## More advantages with steel decking:

- Permanent shuttering
- Can be used with lightweight or dense concrete
- Up to four hours fire resistance with exposed soffit can be designed
- Composite construction reduces steelwork frame weight
- Lower dead load reduces frame and foundation loading
- Stiffens supporting frame if steelwork used
- Cover for following trades
- Provides a safe working platform
- Easily cut and fitted to awkward shapes
- Minimal site storage requirements
- Separate panels can be manhandled into restricted access situations
- Provides the Tensile reinforcement
- Needs no (or minimal) propping
- Shear studs can be site welded 'through-deck' for composite construction
- Speeds construction programme — essential in fast-tracking
- Ceilings and services can be easily suspended using standard fixings

## First Choice For Design, Supply and Installation

The UK's leading decking company, Richard Lees Steel Decking gives you all the technical support you need and backs it up with the most experienced installation service, including through deck welding of shear studs or direct-fastening types of steel connectors.

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Detailing of Ribdeck AL decking is incorporated in 3D+ parametric structural modelling software - an integrated analysis and drafting package operating within the standard AutoCAD environment.

Supplied by CSC (UK) Ltd.
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Ribdeck AL is fully implemented in the RAM Structural System software. Engineers can quickly compare alternative designs using Richard Lees Steel Decking profiles whilst producing calculations, steel tonnages and construction drawings for structural frames.

Supplied by RAM International
Tel: +44 (0) 141 353 5168.
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The only analysis tool that can predict the damped floor response achievable with Resotec. Providing automatic stud and section design, Compos is the premiere tool for composite analysis and design.

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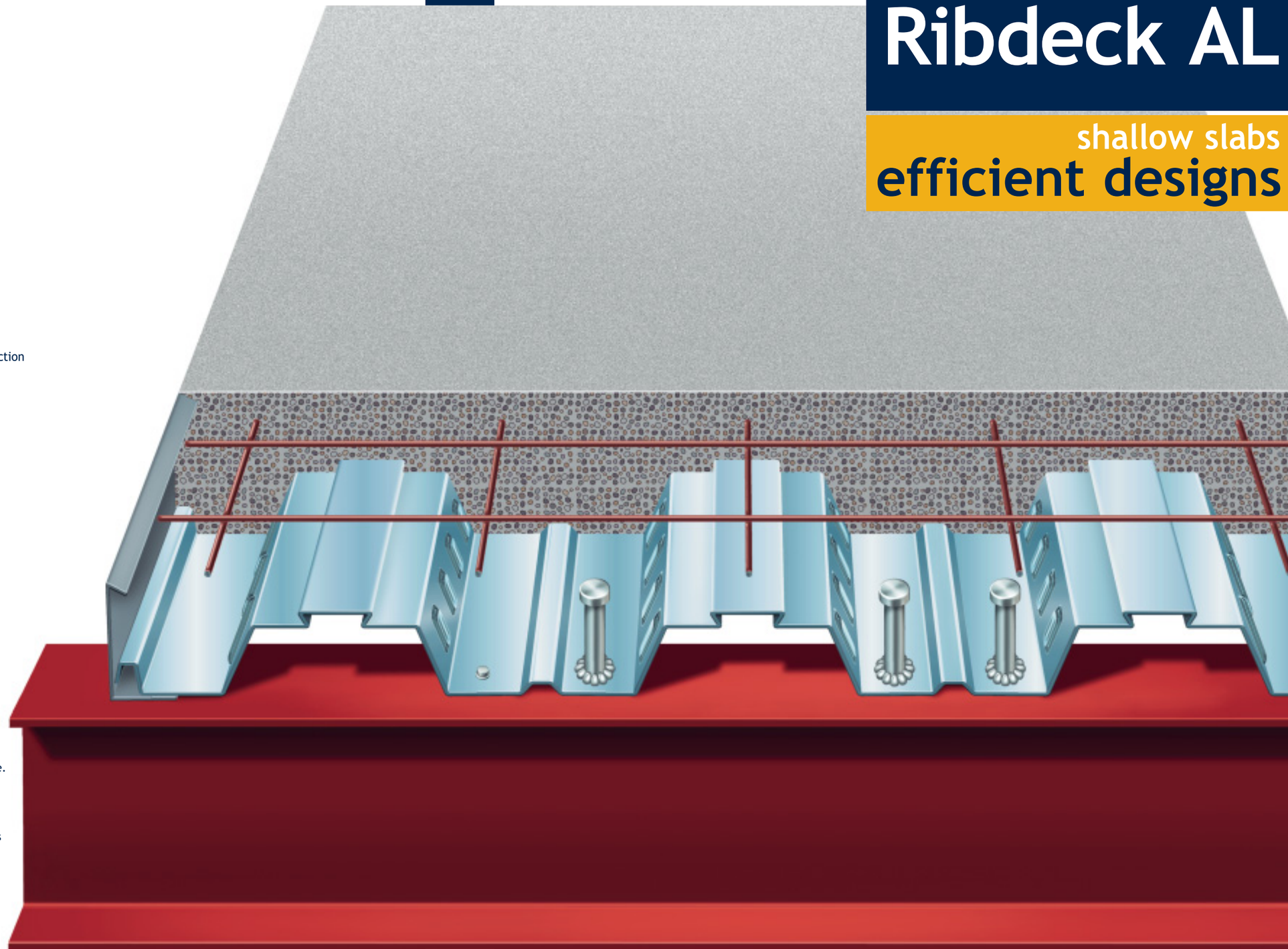
**www.rlsd.com Email: rlsd.decks@skanska.co.uk**

