

Hollowcore Composite Floor Systems

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A composite hollowcore floor combines precast hollowcore units with a structural concrete topping resulting in enhanced structural performance and lateral load distribution.

THE BENEFITS OF HOLLOWCORE COMPOSITE FLOORS

Robust Construction

The prestressed precast element acts compositely with an in-situ structural topping, combining the benefits of precast and in-situ construction. A prestressed composite floor is ideally suited to resist progressive collapse in buildings.

Design Efficient

Composite floors can be designed to act compositely with the structure of the building to reduce member sizes.

Rapid Construction

Precast slabs are manufactured to the specific needs of the building, eliminating shuttering and adding to speed of construction thus reducing costs and can generally be designed to avoid the need for propping.

Diaphragm Action

The precast slabs together with the in-situ topping can provide a structural deck with a full diaphragm action where required for multi-storey structures.

Fire Resistance

All slabs have 1 hour fire resistance. This can however be enhanced up to 2 hours.

DESIGN OF HOLLOWCORE COMPOSITE FLOORING

Slab Widths

Hollowcore slabs are generally manufactured 1200mm wide, but other widths are available.

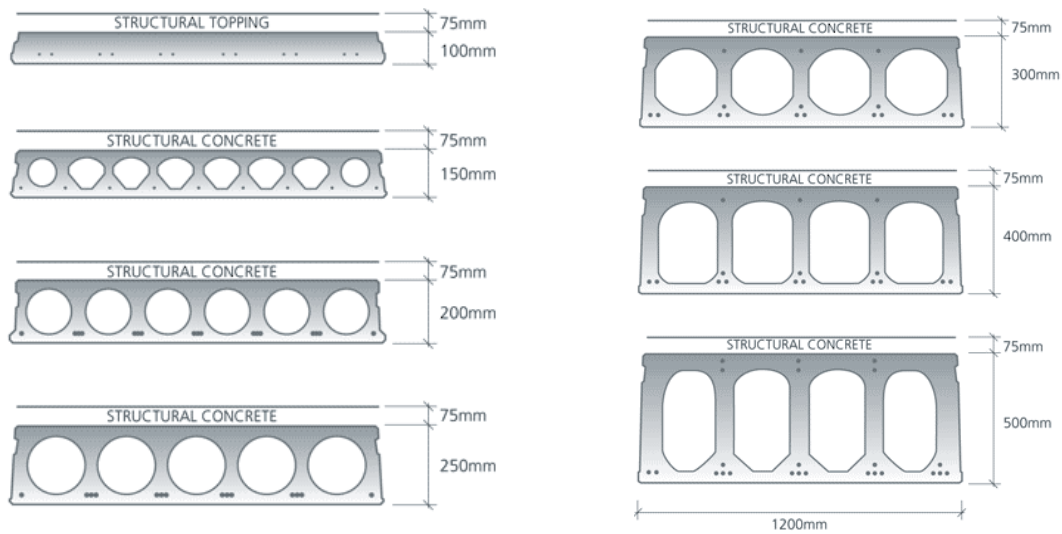
Slab Depths

Slab depths typically range from 100mm to 500mm.

Section Profiles

Section profiles of the precast element may vary in detail depending upon the manufacturer. Typical examples are overleaf.

Composite Sections



Structural Performance

Table 1 gives general guidance on the performance characteristics of hollowcore composite flooring and allowable characteristic live loads. This table is based upon a 75mm thick structural topping. Alternative depths may be used according to structural requirements. Spans are stated in linear metres with an allowance having been made for the self-weight of the unit plus a dead load of 0.25kN/m² for finishes.

Table 1 - Typical maximum spans in metres

Imposed Load (kN/m ²)	Overall Depth (mm)						
	185	225	275	325	375	425	475
	Plank Depth (mm)						
	110	150	200	250	300	350	400
1.5	5.0	7.4	9.4	10.8	13.5	15.0	16.0
2.5	5.0	7.4	9.4	10.6	13.0	14.5	15.5
4.0	5.0	7.3	8.8	9.9	12.3	13.7	14.6
5.0	4.9	7.0	8.4	9.5	11.8	13.2	14.1
7.5	4.4	6.4	7.5	8.4	10.6	12.0	12.8

Domestic
 Office
 Storage

NOTE: Load/span capacity can vary between manufacturers. Consideration must also be given to the exposure conditions, location and size of openings, effects of camber, deflection and vibration. For loadings other than domestic, it is recommended that the reader consults the manufacturer.

Structural Design

- Hollowcore slabs are designed in accordance with Part 1-1 (General rules and rules for buildings) and Part 1-2 (General rules - structural fire design) of Eurocode 2: Design of concrete structures. In addition, hollowcore slabs are manufactured to conform to BS EN 1168.
- Prestressed hollowcore slabs will exhibit a degree of camber, the extent of which will depend upon span and the amount of prestress within the design. Due allowance must be made for this in determining finishes and the overall floor thickness. The specified thickness of structural topping must be provided at the point of maximum camber. Further guidance should be obtained from individual manufacturers.
- Hollowcore composite floors are designed to have effective shear key joints between adjacent slabs such that when grouted and topped the individual slabs become a system that behaves similarly to a monolithic slab. Slabs must be grouted immediately after installation. The structural topping would usually be a C25/30 normal weight concrete reinforced with a structural mesh.
- Hollowcore composite floors can be designed to provide diaphragm action to transmit horizontal force to the primary supporting structure. Various connection details are available to provide the interaction between the floor and the primary structure.
- A hollow composite floor is an excellent solution where enhanced performance is required e.g. heavy point loads, complex structural integration, heavy service penetration, etc.
- The soffit of a hollowcore slab is generally from a steel mould and is therefore suitable for an exposed finish in structures such as car parks and industrial buildings.

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