

## H + H UK Ltd

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Agrément Certificate  
**01/3816**  
Product Sheet 3

## H + H AIRCRETE BLOCKS AND THIN-JOINT SYSTEM

### H + H SOLAR GRADE

This Agrément Certificate Product Sheet<sup>(1)</sup> relates to H + H Solar Grade, general purpose, autoclaved aerated concrete (aircrete) building blocks for use above and below the damp-proof course in the construction of loadbearing and non-loadbearing solid internal and external walls, and inner and outer leaves of cavity walls.

(1) Hereinafter referred to as 'Certificate'.

#### CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.



#### KEY FACTORS ASSESSED

**Strength and stability** — the blocks have a mean compressive strength of 2.9 N·mm<sup>-2</sup> or 3.6 N·mm<sup>-2</sup> and are suitable for use in walls designed and constructed in accordance with BS 5628-1 : 2005, BS 5628-3 : 2005 or BS EN 1996 1-1 : 2005, BS EN 1996-2 : 2006 and BS EN 1996-3 : 2006 and their UK National Annexes, and PD 6697 : 2010 (see section 6 of this Certificate).

**Thermal performance** — the thermal conductivity ( $\lambda$  value) of the blocks may be taken as 0.11 W·m<sup>-1</sup>·K<sup>-1</sup><sup>(1)</sup> in 'protected blockwork' applications (see section 7).

(1) 0.10 W·m<sup>-1</sup>·K<sup>-1</sup> ( $\lambda_{10, dry}$ ), declared dry value.

**Sound insulation** — the blocks may be used in flanking elements to separating walls and floors (see section 8).

**Properties in relation to fire** — the blocks are 'non-combustible' and classified as Class A1 as defined in the national Building Regulations (see section 9).

**Use below the damp-proof course** — the blocks are suitable for use in situations up to and including MX3.2 (as defined in BS EN 1996-2 : 2006), or A3 (as defined in PD 6697 : 2010 or BS 5628-3 : 2005), and for use in classes DS1, DS2, DS3 and DS4 of soil and groundwater, as defined in BRE Special Digest 1 : 2005 (see section 10 of this Certificate).

**Durability** — walls constructed using the blocks will have a durability equivalent to walls of traditional masonry (see section 15).



The BBA has awarded this Certificate to the company named above for the products described herein. These products have been assessed by the BBA as being fit for their intended use provided they are installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Simon Wroe  
Head of Approvals — Engineering

Claire Curtis-Thomas  
Chief Executive

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The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at [www.bbacerts.co.uk](http://www.bbacerts.co.uk)

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

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# Regulations

In the opinion of the BBA, H + H Solar Grade, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



## The Building Regulations 2010 (England and Wales) (as amended)

Requirement:	A1	Loading
Requirement:	A2	Ground movement
Comment:	Walls designed and constructed from the products can satisfy these Requirements. See sections 4, 6.1 and 6.2 and the <i>Installation</i> part of this Certificate.	
Requirement:	B3(1)(2)(3)(a)(4)	Internal fire spread (structure)
Requirement:	B4(1)	External fire spread
Comment:	The products can contribute to a construction satisfying these Requirements. See sections 9.2 and 9.3 of this Certificate.	
Requirement:	C2(b)	Resistance to moisture
Comment:	Suitably-finished walls designed and constructed from the products can contribute to satisfying this Requirement. See sections 4.4 and 11 of this Certificate.	
Requirement:	C2(c)	Resistance to moisture
Comment:	Walls designed and constructed from the products will contribute to limiting the risk of condensation. See sections 12.1 and 12.2 of this Certificate.	
Requirement:	E1	Protection against sound from other parts of the building and adjoining buildings
Requirement:	E2(a)	Protection against sound within a dwelling-house etc
Comment:	Walls designed and constructed from the products can satisfy these Requirements. See sections 8.1, 8.3 and 8.4 of this Certificate.	
Requirement:	L1(a)(i)	Conservation of fuel and power
Comment:	Walls designed and constructed from the products will contribute to limiting heat loss through walls. See sections 7.2 and 7.3 of this Certificate.	
Regulation:	7	Materials and workmanship
Comment:	The products are acceptable. See section 15 and the <i>Installation</i> part of this Certificate.	
Regulation:	26	CO <sub>2</sub> emission rates for new buildings
Regulation:	26A	Fabric energy efficiency rates for new dwellings (applicable to England only)
Regulation:	26A	Primary energy consumption rates for new buildings (applicable to Wales only)
Regulation:	26B	Fabric performance values for new dwellings (applicable to Wales only)
Comment:	The products can contribute to satisfying these Regulations when compensating fabric/services measures are taken. See sections 7.2 and 7.3 of this Certificate.	



