

3. Deck span and beam selector tables

Selector tables are for use by experienced structural engineers for initial design purposes only. They give approximate sizes of beams that should be verified at the design stage by a more rigorous approach.

The tables indicate the performance of ComFlor 225 decking, Asymmetric Slimflor Beams and RHSFBs for typical building load and span requirements, across the effective range of the Slimdek system.

It is important that the beam design is checked for compatibility with the deck design. The tables are based on the minimum slab depth acceptable in each case. If the slab depth is increased then the beam size may have to be increased above that shown in the tables.

For detailed design guidance refer to the following SCI publications:

SCI-P-169: Design of RHS Slimflor edge beams^[18]

SCI-P-175: Design of Asymmetric Slimflor Beams using deep composite decking^[19]

SCI-P-248: Design of Slimflor fabricated beams using deep composite decking^[23]

The following tables are provided:

| Table | Fire resistance | Concrete type | Imposed load |
|---|-----------------|------------------------------|--------------------------|
| ComFlor 225 decking | | | |
| Table 3.1 | 60 min | Lightweight Concrete (LWC) | 2.5 kN/m ² LL |
| Table 3.2 | 60 min | Normal Weight Concrete (NWC) | 2.5 kN/m ² LL |
| Table 3.3 | 60 min | Lightweight Concrete (LWC) | 4.0 kN/m ² LL |
| Table 3.4 | 60 min | Normal Weight Concrete (NWC) | 4.0 kN/m ² LL |
| Asymmetric Slimflor Beams with ComFlor 225 decking | | | |
| Table 3.5 | 60 min | Lightweight Concrete (LWC) | 2.5 kN/m ² LL |
| Table 3.6 | 60 min | Normal Weight Concrete (NWC) | 2.5 kN/m ² LL |
| Table 3.7 | 60 min | Lightweight Concrete (LWC) | 4.0 kN/m ² LL |
| Table 3.8 | 60 min | Normal Weight Concrete (NWC) | 4.0 kN/m ² LL |
| Table 3.9 | 30 min | Lightweight Concrete (LWC) | 2.5 kN/m ² LL |
| Table 3.10 | 30 min | Normal Weight Concrete (NWC) | 2.5 kN/m ² LL |
| Table 3.11 | 30 min | Lightweight Concrete (LWC) | 4.0 kN/m ² LL |
| Table 3.12 | 30 min | Normal Weight Concrete (NWC) | 4.0 kN/m ² LL |
| RHSFBs with ComFlor 225 decking | | | |
| Table 3.13 | 60 min | Lightweight Concrete (LWC) | 2.5 kN/m ² LL |
| Table 3.14 | 60 min | Normal Weight Concrete (NWC) | 2.5 kN/m ² LL |
| Table 3.15 | 60 min | Lightweight Concrete (LWC) | 4.0 kN/m ² LL |
| Table 3.16 | 60 min | Normal Weight Concrete (NWC) | 4.0 kN/m ² LL |

NB A partition load of 1kN/m² has been included in addition to the imposed load in all the above tables

3.1 ComFlor 225 span tables

General

- Composite design
- ComFlor 225 decking 1.25mm thick in S350 steel
- Decking is propped or unpropped, as noted
- No service openings are provided
- Bar reinforcement grade B500A deformed type 2 conforming to BS 4449

Design assumptions

Light Weight Concrete (LWC)

| | |
|--------------------------------------|----------------------------|
| Characteristic strength | 30 N/mm ² |
| Exposure condition | Mild (heated building) |
| Concrete depth | 60mm min above steel deck |
| Wet density | 1900 kg/m ³ |
| Dry density | 1800 kg/m ³ |
| Modular ratio | 15 |
| Mesh reinforcement | A142 (minimum requirement) |
| Yield strength of mesh reinforcement | 500 N/mm ² |

Normal Weight Concrete (NWC)

| | |
|---------------------------------------|----------------------------|
| Characteristic Strength | 30 N/mm ² |
| Exposure condition | Mild (heated building) |
| Concrete depth | 70mm min above steel deck |
| Wet density | 2400 kg/m ³ |
| Dry density | 2350 kg/m ³ |
| Modular ratio | 10 |
| Mesh reinforcement | A142 (minimum requirement) |
| Yield strength of mesh reinforcement: | 500 N/mm ² |

Loads Acting On Beam

| | |
|--|---|
| Occupancy imposed loads | 2.5 kN/m ² or 4.0 kN/m ² as shown on tables |
| Partition loads | 1.0 kN/m ² |
| Ceilings, services and finishes | 0.5 kN/m ² |
| Construction load | 1.5 kN/m ² over a 3m length: 0.75kN/m ² elsewhere |
| Deck weight | 0.2 kN/m ² |
| Ponding due to deck deflection has been taken into account | |

Fire Data

| | |
|--|-------------------------------------|
| Fire resistance period | 60 min or 30 min as shown in tables |
| Proportion of imposed load considered as non-permanent | 100% |
| Additional fire protection | NOT provided or required |

Partial Safety Factors

| | |
|--|-----|
| Dead (self weight) | 1.4 |
| Imposed | 1.6 |
| Super imposed dead (partitions & services) | 1.4 |

Deflection Limits

| | |
|---|-----------------------|
| Construction stage | L/130 or 30mm maximum |
| Composite stage: Imposed load | L/350 or 20mm maximum |
| Composite stage: Superimposed dead load plus imposed load | L/250 or 30mm maximum |

