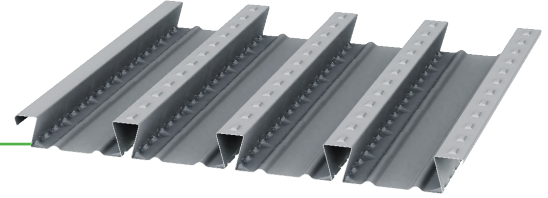


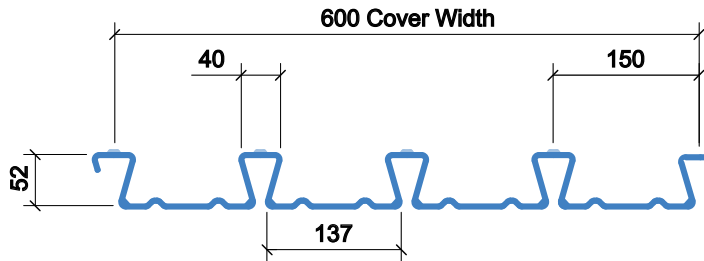
R51⁺™

Floor deck profile



Deck profile

Updated from the original R51 product in 2018, this profile is available in S350 and S450 grades to provide the designer greater flexibility. R51+ is a traditional re-entrant profile 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

- 102mm minimum slab depth, whilst still achieving 1 hour fire rating
- Profile optimised to maximise structural efficiency of steel
- 150mm trough spacings provide flexibility for stud placement, particularly important for building footprints with irregular geometry (raking beams)
- Soffit 'Wedge Nut' fixings available with load capacity of up to 2kN
- 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
0.8	0.76	350	52	12.02	0.118	15.8	1464	56.9
0.9	0.86	350 or 450	52	13.54	0.133	16.2	1657	61.27
1.0	0.96	350 or 450	52	15.01	0.147	16.5	1845	68.73
1.2	1.16	350 or 450	52	17.98	0.176	17	2223	85.6

R51⁺™ Construction, Composite and Fire Selection

Steel Grade S350 – Normal Weight Concrete

Selecting the best profile to suit your specification

Typically, spans are governed by the maximum 'unpropped' condition at Construction Stage. These graphs consider the construction stage design and compares the different SMD gauges based on decking sheets being double spans (unpropped).

By cross-referencing the slab depth / span, you can then determine which gauge and slab depth best suits your proposed support configuration.

Note: Your product choice may also be governed by the stud requirements for your composite beam design.

Once you have reviewed this graph you should have confirmed profile type, gauge and provisional slab depth.

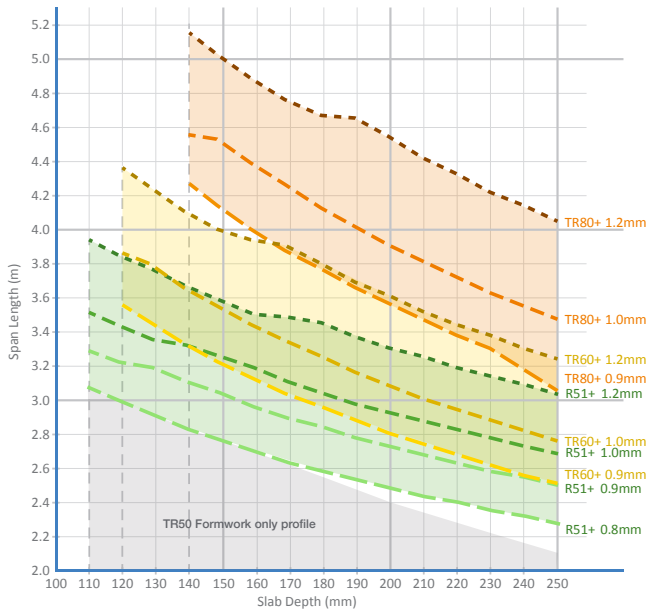
All tables shown are based on the S350 grade profiles. For S450 download Elements® Design Software from www.smdltd.co.uk.

The graphs below are extracts from SMD 'The White Book, Floor Deck Design Guide and Tables' which includes comprehensive span tables for all conditions and the design assumptions used.

Step 1, Which Profile and Gauge?

Construction Stage Graph

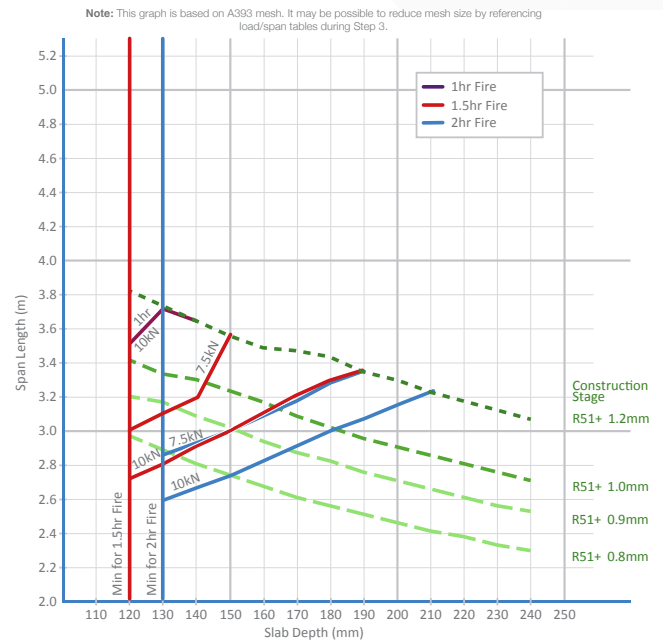
Use this graph to determine which profile and gauge provides an unpropped double span solution for the slab depth and spans required.