## The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)	Durability, workmanship and fitness of materials
Comment:	The use of the products satisfies the requirements of this Regulation. See section 15 and the <i>Installation</i> part of this Certificate.	
Regulation:	9	Building standards applicable to construction
Standard:	1.1(a)(b)	Structure
Comment:	Walls designed and constructed from the products can satisfy this Standard, with reference to clauses 1.1.1 <sup>(1)(2)</sup> to 1.1.3 <sup>(1)(2)</sup> . See sections 4, 6.1 and 6.2 and the <i>Installation</i> part of this Certificate.	
Standard:	2.1	Compartmentation
Standard:	2.2	Separation
Standard:	2.3	Structural protection
Standard:	2.4	Cavities
Standard:	2.6	Spread to neighbouring buildings
Comment:	The products can contribute to a construction satisfying these Standards, with reference to clauses 2.1.1 <sup>(2)</sup> , 2.1.4 <sup>(2)</sup> , 2.1.5 <sup>(2)</sup> , 2.1.8 <sup>(2)</sup> , 2.1.9 <sup>(2)</sup> , 2.1.10 <sup>(2)</sup> , 2.1.11 <sup>(2)</sup> , 2.1.12 <sup>(2)</sup> , 2.1.13 <sup>(2)</sup> , 2.1.15 <sup>(2)</sup> , 2.2.1 to 2.2.5 <sup>(1)(2)</sup> , 2.2.8 <sup>(1)</sup> , 2.2.10 <sup>(1)</sup> , 2.3.1 <sup>(1)(2)</sup> to 2.3.5 <sup>(1)(2)</sup> , 2.4.2 <sup>(1)(2)</sup> , 2.6.1 <sup>(1)(2)</sup> , 2.6.5 <sup>(1)</sup> , 2.6.6 <sup>(1)(2)</sup> and 2.6.7 <sup>(2)</sup> . See sections 9.2 and 9.3 of this Certificate.	
Standard:	3.10	Precipitation
Comment:	Suitably-finished walls designed and constructed from the products can contribute to satisfying this Standard, with reference to clauses 3.10.1 <sup>(1)(2)</sup> , 3.10.2 <sup>(1)(2)</sup> , 3.10.3 <sup>(1)(2)</sup> to 3.10.6 <sup>(1)(2)</sup> . See sections 4.4 and 11 of this Certificate.	
Standard:	3.15	Condensation
Comment:	Walls designed and constructed using the products can contribute to limiting the risk of condensation, with reference to clauses 3.15.1 <sup>(1)(2)</sup> , 3.15.4 <sup>(1)(2)</sup> and 3.15.5 <sup>(1)(2)</sup> . See sections 12.1 and 12.2 of this Certificate.	
Standard:	5.1	Noise separation
Comment:	Walls designed and constructed from the products can satisfy this Standard, with reference to clauses 5.1.1 <sup>(1)(2)</sup> to 5.1.5 <sup>(1)(2)</sup> . See sections 8.2 and 8.3 of this Certificate.	
Standard:	5.2	Noise reduction between rooms
Comment:	Walls designed and constructed from the products can satisfy this Standard, with reference to clauses 5.2.1 <sup>(1)(2)</sup> and 5.2.2 <sup>(1)(2)</sup> . See sections 8.2 and 8.3 of this Certificate.	

Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		Walls designed and constructed from the products can contribute to satisfying these Standards, with reference to clauses 6.1.1 <sup>(1)</sup> , 6.1.2 <sup>(1)</sup> , 6.1.4 <sup>(2)</sup> , 6.1.6 <sup>(1)</sup> , 6.2.1 <sup>(1)(2)</sup> , 6.2.3 <sup>(1)</sup> , 6.2.4 <sup>(2)</sup> , 6.2.5 <sup>(2)</sup> , 6.2.6 <sup>(1)</sup> , 6.2.7 <sup>(1)</sup> , 6.2.8 <sup>(1)(2)</sup> , 6.2.9 <sup>(1)(2)</sup> , 6.2.10 <sup>(2)</sup> , 6.2.11 <sup>(1)(2)</sup> , 6.2.12 <sup>(1)(2)</sup> and 6.2.13 <sup>(1)(2)</sup> . See sections 7.2 and 7.3 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The products can contribute to satisfying the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.
Regulation:	12	<b>Building standards applicable to conversions</b>
Comment:		Comments made in relation to the products under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 <sup>(1)(2)</sup> and Schedule 6 <sup>(1)(2)</sup> . (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



## The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation:	23(a)(i)(iii)(b)	<b>Fitness of materials and workmanship</b>
Comment:		The products are acceptable. See section 15 and the <i>Installation</i> part of this Certificate.
Regulation:	28(b)	<b>Resistance to ground moisture and weather</b>
Comment:		Suitably-finished walls designed and constructed from the products can contribute to satisfying this Regulation. See sections 4.4 and 11 of this Certificate.
Regulation:	29	<b>Condensation</b>
Comment:		Walls designed and constructed using the products can contribute to limiting the risk of interstitial condensation. See section 12.2 of this Certificate.
Regulation:	30(a)	<b>Stability</b>
Comment:		Walls designed and constructed from the products can satisfy this Regulation. See sections 4, 6.1 and 6.2 and the <i>Installation</i> part of this Certificate.
Regulation:	35(1)(2)(3)(4)	<b>Internal fire spread – Structure</b>
Regulation:	36(a)	<b>External fire spread</b>
Comment:		The products can contribute to a construction satisfying these Regulations. See sections 9.2 to 9.3 of this Certificate.
Regulation:	39(a)(i)	<b>Conservation measures</b>
Comment:		Walls designed and constructed from the products can contribute to limiting heat loss through walls. See sections 7.2 and 7.3 of this Certificate.
Regulation:	40(2)	<b>Target carbon dioxide emission rate</b>
Comment:		Walls designed and constructed using the products can contribute to meeting this Regulation. See sections 7.2 and 7.3 of this Certificate.
Regulation:	49	<b>Protection against sound from other parts of the building and from adjoining buildings</b>
Comment:		Walls designed and constructed from the products can satisfy this Regulation. See sections 8.1 and 8.4 of this Certificate.
Regulation:	50(a)	<b>Protection against sound within a dwelling or room for residential purposes</b>
Comment:		Walls designed and constructed from the products may be used to satisfy this Regulation. See sections 8.1 and 8.4 of this Certificate.

### Construction (Design and Management) Regulations 2015

### Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See sections: 1 *Description* (1.2) and 3 *Delivery and site handling* (3.1) of this Certificate.

## Additional Information

### NHBC Standards 2017

NHBC accepts the use of H + H Solar Grade, provided it is installed, used and maintained in accordance with this Certificate, in relation to *NHBC Standards*, Chapters 6.1 *External masonry walls* and 6.3 *Internal walls*.

### CE marking

The Certificate holder has taken the responsibility of CE marking the products in accordance with harmonised European Standard BS EN 771-4 : 2011. An asterisk (\*) appearing in this Certificate indicates that data shown are given in the manufacturer's Declaration of Performance.

### Constructive Details Ltd

The blocks described in this Certificate have been included in an assessment of thermal bridging details by Constructive Details Ltd (CDL). The handbook containing these details is free to download from the CDL website at [www.constructivedetails.co.uk](http://www.constructivedetails.co.uk)

# Technical Specification

## 1 Description

1.1 H + H Solar Grade are building blocks comprising cement, lime, sand and pulverized fuel ash, with aluminium powder used as an aerating agent.

1.2 The blocks are available as wall type only and are supplied with the characteristics detailed in Table 1.

Table 1 Block characteristics (all blocks)

Gross dry density (kg·m <sup>-2</sup> )	460*
Dry density range (kg·m <sup>-2</sup> )	410 to 510
Mean compressive strength (N·mm <sup>-2</sup> )	2.9*
Minimum individual block compressive strength (N·mm <sup>-2</sup> ) <sup>(1)</sup>	2.3

(1) Higher strength blocks are available, details of which can be obtained from the Certificate holder.