Frequency Limit

| | |
|---|------|
| Natural frequency limit (unless noted otherwise on the table) | 5 Hz |
|---|------|

ComFlor 225 span tables

| Table 3.1 60 min fire resistance, Light Weight Concrete (LWC), 2.5 kN/m ² LL | | | | | | | | | |
|---|-----------|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Slab Depth (mm) | | 290 | 300 | 310 | 320 | 330 | 340 | 350 | 360 |
| Slab Weight (kN/m ²) | | 2.7 | 2.89 | 3.08 | 3.27 | 3.46 | 3.65 | 3.84 | 4.03 |
| Bar dia (mm) | Props | Span limit (m) for s = simply supported, p = partial continuity | | | | | | | |
| 16 | Unpropped | 6.3 | 6.2 | 6.1 | 6.0 | 5.8 | 5.7 | 5.6 | 5.5 |
| | 1 | 7.0 s L | 7.0 s L | 7.1 s L | 7.1 s L | 7.2 s L | 7.2 s L | 7.1 L | 6.8 L |
| | | 7.6 p L | 7.6 p L | 7.7 p L | 7.8 p L | 7.7 p L | 7.4 p L | | |
| | 2 | 7.0 s L | 7.0 s L | 7.1 s L | 7.1 s L | 7.2 s L | 7.2 s L | 7.3 s L | 7.3 s L |
| | | 7.6 p L | 7.7 p L | 7.7 p L | 7.8 p L | 7.9 p L | 7.9 p L | 7.9 p L | 8.0 p L |
| | 20 | Unpropped | 6.3 | 6.2 | 6.1 | 6.0 | 5.8 | 5.7 | 5.6 |
| 1 | | 7.5 s L | 7.6 s L | 7.6 s L | 7.7 s L | 7.7 L | 7.4 L | 7.1 L | 6.8 L |
| | | 7.9 p L | 8.1 p L | 8.2 p L | 8.0 p L | | | | |
| 2 | | 7.5 s L | 7.6 s L | 7.6 s L | 7.7 s L | 7.8 s L | 7.9 s L | 7.9 s L | 8.0 s L |
| | | 8.0 p L | 8.1 p L | 8.2 p L | 8.3 p L | 8.5 p L | 8.6 p L | 8.7 p L | 8.7 p L |
| 25 | | Unpropped | 6.3 | 6.2 | 6.1 | 6.0 | 5.8 | 5.7 | 5.6 |
| | 1 | 7.7 s | 7.8 s | 7.9 s L | 8.0 L | 7.7 L | 7.4 L | 7.1 | 6.8 |
| | | 8.2 p L | 8.3 p L | 8.4 p L | | | | | |
| | 2 | 7.7 s | 7.8 s | 7.9 s L | 8.0 s L | 8.0 s L | 8.1 s L | 8.2 s L | 8.3 s L |
| | | 8.2 p L | 8.3 p L | 8.5 p L | 8.6 p L | 8.7 p L | 8.8 p L | 8.9 p L | 9.0 p L |
| | 32 | Unpropped | 6.3 | 6.2 | 6.1 | 6.0 | 5.8 | 5.7 | 5.6 |
| 1 | | 8.0 s | 8.1 s | 8.2 s | 8.0 | 7.7 | 7.4 | 7.1 | 6.8 |
| | | 8.5 p | 8.6 p L | 8.4 p L | | | | | |
| 2 | | 8.0 s | 8.2 s | 8.2 s | 8.3 s | 8.4 s L | 8.5 s L | 8.6 s L | 8.6 s L |
| | | 8.5 p | 8.7 p L | 8.8 p L | 8.9 p L | 9.1 p L | 9.2 p L | 9.3 p L | 9.4 p L |

| Table 3.2 60 min fire resistance, Normal Weight Concrete (NWC), 2.5 kN/m ² LL | | | | | | | | | |
|--|-----------|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Slab Depth (mm) | | 290 | 300 | 310 | 320 | 330 | 340 | 350 | 360 |
| Slab Weight (kN/m ²) | | - | 3.51 | 3.75 | 3.98 | 4.22 | 4.45 | 4.69 | 4.93 |
| Bar dia (mm) | Props | Span limit (m) for s = simply supported, p = partial continuity | | | | | | | |
| 16 | Unpropped | - | 5.7 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 | 5.1 |
| | 1 | - | 6.7 s | 6.7 s | 6.7 s L | 6.5 L | 6.2 | 6.0 | 5.7 |
| | | - | 7.2 p L | 7.2 p L | 6.8 p L | | | | |
| | 2 | - | 6.7 s | 6.7 s | 6.7 s L | 6.8 s L | 6.8 s L | 6.8 s L | 6.8 s L |
| | | - | 7.2 p L | 7.3 p L | 7.3 p L | 7.3 p L | 7.4 p L | 7.4 p L | 7.4 p L |
| | 20 | Unpropped | - | 5.7 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 |
| 1 | | - | 7.4 s | 7.2 | 6.8 | 6.5 | 6.2 | 6.0 | 5.7 |
| | | - | 7.5 p L | | | | | | |
| 2 | | - | 7.4 s | 7.5 s L | 7.5 s L | 7.6 s L | 7.6 s L | 7.7 s L | 7.8 s L |
| | | - | 8.1 p L | 8.2 p L | 8.2 p L | 8.3 p L | 8.4 p L | 8.4 p L | 8.5 p L |
| 25 | | Unpropped | - | 5.7 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 |
| | 1 | - | 7.5 | 7.2 | 6.8 | 6.5 | 6.2 | 6.0 | 5.7 |
| | | - | 8.3 p L | 8.4 p L | 8.5 p L | 8.6 p L | 8.6 p L | 8.7 p L | 8.8 p L |
| | 2 | - | 7.6 s | 7.7 s | 7.8 s L | 7.8 s L | 7.9 s L | 8.0 s L | 8.0 s L |
| | | - | 8.3 p L | 8.4 p L | 8.5 p L | 8.6 p L | 8.6 p L | 8.7 p L | 8.8 p L |
| | 32 | Unpropped | - | 5.7 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 |
| 1 | | - | 7.5 | 7.2 | 6.8 | 6.5 | 6.2 | 6.0 | 5.7 |
| | | - | 8.0 s | 8.1 s | 8.2 s | 8.2 s | 8.3 s L | 8.4 s L | 8.4 s L |
| 2 | | - | 8.0 s | 8.1 s | 8.2 s | 8.2 s | 8.3 s L | 8.4 s L | 8.4 s L |
| | | - | 8.7 p | 8.8 p L | 9.0 p L | 9.0 p L | 9.1 p L | 9.1 p L | 9.0 p L |

