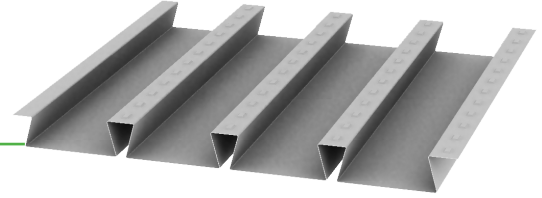


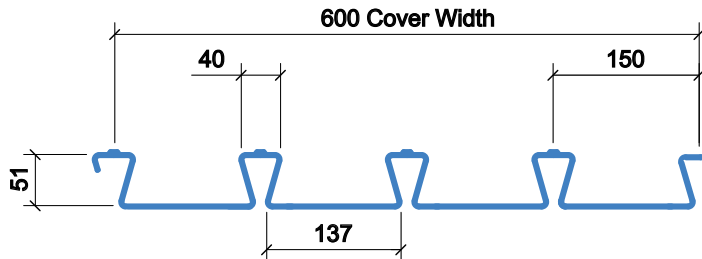
R51™

Floor deck profile



Deck profile

R51 is manufactured from S350 grade steel. This profile is a traditional re-entrant profile and is commonly used on inner city multi-storey projects where the structural zone and storey height is reduced, due to the relatively thin slab depth required to achieve a typical 1 hour fire rating.



Options

- 101mm minimum slab depth, whilst still achieving 1 hour fire rating
- With minimal voids in the concrete section this allows dense slabs to be constructed providing excellent load carrying capacity and good sound insulation
- Soffit 'Wedge Nut' fixings available with load capacity of up to 2kN
- Acoustic Robust Solution – Refer Robust Details Handbook (www.robustdetails.com)
- Product options include **HIGH DURABILITY HD** steel coating & TAB-Deck™ fibre concrete solution

Concrete volume and weight

Slab Depth mm	Volume of Concrete m ³ /m ²	Weight of Concrete (Normal Weight)		Weight of Concrete (Lightweight)	
		Wet (kN/m ²)	Dry (kN/m ²)	Wet (kN/m ²)	Dry (kN/m ²)
120	0.111	2.61	2.56	2.07	1.96
130	0.121	2.85	2.79	2.26	2.14
140	0.131	3.08	3.02	2.44	2.31
150	0.141	3.32	3.25	2.63	2.49
175	0.166	3.91	3.83	3.09	2.93
200	0.191	4.50	4.40	3.56	3.37
225	0.216	5.09	4.98	4.03	3.81
250	0.241	5.67	5.56	4.49	4.26

Deflection – This table is based on concrete poured to a constant thickness and does not take account for deflection of the decking or supporting beams (as a guide, to account for the deflection of the decking, a concrete volume of span/250 should be added to the figures indicated). Concrete Weight – These tables indicate concrete weight only and do not include the weight of decking or reinforcement. Concrete weights are based on the concrete densities specified in BS5950 Part 4 clause 3.3.3 as follows: Normal Weight Concrete – 2400kg/m³ (wet) and 2350 kg/m³ (dry). Lightweight Concrete – 1900kg/m³ (wet) and 1800 kg/m³ (dry).

Profile properties

Nominal Thickness mm	Design Thickness (bare steel) mm	Available Grades N/mm ²	Depth of Profile mm	Weight of Profile kg/m ²	Weight of Profile kN/m ²	Height of Neutral axis mm	Area of Steel mm ² /m	Moment of Inertia cm ⁴ /m
0.9	0.86	S350	51	12.90	0.127	16.9	1580	62.3
1.0	0.96	S350	51	14.35	0.141	16.9	1764	71.0
1.2	1.16	S350	51	17.23	0.169	16.8	2131	87.7

R51™ Load tables (BS5950)

Steel Grade S350 – Normal Weight Concrete

Total Unfactored Applied Load (kN/m²) Maximum Permissible Span (m)

