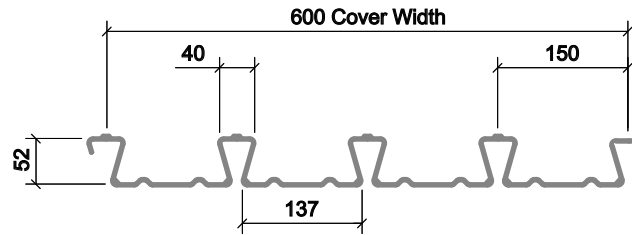


Metal Floor Deck Data Sheet Profile Details and Sectional Properties

R51+™



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 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 | 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 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) |
| 130 | 0.121 | 2.85 | 2.79 | 2.26 | 2.14 |
| 150 | 0.141 | 3.32 | 3.25 | 2.63 | 2.49 |
| 200 | 0.191 | 4.50 | 4.40 | 4.03 | 3.81 |

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 |
| | | | | 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 | |
| | 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 | |
| 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 | |
| | 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 | |
| Double | | | | | | | | | | | | | | | | | | | |
| ▲ | 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 The White Book.

* 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.