Notes:

- Maximum beam centres = span limit + B1 + B2 less 50mm where B1 and B2 are the distances from the centre-line of each support beam to the tip of support respectively.
- Unfactored slab weight = concrete + deck + an allowance for reinforcement.
- Unpropped deck spans are based on the construction stage design.
- L denotes L-bar anchorage.
- U denotes U-bar anchorage.
- p denotes partial end fixity has been assumed to meet serviceability limits (*top reinforcement required at support – see 2.2.3*).
- s denotes simply supported span.

Deck span and beam selector tables

ComFlor 225 span tables

| Table 3.3 60 min fire resistance, Light Weight Concrete (LWC), 4.0 kN/m ² LL | | | | | | | | | | |
|---|--------------------|---|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Slab Depth (mm) | | 290 | 300 | 310 | 320 | 330 | 340 | 350 | 360 | |
| Slab Weight (kN/m ²) | | 2.70 | 2.89 | 3.08 | 3.27 | 3.46 | 3.65 | 3.84 | 4.03 | |
| Bar dia (mm) | Props | Span limit (m) for s = simply supported, p = partial continuity | | | | | | | | |
| 16 | Unpropped | 6.2 s L 6.3 p L | 6.2 L | 6.1 L | 6.0 L | 5.8 L | 5.7 L | 5.6 L | 5.5 L | |
| | 1 | 6.4 s L 6.9 p L | 6.4 s L 7.0 p L | 6.5 s L 7.1 p L | 6.5 s L 7.1 p L | 6.6 s L 7.2 p L | 6.7 s L 7.3 p L | 6.7 s L 7.1 p L | 6.7 s L 6.8 p L | |
| | | 2 | 6.4 s L 7.0 p L | 6.4 s L 7.0 p L | 6.5 s L 7.1 p L | 6.5 s L 7.2 p L | 6.6 s L 7.2 p L | 6.7 s L 7.3 p L | 6.7 s L 7.3 p L | 6.8 s L 7.4 p L |
| | 20 | | Unpropped | 6.3 L | 6.2 L | 6.1 L | 6.0 L | 5.8 L | 5.7 L | 5.6 L |
| | | 1 | 7.1 s L 7.6 p L | 7.3 s L 7.7 p L | 7.4 s L 7.8 p L | 7.5 s L 7.9 p L | 7.6 s L 7.7 p L | 7.4 L | 7.1 L | 6.8 L |
| | 2 | | 7.2 s L 7.6 p L | 7.3 s L 7.7 p L | 7.4 s L 7.8 p L | 7.5 s L 7.9 p L | 7.6 s L 8.1 p L | 7.7 s L 8.2 p L | 7.9 s L 8.3 p L | 7.9 s L 8.4 p L |
| 25 | | Unpropped | 6.3 L | 6.2 L | 6.1 L | 6.0 L | 5.8 | 5.7 | 5.6 | 5.5 |
| | 7.3 s L 7.8 p L | | 7.5 s L 7.9 p L | 7.6 s L 8.0 p L | 7.7 s L 8.0 p L | 7.7 s L 7.9 p L | 7.4 L | 7.1 L | 6.8 L | |
| | 1 | 7.4 s L 7.8 p L | 7.5 s L 7.9 p L | 7.6 s L 8.1 p L | 7.7 s L 8.2 p L | 7.9 s L 8.3 p L | 8.0 s L 8.4 p L | 8.1 s L 8.6 p L | 8.2 s L 8.7 p L | |
| | | 2 | 7.4 s L 7.8 p L | 7.5 s L 7.9 p L | 7.6 s L 8.1 p L | 7.7 s L 8.2 p L | 7.9 s L 8.3 p L | 8.0 s L 8.4 p L | 8.1 s L 8.6 p L | 8.2 s L 8.7 p L |
| | 32 | | Unpropped | 6.3 | 6.2 | 6.1 | 6.0 | 5.8 | 5.7 | 5.6 |
| | | 1 | 7.6 s L 8.1 p L | 7.8 s L 8.2 p L | 7.9 s L 8.4 p L | 8.0 L | 7.7 L | 7.4 L | 7.1 L | 6.8 L |
| 2 | 7.6 s L 8.1 p L | | 7.8 s L 8.2 p L | 7.9 s L 8.4 p L | 8.1 s L 8.5 p L | 8.2 s L 8.7 p L | 8.3 s L 8.8 p L | 8.4 s L 8.9 p L | 8.6 s L 9.0 p L | |

