Beam and Block Floor Systems

September 2017

Beam and block floor systems combine precast prestressed concrete beams and infill blocks to produce high quality economic ground and upper floors in residential and other building types.

INTRODUCTION

The beams that are used in beam and block floors are designed in accordance with BS EN 15037-1 and BS EN 1992-1-1.

All floor beams should carry the CE mark or delivery documentation should reference the CE mark.

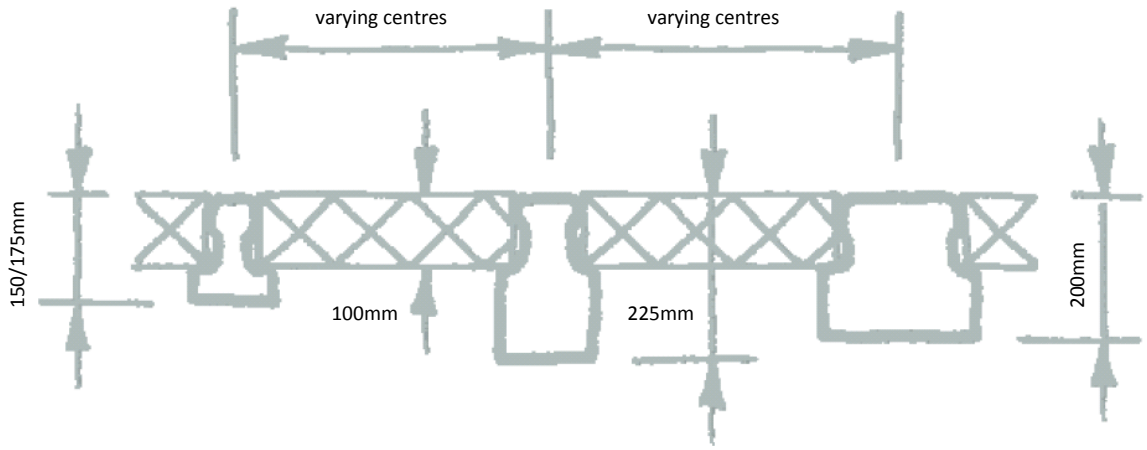
Beam depths may be 150mm, 175mm or 225mm. Beam weights are typically 35kg/m for 150mm deep beams and 68kg/m for 225mm deep beams.

Beams are self bearing and blocks are non-resisting or semi-resisting. Infill blocks may be standard walling blocks to BS EN 771 or purpose made flooring infill blocks. Blocks should be transverse load tested and capable of sustaining a central point load of 3.5kN.

Spans of up to 8m can be achieved depending on loading conditions. Manufacturers should be consulted for full information and design services.

Beam and block floors may be used for garages where specified in conjunction with a reinforced concrete topping. The structural topping should be designed by a competent person in accordance with current design codes.

Typical Beam Sections



mpa British Precast Flooring Federation

The Old Rectory, Main Street, Leicester, LE3 8DG
Tel: 0116 232 5170, email:
info@precastfloors.info
www.precastfloors.onfo

DESIGN CONSIDERATIONS

Thermal Floors

Various thermal floor systems are available which can typically achieve U values of 0.1W/m^2K or better. These thermal floors utilise special lightweight insulation blocks, which work in conjunction with a structural concrete topping. Beam and block floors may contribute to the thermal mass of a building and are ideal flooring bases for underfloor heating.

Fire Resistance

The fire resistance of a beam and block floor depends on the beam used and applied finishes. Individual beams may provide up to one hour's resistance depending on section size.

Sound Resistance

The sound resistance of a floor depends on the overall specification of the floor. Beam and block floors may readily be used as intermediate floors in housing if specified in accordance with internal floor type B as described in Building Regulations Approved Document E. Beam and block floors can also be used as separating floors in multiple occupancy residential units if specified in accordance with solutions E-FC-6 or E-FC-7 in the Part E Robust Details Handbook.

Camber

Prestressed concrete beams will exhibit a degree of upward camber, the extent of which will depend on the span and the amount of prestress within the design. Due allowance must therefore be made for this in determining finishes and overall floor thickness.

Cantilevers

Floor beams have limited cantilever capacity. Individual manufacturers may be able to advise on their product's performance.

