solving for LL,

$$LL = \underline{12.5 \text{ kPa}}$$

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.**

**-Minimum Bearing Length "n" at end support is 1.5 x height of deck = 57mm**

**-At middle support use n=100mm.**

### Load Tables

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  $\geq [LL + 0.833DL]$ ;  
Where LL = specified live load;  
DL = specified dead load;  $0.833 = 1.25/1.5$
2. Loads greater than **10 kPa (200 psf)** are commonly the result of large **concentrated moving loads**. **In such cases, appropriate design consideration should be used by the structural engineers.**
3. The **ICD-150** 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, a minimum steel wire mesh of 152 x 152 – MW9.1/MW9.1 (6 x 6 - 10/10) is recommended as per CSSBI S3-03.
4. Shoring requirements shown in shaded areas of the load table were established in accordance with CSSBI 12M-06.
5. To establish the shear-bond capacity of the composite slab system, laboratory tests were carried out at the Structural Testing and Research laboratory (STAR), Cambridge, Ontario in accordance with CSSBI S2-02.
6. All technical information and load tables were prepared by Dr. R.M. Schuster, Professor Emeritus of Structural Engineering, University of Waterloo, Ontario.