| Table 3.4 60 min fire resistance, Normal Weight Concrete (NWC), 4.0 kN/m ² LL | | | | | | | | | | |
|--|-----------|---|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Slab Depth (mm) | | 290 | 300 | 310 | 320 | 330 | 340 | 350 | 360 | |
| Slab Weight (kN/m ²) | | - | 3.51 | 3.75 | 3.98 | 4.22 | 4.45 | 4.69 | 4.93 | |
| Bar dia (mm) | Props | Span limit (m) for s = simply supported, p = partial continuity | | | | | | | | |
| 16 | Unpropped | - | 5.7 L | 5.6 L | 5.5 L | 5.4 L | 5.3 L | 5.2 L | 5.1 L | |
| | 1 | - | 6.1 s L 6.6 p L | 6.2 s L 6.7 p L | 6.2 s L 6.7 p L | 6.3 s L 6.5 p L | 6.2 L | 6.0 L | 5.7 L | |
| | | 2 | - | 6.1 s L 6.7 p L | 6.2 s L 6.7 p L | 6.2 s L 6.8 p L | 6.3 s L 6.8 p L | 6.3 s L 6.8 p L | 6.3 s L 6.9 p L | 6.4 s L 6.9 p L |
| | 20 | | Unpropped | - | 5.7 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 |
| | | 1 | - | 7.3 s L 7.5 p L | 7.2 L | 6.8 L | 6.5 L | 6.2 L | 6.0 L | 5.7 L |
| | 2 | | - | 7.3 s L 7.7 p L | 7.4 s L 7.8 p L | 7.5 s L 7.9 p L | 7.5 s L 8.1 p L | 7.6 s L 8.2 p L | 7.7 s L 8.3 p L | 7.7 s L 8.4 p L |
| 25 | | Unpropped | - | 5.7 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 | 5.1 |
| | - | | 7.5 L 7.9 p L | 7.2 L 8.1 p L | 6.8 L 8.2 p L | 6.5 L 8.3 p L | 6.2 8.4 p L | 6.0 8.5 p L | 5.7 8.7 p L | |
| | 1 | - | 7.5 L 7.9 p L | 7.6 s L 8.1 p L | 7.7 s L 8.2 p L | 7.8 s L 8.3 p L | 7.8 s L 8.4 p L | 7.9 s L 8.5 p L | 8.0 s L 8.7 p L | |
| | | 2 | - | 7.5 s L 7.9 p L | 7.6 s L 8.1 p L | 7.7 s L 8.2 p L | 7.8 s L 8.3 p L | 7.8 s L 8.4 p L | 7.9 s L 8.5 p L | 8.0 s L 8.7 p L |
| | 32 | | Unpropped | - | 5.7 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 |
| | | 1 | - | 7.5 L 8.3 p L | 7.2 L 8.4 p L | 6.8 8.6 p L | 6.5 8.7 p L | 6.2 8.8 p L | 6.0 8.9 p L | 5.7 9.0 p L |
| 2 | - | | 7.5 L 8.3 p L | 7.6 s L 8.4 p L | 7.7 s L 8.6 p L | 7.8 s L 8.7 p L | 7.8 s L 8.8 p L | 7.9 s L 8.9 p L | 8.0 s L 9.0 p L | |

Notes:

- Maximum beam centres = span limit + B1 + B2 less 50mm where B1 and B2 are the distances from the centre-line of each support beam to the top of support respectively.
- Unfactored slab weight = concrete + deck + an allowance for reinforcement.
- Unpropped deck spans are based on the construction stage design.
- L denotes L-bar anchorage.
- U denotes U-bar anchorage.
- p denotes partial end fixity has been assumed to meet serviceability limits (*top reinforcement required at support – see 2.2.3*).
- s denotes simply supported span.

3.2 ASB selector tables

General

- Composite design
- All beams have been designed using grade S355 to BS EN 10025-2⁽⁴⁾
- All beams are unpropped unless noted by suffix
- All beams have been designed assuming ComFlor 225 deck is used
- Decking is assumed to be propped in construction as necessary
- Decking spans perpendicular to beam on both sides i.e., internal beam
- No service holes are provided in ASB web (refer to design software)

Design assumptions

Light Weight Concrete (LWC)

| | |
|--------------------------------------|---|
| Characteristic strength | 30 N/mm ² |
| Exposure condition | Mild (heated building) |
| Concrete depth | 30mm min above ASB or 60mm above steel deck |
| Wet density | 1900 kg/m ³ |
| Dry density | 1800 kg/m ³ |
| Modular ratio | 15 |
| Mesh reinforcement | A142 (minimum requirement) |
| Yield strength of mesh reinforcement | 500 N/mm ² |

