

# SVELTE-FLOOR 80



## Long Span Trapezoidal Concrete Composite Floor Slab

### Data Sheet

A new long spanning composite tray floor, adding to an extensive range of flooring options from Formsteel Industries.



### Features

- Svelte-floor80 has an interlocking edge lap which eliminates the use of seam fasters.
- Svelte-floor80 has enhanced shear performance due to deep embossment placed within webs.
- Svelte-floor80 design makes allowance for basic shrinkage and incorporates an enhanced concept of creep, thus providing better performance over time.
- Svelte-floor80 is manufactured from corrosion resistant hot dipped galvanized steel.
- Svelte-floor80 acts as permanent formwork eliminating time and labour needed to strip formwork
- Svelte-floor80 uses fewer props, saving expensive prop hire and installation.
- Svelte floor80 allows services to be incorporated within the depth of the floor. This is important where head room is critical.





## **Svelte-floor 80 Propping Span Tables**

### **Max Span Allowable**

Is the maximum span permitted which complies with the 'ponded' limitations stated within the British Standard BS5950:Part4. Specifically, these are span/130 or 30mm, whichever gives the smallest deflection. Spans are measured centre to centre of support, with internal support width being 125mm and end support 70mm.

### **Visible Span**

Are recommended reduced spans, where soffits are exposed to view and an increased aesthetic appeal is required. Visible spans are included as information only to designers and are based on span/360 or 10mm, whichever gives the smallest deflection.

### **Soffit Deflection**

Gives the maximum expected deflection of the trayfloor under the weight of wet concrete, at the 'max span allowable'.

### **Prop Reaction**

Constitutes the full internal ultimate load reactions for double and triple spans (end spans can be taken as half the internal reaction for these spans), and the end span ultimate reactions for single spans.

### **Compliance with NZBC**

Compliance with the New Zealand Building Code Clause B1-Structure is by use of the 'Acceptable Solutions' provisions. The approved document permitted under verification method B1/VM1 is AS/NZS4600:2005 "Cold Formed Steel Structures Code".

It is to be noted that other profiles on the market may not be in compliance with B1/VM1 of the NZBC.

### **Provision of Unpropped Construction**

In the past propping tables have been produced by all manufacturers on the basis that trayflooring would always be propped, using rigid props, which has limited the advantages of 'unpropped' construction to be utilized.

Worse, contractors have taken existing propping tables as being applicable to 'unpropped' construction and this has led to excessive deflections in floors and the possibility of unsafe practices.

The publication of HERA REPORT R4-107;2005 "Composite Floor Construction Handbook", has given serviceability criteria which can be standardized and allows designers to provide a variety of solutions contingent on a project's requirements. Specifically, flexible or rigid construction can be utilized

### **Rigid Construction (Propped)**

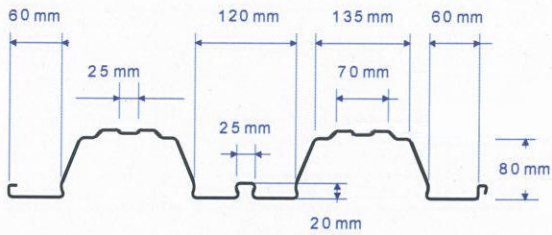
This is consistent with existing propping tables where, trayflooring is supported on solid walls or rigid construction such as props. In terms of HERA REPORT R4-107;2005, applicable primary and secondary deflections are 0mm / 0mm and no allowance for extra ponding is required.

### **Flexible Construction (Un-Propped)**

Flexible construction is associated with the use of 'unpropped' primary and secondary beams, where extra allowance of 'ponded' wet concrete must be made due to deflection of these supporting steel beams. The common limiting deflections specified within HERA REPORT R4-107;2005 are 10mm for primary beams and 20mm for secondary beams [10mm/20mm], and these have been incorporated within the Sveltefloor 80 propping tables.