# Ribdeck AL

## shallow slabs efficient designs



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**RICHARD LEES** STEEL DECKING

## Practical, Effective and Strong

Designing a steel decking profile for composite action is a delicate balance between conflicting ideals. **Ribdeck AL** has been proportioned so that the concrete is used effectively to satisfy the demand for lightweight construction whilst optimising the amount of concrete in those areas where it is most needed.

## Design for Fire

**Ribdeck AL** has been designed to minimise the intrusion of the profile into the slab whilst still providing a practical level of stiffness during the critical construction stage. At only 50mm high, and with a relatively high trough to peak width ratio, composite floor slabs utilising **Ribdeck AL** can achieve the level of thermal insulation required for fire ratings of up to 4 hours. This is accomplished with shallower overall slab depths than can be realised using most other trapezoidal decking profiles available around the world.

## Composite Beam Design

For beams to be designed compositely it is necessary to provide a means of transferring shear forces between the steel support beams and concrete floor slabs. This shear transfer is most commonly achieved using through-deck welded shear studs. **Ribdeck AL** has been designed to allow shear studs welded individually or in pairs in each trough of the profile to achieve the maximum strength permitted by both British and European design codes. The proportions of the decking allow two studs to be welded in-line in each trough, a distinct advantage over other profiles. This is important when considering the design of narrow flange support beams that are commonly found where modern long span, fabricated steel sections are used.

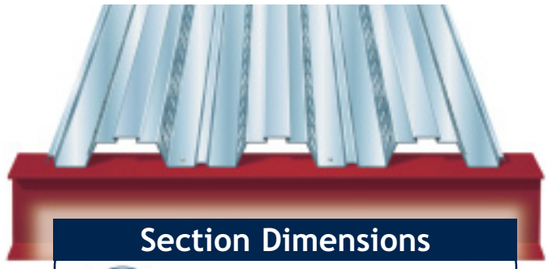
**In-Line Studs**

## Services Suspension

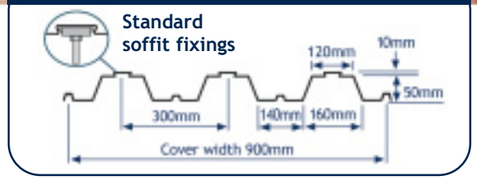
Ribdeck AL was the first of the modern generation of trapezoidal composite floor deck profiles to incorporate a suspension fixing system in the top flange. The flange is shaped to receive simple-to-fit suspension nuts that can be installed or removed at any time during the life of the structure. The wedge shaped nut used in **Ribdeck AL** is fully interchangeable with those provided for the other Richard Lees Steel Decking trapezoidal profiles, Ribdeck 80 and Ribdeck E60.