Span Condition	Fire Rating (hours)	Slab Depth (mm)	Mesh	0.9mm Gauge				1.0mm Gauge				1.2mm Gauge			
				3.5	5.0	7.5	10.0	3.5	5.0	7.5	10.0	3.5	5.0	7.5	10.0
Single*	1.0	101	A142	2.76	2.76	2.76	2.76	3.00	3.00	3.00	2.93	3.27	3.27	3.27	3.13
		130	A193	2.59	2.59	2.59	2.59	2.76	2.76	2.76	2.76	3.04	3.04	3.04	3.04
		150	A252	2.46	2.46	2.46	2.46	2.65	2.65	2.65	2.65	2.90	2.90	2.90	2.90
	1.5	110	A142	2.68	2.68	2.68	2.45	2.92	2.92	2.92	2.51	3.19	3.19	3.07	2.65
		130	A193	2.59	2.59	2.59	2.59	2.76	2.76	2.76	2.76	3.04	3.04	3.04	3.04
		150	A252	2.46	2.46	2.46	2.46	2.65	2.65	2.65	2.65	2.90	2.90	2.90	2.90
	2.0	125	A193	2.60	2.60	2.60	2.32	2.80	2.80	2.70	2.35	3.08	3.08	2.74	2.41
		150	A252	2.46	2.46	2.46	2.46	2.65	2.65	2.65	2.65	2.90	2.90	2.90	2.90
		175	A252	2.32	2.32	2.32	2.32	2.52	2.52	2.52	2.52	2.75	2.75	2.75	2.75
Double	1.0	101	A142	3.23	3.23	3.03	2.67	3.47	3.47	3.13	2.76	3.78	3.78	3.32	2.93
		130	A193	3.05	3.05	3.05	3.05	3.30	3.30	3.30	3.30	3.51	3.51	3.51	3.51
		150	A252	2.89	2.89	2.89	2.89	3.14	3.14	3.14	3.14	3.44	3.44	3.44	3.44
	1.5	110	A142	3.22	3.13	2.67	2.38	3.39	3.22	2.75	2.44	3.69	3.38	2.89	2.57
		130	A193	3.05	3.05	3.05	2.74	3.30	3.30	3.17	2.81	3.51	3.51	3.32	2.94
		150	A252	2.89	2.89	2.89	2.89	3.14	3.14	3.14	3.14	3.44	3.44	3.44	3.35
	2.0	125	A193	3.09	2.94	2.52	2.25	3.33	2.98	2.56	2.29	3.45	3.05	2.63	2.35
		150	A252	2.89	2.89	2.89	2.65	3.14	3.14	3.01	2.68	3.44	3.44	3.07	2.74
		175	A252	2.72	2.72	2.72	2.72	2.98	2.98	2.98	2.84	3.26	3.26	3.26	2.91
Double Span (Propped)	1.0	101	A252	4.13	3.70	3.21	2.88	4.24	3.80	3.30	2.96	4.45	3.99	3.46	3.11
		130	A393	4.86	4.34	3.76	3.36	4.98	4.52	3.97	3.55	5.19	4.71	4.14	3.74
		150	2 x A252	5.10	4.59	4.00	3.59	5.38	4.84	4.22	3.79	5.66	5.18	4.58	4.15
	1.5	110	A252	3.76	3.38	2.94	2.64	3.84	3.45	3.01	2.70	4.00	3.59	3.13	2.81
		130	A393	4.39	3.97	3.49	3.15	4.47	4.05	3.55	3.21	4.62	4.18	3.67	3.32
		150	2 x A252	4.84	4.42	3.91	3.54	4.92	4.49	3.97	3.60	5.08	4.63	4.10	3.71
	2.0	125	A393	3.85	3.48	3.05	2.75	3.89	3.52	3.08	2.78	3.97	3.59	3.14	2.84
		150	2 x A252	4.35	3.96	3.50	3.17	4.39	4.00	3.53	3.20	4.46	4.07	3.60	3.26
		175	2 x A252	4.49	4.12	3.67	3.34	4.54	4.17	3.71	3.38	4.62	4.24	3.78	3.44

Figures shown in Red, indicates where spans are limited by the maximum composite stage condition. Figures shown in Blue, indicates where spans are limited by the maximum composite stage and are achieved using two rows of temporary propping at third points. The above tables are limited to the span/depth ratio for end span condition (Refer BS5950 Part 4: Clause 6.6.3 Table 2) and a maximum span of 6m. * These tables are based on the composite slab and mesh reinforcement (not necessarily the metal deck) continuous over one or more internal supports (end bay condition). For full design notes relating to these tables refer to page 4 of The White Book.