## Svelte-floor 80 Section Properties (1000 mm width) :



Svelte-floor 80 is a trapezoidal deck profile section which is designed for composite floor construction. Panels are manufactured from G550 (550MPa yield Stress) steel with a base metal thickness of 0.75 mm, 0.95 mm and 1.20mm. The steel panel is protected with a galvanized coating of Z275.

Svelte-floor 80 has been designed utilizing the most up to date design standards including:

BS 5950: Part4: 1994 "Composite Slab Standard"  
AS/NZS 4600 : 2005 "Cold Formed Structures Code"

| Properties/metre                                    | 0.95 mm BMT SECTION PROPERTIES          |   |   | 1.15 mm BMT SECTION PROPERTIES          |   |   |
|---|---|---|---|---|---|---|
|   | Gross Section                           | Negative Bending                        | Positive Bending                        | Gross Section                           | Negative Bending                        | Positive Bending                        |
| Area (mm <sup>2</sup> )                             | 1 506 mm <sup>2</sup>                   | 1 327 mm <sup>2</sup>                   | 1 506 mm <sup>2</sup>                   | 1 826 mm <sup>2</sup>                   | 1 692 mm <sup>2</sup>                   | 1 826 mm <sup>2</sup>                   |
| I <sub>xx</sub> 10 <sup>6</sup> (mm <sup>4</sup> )  | 1.935 x 10 <sup>6</sup> mm <sup>4</sup> | 1.623 x 10 <sup>6</sup> mm <sup>4</sup> | 1.935 x 10 <sup>6</sup> mm <sup>4</sup> | 2.367 x 10 <sup>6</sup> mm <sup>4</sup> | 2.136 x 10 <sup>6</sup> mm <sup>4</sup> | 2.367 x 10 <sup>6</sup> mm <sup>4</sup> |
| Y <sub>cg</sub> (mm)                                | 39.29 mm                                | 44.59 mm                                | 39.29 mm                                | 38.89 mm                                | 41.93 mm                                | 38.89 mm                                |
| Z <sub>top</sub> 10 <sup>3</sup> (mm <sup>3</sup> ) | 35.32 x 10 <sup>-6</sup> m <sup>3</sup> | 32.74 x 10 <sup>-6</sup> m <sup>3</sup> | 35.32 x 10 <sup>-6</sup> m <sup>3</sup> | 42.18 x 10 <sup>-6</sup> m <sup>3</sup> | 40.25 x 10 <sup>-6</sup> m <sup>3</sup> | 42.18 x 10 <sup>-6</sup> m <sup>3</sup> |
| Z <sub>bot</sub> 10 <sup>3</sup> (mm <sup>3</sup> ) | 49.36 x 10 <sup>-6</sup> m <sup>3</sup> | 36.29 x 10 <sup>-6</sup> m <sup>3</sup> | 49.36 x 10 <sup>-6</sup> m <sup>3</sup> | 60.86 x 10 <sup>-6</sup> m <sup>3</sup> | 50.94 x 10 <sup>-6</sup> m <sup>3</sup> | 60.86 x 10 <sup>-6</sup> m <sup>3</sup> |
| I <sub>xs</sub> 10 <sup>6</sup> (mm <sup>4</sup> )  | 1.935 x 10 <sup>6</sup> mm <sup>4</sup> | varies with fs                          | 1.935 x 10 <sup>6</sup> mm <sup>4</sup> | 2.367 x 10 <sup>6</sup> mm <sup>4</sup> | varies with fs                          | 2.367 x 10 <sup>6</sup> mm <sup>4</sup> |