**Section Properties (per metre width)**

| Gauge mm | Self Weight kg/m² | Self Weight kN/m² | Area mm² | Inertia cm⁴ | $Y_{NA}$ mm |
|---|---|---|---|---|---|
| 0.9 | 9.5 | 0.093 | 1,171 | 67.4 | 28.0 |
| 1.0 | 10.5 | 0.103 | 1,301 | 75.2 | 28.0 |
| 1.2 | 12.6 | 0.124 | 1,570 | 90.9 | 28.0 |



**Section Dimensions**




## Ribdeck AL — Span/Load table - Normal weight concrete

| | Support Condition | Slab Depth (mm) | Concrete Volume (m³/m²) | Maximum Permissible Spans (m) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 0.9mm GAUGE IMPOSED LOAD (kN/m²) | | | | 1.0mm GAUGE IMPOSED LOAD (kN/m²) | | | | 1.2mm GAUGE IMPOSED LOAD (kN/m²) | | | | |
| | | | | * | 5.0 | 6.7 | 10.0 | * | 5.0 | 6.7 | 10.0 | * | 5.0 | 6.7 | 10.0 | |
| SINGLE | | 120 | 0.095 | 2.96 | 2.96 | 2.96 | 2.95 | 3.06 | 3.06 | 3.06 | 3.06 | 3.23 | 3.23 | 3.23 | 3.23 | SINGLE |
| | | 130 | 0.105 | 2.89 | 2.89 | 2.89 | 2.89 | 2.98 | 2.98 | 2.98 | 2.98 | 3.15 | 3.15 | 3.15 | 3.15 | |
| | | 140 | 0.115 | 2.81 | 2.81 | 2.81 | 2.81 | 2.91 | 2.91 | 2.91 | 2.91 | 3.07 | 3.07 | 3.07 | 3.07 | |
| | | 150 | 0.125 | 2.75 | 2.75 | 2.75 | 2.75 | 2.84 | 2.84 | 2.84 | 2.84 | 3.00 | 3.00 | 3.00 | 3.00 | |
| | | 175 | 0.150 | 2.61 | 2.61 | 2.61 | 2.61 | 2.70 | 2.70 | 2.70 | 2.70 | 2.85 | 2.85 | 2.85 | 2.85 | |
| | | 200 | 0.175 | 2.50 | 2.50 | 2.50 | 2.50 | 2.58 | 2.58 | 2.58 | 2.58 | 2.73 | 2.73 | 2.73 | 2.73 | |
| MULTIPLE | | 120 | 0.095 | 3.28 | 3.28 | 3.28 | 2.95 | 3.54 | 3.54 | 3.54 | 3.08 | 3.81 | 3.81 | 3.81 | 3.32 | MULTIPLE |
| | | 130 | 0.105 | 3.20 | 3.20 | 3.20 | 3.14 | 3.44 | 3.44 | 3.44 | 3.27 | 3.72 | 3.72 | 3.72 | 3.52 | |
| | | 140 | 0.115 | 3.12 | 3.12 | 3.12 | 3.12 | 3.36 | 3.36 | 3.36 | 3.36 | 3.63 | 3.63 | 3.63 | 3.63 | |
| | | 150 | 0.125 | 3.05 | 3.05 | 3.05 | 3.05 | 3.29 | 3.29 | 3.29 | 3.29 | 3.55 | 3.55 | 3.55 | 3.55 | |
| | | 175 | 0.150 | 2.88 | 2.88 | 2.88 | 2.88 | 3.12 | 3.12 | 3.12 | 3.12 | 3.37 | 3.37 | 3.37 | 3.37 | |
| | | 200 | 0.175 | 2.73 | 2.73 | 2.73 | 2.73 | 2.99 | 2.99 | 2.99 | 2.99 | 3.23 | 3.23 | 3.23 | 3.23 | |
| PROPPED | | 120 | 0.095 | 4.20 | 3.94 | 3.40 | 2.75 | 4.20 | 4.10 | 3.54 | 2.87 | 4.20 | 4.20 | 3.80 | 3.10 | PROPPED |
| | | 130 | 0.105 | 4.55 | 4.14 | 3.58 | 2.90 | 4.55 | 4.30 | 3.72 | 3.02 | 4.55 | 4.55 | 4.00 | 3.26 | |
| | | 140 | 0.115 | 4.90 | 4.34 | 3.75 | 3.05 | 4.90 | 4.51 | 3.90 | 3.18 | 4.90 | 4.83 | 4.19 | 3.42 | |
| | | 150 | 0.125 | 5.25 | 4.53 | 3.92 | 3.19 | 5.25 | 4.70 | 4.08 | 3.32 | 5.25 | 5.02 | 4.37 | 3.58 | |
| | | 175 | 0.150 | 5.74 | 4.94 | 4.31 | 3.52 | 6.13 | 5.12 | 4.47 | 3.66 | 6.13 | 5.47 | 4.79 | 3.94 | |
| | | 200 | 0.175 | 5.47 | 5.30 | 4.65 | 3.82 | 5.92 | 5.49 | 4.82 | 3.97 | 6.41 | 5.86 | 5.16 | 4.26 | |

