

RACKHAM[®]
HOUSEFLOORS

Block and Beam

Technical Specification





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HOUSEFLOORS

Block and Beam The Beams & Components

1. The Beams

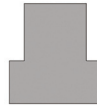
175mm Deep Standard Section Beam

The 175mm standard section is used in mainly domestic situations and can be used in a double or treble format to carry heavier loads such as blockwork partitions, stair toes, newel posts etc. and can span up to 6.0 metres. (Dependent upon loadings).



175mm Deep WIDE Section Beam

The WIDE section 175mm deep beam is an alternative floor beam to be used where larger spans and greater imposed loads are present. The WIDE beam section can also be used to complement the standard section beam to optimise beam layouts, support increased loads where necessary and can span up to 6.5 metres. (Dependent upon loadings).



225mm Deep Section Beam

The 225mm deep beam can span up to 7.3 metres and enables the support of greater imposed loads on the larger spans. Whilst mainly for use in domestic situations it is also suitable for use in light commercial/industrial situations, (domestic garages, shops, offices etc.)

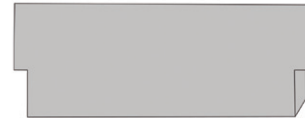


2. Components

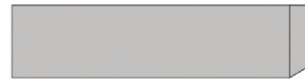
The floor beams are the main structural element of the floor. Any of the three beam sections can be used dependent upon the spans, loadings and other relevant design criteria. Infill blocks are supplied by others and are widely available at all builder's merchants.

Ancillaries

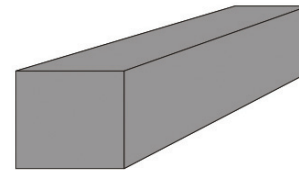
Closure Blocks - an inverted 'T' shaped block profiled to fit between the beam bearing ends over the supporting wall, to avoid the need to cut blocks/bricks to size.



Slip Bricks - a 385mm x 100 block which can be used either below the beam ends or above the beams ends to assist in alignment of internal and external courses.

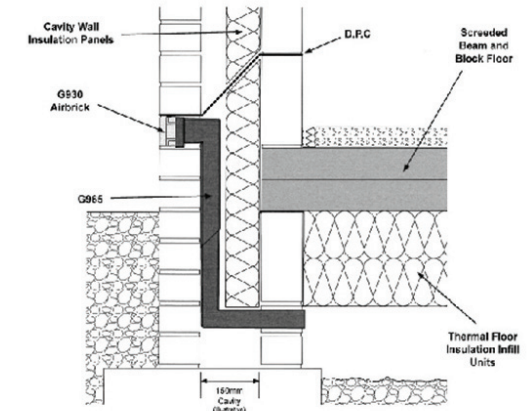
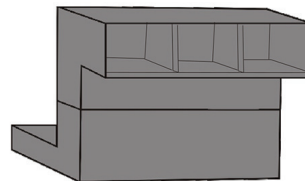


Coursing Block - is a 440mm x 100mm x 90mm block that sits on the foundation blockwork under the outer skin of the cavity wall to align the internal and external courses.

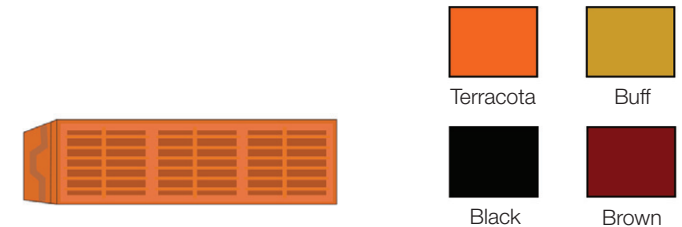


Telescopic Underfloor Ventilator & Airbricks

Telescopic underfloor ventilators are available in two vertical sizes (2/3 courses and 5/8 courses) dependent on the floor depth.