## Load Span Propping Tables

### 0.95 mm BMT Section Properties

| Allowable Propping Spans for 0.95 mm Sveltefloor 80 |   |                   |                        |                    |  |                   |                        | SINGLE SPAN        |
|---|---|-------------------|------------------------|--------------------|--|-------------------|------------------------|--------------------|
| Properties/metre                                    | Rigid Supports 0mm / 0mm [Primary / Secondary Deflection] |                   |                        |                    | Flexible Supports 10mm / 20mm [Primary / Secondary Deflection] |                   |                        |                    |
|   | Max Span Allowable (mm)                                   | Visible Span (mm) | Soffit Deflection (mm) | Prop Reaction (kN) | Max Span Allowable (mm)  | Visible Span (mm) | Soffit Deflection (mm) | Prop Reaction (kN) |
| 150 mm  | 4 000   | 2 860             | 30                     | 12.8               | 3 785  | 2 675             | 30                     | 13.8               |
| 160 mm  | 3 925   | 2 795             | 30                     | 13.2               | 3 715  | 2 625             | 29                     | 14.1               |
| 170 mm  | 3 860   | 2 730             | 30                     | 13.5               | 3 650  | 2 580             | 29                     | 14.3               |
| 180 mm  | 3 790   | 2 675             | 30                     | 13.8               | 3 590  | 2 535             | 28                     | 14.6               |
| 190 mm  | 3 720   | 2 625             | 30                     | 14.1               | 3 530  | 2 490             | 28                     | 14.9               |
| 200 mm  | 3 655   | 2 580             | 30                     | 14.3               | 3 475  | 2 455             | 27                     | 15.1               |

| Allowable Propping Spans for 0.95 mm Sveltefloor 80 |   |                   |                        |                    |  |                   |                        | DOUBLE / TRIPLE SPANS |
|---|---|-------------------|------------------------|--------------------|--|-------------------|------------------------|-----------------------|
| Properties/metre                                    | Rigid Supports 0mm / 0mm [Primary / Secondary Deflection] |                   |                        |                    | Flexible Supports 10mm / 20mm [Primary / Secondary Deflection] |                   |                        |                       |
|   | Max Span Allowable (mm)                                   | Visible Span (mm) | Soffit Deflection (mm) | Prop Reaction (kN) | Max Span Allowable (mm)  | Visible Span (mm) | Soffit Deflection (mm) | Prop Reaction (kN)    |
| 150 mm  | 4 375   | 3 230             | 30                     | 30.8               | 4 170  | 3 030             | 30                     | 33.6                  |
| 160 mm  | 4 305   | 3 160             | 30                     | 31.8               | 4 115  | 2 975             | 30                     | 34.6                  |
| 170 mm  | 4 235   | 3 095             | 30                     | 32.7               | 4 060  | 2 925             | 30                     | 35.5                  |
| 180 mm  | 4 175   | 3 035             | 30                     | 33.7               | 4 005  | 2 875             | 30                     | 36.4                  |
| 190 mm  | 4 115   | 2 975             | 30                     | 34.6               | 3 960  | 2 825             | 30                     | 37.4                  |
| 200 mm  | 4 060   | 2 925             | 30                     | 35.5               | refer manual   |                   |                        |                       |

### Important Note to Propping Tables

The Rigid Support [ 0mm / 0mm ] propping tables are based on the traditional propping span tables to BS5950:Part4 and are directly comparable to other manufacturers span tables.

The Flexible Support [ 10mm / 20mm ] propping tables have been calculated to be compatible with HERA REPORT R4-107:2005, and account for extra 'ponded' weight associated with the use of unpropped steel support beams. Traditional propping span tables do not account for this extra 'ponded' weight and their use under such circumstances may lead to excessive deflections or unsafe construction practices.

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## 1.15 mm BMT Section Properties