Normal Weight Concrete (NWC)

| | |
|--------------------------------------|---|
| Characteristic strength | 30 N/mm ² |
| Exposure condition | Mild (heated building) |
| Concrete depth | 40mm min above ASB or 70mm min above steel deck |
| Wet density | 2400 kg/m ³ |
| Dry density | 2350 kg/m ³ |
| Modular ratio | 10 |
| Mesh reinforcement | A142 (minimum requirement) |
| Yield strength of mesh reinforcement | 500 N/mm ² |

Loads Acting On Beam

| | |
|--|---|
| Occupancy imposed loads | 2.5 kN/m ² or 4.0 kN/m ² as shown on tables |
| Partition loads | 1.0 kN/m ² |
| Ceilings, services and finishes | 0.5 kN/m ² |
| Construction load | 0.5 kN/m ² |
| Deck weight | 0.2 kN/m ² |
| BS 6399 imposed load reduction has been utilised | |
| Ponding due to deck deflection has NOT been taken into account | |

Fire Data

| | |
|--|-------------------------------------|
| Fire resistance period | 60 min or 30 min as shown in tables |
| Proportion of imposed load considered as non-permanent | 100% |
| Additional fire protection | NOT provided or required |

Partial Safety Factors

| | |
|--|-----|
| Dead (self weight) | 1.4 |
| Imposed | 1.6 |
| Super imposed dead (partitions & services) | 1.4 |

Deflection Limits (internal beams only)

| | |
|-------------------------------|-------|
| Imposed load deflection limit | L/360 |
| Total load deflection limit | L/200 |

Frequency Limit

| | |
|---|------|
| Natural frequency limit (unless noted otherwise on the table) | 4 Hz |
|---|------|

ASB selector tables

Table 3.5 60 min fire resistance, Light Weight Concrete (LWC), 2.5 kN/m² LL

| Beam spacing (m) | Beam span (m) | | | | | |
|------------------|-------------------|-------------------|-------------------|---------------------|---------------------|---------------|
| | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 |
| 5.0 | 280 ASB 74 | 280 ASB 74 | 280 ASB(FE) 100 | 280 ASB(FE) 100 f | 300 ASB(FE) 153 | 300 ASB 155 f |
| 6.0 | 280 ASB 74 | 280 ASB(FE) 100 | 280 ASB(FE) 100 | 280 ASB(FE) 136 | 300 ASB 155 | 300 ASB 196 f |
| 7.0 | 280 ASB 74 p | 280 ASB(FE) 100 p | 280 ASB(FE) 100 p | 280 ASB(FE) 136 p f | 300 ASB(FE) 185 p f | NSA |
| 8.0 | 280 ASB 74 p | 280 ASB(FE) 100 p | 280 ASB(FE) 136 p | 300 ASB(FE) 153 p | 300 ASB 196 p | NSA |
| 9.0 | 280 ASB(FE) 100 p | 280 ASB(FE) 100 p | 280 ASB(FE) 136 p | 300 ASB(FE) 153 p f | 300 ASB(FE) 249 p | NSA |

Table 3.6 60 min fire resistance, Normal Weight Concrete (NWC), 2.5 kN/m² LL

| Beam spacing (m) | Beam span (m) | | | | | |
|------------------|-------------------|-------------------|-------------------|---------------------|---------------------|-----------------|
| | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 |
| 5.0 | 280 ASB 74 | 280 ASB 74 | 280 ASB(FE) 100 | 280 ASB 124 | 300 ASB(FE) 153 f | 300 ASB 196 |
| 6.0 | 280 ASB 74 | 280 ASB(FE) 100 | 280 ASB(FE) 100 | 280 ASB(FE) 136 f | 300 ASB(FE) 153 p f | 300 ASB 196 p f |
| 7.0 | 280 ASB 74 p | 280 ASB(FE) 100 p | 280 ASB(FE) 136 p | 280 ASB(FE) 136 p f | 300 ASB(FE) 185 p f | NSA |
| 8.0 | 280 ASB(FE) 100 p | 280 ASB(FE) 100 p | 280 ASB(FE) 136 p | 300 ASB(FE) 153 p f | 300 ASB(FE) 249 p | NSA |
| 9.0 | 280 ASB(FE) 100 p | 280 ASB 124 p | 280 ASB(FE) 136 p | 300 ASB(FE) 185 p | 300 ASB(FE) 249 p f | NSA |

Table 3.7 60 min fire resistance, Light Weight Concrete (LWC), 4.0 kN/m² LL

| Beam spacing (m) | Beam span (m) | | | | | |
|------------------|-------------------|----------------------|-------------------|---------------------|----------------------|----------------------|
| | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 |
| 5.0 | 280 ASB 74 | 280 ASB(FE) 100 | 280 ASB(FE) 100 | 280 ASB(FE) 136 | 300 ASB 155 | 300 ASB 196 f |
| 6.0 | 280 ASB 74 | 280 ASB(FE) 100 | 280 ASB(FE) 100 f | 300 ASB(FE) 153 | 300 ASB(FE) 185 f | 300 ASB(FE) 196 pp f |
| 7.0 | 280 ASB 74 p | 280 ASB(FE) 100 p | 280 ASB(FE) 136 p | 300 ASB(FE) 153 p f | 300 ASB 196 p | NSA |
| 8.0 | 280 ASB(FE) 100 p | 280 ASB(FE) 100 p \$ | 280 ASB(FE) 136 p | 300 ASB(FE) 185 p | 300 ASB(FE) 249 p | NSA |
| 9.0 | 280 ASB(FE) 100 p | 280 ASB(FE) 136 p | 300 ASB(FE) 153 p | 300 ASB(FE) 185 p f | 300 ASB(FE) 249 pp f | NSA |

