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**Agrément Certificate**

**11/4869**

Product Sheet 5

### MANNOK AIRCRETE THERMAL BLOCKS

### MANNOK AIRCRETE HIGH TEN BLOCKS

This Agrément Certificate Product Sheet<sup>(1)</sup> relates to Mannok Aircrete High Ten blocks, 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 the 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 10.4 N·mm<sup>-2</sup> and are suitable for use in walls designed and constructed in accordance with 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 : 2019 (see section 6).

**Thermal performance** — the thermal conductivity ( $\lambda$  value) of the blocks may be taken as 0.21 W·m<sup>-1</sup>·K<sup>-1</sup>(1) in 'protected blockwork' applications (see section 7).

(1) 0.23 W·m<sup>-1</sup>·K<sup>-1</sup> for 'exposed blockwork' applications.

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

**Performance in relation to fire** — the blocks are classified as Class A1 for reaction to fire in accordance with BS EN 13501-1 : 2018, and their use is unrestricted by 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, Annex A, Table A.1 and its UK National Annex, and for use in classes DS1, DS2 and DS3 of soil and groundwater as defined in BRE Special Digest 1 : 2005 (see section 10).

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



The BBA has awarded this Certificate to the company named above for the product described herein. This product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of First issue: 11 May 2022

Hardy Giesler  
Chief Executive Officer

*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 MUST check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.  
Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.*

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## Regulations

In the opinion of the BBA, Mannok Aircrete High Ten blocks, 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)

<b>Requirement:</b> A1	<b>Loading</b>
<b>Requirement:</b> A2	<b>Ground movement</b>
Comment:	Walls designed for, and constructed from the product satisfy these Requirements. See sections 4, 6.1 and 6.2 and the <i>Installation</i> part of this Certificate.
<b>Requirement:</b> B2(1)	<b>Internal fire spread (linings)</b>
Comment:	The product is unrestricted by this Requirement. See sections 9.1 to 9.3 of this Certificate.
<b>Requirement:</b> B3(1)(2)(3)(a)(4)	<b>Internal fire spread (structure)</b>
<b>Requirement:</b> B4(1)	<b>External fire spread</b>
Comment:	The product can contribute to a construction satisfying these Requirements. See sections 9.1 to 9.3 of this Certificate.
<b>Requirement:</b> C2(a)	<b>Resistance to moisture</b>
Comment:	The product can contribute to satisfying this Requirement. See sections 10.1 and 10.2 of this Certificate.
<b>Requirement:</b> C2(b)	<b>Resistance to moisture</b>
Comment:	Suitably-finished walls designed for, and constructed from the product can contribute to meeting this Requirement. See sections 11.1 and 11.2 of this Certificate.
<b>Requirement:</b> C2(c)	<b>Resistance to moisture</b>
Comment:	Walls designed for, and constructed from the product will contribute to limiting the risk of condensation. See sections 12.1 and 12.3 of this Certificate.
<b>Requirement:</b> E1	<b>Protection against sound from other parts of the building and adjoining buildings</b>
<b>Requirement:</b> E2(a)	<b>Protection against sound within a dwelling-house etc</b>
Comment:	Walls designed for, and constructed from the product can satisfy these Requirements. See sections 8.1 to 8.3, 8.5 and 8.6 of this Certificate.
<b>Requirement:</b> L1(a)(i)	<b>Conservation of fuel and power</b>
Comment:	Walls designed for, and constructed from the product will contribute to limiting heat loss through walls. See section 7.1 of this Certificate.
<b>Regulation:</b> 7(1)	<b>Materials and workmanship</b>
Comment:	The product is acceptable. See section 15 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b> 7(2)	<b>Materials and workmanship</b>
Comment:	The product is unrestricted by this Regulation. See sections 9.1 to 9.3 of this Certificate.