Table 2 Block dimensions

	Face size (mm)	Thickness (mm)
Celcon Blocks	440 x 215	Several available <sup>(1)</sup>
Celcon Plus Blocks	630 x 215	100, 140, 215
Jumbo Bloks	630 x 250	100, 140

(1) A typical weight for a 440 mm by 215 mm by 100 mm block is 5 kg (block weight at typical moisture content when laid).

## 2 Manufacture

2.1 The blocks are manufactured by mixing the raw materials into a slurry which is discharged into moulds. The slurry rises and sets to form a cake which is cut into blocks of the required dimensions using tensioned wires. Curing takes place in autoclaves under steam and pressure to increase the physical and chemical stability, before blocks are removed and packaged.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

2.3 The management system of H + H UK Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by BSI (Certificate IMR 511419).

## 3 Delivery and site handling

3.1 The blocks are supplied shrink-wrapped in standard packs, or banded to pallets (to order) suitable for off-loading with mechanical grabs or fork-lift trucks.

3.2 The blocks must be stored clear of the ground on a firm, level surface and protected from rain and water from the ground. The shrink-wrapping should be kept in place until the blocks are required for use.

# Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on H + H Solar Grade.

## Design Considerations

## 4 Use



4.1 H + H Solar Grade are satisfactory for use in the construction of loadbearing and non-loadbearing solid internal and external walls above and below the damp-proof course, and inner and outer leaves of cavity walls.

4.2 The blocks comply with the requirements of BS EN 771-4 : 2011.

4.3 The blocks should be specified in accordance with BS EN 771-4 : 2011 and BS 6073-2 : 2008.

4.4 Walls must be designed and constructed in accordance with BS 5250 : 2011, BS 5628-1 : 2005, BS 5628-3 : 2005 or BS EN 1996-1-1 : 2005, BS EN 1996-1-2 : 2005, BS EN 1996-2 : 2006 and BS EN 1996-3 : 2006 and their UK National Annexes, and PD 6697 : 2010.

## 5 Practicability of installation

The products are designed to be installed by a competent general builder, or a contractor, experienced with these types of products.

## 6 Strength and stability

### General



6.1 Coursing should be set out such that bearings are not less than 100 mm in length or the length required by the design calculation, whichever is the greater. Where possible, the masonry should be set out to provide a full block under a bearing. Pressed steel lintels should have a bearing of not less than 150 mm.

### Concentrated loads



6.2 Increased local stresses may be permitted in the masonry provided the member applying the load is sensibly rigid and of appropriate bearing area or a suitable spreader is introduced. Design should be in accordance with BS 5628-1 : 2005 or BS EN 1996-1-1 : 2005, clause 6.1.3 and its UK National Annex.

6.3 For low-rise buildings, the design of the masonry walls should be in accordance with BS 8103-2 : 2013.

6.4 Joist hangers may be used provided that:

- when designing in accordance with BS 5628-1 : 2005 or BS EN 1996-1-1 : 2005 and its UK National Annex and/or PD 6697 : 2010, the full effect of the maximum eccentric load at the joist hanger detail is taken into account. It should be assumed that joist hangers are not effectively rigid when calculating the local bearing stress under single hangers, and the effective load applied via the hanger should be determined by an acceptable elastic theory
- they are compatible with aircrete blocks with mean compressive strengths of  $2.9 \text{ N}\cdot\text{mm}^{-2}$  or above. The dimensions used in the design and the manufacture from appropriate materials are set out in BS 5628-1 : 2005 or BS EN 845-1 : 2013 and BS EN 1996-2 : 2006, Annex C, Table C1 and its UK National Annex
- supervision and workmanship<sup>(1)</sup> are adequate, to ensure that:
  - installation is in accordance with the hanger manufacturer's instructions
  - the masonry course to carry the hangers is level and at the correct height, any adjustments being made before the course is laid
  - the hanger bears directly on a complete block with the back plate flat against the block
  - the gap between the joist and the back plate does not exceed 6 mm
  - construction complies with the conditions used in the design and restraint-type hangers are used when specified
  - the blockwork above the hanger is completed and matured before any load is applied to the hanger.

(1) Further guidance may be obtained from the BRE *Good Building Guide 21 (1996): Joist hangers*.

6.5 The characteristic initial shear strength of designed masonry mortars in combination with the blocks must be as follows, in accordance with BS EN 998-2 : 2016:

- $0.15 \text{ N}\cdot\text{mm}^2$  for general purposes and lightweight mortar
- $0.3 \text{ N}\cdot\text{mm}^2$  for thin layer mortar.