Table 3.8 60 min fire resistance, Normal Weight Concrete (NWC), 4.0 kN/m² LL

| Beam spacing (m) | Beam span (m) | | | | | |
|------------------|-------------------|-------------------|-------------------|---------------------|----------------------|---------------------|
| | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 |
| 5.0 | 280 ASB 74 | 280 ASB(FE) 100 | 280 ASB(FE) 100 | 280 ASB(FE) 136 | 300 ASB(FE) 153 | 300 ASB 196 f |
| 6.0 | 280 ASB 74 | 280 ASB(FE) 100 | 280 ASB(FE) 136 | 300 ASB(FE) 136 p f | 300 ASB 185 p f | 300 ASB(FE) 249 p f |
| 7.0 | 280 ASB(FE) 100 p | 280 ASB(FE) 100 p | 280 ASB(FE) 136 p | 300 ASB(FE) 153 p f | 300 ASB(FE) 249 p | NSA |
| 8.0 | 280 ASB(FE) 100 p | 280 ASB(FE) 136 p | 300 ASB(FE) 153 p | 300 ASB(FE) 185 p f | 300 ASB(FE) 249 p f | NSA |
| 9.0 | 280 ASB(FE) 100 p | 280 ASB(FE) 136 p | 300 ASB(FE) 153 p | 300 ASB(FE) 249 p | 300 ASB(FE) 249 pp f | NSA |

Notes:

- p Deck is propped during construction
- pp Both deck and beam are propped
- f 10% end fixity assumed (Flush Type B or extended end plate required)
- \$ Reinforcement anchored over or through the beam required for torsion resistance
- NSA No Section Available

ASB selector tables

Table 3.9 30 min fire resistance, Light Weight Concrete (LWC), 2.5 kN/m² LL

| Beam spacing (m) | Beam span (m) | | | | | |
|------------------|---------------|-----------------|------------------------|---------------------|-----------------|---------------|
| | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 |
| 5.0 | 280 ASB 74 | 280 ASB 74 | 280 ASB 74 | 280 ASB(FE) 100 f | 280 ASB 124 f | 300 ASB 155 f |
| 6.0 | 280 ASB 74 | 280 ASB 74 | 280 ASB(FE) 100 | 280 ASB 105 f | 300 ASB 155 | 300 ASB 196 f |
| 7.0 | 280 ASB 74 p | 280 ASB 74 p | 280 ASB(FE) 100 p | 280 ASB 124 p | 300 ASB 155 p f | NSA |
| 8.0 | 280 ASB 74 p | 280 ASB 74 p \$ | 280 ASB(FE) 100 p f \$ | 300 ASB(FE) 153 p | 300 ASB 196 p | NSA |
| 9.0 | 280 ASB 74 p | 280 ASB 74 p \$ | 280 ASB 105 p | 300 ASB(FE) 153 p f | 300 ASB 196 p f | NSA |

Table 3.10 30 min fire resistance, Normal Weight Concrete (NWC), 2.5 kN/m² LL

| Beam spacing (m) | Beam span (m) | | | | | |
|------------------|---------------|-----------------|---------------------|---------------------|---------------------|-------------------|
| | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 |
| 5.0 | 280 ASB 74 | 280 ASB 74 | 280 ASB(FE) 100 | 280 ASB 105 | 300 ASB(FE) 153 f | 300 ASB 196 |
| 6.0 | 280 ASB 74 | 280 ASB 74 | 280 ASB(FE) 100 | 280 ASB 124 | 300 ASB 155 f | 300 ASB(FE) 249 f |
| 7.0 | 280 ASB 74 p | 280 ASB 74 p | 280 ASB(FE) 100 p | 280 ASB 124 p f | 300 ASB 155 p f | NSA |
| 8.0 | 280 ASB 74 p | 280 ASB 74 p \$ | 280 ASB(FE) 100 p f | 300 ASB(FE) 153 p f | 300 ASB 196 p | NSA |
| 9.0 | 280 ASB 74 p | 280 ASB 74 p \$ | 280 ASB 105 p f | 300 ASB 155 p | 300 ASB(FE) 249 p f | NSA |

Table 3.11 30 min fire resistance, Light Weight Concrete (LWC), 4.0 kN/m² LL

| Beam spacing (m) | Beam span (m) | | | | | |
|------------------|-----------------|----------------------|--------------------|---------------------|----------------------|-------------------|
| | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 |
| 5.0 | 280 ASB 74 | 280 ASB 74 | 280 ASB 74 f \$ | 280 ASB 105 f | 300 ASB 155 | 300 ASB 196 f |
| 6.0 | 280 ASB 74 | 280 ASB 74 \$ | 280 ASB(FE) 100 f | 280 ASB 124 f | 300 ASB(FE) 185 f | 300 ASB(FE) 249 f |
| 7.0 | 280 ASB 74 p | 280 ASB 74 p \$ | 280 ASB 105 p | 300 ASB(FE) 153 p f | 300 ASB 196 p | NSA |
| 8.0 | 280 ASB 74 p | 280 ASB 74 p \$ | 280 ASB 105 p f \$ | 300 ASB 155 p | 300 ASB 196 p f | NSA |
| 9.0 | 280 ASB 74 p \$ | 280 ASB(FE) 100 p \$ | 280 ASB 124 p f | 300 ASB(FE) 185 p f | 300 ASB(FE) 249 pp f | NSA |

