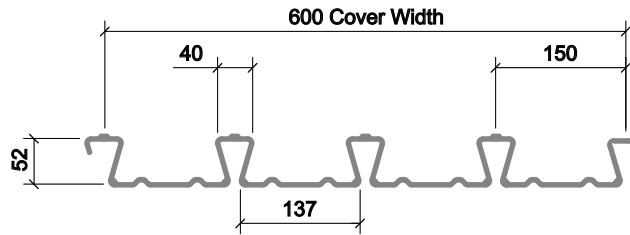


# R51<sup>+</sup>™



## Description

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 one hour fire rating.

## Benefits

- 102mm minimum slab depth
- Optimised to maximise structural efficiency of steel
- 150mm trough spacings provide flexibility for stud placement
- TAB-Deck™ fibre concrete option

## Gauges

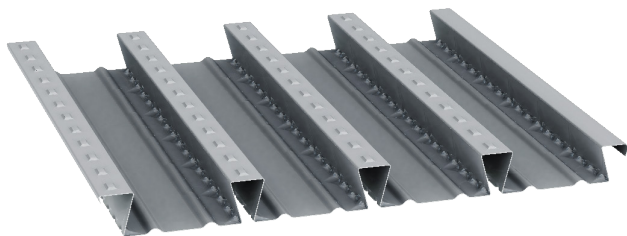
- 0.8mm
- 0.9mm
- 1.0mm
- 1.2mm

## Specification

- 600mm cover width
- 52mm deep

## Steel Grade

- S350
- S450



## Finishes

- Galvanised (Z275)
- HD (ZM310)

## Profile Properties

Nominal Thickness mm	Design Thickness (bare steel) mm	Weight of Profile kg/m <sup>2</sup>	Weight of Profile kN/m <sup>2</sup>	Height of Neutral Axis mm	Area of Steel mm <sup>2</sup> /m	Moment of Inertia cm <sup>4</sup> /m
0.8	0.76	12.02	0.118	15.80	1464	56.9
0.9	0.86	13.54	0.133	16.20	1657	61.3
1.0	0.96	15.01	0.147	16.50	1845	68.7
1.2	1.16	17.98	0.176	17.00	2223	85.6

Section properties are calculated assisted by testing in accordance with Eurocode 3.

# Fire Insulation Thickness

## Minimum Insulation Thickness (x) of Concrete (mm)

Fire Rating	NWC	LWC
1.0 Hour	100	100
1.5 Hour	110	105
2.0 Hour	125	115
3.0 Hour	150	135
4.0 Hour	170	150



The image and table above details the minimum insulation thickness required to suit fire design criteria in accordance with SCI PN005c-GB or BS5950 Part 8.

## Concrete Volume and Weight

Slab Depth mm	Volume of Concrete m³/m²	Weight of Concrete (Normal Weight)		Weight of Concrete (Lightweight)	
		Wet (kN/m²)	Dry (kN/m²)	Wet (kN/m²)	Dry (kN/m²)
130	0.121	3.03	2.91	2.43	2.31
150	0.141	3.53	3.39	2.83	2.70
200	0.191	4.78	4.59	3.84	3.65

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 BS EN 1991-1-1 as follows: Normal Weight Concrete – 2550kg/m³ (wet) and 2450 kg/m³ (dry). Lightweight Concrete – 2050kg/m³ (wet) and 1950 kg/m³ (dry).

## Load Tables (Eurocode)

### 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	0.8mm Gauge				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	3.5	5.0	7.5	10.0
				<b>Single**</b>															
▲	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	
	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	2.410	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
	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	
▲	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	
	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	
▲	1.0	130	HE 1/50*	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	3.680
		150	HE 1/50*	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	HE 1/50*	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	
	2.0	130	HE 1/50*	2.891	2.891	2.550	2.310	3.180	3.180	2.610	2.360	3.335	3.335	2.650	2.400	3.742	3.742	2.760	2.505
		150	HE 1/50*	2.750	2.750	2.750	2.660	3.023	3.023	2.970	2.710	3.242	3.242	3.030	2.750	3.569	3.569	3.130	2.840
	200	HE 1/50*	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	

Figures shown in red are governed by the normal (composite) or fire stages, greater spans can be achieved by increasing reinforcement or fibre type/dosage - refer to SMD Elements® Design Software, Elements® Span Check App or The SMD White Book for more extensive design information.

For full design notes relating to these tables refer to SMD's The White Book, Floor Deck Design Guide and Tables.

\* TAB-Deck™ fibre concrete spans are based on a dosage of 30kg/m³ - For further guidance refer to the TAB-Deck™ design manual at www.smdltd.co.uk.

\*\* Single span design limits indicated are based on single span deck with the slab being continuous over at least one internal support (end span condition). For true single span slabs with no continuity, refer to SMD Elements® Design Software as additional bottom reinforcement will be required.