R51™ Load tables (BS5950)

Steel Grade S350 – Lightweight Concrete

Total Unfactored Applied Load (kN/m²) Maximum Permissible Span (m)

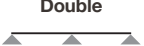
Span Condition	Fire Rating (hours)	Slab Depth (mm)	Mesh	0.9mm Gauge				1.0mm Gauge				1.2mm Gauge			
				3.5	5.0	7.5	10.0	3.5	5.0	7.5	10.0	3.5	5.0	7.5	10.0
Single*	1.0	101	A142	2.97	2.97	2.97	2.85	3.19	3.19	3.19	2.95	3.48	3.48	3.48	3.14
		130	A193	2.74	2.74	2.74	2.74	2.99	2.99	2.99	2.99	3.26	3.26	3.26	3.26
		150	A252	2.67	2.67	2.67	2.67	2.85	2.85	2.85	2.85	3.13	3.13	3.13	3.13
	1.5	105	A142	2.93	2.93	2.84	2.45	3.16	3.16	2.91	2.52	3.44	3.44	3.06	2.64
		130	A193	2.74	2.74	2.74	2.74	2.99	2.99	2.99	2.99	3.26	3.26	3.26	3.23
		150	A252	2.67	2.67	2.67	2.67	2.85	2.85	2.85	2.85	3.13	3.13	3.13	3.13
	2.0	115	A193	2.85	2.85	2.69	2.34	3.09	3.09	2.71	2.37	3.36	3.36	2.77	2.43
		150	A252	2.67	2.67	2.67	2.67	2.85	2.85	2.85	2.85	3.13	3.13	3.13	3.06
		175	A252	2.53	2.53	2.53	2.53	2.71	2.71	2.71	2.71	2.99	2.99	2.99	2.99
Double	1.0	101	A142	3.43	3.43	3.09	2.71	3.69	3.69	3.19	2.81	4.02	4.02	3.39	2.98
		130	A193	3.26	3.26	3.26	3.26	3.51	3.51	3.51	3.37	3.76	3.76	3.76	3.56
		150	A252	3.12	3.12	3.12	3.12	3.37	3.37	3.37	3.37	3.68	3.68	3.68	3.68
	1.5	105	A142	3.41	3.20	2.70	2.39	3.65	3.28	2.77	2.46	3.98	3.45	2.92	2.58
		130	A193	3.26	3.26	3.21	2.83	3.51	3.51	3.29	2.90	3.76	3.76	3.43	3.03
		150	A252	3.12	3.12	3.12	3.12	3.37	3.37	3.37	3.33	3.68	3.68	3.68	3.46
	2.0	115	A193	3.38	3.04	2.58	2.29	3.56	3.07	2.61	2.32	3.60	3.14	2.68	2.38
		150	A252	3.12	3.12	3.12	2.78	3.37	3.37	3.18	2.81	3.68	3.68	3.24	2.87
		175	A252	2.97	2.97	2.97	2.95	3.21	3.21	3.21	2.98	3.52	3.52	3.44	3.05
Double Span (Propped)	1.0	101	A252	4.19	3.84	3.30	2.95	4.25	3.91	3.39	3.03	4.35	4.01	3.51	3.17
		130	A393	5.06	4.52	3.87	3.44	5.11	4.72	4.09	3.63	5.19	4.89	4.29	3.85
		150	2 x A252	5.39	4.80	4.14	3.69	5.54	5.06	4.36	3.89	5.64	5.35	4.76	4.27
	1.5	105	A252	3.93	3.50	3.02	2.69	4.01	3.57	3.08	2.75	4.17	3.71	3.20	2.86
		130	A393	4.70	4.22	3.67	3.29	4.78	4.29	3.73	3.35	4.93	4.43	3.85	3.46
		150	2 x A252	5.21	4.72	4.13	3.69	5.30	4.79	4.19	3.78	5.46	4.93	4.32	3.89
	2.0	115	A393	4.12	3.68	3.18	2.85	4.16	3.71	3.21	2.88	4.23	3.78	3.27	2.93
		150	2 x A252	4.76	4.30	3.76	3.39	4.80	4.34	3.80	3.42	4.88	4.41	3.86	3.48
		175	2 x A252	4.91	4.47	3.94	3.56	4.96	4.51	3.97	3.59	5.05	4.59	4.05	3.66

For more comprehensive tables covering a wider range of slab depths, loadings, fire ratings and mesh sizes visit our website at www.smdltd.co.uk