The Dual Extended underfloor ventilator (5/8 courses) has been designed to provide a clear airflow to the void beneath deeper insulated suspended floor constructions - either polystyrene infill panels or insulation above the floor beams.



Airbricks - Both types of underfloor ventilator can be supplied with a coloured airbrick (terracotta, buff, blue/black or brown) to co-ordinate with the colours of the external wall construction.

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Block and Beam Installation

3. Installation



Beams in place

The ground beneath the floor must be cleared of any surface soil and vegetable matter and the solum treated to prevent vegetable growth.

No oversite concrete or other surface seal is required, but any uplifting to bring the solum to an even surface should be of hard, dry material.

Foundation walls must be accurately constructed so that the beam bearing ends are well supported on the inner leaf but do not overhang into the cavity.

On ground floors a continuous damp-proof course must be laid along the top of the support wall before the beams are lifted into position. To ensure a clean bearing on the support wall and to avoid damage to the DPC,



Infilled floor with grout

the underside of the beams should be cleaned of dirt or debris before they are placed in position.

As the beams are positioned, infill blocks are laid between the ends to ensure correct spacing. The flanges of the beams should be cleaned of debris so that the blocks sit properly and beams should be 'tightened up' as they are laid, to minimise gaps between blocks and beams.

Once all the beams are in place, they should then be infilled with blocks over the whole floor area. It is important that blocks are not cut or drilled in such a way as to impair their performance.

The whole floor area must be grouted with a 3:1 sand/cement mix (using coarse sand) as soon as possible after the fixing of the beams and blocks has been completed.

This should be done by brushing the grout over the floor with a stiff broom after the surface has been well 'wetted' so that the grout penetrates into the joints and provides a monolithic construction.

Walls running parallel with the beams are usually required to support a row of blocks and bearing levels should be prepared accordingly. Rackham's standard sections show this arrangement and it is advisable to study these before fixing commences.

Partitions can be built off the floor providing these have been allowed for in the design and are shown on the layout drawings supplied by Rackhams. It is sometimes necessary to place either two or three beams together to carry the additional load and in such cases care should be taken that the partitions are built directly over these units which must be concreted solidly together.

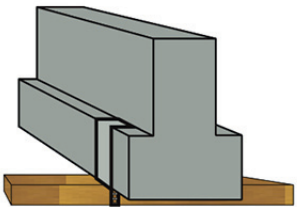
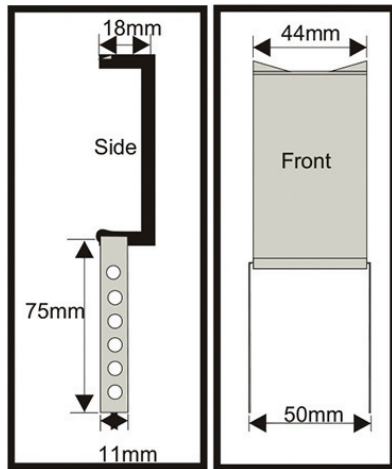
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Block and Beam Installation



Ceiling clips section

On upper floors, ceiling clips can be supplied to provide a fixing for timber battens. It is recommended that the clips be staggered on plan and lined up prior to grouting. The clip is placed on the shoulder of the beams and held in position by the infill block. The batten is placed between the two prongs, which are then bent around the batten and fixed with suitable nails, thus securing the batten firmly in place. Perimeter battens can be secured directly onto adjacent walls.

Beams must not be drilled or shot fired into under any circumstances.

During construction care should be taken to avoid overloading the floor. The following guidelines should be observed:

- Planks should be laid across the beams before stacking materials on top.
- Stacked materials should be positioned as near to the floor bearings as possible.
- Stacks of bricks, blocks or similar materials should be restricted to a total weight of 350kg (e.g. 120 bricks or 20 blocks on each beam).

Finishes

All normal finishes can be applied to Rackham floors, including screed and chipboard & polystyrene.