Step 2, R51+ Composite Slab Graph

Span and slab depth guidance graph

With proposed profile and gauge determined at step 1, review the graph below to consider whether Load and Fire rating govern the design. Construction stage governs (shown dashed) except where solid lines representing the different Load/Fire limits are shown.



TR50[™]
(Formwork only)
Refer to Data Sheet
Document 528

R51⁺™
See Page 3

TR60⁺™
Refer to Data Sheet
Document 533

TR80⁺™
Refer to Data Sheet
Document 534

Need tables for other profiles?

Download all our Data Sheets at www.smdltd.co.uk

R51⁺™ Load tables (EC)

Steel Grade S350 – Normal Weight Concrete

Maximum Permissible Span (m)

Deck Span	Fire Rating (hours)	Slab Depth (mm)	Mesh	0.8mm Gauge				0.9mm Gauge				1.0mm Gauge				1.2mm Gauge			
				FW	5.0kN	7.5kN	10.0kN	FW	5.0kN	7.5kN	10.0kN	FW	5.0kN	7.5kN	10.0kN	FW	5.0kN	7.5kN	10.0kN
Single*	1.0	130	A193	2.534	2.534	2.534	2.534	2.707	2.707	2.707	2.707	2.891	2.891	2.891	2.891	3.160	3.160	3.160	3.160
		150	A252	2.410	2.410	2.410	2.410	2.585	2.585	2.585	2.585	2.765	2.765	2.765	2.765	3.031	3.031	3.031	3.031
		200	A393	2.168	2.168	2.168	2.168	2.339	2.339	2.339	2.339	2.503	2.503	2.503	2.503	2.781	2.781	2.781	2.781
		250	2xA252	1.988	1.988	1.988	1.988	2.153	2.153	2.153	2.153	2.308	2.308	2.308	2.308	2.593	2.593	2.593	2.593
	1.5	130	A193	2.534	2.534	2.534	2.362	2.707	2.707	2.707	2.430	2.891	2.891	2.891	2.488	3.160	3.160	3.157	2.608
		150	A252	2.410	2.410	2.410	2.410	2.585	2.585	2.585	2.585	2.765	2.765	2.765	2.765	3.031	3.031	3.031	3.031
		200	A393	2.168	2.168	2.168	2.168	2.339	2.339	2.339	2.339	2.503	2.503	2.503	2.503	2.781	2.781	2.781	2.781
		250	2xA252	1.988	1.988	1.988	1.988	2.153	2.153	2.153	2.153	2.308	2.308	2.308	2.308	2.593	2.593	2.593	2.593
	2.0	130	A193	2.534	2.534	2.370	2.149	2.707	2.707	2.430	2.203	2.891	2.891	2.488	2.257	3.160	3.160	2.596	2.358
		150	A252	2.410	2.410	2.383	2.585	2.585	2.585	2.438	2.765	2.765	2.765	2.492	3.031	3.031	3.031	2.593	2.593
		200	A393	2.168	2.168	2.168	2.168	2.339	2.339	2.339	2.339	2.503	2.503	2.503	2.503	2.781	2.781	2.781	2.781
		250	2xA252	1.988	1.988	1.988	1.988	2.153	2.153	2.153	2.153	2.308	2.308	2.308	2.308	2.593	2.593	2.593	2.593
Double	1.0	130	A193	2.891	2.891	2.891	2.891	3.180	3.180	3.180	3.015	3.335	3.335	3.335	3.093	3.742	3.742	3.742	3.250
		150	A252	2.750	2.750	2.750	2.750	3.023	3.023	3.023	3.023	3.242	3.242	3.242	3.242	3.569	3.569	3.569	3.569
		200	A393	2.469	2.469	2.469	2.469	2.711	2.711	2.711	2.711	2.914	2.914	2.914	2.914	3.296	3.296	3.296	3.296
		250	2xA252	2.261	2.261	2.261	2.261	2.488	2.488	2.488	2.488	2.672	2.672	2.672	2.672	3.019	3.019	3.019	3.019
	1.5	130	A193	2.891	2.891	2.608	2.362	3.180	3.180	2.676	2.430	3.335	3.335	2.742	2.488	3.742	3.742	2.875	2.608
		150	A252	2.750	2.750	2.633	3.023	3.023	2.965	2.695	3.242	3.242	3.031	2.757	3.569	3.569	3.164	2.883	2.883
		200	A393	2.469	2.469	2.469	2.469	2.711	2.711	2.711	2.711	2.914	2.914	2.914	2.914	3.296	3.296	3.296	3.296
		250	2xA252	2.261	2.261	2.261	2.261	2.488	2.488	2.488	2.488	2.672	2.672	2.672	2.672	3.019	3.019	3.019	3.019
	2.0	130	A193	2.891	2.891	2.370	2.149	3.180	3.180	2.430	2.203	3.335	3.335	2.488	2.257	3.742	3.657	2.596	2.358
		150	A252	2.750	2.750	2.620	2.383	3.023	3.023	2.680	2.438	3.242	3.242	2.738	2.492	3.569	3.569	2.850	2.593
		200	A393	2.469	2.469	2.469	2.469	2.711	2.711	2.711	2.711	2.914	2.914	2.914	2.914	3.296	3.296	3.296	3.153
		250	2xA252	2.261	2.261	2.261	2.261	2.488	2.488	2.488	2.488	2.672	2.672	2.672	2.672	3.019	3.019	3.019	3.019

Figures shown in Red, indicates where spans are limited by the maximum composite stage condition. 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.

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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