* Denotes decking used as shuttering only.

**Notes:**

1. Spans shown assume clear span +100mm to the centreline of supports.
2. Designs are fully in accordance with BS 5950: Parts 4 & 6.
3. The dead weight of the slab has been included in the development of the spans shown. However, consideration should be given to finishes, partitions, walls, etc. when reading from the table.
4. Based upon concrete densities at wet stage: normal weight concrete 2400 kg/m³, lightweight concrete 1900 kg/m³.

## Ribdeck AL — Span/Load table - Lightweight concrete

| | Support Condition | Slab Depth (mm) | Concrete Volume (m³/m²) | Maximum Permissible Spans (m) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 0.9mm GAUGE IMPOSED LOAD (kN/m²) | | | | 1.0mm GAUGE IMPOSED LOAD (kN/m²) | | | | 1.2mm GAUGE IMPOSED LOAD (kN/m²) | | | | |
| | | | | * | 5.0 | 6.7 | 10.0 | * | 5.0 | 6.7 | 10.0 | * | 5.0 | 6.7 | 10.0 | |
| SINGLE | | 110 | 0.085 | 2.75 | 2.75 | 2.75 | 2.75 | 2.75 | 2.75 | 2.75 | 2.75 | 2.75 | 2.75 | 2.75 | 2.75 | SINGLE |
| | | 120 | 0.095 | 3.00 | 3.00 | 3.00 | 2.95 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | |
| | | 130 | 0.105 | 3.10 | 3.10 | 3.10 | 3.10 | 3.20 | 3.20 | 3.20 | 3.20 | 3.25 | 3.25 | 3.25 | 3.25 | |
| | | 150 | 0.125 | 2.95 | 2.95 | 2.95 | 2.95 | 3.05 | 3.05 | 3.05 | 3.05 | 3.23 | 3.23 | 3.23 | 3.23 | |
| | | 175 | 0.150 | 2.81 | 2.81 | 2.81 | 2.81 | 2.90 | 2.90 | 2.90 | 2.90 | 3.07 | 3.07 | 3.07 | 3.07 | |
| | | 200 | 0.175 | 2.69 | 2.69 | 2.69 | 2.69 | 2.77 | 2.77 | 2.77 | 2.77 | 2.94 | 2.94 | 2.94 | 2.94 | |
| MULTIPLE | | 110 | 0.085 | 3.30 | 3.30 | 3.30 | 2.77 | 3.30 | 3.30 | 3.30 | 2.89 | 3.30 | 3.30 | 3.30 | 3.11 | MULTIPLE |
| | | 120 | 0.095 | 3.49 | 3.49 | 3.49 | 2.95 | 3.60 | 3.60 | 3.60 | 3.08 | 3.60 | 3.60 | 3.60 | 3.32 | |
| | | 130 | 0.105 | 3.41 | 3.41 | 3.41 | 3.14 | 3.70 | 3.70 | 3.70 | 3.27 | 3.90 | 3.90 | 3.90 | 3.52 | |
| | | 150 | 0.125 | 3.27 | 3.27 | 3.27 | 3.27 | 3.53 | 3.53 | 3.53 | 3.53 | 3.81 | 3.81 | 3.81 | 3.81 | |
| | | 175 | 0.150 | 3.12 | 3.12 | 3.12 | 3.12 | 3.36 | 3.36 | 3.36 | 3.36 | 3.63 | 3.63 | 3.63 | 3.63 | |
| | | 200 | 0.175 | 2.98 | 2.98 | 2.98 | 2.98 | 3.21 | 3.21 | 3.21 | 3.21 | 3.47 | 3.47 | 3.47 | 3.47 | |
| PROPPED | | 110 | 0.085 | 3.30 | 3.30 | 3.27 | 2.63 | 3.30 | 3.30 | 3.30 | 2.75 | 3.30 | 3.30 | 3.30 | 2.96 | PROPPED |
| | | 120 | 0.095 | 3.60 | 3.60 | 3.47 | 2.79 | 3.60 | 3.60 | 3.60 | 2.91 | 3.60 | 3.60 | 3.60 | 3.14 | |
| | | 130 | 0.105 | 3.90 | 3.90 | 3.66 | 2.95 | 3.90 | 3.90 | 3.81 | 3.07 | 3.90 | 3.90 | 3.90 | 3.31 | |
| | | 150 | 0.125 | 4.50 | 4.50 | 4.04 | 3.25 | 4.50 | 4.50 | 4.19 | 3.39 | 4.50 | 4.50 | 4.50 | 3.65 | |
| | | 175 | 0.150 | 5.25 | 5.17 | 4.46 | 3.60 | 5.25 | 5.25 | 4.63 | 3.75 | 5.25 | 5.25 | 4.95 | 4.03 | |
| | | 200 | 0.175 | 5.91 | 5.58 | 4.84 | 3.92 | 6.00 | 5.78 | 5.02 | 4.08 | 6.00 | 6.00 | 5.36 | 4.38 | |