Screed should be a minimum of 50mm thick and in domestic garage floors the concrete topping should be reinforced with A98 steel mesh.

Full details of all suitable finishes are available on request.

Where concrete toppings are applied to beam and block floors, particularly over an insulating layer, the appropriate NHBC or other relevant regulatory guidance should be followed.



Service Pipe Through Floor

Incorporation of Services

Services must not be attached to the beams or blocks in such a way as to impact on their strength or durability.

Soil pipes passing vertically through the floor can be accommodated by the removal of the infill block making good around the pipes with in-situ concrete.

In situations where landfill gas (methane) or radon precautions are required services should not pass through the floor if at all possible. Where this is unavoidable the gas proof barrier should be carefully sealed around all penetrating service pipes. Water pipes must be pre-lagged.

If you require any more information please contact our Technical Department on 01924 455876.

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Block and Beam Technical Specification

4. Beam & Block Technical Specification

Building Regulations

When supplied and fixed in accordance with Rackham's installation details and technical specifications the Rackham system meets all the requirements of the latest building regulations.

Rackham Floor Beams

Prestressed concrete floor beams, 175mm standard, 175mm WIDE and 225mm deep are supplied in lengths to suit individual layouts in 50mm increments.

Infill Blocks

Unless otherwise stated on Rackham layout drawings, the concrete infill blocks should be 440mm x 215mm x 100mm to BS EN 771-3. Compressive strength should be 7.3N/mm² or greater, alternatively they should have an appropriate manufacturers declaration confirming their suitability for use as an infill block. Where infill blocks are built into walls they should be the same compressive strength as the wall blocks so as to maintain the structural integrity of the wall.

Weight of Construction

175mm standard beam weight - 34kg/m. The calculated dead weight of the grouted floor is 181kg/m² (based on a block density of 1275kg/m³).

175mm **WIDE** beam weight - 56kg/m. The calculated dead weight of the grouted floor is 205kg/m² (based on a block density of 1275kg/m³).

225mm beam weight - 65kg/m. The calculated dead weight of the grouted floor is 290kg/m² (based on a block density of 2000kg/m³).

Imposed Loads

Normally 1.5kN/m² unless otherwise stated on the Rackham layout drawing. Where required additional Rackham beams are supplied to carry block partitions and other additional loads.

Domestic garages (with steel mesh reinforced concrete topping) (minimum compressive strength 20N/mm²) are designed to carry a distributed load of 2.5kN/m² or concentrated load of 10kN.

No other loads e.g. Wind buttressing loads, newel posts etc, are allowed for unless otherwise noted on the Rackham layout drawing.

Structural Calculations

The design method and calculations for this floor have been checked and approved in accordance with the appropriate European Standards. Particular calculations based on BS EN 1992 can be provided with all schemes if required.

Bearings

Rackham beams are normally supported by the inner skin on the cavity walls. A double bearing can be taken on internal 100mm brick or block walls by staggering the beam layout.

Fixing

1. Units should always be lifted as near to each end as possible and always handled and stacked the right way up. Timber skids should be used.
2. It is recommended that blocks should be placed between the ends of the Rackham beams as they are laid in position and then 'tightened up'. This will space the Rackham beam correctly and should enable the remaining blocks to be placed without

difficulty. The bearings should be level so that all beams are vertical and the shoulders will then provide a bearing for the blocks of 15mm (+ 3mm tolerance).