R51™ Fire tables (BS5950)

TAB-Deck™ Fibres - Normal Weight Concrete

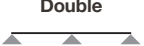
Total Unfactored Applied Load (kN/m²) Maximum Permissible Span (m)

Span Condition	Fire Rating (hours)	Slab Depth (mm)	Steel Fibre	0.9mm Gauge				1.0mm Gauge				1.2mm Gauge			
				3.5	5.0	7.5	10.0	3.5	5.0	7.5	10.0	3.5	5.0	7.5	10.0
Double 	1.0	101	HE 1.0/50	3.23	3.23	3.23	3.18	3.47	3.47	3.47	3.34	3.78	3.78	3.78	3.46
		130	HE 1.0/50	3.05	3.05	3.05	3.05	3.30	3.30	3.30	3.30	3.51	3.51	3.51	3.51
		150	HE 1.0/50	2.89	2.89	2.89	2.89	3.14	3.14	3.14	3.14	3.44	3.44	3.44	3.44
	1.5	110	HE 1.0/50	3.22	3.21	2.82	2.54	3.39	3.34	2.93	2.64	3.69	3.58	3.14	2.83
		130	HE 1.0/50	3.05	3.05	3.05	2.79	3.30	3.30	3.19	2.89	3.51	3.51	3.42	3.10
		150	HE 1.0/50	2.89	2.89	2.89	2.89	3.14	3.14	3.14	3.14	3.44	3.44	3.44	3.35
	2.0	125	HE 1.0/50	3.09	2.95	2.60	2.35	3.33	3.07	2.70	2.44	3.45	3.27	2.88	2.61
		150	HE 1.0/50	2.89	2.89	2.89	2.71	3.14	3.14	3.09	2.81	3.44	3.44	3.28	2.98
		175	HE 1.0/50	2.72	2.72	2.72	2.72	2.98	2.98	2.98	2.98	3.26	3.26	3.26	3.19

R51™ Fire tables (BS5950)

TAB-Deck™ Fibres - Lightweight Concrete

Total Unfactored Applied Load (kN/m²) Maximum Permissible Span (m)

Span Condition	Fire Rating (hours)	Slab Depth (mm)	Steel Fibre	0.9mm Gauge				1.0mm Gauge				1.2mm Gauge			
				3.5	5.0	7.5	10.0	3.5	5.0	7.5	10.0	3.5	5.0	7.5	10.0
Double 	1.0	101	HE 1.0/50	3.43	3.43	3.39	3.08	3.69	3.69	3.44	3.12	4.02	4.02	3.53	3.21
		130	HE 1.0/50	3.26	3.26	3.26	3.26	3.51	3.51	3.51	3.51	3.76	3.76	3.76	3.76
		150	HE 1.0/50	3.12	3.12	3.12	3.12	3.37	3.37	3.37	3.37	3.68	3.68	3.68	3.68
	1.5	105	HE 1.0/50	3.41	3.19	2.76	2.47	3.65	3.32	2.87	2.57	3.98	3.57	3.09	2.77
		130	HE 1.0/50	3.26	3.26	3.23	2.91	3.51	3.51	3.34	3.01	3.76	3.76	3.56	3.21
		150	HE 1.0/50	3.12	3.12	3.12	3.12	3.37	3.37	3.37	3.27	3.68	3.68	3.68	3.47
	2.0	115	HE 1.0/50	3.33	2.99	2.60	2.33	3.46	3.10	2.70	2.42	3.69	3.31	2.88	2.58
		150	HE 1.0/50	3.12	3.12	3.12	2.86	3.37	3.37	3.27	2.96	3.68	3.68	3.45	3.11
		175	HE 1.0/50	2.97	2.97	2.97	2.97	3.21	3.21	3.21	3.20	3.52	3.52	3.52	3.35

For further guidance on the design of TAB-Deck™ fibre reinforced slabs, download the TAB-Deck™ design manual at www.smdltd.co.uk

R51™ Fire Insulation Thickness

Minimum Insulation Thickness (x) of Concrete (mm)



Concrete Weight	1 hr	1.5 hr	2 hr	3 hr	4 hr
NWC	90	110	125	150	170
LWC	90	105	115	135	150

The image and table above details the minimum insulation thickness required to suit fire design criteria – in accordance with BS5950 Part 8.



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