| Allowable Propping Spans for 1.15 mm BMT Sveltefloor 80 |   |                   |                        |                    |  |                   |                        | SINGLE SPAN        |
|---|---|-------------------|------------------------|--------------------|--|-------------------|------------------------|--------------------|
| Properties/metre  | Rigid Supports 0mm / 0mm [Primary / Secondary Deflection] |                   |                        |                    | Flexible Supports 10mm / 20mm [Primary / Secondary Deflection] |                   |                        |                    |
|   | Max Span Allowable (mm)                                   | Visible Span (mm) | Soffit Deflection (mm) | Prop Reaction (kN) | Max Span Allowable (mm)  | Visible Span (mm) | Soffit Deflection (mm) | Prop Reaction (kN) |
| 150 mm  | 4 200   | 3 065             | 30                     | 13.5               | 4 000  | 2 860             | 30                     | 14.6               |
| 160 mm  | 4 125   | 2 990             | 30                     | 13.9               | 3 935  | 2 805             | 30                     | 15.0               |
| 170 mm  | 4 060   | 2 925             | 30                     | 14.2               | 3 880  | 2 755             | 30                     | 15.3               |
| 180 mm  | 3 995   | 2 865             | 30                     | 14.6               | 3 830  | 2 705             | 30                     | 15.7               |
| 190 mm  | 3 940   | 2 805             | 30                     | 15.0               | 3 770  | 2 660             | 29                     | 16.0               |
| 200 mm  | 3 885   | 2 755             | 30                     | 15.3               | 3 710  | 2 620             | 29                     | 16.2               |

| Allowable Propping Spans for 1.15 mm BMT Sveltefloor 80 |   |                   |                        |                    |  |                   |                        | DOUBLE / TRIPLE SPANS |
|---|---|-------------------|------------------------|--------------------|--|-------------------|------------------------|-----------------------|
| Properties/metre  | Rigid Supports 0mm / 0mm [Primary / Secondary Deflection] |                   |                        |                    | Flexible Supports 10mm / 20mm [Primary / Secondary Deflection] |                   |                        |                       |
|   | Max Span Allowable (mm)                                   | Visible Span (mm) | Soffit Deflection (mm) | Prop Reaction (kN) | Max Span Allowable (mm)  | Visible Span (mm) | Soffit Deflection (mm) | Prop Reaction (kN)    |
| 150 mm  | 4 575   | 3 430             | 30                     | 32.8               | 4 375  | 3 230             | 30                     | 35.8                  |
| 160 mm  | 4 505   | 3 360             | 30                     | 33.8               | 4 315  | 3 175             | 30                     | 36.8                  |
| 170 mm  | 4 435   | 3 290             | 30                     | 34.8               | 4 260  | 3 120             | 30                     | 37.7                  |
| 180 mm  | 4 375   | 3 230             | 30                     | 35.8               | 4 210  | 3 070             | 30                     | 38.7                  |
| 190 mm  | 4 315   | 3 175             | 30                     | 36.8               | 4 160  | 3 020             | 30                     | 39.7                  |
| 200 mm  | 4 260   | 3 120             | 30                     | 37.7               | 4 115  | 2 975             | 30                     | 40.7                  |



## General Design of Svelte-floor 80

### Shrinkage Consideration

The degree of cracking will be determined in part by the amount of steel provided and the tensile stress within the negative reinforcement bars. Shrinkage due to restraint by the internal reinforcement and the supporting structure, should be taken into account and is required for compliance with the NZBC.

### Creep Incorporation

Composite floor design uses the notion of transformed area and modular ratio to determine the combined member properties of the steel and concrete elements.

As modular ratio values can vary between 8 and 26 depending on the nature and magnitude of loading, member properties for a large range of 'n' values are included in the Svelte-floor manual.

### Fire Reinforcement

Fire reinforcement is calculated in accordance with HERA document R4-82, and an extensive range of FRR are given within the sveltefloor manual. Sveltefloor 80 has a 30 minute FRR incorporated, without the inclusion of additional fire reinforcement.

## Svelte-floor 80 Specifications

### Materials

The concrete is required to have a minimum 28 day compressive strength of 25 MPa.

### Supporting Structure

The supporting structure shall be designed and detailed by a suitably qualified engineer.

### Installation

Svelte-floor sheets shall be stored clear of the ground. Approved conduits for electrical and water reticulation pipes may be installed prior to placement of reinforcement and slab. Penetration for plumbing etc. can be made prior to pouring the slab. Cutting of ribs should be avoided.

### Finishes

The slab shall be finished in accordance with the architectural/structural specifications.

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