3. The whole floor should be grouted with 3:1 sand/cement screed (using coarse sand) as soon as possible after fixing of Rackham beams/blocks is complete. This should be done by brushing the grout over the floor with a stiff broom after the surface has been 'well wetted' so that the grout penetrates into the joints and provides a monolithic construction.
4. Walls running parallel with the Rackham beams are usually required to support a row of blocks and bearing levels should be prepared accordingly.
5. Partitions can be built off the floor providing these have been allowed for in the design and are shown on the Rackham layout drawing. It is sometimes necessary to place multiple beams together to carry the additional load and in such cases care should be taken to ensure that the partitions are built directly over these units which must be grouted solidly together.
6. Care should be taken to avoid overloading the floor during construction. Generally this will be achieved if the following guidelines are observed:
 - a) Planks are laid across the beams before stacking.
 - b) Building materials are placed as near as possible to the floor bearings.
 - c) Bricks or blocks or similar are restricted to a total weight of 350kg (e.g. 120 bricks or 20 blocks on each Beam).

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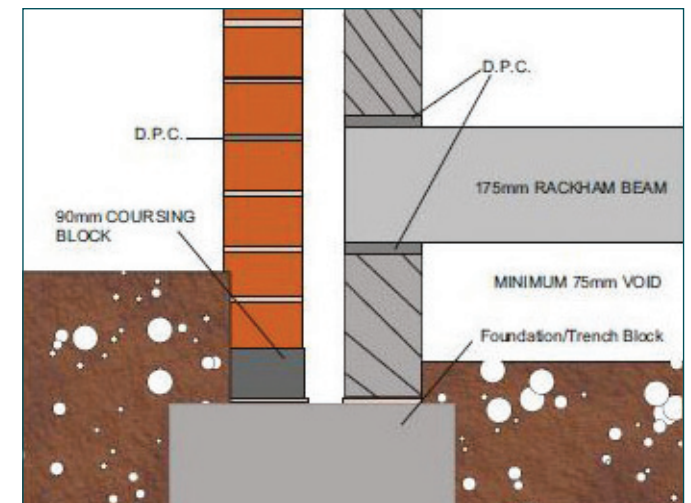
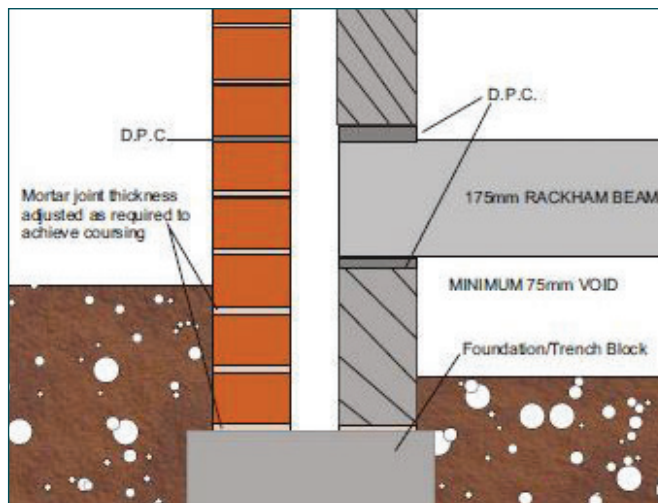
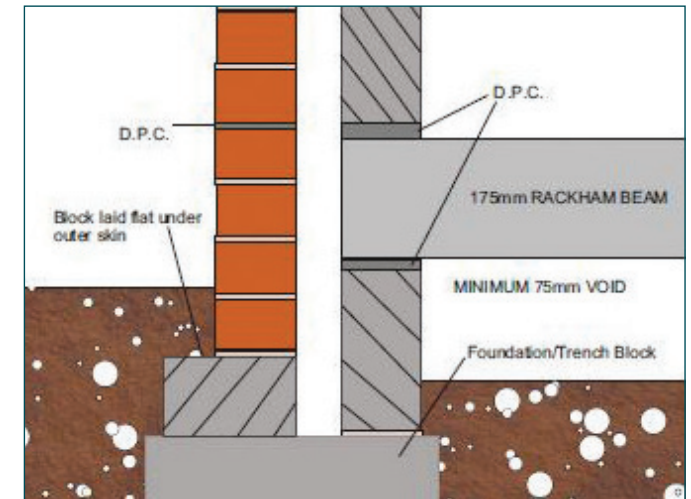
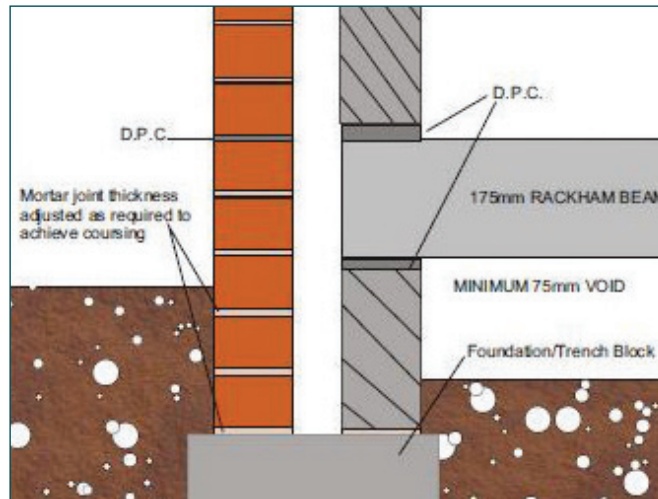
Block and Beam Suggested Coursing

