Aggregate Concrete Blocks

CONCRETE BLOCK ASSOCIATION

Safe Handling and Correct Use

Data Sheet 13
November 2017

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Ff2 (Ajv)

Introduction

Much can be done to improve the safe handling and use of concrete blocks by following simple and straightforward good working practices and giving adequate consideration to health and safety aspects at the appropriate stage in the construction programme.

Careful consideration of the blocklayer's working area can also contribute significantly to safe working.

Points to take into consideration include:

- Minimise manual handling by delivering units as close to the place of use as safety considerations permit
- Move units in packs and by mechanical means whenever possible
- Load units out to above knee height
- Ensure that normal protective equipment appropriate to construction sites is both provided and used
- Ensure that appropriate eye protection and dust suppression or extraction measures are provided when mechanically cutting or chasing units.

Legislation

The Manual Handling Operations Regulations places duties on employers to carry out a risk assessment on all manual handling tasks. The Construction (Design & Management) Regulations places duties in the form of a mandatory Health & Safety system, on clients/designers/contractors.

Interpretation of Legislation

In the absence of a revised version of the HSE guidance given in their withdrawn Construction Sheet 37 'Handling Building Blocks' the following principles should be followed:

There is a risk of injury in the repetitive handling of blocks heavier than 20kg. Repetitive manual handling of blocks over 20kg should be subject to a risk assessment and a safe system of work should be established before block-laying commences.

Concrete Block Association, The Old Rectory
8 Main Street, Glenfield LE3 8DG
Tel: 0116 232 5165
www.cba-blocks.org.uk

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Blocks and construction options

The majority of units manufactured by CBA members are 20kg or less. Units of greater than 20kg may be specified and used to meet particular design requirements provided that appropriate handling methods are used, or the units are not to be handled repetitively.

There are several options available to avoid specifying units of more than 20kg. The appropriate choice from the options available will depend on the unit or wall properties dictated by the application.

Options include:

- Using lighter solid units having sufficiently similar properties (made with lighter materials or in a smaller format)
- Using cellular/hollow units (Group 2 units[1]) instead of solid units (having almost identical properties to solid units)
- Using alternative construction techniques such as:
  - i) laying units flat to form a 190 or 215mm width wall (suitable for finishes such as plastering or drylining)
  - ii) collar jointing[2]) 90mm or 100mm wide units to form a 190 or 215mm width wall (particularly suited to facing applications as both sides of a wall can be built fair)

Whenever making the choice of units it is essential to ensure that the desired performance characteristics of the finished wall are not compromised. Your supplier will be able to advise on an appropriate choice from the options available.

[1)] Group 1 units contain no more than 25% formed voids
Group 2 units contain more than 25% but less than 60% formed voids

[2)] Collar jointing is laying units back to back in normal aspect with a 10-15mm cavity between the adjoining faces of the units. The cavity should not be filled with mortar. The two leaves may be tied together. If tied either normal ties or bed joint reinforcement may be used.

Collar jointed walls are not suitable for separating walls in dwellings.

Alternatives to full width solid units of greater than 20kg

For product specific data it is recommended that CBA member companies are consulted.

Table 1 Block and construction options

Required wall thickness	Block options	Contruction options
140mm	140mm Ultralightweight units 140mm Lightweight units 140mm Dense group 2 units 140mm dense units with smaller face size	
190mm	190mm Ultralightweight units 190mm Lightweight or dense group 2 units	i) 2x90mm leaves of group 1 units collar jointed ii) 390x190x100mm group 1 units laid flat
215mm	215mm Ultralightweight units 215mm Lightweight or dense group 2 units	i) 2x100mm leaves of group 1 units collar jointed ii) 440x215x100mm group 1 units laid flat

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Indicative block weights

(a check should be made with individual block producers for specific unit weights)

Table 2 Guide to block weights

Code: 🟢 Green – not exceeding 20kg
🟠 Amber – not normally exceeding 20kg
🔴 Red – exceeding 20kg

