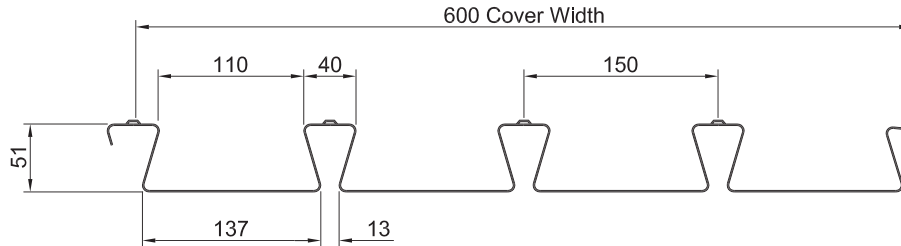


# R51

## Technical Data Sheet

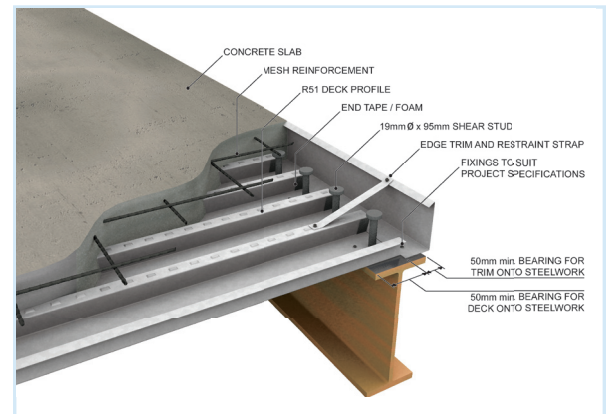
R51 is manufactured from S350 grade steel. This profile is a traditional re-entrant profile and is commonly used on inner city multi-storey projects where the structural zone and storey height is reduced, due to the relatively thin slab depth required to achieve a typical 1 hour fire rating.

### R51 Deck Profile



### R51 Benefits

- 51mm deep re-entrant profile
- 101mm minimum slab depth, whilst still achieving 1 hour fire rating
- Wide flat trough provides flexibility for shear stud positioning
- 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
- Narrow re-entrant ribs provide virtually flat soffit
- Acoustic Robust Solution – Refer 'Robust Standard Details'
- TAB-Deck™ fibre concrete solution now available



R51 Typical Section Detail

### Concrete Volume and Weight

Slab Depth mm	Volume of Concrete m <sup>3</sup> /m <sup>2</sup>	Weight of Concrete (Normal Weight)		Weight of Concrete (Lightweight)	
		Wet (kN/m <sup>2</sup> )	Dry (kN/m <sup>2</sup> )	Wet (kN/m <sup>2</sup> )	Dry (kN/m <sup>2</sup> )
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 of 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/m<sup>3</sup> (wet) and 2350 kg/m<sup>3</sup> (dry). Lightweight Concrete – 1900kg/m<sup>3</sup> (wet) and 1800 kg/m<sup>3</sup> (dry).

### Sectional Properties

Nominal thickness mm	Design Thickness (bare steel) mm	Available Grade N/mm <sup>2</sup>	Depth of Profile mm	Weight of Profile		Height of neutral axis mm	Area of Steel mm <sup>2</sup> /m	Moment of Inertia cm <sup>4</sup> /m
				kg/m <sup>2</sup>	kN/m <sup>2</sup>			
0.9	0.86	S350	51	12.98	0.128	16.9	1580	62.3
1.0	0.96	S350	51	14.42	0.142	16.9	1764	71.0
1.2	1.16	S350	51	17.30	0.170	16.8	2131	87.7

# R51 Load Span Tables (Normal Weight Concrete) – Steel Grade S350

Span Type	Fire Rating (hours)	Slab Depth (mm)	Mesh	Maximum Permissible Span (m)												
				0.9mm Gauge				1.0mm Gauge				1.2mm Gauge				
				Total Unfactored Applied Load (kN/m <sup>2</sup> )												
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 Span	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 Span	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

# R51 Load Span Tables (Lightweight Concrete) – Steel Grade S350

Span Type	Fire Rating (hours)	Slab Depth (mm)	Mesh	Maximum Permissible Span (m)												
				0.9mm Gauge				1.0mm Gauge				1.2mm Gauge				
				Total Unfactored Applied Load (kN/m <sup>2</sup> )												
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 Span	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 Span	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

Refer to page 07 for notes associated with these load/span tables. 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](http://www.smdltd.co.uk).

# R51 Fire Tables – TAB-Deck™ Fibres

## Normal Weight Concrete

Span Type	Fire Rating (hours)	Slab Depth (mm)	Steel Fibre	Maximum Permissible Span (m)											
				0.9mm Gauge				1.0mm Gauge				1.2mm Gauge			
				Total Unfactored Applied Load (kN/m <sup>2</sup> )											
				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 Span	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

## Lightweight Concrete

Span Type	Fire Rating (hours)	Slab Depth (mm)	Steel Fibre	Maximum Permissible Span (m)											
				0.9mm Gauge				1.0mm Gauge				1.2mm Gauge			
				Total Unfactored Applied Load (kN/m <sup>2</sup> )											
				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 Span	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](http://www.smdltd.co.uk)

## R51 Fire Insulation Thickness



Minimum Insulation Thickness (x) of Concrete (mm)					
Fire Rating	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.