5. Suggested Coursing

Adequate ventilation should be provided to the underfloor void using one Rackham Ventilator per 3.0 metres of external wall.

Cavity to be a minimum of 150mm below lowest DPC, 225mm to NHBC requirement.

All construction details to be in accordance with current Building Regulations and/or NHBC requirements.



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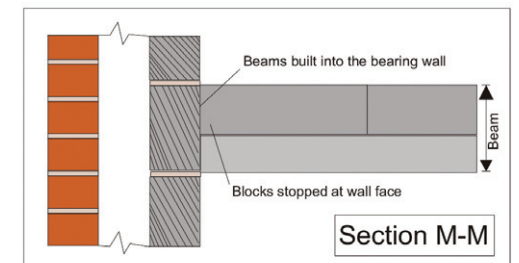
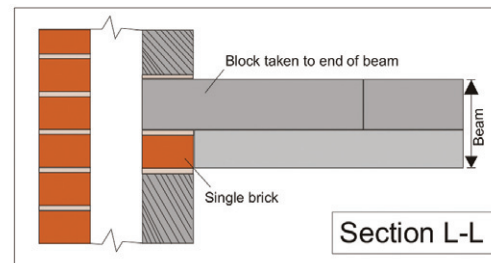
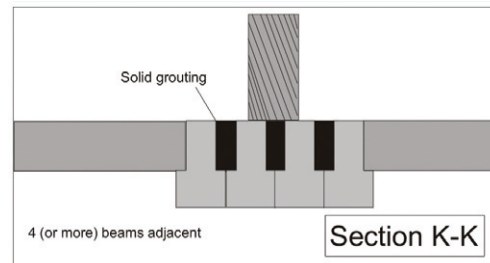
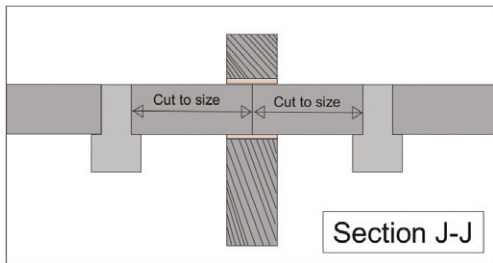
