

**2.2.1 FLOORS**

**2.2.1.4 SOLID SLABS**

**GENERAL DESCRIPTION**

Solid precast prestressed floor planks are wet-cast on long-line beds in unit moulds or by hollowcore equipment using slipform or extrusion methods. The hollowcore equipment will set the width dimension, usually at 1200 mm. A convenient module may be selected to suit the building layout when using unit moulds. The cross-section has similar shear key details to hollowcore planks. Thickness is also the same as hollowcore, usually 150, 200 and 250 mm. Units over 250 mm deep are likely to be too heavy for normal building purposes.

They are chosen in preference to hollowcore planks where:

- the load results in high shear or there are heavy point loads;
- the environment is aggressive, for example in splash zones or where condensation may occur over water;
- high cover or special concrete is required;
- projecting reinforcement requires the units to be wet-cast, for example when used as a soffit beam to support hollowcore planks;
- the required width or depth module is not available in hollowcore planks.

**COMPONENT DETAILS**

Prestressed units will develop hog, with inevitably some differential between adjacent units. Where this is a concern, an insitu topping can be used to provide a level floor (usually Normal Class N32 concrete). A grouted shear key detail is required between planks to transfer local loads to adjacent units. Typically, 50% of local loading on a plank is transferred to adjacent units through the shear keys.

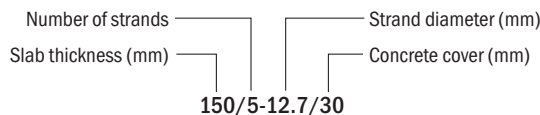
Untopped units require grouted joints for fire integrity, sound insulation and to prevent long-term differential movement between adjacent planks. Topped units are not grouted separately, the width of the joint is selected to allow filling during the topping operation.

The length of support at the end of the plank will be dictated by circumstances. A bearing length of 80 mm is a normal minimum and, preferably, the length should be half the depth of the precast section. Plank lengths of less than 3 m may not develop the tensile capacity of the prestressing strand due to bond limitations. The critical section for shear usually occurs in the transmission zone of the strand.

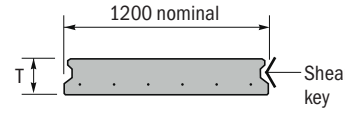
The slenderness should not exceed an L/D of 45. This may need to be limited to 30 to 35 for applications that are sensitive to vibration.

In addition to service requirements, construction load conditions should be checked. These should include: live load on the precast unit; the topping weight plus live load on the precast section prior to developing composite action; and, stacked materials on both the precast and composite sections if this is likely to occur.

**SLAB IDENTIFICATION (Example)**

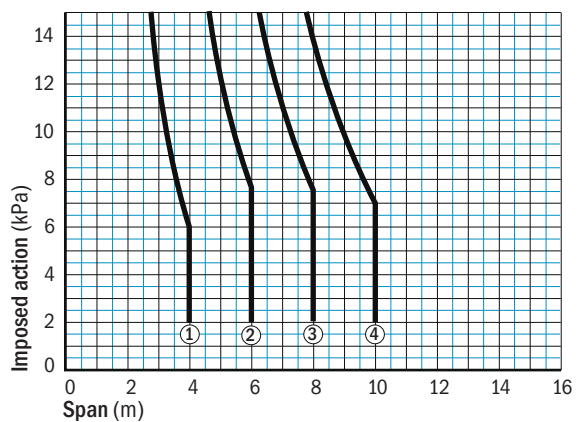


**SOLID SLABS WITHOUT TOPPING**

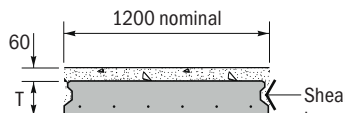


- Key to Curves**
- ① 100/8-9.5/40
  - ② 150/7-12.7/40
  - ③ 200/9-12.7/40
  - ④ 250/11-12.7/40

Section properties	Plank thickness, T (mm)			
	100	150	200	250
Area (mm <sup>2</sup> )	120 000	180 000	240 000	300 000
I (mm <sup>4</sup> ×10 <sup>6</sup> )	100.0	337.5	800.0	1562.5
Y <sub>b</sub> (mm)	50	75	100	125
Z <sub>b</sub> (mm <sup>3</sup> ×10 <sup>6</sup> )	2.0	4.5	8.0	12.5
Z <sub>t</sub> (mm <sup>3</sup> ×10 <sup>6</sup> )	2.0	4.5	8.0	12.5
Mass (kN/m <sup>2</sup> )	2.5	3.75	5.0	6.25



**SOLID SLABS WITH 60-mm TOPPING**



- Key to Curves**
- ① 100/8-9.5/40
  - ② 150/7-12.7/40
  - ③ 200/9-12.7/40
  - ④ 250/11-12.7/40

Section properties	Plank thickness, T (mm)			
	100	150	200	250
Area (mm <sup>2</sup> )	192 000	252 000	312 000	372 000
I (mm <sup>4</sup> ×10 <sup>6</sup> )	387.44	879.54	1677.08	2855.06
Y <sub>b</sub> (mm)	77.93	102.66	127.49	152.38
Z <sub>b</sub> (mm <sup>3</sup> ×10 <sup>6</sup> )	4.97	8.57	13.15	18.74
Z <sub>t</sub> (mm <sup>3</sup> ×10 <sup>6</sup> )	4.72	8.20	12.66	18.12
Mass (kN/m <sup>2</sup> )	4.00	5.25	6.50	7.75