Table 3.12 30 min fire resistance, Normal Weight Concrete (NWC), 4.0 kN/m² LL

| Beam spacing (m) | Beam span (m) | | | | | |
|------------------|-----------------|----------------------|--------------------|---------------------|----------------------|---------------------|
| | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 |
| 5.0 | 280 ASB 74 | 280 ASB 74 | 280 ASB(FE) 100 | 280 ASB 105 f | 300 ASB 155 | 300 ASB 196 f |
| 6.0 | 280 ASB 74 | 280 ASB 74 \$ | 280 ASB(FE) 100 f | 300 ASB(FE) 153 | 300 ASB 155 p f | 300 ASB(FE) 249 p f |
| 7.0 | 280 ASB 74 p | 280 ASB 74 p \$ | 280 ASB 105 p | 300 ASB(FE) 153 p f | 300 ASB 196 p | NSA |
| 8.0 | 280 ASB 74 p \$ | 280 ASB 74 p \$ | 280 ASB 105 p f \$ | 300 ASB 155 p f | 300 ASB(FE) 249 p f | NSA |
| 9.0 | 280 ASB 74 p \$ | 280 ASB(FE) 100 p \$ | 280 ASB 124 p f | 300 ASB 196 p | 300 ASB(FE) 249 pp f | NSA |

Notes:

- p Deck is propped during construction
- pp Both deck and beam are propped
- f 10% end fixity assumed (Flush Type B or extended end plate required)
- \$ Reinforcement anchored over or through the beam required for torsion resistance
- NSA No Section Available

3.3 RHSFB selector tables

General

- The non-composite option is based on the lightest RHSFB solution with the minimum slab depth acceptable to achieve the stated floor span. This may result in the RHSFB projecting above the top surface of the slab. A shallower but heavier solution may be possible.
- Composite solutions require adequate cover to the shear studs which will normally govern the slab depth and will generally result in an uneconomic design. As a result, composite solutions are not included in these tables.
- All beams have been designed using a Corus Celsius RHS grade S355 J2H to EN 10210⁶⁾ (Hot finished 355N/mm²) and plate grade S355 to BS EN 10025-2⁴⁾.
- All beams are unpropped unless noted by suffix.
- All beams have been designed assuming ComFlor 225 deck is used.
- Decking is assumed to be propped in construction as necessary.
- Decking spans perpendicular to the beam on one side only i.e., edge beam.
- No service holes are provided in the RHSFB web.

Design assumptions

Light Weight Concrete (LWC)

| | | |
|--------------------------------------|---------------------|---|
| Characteristic strength | | 30 N/mm ² |
| Exposure condition | | Mild (heated building) |
| Concrete depth | Non-Composite RHSFB | 40mm min above RHSFB or 60mm above steel deck (except cases shown # which denotes that beam projects above top of slab) |
| Wet density | | 1900 kg/m ³ |
| Dry density | | 1800 kg/m ³ |
| Modular ratio | | 15 |
| Mesh reinforcement | | A142 (minimum requirement) |
| Yield strength of mesh reinforcement | | 500 N/mm ² |

Normal Weight Concrete (NWC)

| | | |
|--------------------------------------|---------------------|---|
| Characteristic strength | | 30 N/mm ² |
| Exposure condition | | Mild (heated building) |
| Concrete depth | Non-Composite RHSFB | 40mm min above RHSFB or 70mm min above steel deck (except cases shown # which denotes that beam projects above top of slab) |
| Wet density | | 2400 kg/m ³ |
| Dry density | | 2350 kg/m ³ |
| Modular ratio | | 10 |
| Mesh reinforcement | | A142 (minimum requirement) |
| Yield strength of mesh reinforcement | | 500 N/mm ² |

Loads Acting On Beam

| | | |
|---|--|---|
| Occupancy imposed loads | | 2.5 kN/m ² or 4.0 kN/m ² as shown on tables |
| Partition loads | | 1.0 kN/m ² |
| Ceilings, services and finishes | | 0.5 kN/m ² |
| Construction load | | 0.5 kN/m ² |
| Deck weight | | 0.2 kN/m ² |
| Cladding load | | 8 kN/m |
| Cladding eccentricity | | 200mm |
| BS 6399 imposed load reduction has been utilised | | |
| Ponding due to deck and beam deflection has NOT been taken into account | | |

Fire Data

| | | |
|--|--|--------------------------|
| Fire resistance period | | 60 min |
| Proportion of imposed load considered as non-permanent | | 100% |
| Additional fire protection | | NOT provided or required |

Partial Safety Factors

| | | |
|--|--|-----|
| Dead (self weight) | | 1.4 |
| Imposed | | 1.6 |
| Super imposed dead (partitions & services) | | 1.4 |

Deflection Limits

| | | |
|---------------------------------------|--|-------|
| Imposed load deflection limit | | L/500 |
| Imposed and cladding deflection limit | | L/360 |
| Total load deflection limit | | L/250 |

Frequency Limit

| | | |
|---|--|------|
| Natural frequency limit (unless noted otherwise on the table) | | 4 Hz |
|---|--|------|