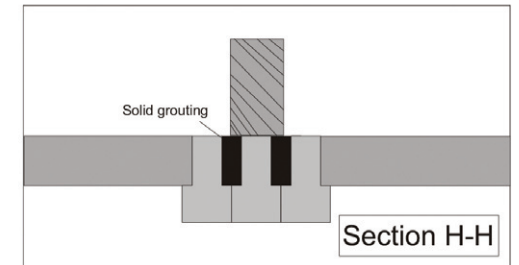
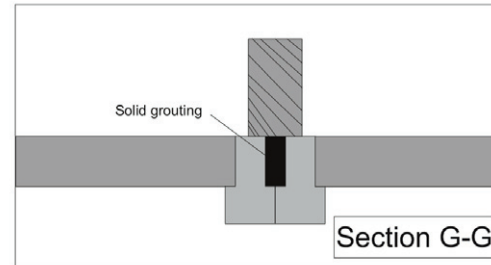
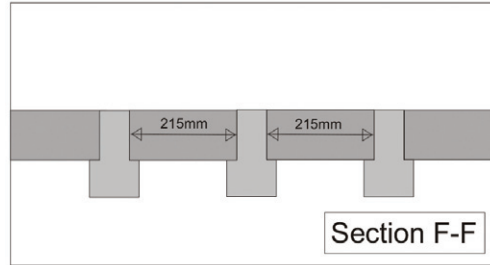
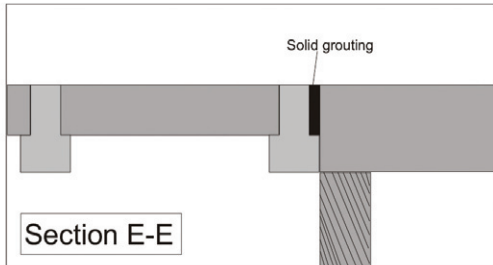
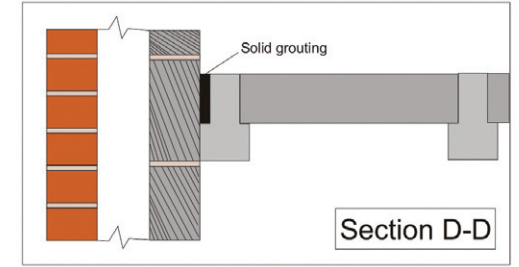
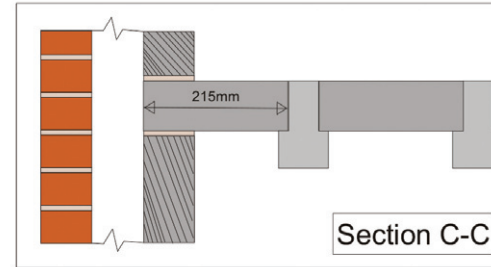
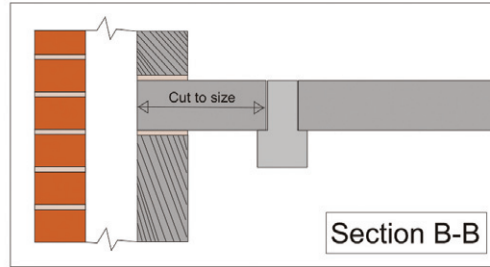
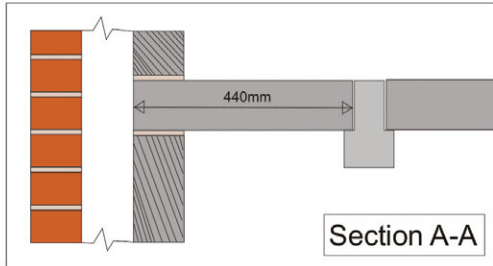
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Block and Beam Ground Floor Section Details

6. Ground Floor Sections Details



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Block and Beam Span Load Tables