5. Concrete volumes: Figures shown in the tables are nominal values based on constant slab thickness. As with all steel decks, when ordering concrete an allowance should be made for the deflected form of the soffit and for this we suggest, as guidance, -25 mm allowance for voids +span/250 for ponding.
6. A span to depth ratio of 35:1 for normal weight and 30:1 for lightweight concrete is imposed in deriving the spans.
7. Maximum deflections are limited to span/130 after taking account of ponding.
8. Construction stage design includes a minimum allowance of 1.5kN/m² for construction loading.
9. Composite slabs are designed as simply supported irrespective of the deck support configuration. A minimum crack control and distribution mesh is required over the supports in accordance with clauses 6.7, 6.8 and 6.9 of BS5950: Part 4.
10. Decking is manufactured from material meeting the following specification: BS EN 10147-S350GD+Z275-N-A-C, i.e. yield strength = 350 N/mm².

## Mesh sizes for Simplified Fire Designs - Normal weight concrete

| | Fire Rating (Hrs) | Slab Depth (mm) | Span (m) for given Imposed Load (kN/m²) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | A142 | | | A193 | | | A252 | | | |
| | | | 5.0 | 6.7 | 10.0 | 5.0 | 6.7 | 10.0 | 5.0 | 6.7 | 10.0 | |
| NORMAL WEIGHT CONCRETE | 1.0 | 120 | 3.57 | 3.23 | 2.79 | 3.85 | 3.48 | 3.01 | 4.14 | 3.75 | 3.23 | NORMAL WEIGHT CONCRETE |
| | | 130 | 3.73 | 3.38 | 2.93 | 4.03 | 3.66 | 3.16 | 4.34 | 3.94 | 3.40 | |
| | | 140 | 3.80 | 3.46 | 3.01 | 4.12 | 3.75 | 3.25 | 4.44 | 4.04 | 3.50 | |
| | | 150 | 3.87 | 3.53 | 3.07 | 4.18 | 3.81 | 3.32 | 4.50 | 4.11 | 3.57 | |
| | | 175 | -- | -- | -- | 4.32 | 3.96 | 3.47 | 4.65 | 4.26 | 3.73 | |
| | | 200 | -- | -- | -- | 4.44 | 4.09 | 3.61 | 4.78 | 4.40 | 3.88 | |
| | 1.5 | 130 | 3.26 | 2.96 | 2.57 | 3.56 | 3.24 | 2.80 | 3.87 | 3.51 | 3.04 | |
| | | 140 | 3.40 | 3.09 | 2.69 | 3.72 | 3.39 | 2.94 | 4.05 | 3.69 | 3.20 | |
| | | 150 | 3.46 | 3.16 | 2.75 | 3.80 | 3.47 | 3.02 | 4.14 | 3.77 | 3.07 | |
| | | 175 | -- | -- | -- | 3.92 | 3.59 | 3.15 | 4.26 | 3.91 | 3.42 | |
| | | 200 | -- | -- | -- | 4.02 | 3.70 | 3.26 | 4.37 | 4.03 | 3.55 | |
| | 2.0 | 140 | 3.01 | 2.74 | 2.38 | 3.34 | 3.05 | 2.65 | 3.67 | 3.34 | 2.90 | |
| | | 150 | 3.12 | 2.85 | 2.49 | 3.48 | 3.17 | 2.76 | 3.83 | 3.49 | 3.04 | |
| | | 175 | -- | -- | -- | 3.58 | 3.28 | 2.88 | 3.95 | 3.62 | 3.17 | |
| | | 200 | -- | -- | -- | 3.66 | 3.38 | 2.98 | 4.04 | 3.72 | 3.28 | |

