PRECAST CONCRETE FLOORS IN HOUSING

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- Precast Flooring Federation
- Housing Applications
- Floor Types
- Design and Installation
- Typical Details for Precast Upper Floors
- Benefits of Precast Concrete Upper Floors
**Precast Flooring Federation (PFF)**

- Represents leading manufacturers of hollowcore, beam and block, and lattice girder flooring
- Part of British Precast
- Produces technical guidance related to design, H&S and installation

[www.precastfloors.info](http://www.precastfloors.info)

**Housing Applications**

- Floors over basement
- Ground floors
- Internal floors
Floor Types

- Hollowcore
- Beam and block
- Lattice girder

Hollowcore

- Precast concrete element with continuous voids
- Depths vary from 100mm to 400mm depending on the required span and loading conditions
- Most systems are prestressed
**Hollowcore**

- Different types of infill blocks can be used
- Beam depths range from 150mm to 225mm
- Spans up to 8m are achievable
**Beam and Block**

Plank depths typically range from 50mm to 100mm

Finished overall depth between 115mm to 250mm

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**Lattice Girder**

Plank depths typically range from 50mm to 100mm

Finished overall depth between 115mm to 250mm

1200 or 2400 nom.
Lattice Girder

- Composite floor: permanent concrete formwork with in-situ concrete topping
- Visual concrete soffit provided

Design

- Technical advice pre-tender
- Scheme rationalisation
- Detailed layout drawings
- Calculations
Installation

- Health and safety
- Quality
- Programme coordination

Typical Details for Precast Upper Floors

- Bearings
- Wall Support
- Holes
- Services
Bearing

On reduced width shared bearing, slabs must be propped until concreted joint is fully cured.

Wall Support

[Diagram of wall support]
Holes

Services
Key Benefits of Precast Upper Floors

- Fire Resistance
- Acoustic Separation
- Thermal Mass

Other Benefits of Precast Upper Floors

- Locally manufactured
- Factory produced quality
- Rapid construction on site
- Working platform
- Durability
Fire Resistance

“Statistically fires in the home are more likely to start inside the property than from outside”

“Although occupier behaviour is a major reason for fires starting, the design and characteristics of a building will affect the potential for a fire to spread or to be undetected and, therefore, impact on the likelihood of the fire causing harm.”

Fire Resistance

- Non-combustible - does not burn
- Inherently fire resistant - no spread of fire
- Slow rate of heat transfer - making it an effective fire shield
- Does not produce any smoke, toxic gases or emissions in a fire situation
- Retains most of its strength under typical fire conditions
Acoustic Separation

Protection against sound within a dwelling-house, etc.

“Dwelling-houses ... shall be designed and constructed in such a way that ... internal floors ... provide reasonable resistance to sound.”

Requirement E2 states that internal walls and floors must achieve the sound insulation values set out below.

<table>
<thead>
<tr>
<th>Airborne sound insulation</th>
<th>$R_w$ dB</th>
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</thead>
<tbody>
<tr>
<td>(Minimum values)</td>
<td></td>
</tr>
<tr>
<td>Walls</td>
<td>40</td>
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<tr>
<td>Floors</td>
<td>40</td>
</tr>
</tbody>
</table>
Acoustic Separation

Diagram 5.5 Internal floor type A
- Concrete planks
- Min. mass per unit area 180kg/m²
- Screed optional
- Ceiling finish is optional

Diagram 5.6 Internal floor type B
- Concrete beams with infill blocks
- Min. mass per unit area 220kg/m²
- Bonded screed (min. 40mm for sand)
- Ceiling treatment C (or better)

Established that ‘squeaky floors’ is now a major complaint in new homes

Figure 5: Squeaky floors. Homeowner contacts to NHBC in other noise categories for homes first occupied from 2004 to 2012.
Thermal Mass

Concrete presents an opportunity to use thermal mass to reduce energy use for heating and cooling

Excellent thermal performance is possible using concrete floors

www.Concretecentre.com/publications

Thermal Mass

- Timber upper floor, up to 9-18 kJ/m²K
- Hollowcore upper floor, up to 120-160 kJ/m²K
- Beam & block upper floor, up to 120-140 kJ/m²K
Thank you for your attention