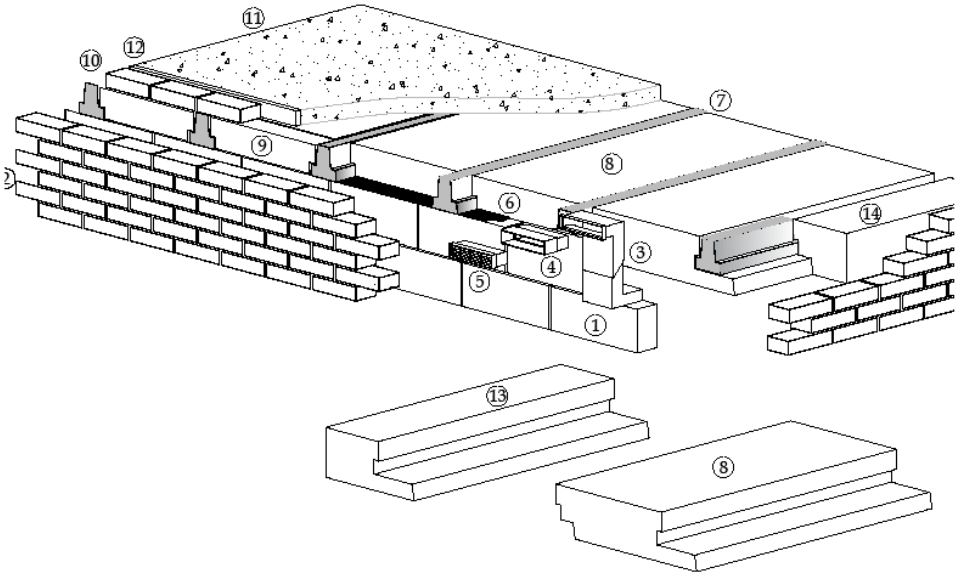
End bearing

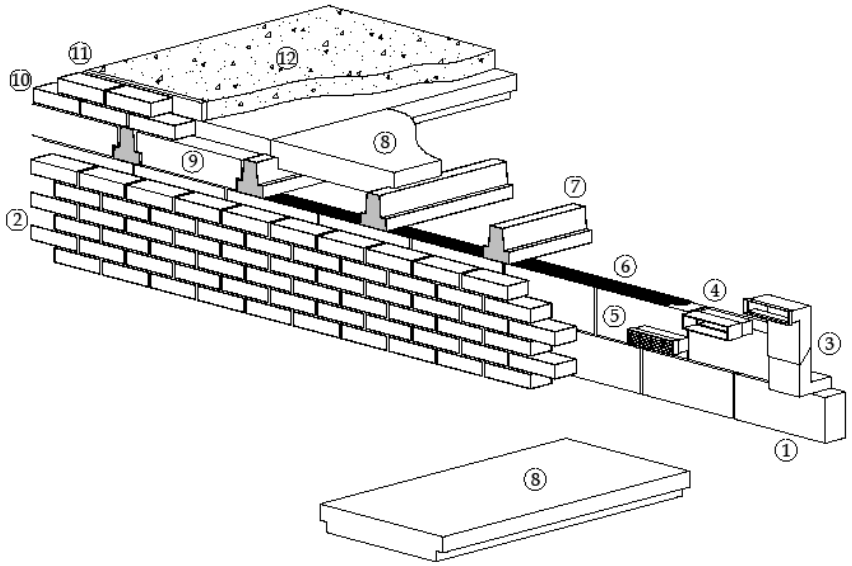
Floor beams require nominal 100mm end bearing on masonry and 75mm on steel. They are generally not bedded onto the support wall and are sat on a d.p.c. as protection for the steel within the beam. Floor beams may be notched to sit into steel at upper levels, but the manufacturer must give approval for each design situation where this is required. End closure blocks / slips are available from manufacturers. Where infill blocks are built into a load bearing wall the strength of the infill blocks should be at least equal to the strength of the wall blocks.

Ventilation

The void below a suspended floor should be ventilated in accordance with current Building Regulations. Generally this requirement is 1500mm^2 per metre run of wall or 500mm^2 per m^2 of floor area, whichever is the greater. Site conditions may require greater values. Radon barriers can also be incorporated. However the exact detailing of junctions needs to be carried out by the building designer to ensure continuity of the barrier.

1. Substructure masonry
2. Dy Silo mix mortar
3. Telescopic underfloor vent
4. Extension sleeve
5. 215 x 65mm Air brick
6. D.p.c.
7. Floor beam
8. EPS Infill block
9. End Closure block or masonry makeup
10. Perimeter courses of masonry
11. Structural topping on d.p.m.
12. Insulation Edge Strip
13. EPS Starter unit
14. EPS End unit





1. Substructure masonry
2. Dry Silo mix mortar
3. Telescopic underfloor vent
4. Extension sleeve
5. 215 x 65mm Air brick
6. D.p.c.
7. Floor beam
8. XPS Infill block
9. End Closure block or masonry makeup
10. Perimeter courses of masonry
11. Insulation Edge Strip
12. Structural topping on d.p.m.

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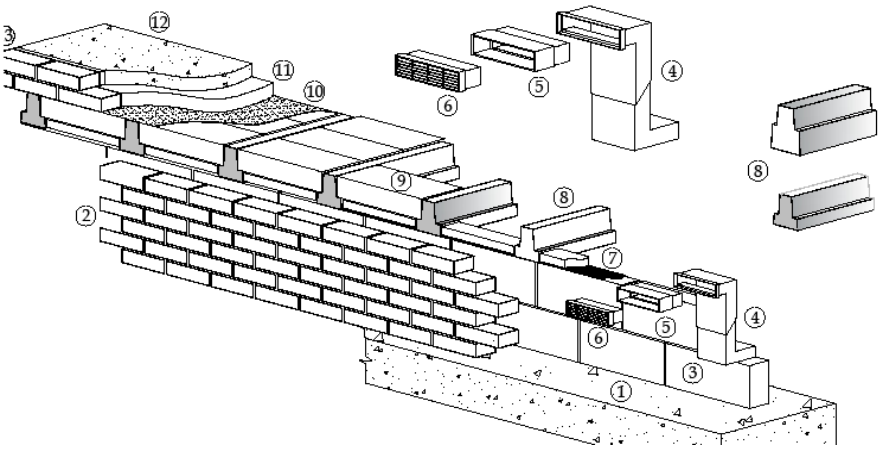
1. Readymix foundations
2. Dy Silo mix mortar
3. Substructure masonry
4. Telescopic underfloor vent
5. Extension sleeve
6. 215 x 65mm Air brick
7. Split course block on d.p.c.
8. Floorbeam 155dp or 225dp
9. Infill block
10. Sand / cement grout
11. Insulation on dpm
12. Floor Screed
13. Insulation edge strip



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