6.6 Flexural strength values  $f_{xk1}$  and  $f_{xk2}$  to be used for general purpose mortars are given in BS EN 1996-1-1 : 2005 and its UK National Annex, Table NA.6.

## 7 Thermal performance

7.1 Thermal transmittance (U value) calculations of walls should be carried out in accordance with BS EN ISO 6946 : 2007 and BRE Report BR 443 : 2006. The conductivity of the blocks should be taken as  $0.11 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$  for 'protected blockwork',  $0.12 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$  for external blockwork exposed (eg not protected by a cladding system) or below the dpc but above ground level, and  $0.17 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$  for blockwork below ground level.



7.2 Walls incorporating the blocks and a brick outer leaf will need to incorporate thermal insulation as necessary to achieve or improve on (as appropriate) the following 'mean' design U values specified in:

**England** —  $0.18 - 0.35 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$

**Wales** —  $0.26 - 0.35 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$

**Scotland** —  $0.19 - 0.30 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$

**Northern Ireland** —  $0.26 - 0.35 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ .

7.3 The products can contribute to maintaining continuity of thermal insulation at junctions between elements and around openings. Guidance on limiting heat loss by air infiltration can be found in:

**England and Wales** — Accredited Construction Details (version 1.0)

**Scotland** — Accredited Construction Details (Scotland)

**Northern Ireland** — Accredited Construction Details (version 1.0).

7.4 Further information can be found in the NHBC Foundation's *A practical guide to building airtight dwellings (NF16)* (September 2010).

## 8 Sound insulation

### Walls flanking a separating wall or floor



8.1 The blocks can form the inner leaf of an external masonry cavity wall where any leaf surface mass, excluding finishes, is acceptable (for example, where there is no separating floor), as described in the following documents:

**England and Wales** — Approved Document E, Sections 2 and 3

**Northern Ireland** — Technical Booklet G, Sections 2 and 3.



8.2 The blocks can form the inner leaf of an external masonry cavity wall flanking a Type 2 separating wall where there is no separating floor and the minimum block density is  $450 \text{ kg}\cdot\text{m}^{-3}$  as described in the Building Standards Division Publication *Example constructions and generic internal constructions*, Section *Generic Internal Constructions*, referred to in clause 5.1.3 of the Technical Handbooks.

### Internal walls — new buildings and conversions



8.3 Internal walls between a bedroom, or a room containing a toilet, and other rooms (in England and Wales) or an internal wall between an apartment in a dwelling and a room in a residential building which is capable of being used for sleeping (in Scotland), are acceptable as follows:

**England and Wales** — wall Type D described in paragraph 5.20 of Approved Document E and a wall meeting the minimum sound insulation values in Table 0.2 of Approved Document E

**Scotland** — wall Types 4 and 4A described in the *Generic Internal Constructions* referred to in clause 5.2.2 of the Technical Handbooks and walls meeting the minimum sound insulation values in clause 5.2.1 of the Technical Handbooks.



8.4 The blocks can form an internal partition abutting a Type 1, 2 or 4 separating wall or a Type 1 or 2 separating floor if the minimum surface mass, excluding finishes, of the partition is not less than  $120 \text{ kg}\cdot\text{m}^{-2}$ . Guidance on circumstances (for example, where there is no separating floor) where any surface mass can be acceptable can be found in the following documents:

**England and Wales** — Approved Document E, Sections 2 and 3

**Northern Ireland** — Technical Booklet G, Sections 2 and 3.

## 9 Properties in relation to fire

9.1 The blocks have a reaction to fire classification\* of A1 to BS EN 13501-1: 2007 and are classified as non-combustible as defined in the national Building Regulations.



9.2 The fire resistance of walls constructed with autoclaved aerated concrete masonry can be determined by reference to:

- BS EN 1996-1-2 : 2005, Annex B, Tables NB 4.6 and its UK National Annex, Tables NA 3.10 to NA 3.12
- BRE Report BR 128 : 1988.

9.3 With regard to the placing of cavity barriers, the surface of the products may be taken as Class 0.

9.4 The fire performance and suitability of wall ties and anchors for a specific construction should be confirmed with the manufacturer of these products.