<b>Regulation:</b>	<b>26</b>	<b>CO<sub>2</sub> emission rates for new buildings</b>
<b>Regulation:</b>	<b>26A</b>	<b>Fabric energy efficiency rates for new dwellings (applicable to England only)</b>
<b>Regulation:</b>	<b>26A</b>	<b>Primary energy consumption rates for new buildings (applicable to Wales only)</b>
<b>Regulation:</b>	<b>26B</b>	<b>Fabric performance values for new dwellings (applicable to Wales only)</b>
<b>Comment:</b>		The product can contribute to satisfying these Regulations when compensating fabric/services measures are taken. See section 7.1 of this Certificate.



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

<b>Regulation:</b>	<b>8(1)</b>	<b>Durability, workmanship and fitness of materials</b>
<b>Comment:</b>		The use of the product satisfies the requirements of this Regulation. See section 15 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	<b>9</b>	<b>Building standards applicable to construction</b>
<b>Standard:</b>	<b>1.1(a)(b)</b>	<b>Structure</b>
<b>Comment:</b>		Walls designed for, and constructed from the product 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.
<b>Standard:</b>	<b>2.1</b>	<b>Compartmentation</b>
<b>Standard:</b>	<b>2.2</b>	<b>Separation</b>
<b>Standard:</b>	<b>2.3</b>	<b>Structural protection</b>
<b>Standard:</b>	<b>2.4</b>	<b>Cavities</b>
<b>Standard:</b>	<b>2.6</b>	<b>Spread to neighbouring buildings</b>
<b>Comment:</b>		The product 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 <sup>(1)(2)</sup> 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 9.1 to 9.3 of this Certificate.
<b>Standard:</b>	<b>2.5</b>	<b>Internal linings</b>
<b>Comment:</b>		The system is unrestricted by 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> , 2.2.6 <sup>(1)</sup> , 2.2.7 <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> , 2.4.1 <sup>(1)(2)</sup> , 2.4.2 <sup>(1)(2)</sup> , 2.5.1 <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 9.1 to 9.3 of this Certificate.
<b>Standard:</b>	<b>3.4</b>	<b>Moisture from the ground</b>
<b>Comment:</b>		The product can contribute to satisfying this Requirement. See sections 10.1 and 10.2 of this Certificate.
<b>Standard:</b>	<b>3.10</b>	<b>Precipitation</b>
<b>Comment:</b>		Suitably-finished walls designed for and constructed from the product can contribute to satisfying this Standard, with reference to clauses 3.10.1 <sup>(1)(2)</sup> , 3.10.2 <sup>(1)(2)</sup> and 3.10.3 <sup>(1)(2)</sup> to 3.10.6 <sup>(1)(2)</sup> . See sections 4.4 and 11 of this Certificate.
<b>Standard:</b>	<b>3.15</b>	<b>Condensation</b>
<b>Comment:</b>		Walls designed for, and constructed from the product 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 12.2 and 12.3 of this Certificate.
<b>Standard:</b>	<b>5.1</b>	<b>Noise separation</b>
<b>Comment:</b>		Walls designed for, and constructed from the product 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 8.1, 8.4 and 8.5 of this Certificate.

Standard:	5.2	Noise reduction between rooms
Comment:		Walls designed for, and constructed from the product 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 8.1, 8.4 and 8.5 of this Certificate.
Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		Walls designed for, and constructed from the product can contribute to satisfying these Standards, with reference to clauses 6.1.1 <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>(2)</sup> , 6.2.9 <sup>(1)(2)</sup> , 6.2.10 <sup>(1)</sup> , 6.2.11 <sup>(1)(2)</sup> , 6.2.12 <sup>(1)(2)</sup> and 6.2.13 <sup>(1)(2)</sup> . See section 7.1 of this Certificate.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The product can contribute to meeting 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.
<b>Regulation:</b>	<b>12</b>	<b>Building standards applicable to conversions</b>
Comment:		All comments given for this product 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)