**Notes:**

1. Table is applicable for any construction where the mesh may act in tension over a supporting beam or wall (negative bending). This includes end bay conditions i.e. the **concrete slab** is continuous over more than one span.
2. Loads shown are unfactored working loads and should include all imposed live and dead loads, excluding only the self-weight of the slab.
3. An ultimate load factor of 1.0 is assumed throughout.
4. -- indicates that the area of mesh is less than the minimum for crack control recommended in BS5950: Part 4

## Mesh sizes for Simplified Fire Designs - Lightweight concrete

| | Fire Rating (Hrs) | Slab Depth (mm) | Span (m) for given Imposed Load (kN/m²) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | A142 | | | A193 | | | A252 | | | |
| | | | 5.0 | 6.7 | 10.0 | 5.0 | 6.7 | 10.0 | 5.0 | 6.7 | 10.0 | |
| LIGHTWEIGHT CONCRETE | 1.0 | 110 | 3.30 | 3.18 | 2.72 | 3.30 | 3.30 | 2.94 | 3.30 | 3.30 | 3.15 | LIGHTWEIGHT CONCRETE |
| | | 120 | 3.60 | 3.37 | 2.88 | 3.60 | 3.60 | 3.12 | 3.60 | 3.60 | 3.36 | |
| | | 130 | 3.88 | 3.50 | 3.01 | 3.90 | 3.80 | 3.26 | 3.90 | 3.90 | 3.52 | |
| | | 150 | 4.03 | 3.65 | 3.15 | 4.37 | 3.96 | 3.41 | 4.50 | 4.27 | 3.68 | |
| | | 175 | -- | -- | -- | 4.54 | 4.13 | 3.58 | 4.89 | 4.45 | 3.86 | |
| | | 200 | -- | -- | -- | 4.68 | 4.28 | 3.73 | 5.04 | 4.61 | 4.02 | |
| | 1.5 | 120 | 3.35 | 3.01 | 2.58 | 3.60 | 3.31 | 2.83 | 3.60 | 3.60 | 3.08 | |
| | | 130 | 3.52 | 3.17 | 2.73 | 3.87 | 3.49 | 3.00 | 3.90 | 3.81 | 3.27 | |
| | | 150 | 3.64 | 3.30 | 2.85 | 4.01 | 3.63 | 3.13 | 4.38 | 3.96 | 3.42 | |
| | | 175 | -- | -- | -- | 4.14 | 3.77 | 3.27 | 4.52 | 4.12 | 3.57 | |
| | | 200 | -- | -- | -- | 4.26 | 3.89 | 3.40 | 4.65 | 4.25 | 3.71 | |
| | 2.0 | 130 | 3.18 | 2.87 | 2.47 | 3.55 | 3.20 | 2.75 | 3.90 | 3.53 | 3.03 | |
| | | 150 | 3.33 | 3.02 | 2.61 | 3.73 | 3.38 | 2.91 | 4.12 | 3.73 | 3.22 | |
| | | 175 | -- | -- | -- | 3.84 | 3.49 | 3.03 | 4.24 | 3.86 | 3.35 | |
| | | 200 | -- | -- | -- | 3.93 | 3.59 | 3.14 | 4.34 | 3.97 | 3.46 | |

5. Mesh should satisfy the minimum elongation requirement given in BS4449: 1988.
6. For conditions outside the scope of the simplified tables, including all isolated spans, consult SCI publication 56 (2nd edition) or RLSD's Deckspan software.