## 10 Use below the damp-proof course

10.1 The blocks are resistant to freeze/thaw conditions likely to occur below the dpc and are therefore suitable for use in situations up to and including MX3.2 (as defined in BS EN 1996-2 : 2006, Annex A, Table A1 and its UK National Annex), or A3 (as defined in BS 5628-3 : 2005 Table 12 or PD 6697 : 2010, Table 15), that is, where there is a high risk of saturation with freezing.

10.2 The blocks are suitable for use in classes DS1, DS2, DS3 and DS4 of soil or groundwater, as defined in BRE Special Digest 1 : 2005.

10.3 In unusual soil and/or groundwater conditions, eg soils contaminated by industrial waste or highly acidic soils, expert advice should be obtained.

## 11 Resistance to moisture



11.1 Walls built from the blocks should be designed and constructed in accordance with:

**England and Wales** — Approved Document C

**Scotland** — Mandatory Standard 3.10, clauses 3.10.1<sup>(1)(2)</sup> to 3.10.4<sup>(1)(2)</sup> and 3.10.6<sup>(1)(2)</sup>

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

**Northern Ireland** — Technical Booklet C.

11.2 For single leaf constructions, the minimum block thicknesses to be used in solid rendered external walls are given in Table 3.

Table 3 Minimum block thicknesses<sup>(1)</sup>

Exposure <sup>(2)</sup>	Minimum block thickness (mm)
Severe	215
Moderate	190
Sheltered	90

(1) Increased thicknesses may be necessary to meet other requirements such as structural stability, thermal performance and sound insulation (see sections 4.4, 7 and 8 of this Certificate).

(2) The exposure is defined in PD 6697 : 2010.

## 12 Condensation risk



12.1 Walls will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed  $0.7 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$  ( $1.2 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$  in Scotland) at any point and the junctions with floors, roof and openings comply with section 7.3.



12.2 Walls will adequately limit the risk of interstitial condensation when they are constructed in accordance with BS 5250 : 2011 (Section 4 and Annexes D and G). For the purpose of calculations, the block's water vapour resistance factor ( $\mu$ ) may be taken as 10 (a resistivity of  $50 \text{ MN}\cdot\text{s}^{-1}\cdot\text{g}^{-1}\cdot\text{m}^{-1}$ ) as given in BS EN ISO 10456 : 2007, Table 4.

12.3 The water vapour resistance ( $\mu$ ) for the block is  $5^{(1)}/10^{(2)}$  in accordance with BS EN 1745 : 2012.

(1) The diffusion behaviour is into a building block.

(2) The diffusion behaviour is out of the building block.

12.4 Additional guidance can be found in BRE Report BR 262 : 2002.

## 13 Movement

13.1 The maximum declared\* moisture movement of the blocks may be taken as a nominal value of  $0.4 \text{ mm}\cdot\text{m}^{-1}$ .

13.2 Movement may be accommodated using movement joints or bed joint reinforcement, or a combination of the two. When bed joint reinforcement is intended to contribute towards accommodation of movement, it should be designed and installed strictly in accordance with the Certificate holder's instructions.

13.3 Movement joints must be provided in accordance with BS 5628-3 : 2005 or clause 2.3.4 of BS EN 1996-2 : 2006 and clause NA.2.1 of its UK National Annex, Table NA.1 of PD 6697 : 2010 and the Certificate holder's instructions.

13.4 In external walls containing openings, movement joints may need to be provided at more frequent intervals, or the masonry above and below the opening may need to be reinforced to restrain movement. Particular attention should be paid to long, low, horizontal panels of masonry, eg those under windows.

## 14 Maintenance

As the blocks are generally concealed and have suitable durability (see section 15), maintenance is not required.

## 15 Durability



Autoclaved aerated concrete (Aircrete) is a durable material. Walls constructed from the products will have durability equivalent to walls of traditional masonry and will fulfil their intended function for the life of the building in which they have been installed.

### 16 General

16.1 Installation of H + H Solar Grade must be carried out strictly in accordance with BS 8000-0 : 2014, BS 8000-3 : 2001, the Certificate holder's instructions and this Certificate.

16.2 Mortar must not be stronger than the blocks, using the definitions in:

- BS EN 1996-1-1 : 2005 and Table NA.2 of its UK National Annex, or
- PD 6697 : 2010, Table 15, or
- BS 5628-3 : 2005, Table 13.