Table 2a 440mm x 215mm face size – Group 1 units – assumed no formed voids					
Block type/width	**75mm**	**100mm**	**140mm**	**190mm**	**215mm**
Ultralightweight	🟢	🟢	🟢	🟢	🟢
Lightweight	🟢	🟢	🟠	🔴	🔴
Dense	🟢	🟢	🔴	🔴	🔴

Table 2b 390mm x 190mm face size – Group 1 units – assumed no formed voids					
Block type/width	**75mm**	**90mm**	**100mm**	**140mm**	**190mm**
Ultralightweight	🟢	🟢	🟢	🟢	🟢
Lightweight	🟢	🟢	🟢	🟢	🔴
Dense	🟢	🟢	🟢	🔴	🔴

Table 2c 440mm x 215mm face size – Group 2 units – assumed 40% formed voids			
Block type/width	**140mm**	**190mm**	**215mm**
Ultralightweight	🟢	🟢	🟢
Lightweight	🟢	🟢	🟢
Dense	🟢	🔴	🔴

Guidance for designers

Table 3 Characteristic compressive strength (f_k) values for single leaf and collar jointed walls

Using a designation M4 mortar - Unit face size 440x215mm

Unit strength (N/mm²)

Wall width	Group	3.6	4.2	7.3	10.4	17.5	22.5	30.0	40.0
75mm	1	3.6	4.0	5.9	7.5				
90mm	1	3.5	3.9	5.8	7.4	10.7	12.7	15.6	19.0
100mm	1	3.5	3.9	5.7	7.4	10.6	12.6	15.4	18.8
140mm	1	3.4	3.8	5.5	7.0	10.1	12.1	14.8	18.1
140mm	2	3.1	3.5	5.1	6.6	9.5			
190mm	1	3.2	3.5	5.2	6.7	9.6	11.4	14.0	17.1
190mm	2	2.9	3.3	4.9	6.2	8.9			
215mm	1	3.1	3.4	5.1	6.5	9.4	11.2	13.6	16.7
215mm	2	2.9	3.2	4.7	6.1	8.7			

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Guidance for designers

Table 4 Characteristic compressive strength (f_k) values for single leaf and collar jointed walls									
Using a designation M6 mortar - Unit face size 440x215mm									
Unit strength (N/mm²)									
Wall width	**Group**	**3.6**	**4.2**	**7.3**	**10.4**	**17.5**	**22.5**	**30.0**	**40.0**
75mm	1	3.6	4.2	6.6	8.5				
90mm	1	3.6	4.2	6.5	8.4	12.0	14.4	17.6	21.5
100mm	1	3.6	4.2	6.5	8.3	11.9	14.2	17.4	21.3
140mm	1	3.5	4.2	6.2	7.9	11.5	13.7	16.7	20.4
140mm	2	3.3	4.0	5.8	7.4	10.7			
190mm	1	3.2	4.0	5.9	7.5	10.8	12.9	15.8	19.3
190mm	2	3.0	3.7	5.5	7.0	10.1			
215mm	1	3.2	3.8	5.7	7.4	10.6	12.6	15.4	18.8
215mm	2	2.9	3.6	5.4	6.9	9.9			

Table 5 Characteristic compressive strength (f_k) values for 100mm units laid flat								
Using a designation M4 mortar								
Unit strength (N/mm²)								
Wall width	**3.6**	**4.2**	**7.3**	**10.4**	**17.5**	**22.5**	**30.0**	**40.0**
190mm	2.3	2.5	3.7	4.7	6.8	8.1	9.9	12.2
215mm	2.3	2.6	3.8	4.9	7.1	8.4	10.3	12.5

Table 6 Characteristic compressive strength (f_k) values for 100mm units laid flat								
Using a designation M6 mortar								
Unit strength (N/mm²)								
Wall width	**3.6**	**4.2**	**7.3**	**10.4**	**17.5**	**22.5**	**30.0**	**40.0**
190mm	2.5	2.8	4.2	5.3	7.7	9.2	11.3	13.7
215mm	2.5	2.9	4.3	5.5	7.9	9.5	11.6	14.2

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