<b>Regulation:</b>	<b>23(a)(i)(iii)(b)</b>	<b>Fitness of materials and workmanship</b>
Comment:		The product is acceptable. See section 15 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	<b>28</b>	<b>Resistance to moisture and weather</b>
Comment:		Suitably-finished walls designed for, and constructed from the product can contribute to meeting this Regulation. See sections 10.1, 10.2 and 11 of this Certificate.
<b>Regulation:</b>	<b>29</b>	<b>Condensation</b>
Comment:		Walls designed for, and constructed using the product can contribute to limiting the risk of condensation. See section 12.3 of this Certificate.
<b>Regulation:</b>	<b>30(a)(b)</b>	<b>Stability</b>
Comment:		Walls designed for, and constructed from the product can meet this Regulation. See sections 4, 6.1 and 6.2 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	<b>34(a)(b)</b>	<b>Internal fire spread — Linings</b>
Comment:		The system is unrestricted by this Regulation. See sections 9.1 to 9.3 of this Certificate.
<b>Regulation:</b>	<b>35</b>	<b>Internal fire spread — Structure</b>
<b>Regulation:</b>	<b>36(a)</b>	<b>External fire spread</b>
Comment:		The product can contribute to a construction meeting these Regulations. See sections 9.1 to 9.3 of this Certificate.
<b>Regulation:</b>	<b>39(a)(i)</b>	<b>Conservation measures</b>
Comment:		Walls designed for, and constructed from the product can contribute to limiting heat loss through walls. See section 7.1 of this Certificate.
<b>Regulation:</b>	<b>40(2)</b>	<b>Target carbon dioxide Emissions Rate</b>
Comment:		Walls designed for, and constructed from the product can contribute to satisfying this Regulation. See section 7.1 of this Certificate.

<b>Regulation:</b> 49	<b>Protection against sound from other parts of the building and adjoining buildings</b>
Comment:	Walls designed for, and constructed from the product can meet these Requirements. See sections 8.1 to 8.3 and 8.6 of this Certificate.
<b>Regulation:</b> 50(a)	<b>Protection against sound within a dwelling or room for residential purposes</b>
Comment:	Walls designed and constructed from the product can meet these Requirements. See sections 8.1 to 8.3 and 8.6 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 2022

In the opinion of the BBA, Mannok Aircrete High Ten blocks, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements 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 product in accordance with harmonised European Standard BS EN 771-4 : 2011.

### Technical Specification

#### 1 Description

1.1 Mannok Aircrete High Ten blocks are general purpose aircrete building blocks, comprising cement, lime, sand and pulverized fuel ash, with aluminium powder used as an aerating agent. The blocks are manufactured to the requirements of BS EN 771-4 : 2011, Category 2 with GPLM (General Purpose Light Masonry) tolerances.

1.2 The blocks are available as wall blocks and are supplied with the characteristics detailed in Table 1 and the dimensions given in Table 2.

*Table 1 Block characteristics*

Gross dry density ( $\text{kg}\cdot\text{m}^{-2}$ )	830
Dry density range ( $\text{kg}\cdot\text{m}^{-2}$ )	780 to 880
Mean compressive strength ( $\text{N}\cdot\text{mm}^{-2}$ )	10.4 <sup>(1)(2)</sup>
Minimum individual block compressive strength ( $\text{N}\cdot\text{mm}^{-2}$ )	7.2
Dimensional tolerances	GPLM
Thermal conductivity for 'protected blockwork' ( $\text{W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ )	0.21 <sup>(3)</sup>

(1) Category 2 to BS EN 771-4 : 2011.

(2) Category 1 mean compressive strength of 9.0  $\text{N}\cdot\text{mm}^{-2}$  to BS EN 771-4 : 2011.

(3) 0.19  $\text{W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$  ( $\lambda_{10, \text{dry, unit}}$ ) declared dry value.