### 17 Chasing

17.1 The maximum depth of horizontal and vertical chases allowed without calculation is given in clauses 8.6.1 to 8.6.3 of BS EN 1996-1-1 : 2005 and Tables NA.11 and NA.12 of its UK National Annex.

17.2 In accordance with BS 5628-3 : 2005 or BS EN 1996-1-2 : 2005 section 5, vertical chases in the masonry should not exceed one third of the thickness of the leaf, and horizontal chases should not exceed one sixth of the thickness of the leaf at any point.

### 18 Rendering and plastering

Rendering and plastering must be carried out in accordance with BS EN 13914-1 : 2016 and BS EN 13914-2 : 2016. The Certificate holder should be consulted regarding suitable finishes and low water-vapour-permeability renders. The moisture condition of the blocks should be considered before the finishes are applied.

### 19 Fixings

19.1 Cut nails or proprietary nails may be used for lightweight fixtures. Screws and plugs, nailable expansion fixings or helical fixings should be used for heavier fixtures. All fixings must penetrate a minimum of 50 mm into the blocks.

19.2 Fixings must be selected and installed in accordance with the fixing manufacturer's instructions, paying particular attention to drilling depth, drill diameter, minimum spacings and minimum edge distance.

19.3 Mean pull-out loads for certain proprietary fixings used with the blocks can be obtained from the Certificate holder. In each case, a safety factor of 4 is recommended to establish a safe working load.

## Technical Investigations

### 20 Tests

20.1 Tests were carried out and the results assessed to determine:

- dimensional accuracy
- dry density
- compressive strength
- drying shrinkage.

20.2 An assessment of durability of the products was made, based on data resulting in the issue of a previous Agrément Certificate.

### 21 Investigations

The manufacturing process was evaluated, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.



## Bibliography

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- BS 5628-1 : 2005 *Code of practice for the use of masonry — Structural use of unreinforced masonry*
- BS 5628-3 : 2005 *Code of practice for the use of masonry — Materials and components, design and workmanship*
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- BS 8000-0 : 2014 *Workmanship on construction sites — Introduction and general principles*
- BS 8000-3 : 2001 *Workmanship on building sites — Code of practice for masonry*
- BS 8103-2 : 2013 *Structural design of low-rise buildings — Code of practice for masonry walls for housing*
- BS EN 771-4 : 2011 + A1 : 2015 *Specification for masonry units — Autoclaved aerated concrete masonry units*
- BS EN 845-1 : 2013 + A1 : 2016 *Specification for ancillary components for masonry — Ties, tension straps, hangers and brackets*
- BS EN 998-2 : 2016 *Specification for mortar masonry — Masonry mortar*
- BS EN 1745 : 2012 *Masonry and masonry products — Methods for determining thermal properties*
- BS EN 1996-1-1 : 2005 + A1 : 2012 *Eurocode 6: Design of masonry structures — General rules for reinforced and unreinforced masonry structures*
- NA to BS EN 1996-1-1 : 2005 + A1 : 2012 *UK National Annex to Eurocode 6: Design of masonry structures — General rules for reinforced and unreinforced masonry structures*
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- BS EN 13501-1 : 2007 + A1 : 2009 *Fire classification of construction products and building elements — Classification using test data from reaction to fire tests*
- BS EN 13914-1 : 2016 *Design, preparation and application of external rendering and internal plastering — External rendering*
- BS EN 13914-2 : 2016 *Design, preparation and application of external rendering and internal plastering — Design considerations and essential principles for internal plastering*
- BS EN ISO 6946 : 2007 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*
- BS EN ISO 9001 : 2008 *Quality management systems — Requirements*
- BS EN ISO 10456 : 2007 *Building materials and products — Hygrothermal properties — Tabulated design values and procedures for determining declared and design thermal values*
- BRE Report (BR 128 : 1988) *Guidelines for the construction of fire-resisting structural elements*
- BRE Report (BR 262 : 2002) *Thermal insulation: avoiding risks*
- BRE Report (BR 443 : 2006) *Conventions for U-value calculations*
- BRE Special Digest 1 : 2005 *Concrete in aggressive ground (SD1)*
- PD 6697 : 2010 *Recommendations for the design of masonry structures to BS EN 1996-1-1 and BS EN 1996-2*

## 22 Conditions

22.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page — no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- is valid only within the UK
- has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

22.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

22.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

22.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

22.5 In issuing this Certificate, the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

22.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.