Flange Plate Data

| | | |
|-----------------------------------|--|-------|
| Plate projection on cladding side | | 10mm |
| Plate projection on decking side | | 100mm |
| Plate thickness | | 15mm |

RHSFB selector tables

Table 3.13 60 min fire resistance, Light Weight Concrete (LWC), 2.5 kN/m² LL

| Beam spacing (m) | Beam span (m) | | | | | | |
|------------------|---------------------------------|---------------|------------------|----------------|----------------|------------------|--|
| | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 | |
| 5.0 | Non-composite RHSFB 200x150x8 | 200x150x8 | 300x200x8 # | 400x200x8 # | 400x200x8 # | 450x250x8 # | |
| 6.0 | Non-composite RHSFB 200x150x8 | 200x150x8 | 300x200x8 # | 400x200x8 # | 400x200x10 # | 450x250x10 # | |
| 7.0 | Non-composite RHSFB 200x150x8 p | 200x150x10 p | 300x200x8 p # | 400x200x8 p # | 400x200x10 p # | 450x250x12.5 p # | |
| 8.0 | Non-composite RHSFB 250x150x8 p | 200x150x10 p | 300x200x8 p # \$ | 400x200x8 p # | 450x250x8 p # | 500x300x8 p # | |
| 9.0 | Non-composite RHSFB 250x150x8 p | 300x200x8 p # | 400x200x8 p # | 400x200x10 p # | 450x250x8 p # | 500x300x8 p # | |

Table 3.14 60 min fire resistance, Normal Weight Concrete (NWC), 2.5 kN/m² LL

| Beam spacing (m) | Beam span (m) | | | | | | |
|------------------|---------------------------------|---------------|------------------|------------------|----------------|----------------|--|
| | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 | |
| 5.0 | Non-composite RHSFB 200x150x8 | 200x150x8 | 300x200x8 # | 400x200x8 # | 400x200x10 # | 450x250x10 # | |
| 6.0 | Non-composite RHSFB 200x150x8 | 200x150x10 | 300x200x8 # | 400x200x8 # | 450x250x8 # | 450x250x12.5 # | |
| 7.0 | Non-composite RHSFB 200x150x8 p | 200x150x10 p | 300x200x8 p # \$ | 300x200x8 p # \$ | 450x250x8 p # | 500x300x8 p # | |
| 8.0 | Non-composite RHSFB 250x150x8 p | 300x200x8 p # | 400x200x8 p # | 400x200x10 p # | 450x250x8 p # | 500x300x10 p # | |
| 9.0 | Non-composite RHSFB 250x150x8 p | 300x200x8 p # | 400x200x8 p # | 400x200x10 p # | 450x250x10 p # | 500x300x10 p # | |

Table 3.15 60 min fire resistance, Light Weight Concrete (LWC), 4.0 kN/m² LL

| Beam spacing (m) | Beam span (m) | | | | | | |
|------------------|------------------------------------|---------------|---------------|----------------|----------------|----------------|--|
| | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 | |
| 5.0 | Non-composite RHSFB 250x150x8 | 250x150x8 | 300x200x8 # | 400x200x8 # | 400x200x8 # | 450x250x10 # | |
| 6.0 | Non-composite RHSFB 250x150x8 | 200x150x10 | 300x200x8 # | 400x200x8 # | 400x200x10 # | 500x300x8 # | |
| 7.0 | Non-composite RHSFB 200x150x8 p | 300x200x8 p # | 400x200x8 p # | 400x200x8 p # | 400x250x8 p # | 500x300x8 p # | |
| 8.0 | Non-composite RHSFB 250x150x8 p | 300x200x8 p # | 400x200x8 p # | 400x200x10 p # | 450x250x10 p # | 500x300x8 p # | |
| 9.0 | Non-composite RHSFB 250x150x8 p \$ | 300x200x8 p # | 400x200x8 p # | 450x250x8 p # | 500x300x8 p # | 500x300x10 p # | |

Table 3.16 60 min fire resistance, Normal Weight Concrete (NWC), 4.0 kN/m² LL

| Beam spacing (m) | Beam span (m) | | | | | | |
|------------------|------------------------------------|---------------|----------------|----------------|---------------|----------------|--|
| | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 | |
| 5.0 | Non-composite RHSFB 200x150x8 | 250x150x10 | 300x200x8 # | 400x200x8 # | 400x200x10 # | 450x250x10 # | |
| 6.0 | Non-composite RHSFB 250x150x8 | 300x200x8 # | 300x200x10 # | 400x200x8 # | 450x250x8 # | 500x300x8 # | |
| 7.0 | Non-composite RHSFB 250x150x8 p | 300x200x8 p # | 400x200x8 p # | 400x200x10 p # | 500x300x8 p # | 500x300x8 p # | |
| 8.0 | Non-composite RHSFB 250x150x8 p \$ | 300x200x8 p # | 400x200x8 p # | 400x200x10 p # | 500x300x8 p # | 500x300x10 p # | |
| 9.0 | Non-composite RHSFB 250x150x10 p | 400x200x8 p # | 400x200x10 p # | 450x250x8 p # | 500x300x8 p # | 500x300x10 p # | |

Notes:

- # Beam projects above the top of the slab
- p Deck is propped during construction
- pp Both deck and beam are propped
- f 10% end fixity assumed (extended end plate required)
- \$ Reinforcement anchored over or through the beam required for torsion resistance
- NSA No Section Available