Span Load Tables 175 & 175W

Load/Span for 175 Standard Beam with 1300kg/m² Infill Blocks

Load/Span for 175 Standard Beam with 1300kg/m² Infill Blocks

Imposed Load		1.5kN/m²		2.5kN/m²		4.0kN/m²			
		Finishes		1.5	1.8	1.5	1.8	1.5	1.8
		Effective Beam Centre	Self Weight kg/m²	65mm Screed	75mm Screed	65mm Screed	75mm Screed	65mm Screed	75mm Screed
				Maximum Spans (mm)					
		No Partition Loading							
	S500	182	4332	4212	3970	3876	3452	3328	
	S388	197	4878	4745	4479	4375	4028	3928	
	S275	224	5691	5543	5244	5127	4733	4646	
	D600	213	5463	5320	5031	4918	4538	4454	
	D488	234	5982	5830	5521	5401	4993	4902	
	D375	234	6000	6000	6000	6000	5614	5516	
	T700	265	6000	5935	5624	5502	5089	4997	
	T500	259	6000	6000	6000	5938	5503	5406	
	T475	290	6000	6000	6000	6000	6000	5933	

Load/Span for 175 Wide Beam with 1300kg/m² Infill Blocks

Load/Span for 175 Wide Beam with 1300kg/m ² Infill Blocks	Imposed Load		1.5kN/m ²		2.5kN/m ²		4.0kN/m ²	
	Finishes		1.5	1.8	1.5	1.8	1.5	1.8
	Effective Beam Centre	Self Weight kg/m ²	65mm Screed	75mm Screed	65mm Screed	75mm Screed	65mm Screed	75mm Screed
			Maximum Spans (mm)					
			No Partition Loading					
	S555	204	5636	5485	5181	5063	4666	4578
	S443	223	6235	6073	5745	5617	5186	5091
	S330	255	7072	6896	6539	6399	5925	5820
	D715	245	6826	6655	6307	6171	5710	5608
	D603	267	7300	7153	6790	6647	6162	6054
	D490	299	7300	7300	7300	7250	6738	6624
	T875	272	7300	7345	6880	6736	6247	6138
	T763	292	7300	7300	7266	7137	6630	6517
	T650	320	7300	7300	7300	7300	7093	6975

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Block and Beam Health & Safety

7. Health & Safety



Prestressed Concrete Floor Beams - (175 & 175 WIDE & 225mm)

Product

A concrete component for a specific use in building and construction.

Composition

Portland cement. Crushed limestone rock and sand from naturally occurring mineral deposits including some Quartz. Some mixtures contain a plasticiser to improve the characteristics of the product. High tensile indented steel wires to BS 5896/2 relaxation class 2.

Health Hazards

Floor beams made from hardened concrete do not present a specific health hazard as supplied.

Precautions

Inhalation of any dust from ground concrete should be avoided. Consideration should be given to wet methods of grinding and cutting. Where dry grinding or cutting is used dust masks to BS 2091 (B) or their European equivalent should be worn.

The 175mm standard beam weighs 34kg per metre run, the 175mm WIDE beam weighs 56kg per metre run and the 225mm beam weighs 65kg per metre run and therefore consideration should be given to safe handling and installation methods. All statutory health & safety requirements and associated codes of practice must be observed. Particular reference to lifting by mechanical means in relation to LOLER is required. The beams must have adequate bearings (normal 100mm) at either end onto suitable blockwork (min strength 7.0N/mm²).

Overloading during the construction process must be avoided i.e. no stacking/landing of materials on the floor structure.

Storage

Beams when off loaded and not immediately used shall be stored on firm level ground and stacked with suitable minimum 50mm x 50mm timber bearers between. Consideration must be given to appropriate sizing (width) of base bearers to spread the stack load accordingly to ground conditions. Stacking height should be adjusted accordingly to safe working practices (max height 1.6m) and safe ground bearing pressures to ensure stack stability.

C.D.M.

Regulation 11 relating to design risk. If correctly installed to our specification (other than obvious collapse if cut or overloaded) the product has a low risk factor. For specifications of loading capabilities please see our technical guidance note on the applicable Rackham layout drawing.

The beams must be positioned on suitable bearings, constructed by others.

Protective Clothing (P.P.E.)

Due attention should be given to the protection of eyes in cutting and grinding operations. Suitable protection for the head, hands and feet should be worn in accordance with relevant legislation.

8. Accreditations



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Block and Beam

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