*Table 2 Block dimensions*

	Face size (mm)	Thickness (mm)
Mannok Aircrete High Ten blocks	440 x 215	75 to 355 <sup>(1)</sup>

(1) A typical weight for a 440 mm x 215 mm x 100 mm block is 7.57 kg (block weight at typical 3 % moisture content when laid).

1.3 Coursing units are also available.

1.4 Other components which may be used with the blocks, but which are outside the scope of this Certificate, are:

- cavities
- cavity wall ties — these should be manufactured in accordance with BS EN 845-1 : 2013. Ties should be embedded a minimum of 50 mm into the mortar joints of each leaf. A minimum of 2.5 ties per m<sup>2</sup> should be used, increased to 4.9 ties per m<sup>2</sup> for blocks thinner than 90 mm
- vertical movement joints – spaced no further than 6 m apart, including corners
- movement joint ties — strip-form dowels, manufactured from appropriate materials as set out in PD 6697 : 2019 Table 2. They are incorporated in the movement joint at 450 mm maximum centres vertically
- bed joint reinforcement — a flattened wire, 2 mm thick, and manufactured from appropriate materials in accordance with BS EN 845-3 : 2013. Alternatively, a movement-control mesh may be used. Advice should be sought from the Certificate holder for particular applications.
- insulation
- membranes (eg vapour control, damp proof etc)
- attachments and fixings.

1.5 Details of suitable products/specifications may be obtained from the Certificate holder.

## 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 then 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 of the blocks, before they 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 Quality Management System of Mannok Build has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 by BSI Ltd (Certificate FS 737560).

2.4 The Environmental Management System of Mannok Build has been assessed and registered as meeting the requirements of BS EN ISO 14001 : 2015 by BSI Ltd (Certificate EMS 552208)

## 3 Delivery and site handling

3.1 The blocks are supplied shrink-wrapped, with green banding, placed on pallets suitable for off-loading with a mechanical grab or by 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 must 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 Mannok Aircrete High Ten blocks.

### 4 Use



4.1 Mannok Aircrete High Ten blocks are suitable for use in the construction of loadbearing and non-loadbearing solid internal and external walls above and below the damp-proof course, and the inner and outer leaves of cavity walls.

4.2 The blocks comply with the requirements of BS EN 771-4 : 2011 and 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 EN 1996-1-1 : 2005, BS EN 1996-1-2 : 2005, BS EN 1996-2 : 2006, BS EN 1996-3 : 2006 and their UK National Annexes, and PD 6697 : 2019.

4.5 The block tolerances are not suitable for use with thin-joint mortar systems.

### 5 Practicability of installation

The product is designed to be installed by a competent general builder, or a contractor, experienced with this type of product.

### 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 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 should be in accordance with BS 8103-2 : 2013.

6.4 Joist hangers may be used provided that:

- when designing in accordance with BS EN 1996-1-1 : 2005 and its UK National Annex and/or PD 6697 : 2019, 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  $10.4 \text{ N}\cdot\text{mm}^{-2}$  or above. The dimensions used in the design and the manufacture from appropriate materials are set out in BS EN 845-1 : 2013 and BS EN 1996-2 : 2006, Annex C, Table C1 and its UK National Annex.
- supervision and quality of work<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.



6.5 The characteristic initial shear strength of designed masonry mortars in combination with the blocks must be  $0.15 \text{ N}\cdot\text{mm}^{-2}$  for general purpose and lightweight mortar, in accordance with BS EN 998-2 : 2016.

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 : 2017 and BRE Report BR 443 : 2019. The thermal conductivity of the blocks should be taken as  $0.21 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$  for 'protected blockwork',  $0.23 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$  for external blockwork exposed (eg not protected by a cladding system) or below dpc but above ground level, and  $0.34 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$  for blockwork below ground level.

7.2 Walls incorporating the blocks will need to incorporate thermal insulation as necessary to achieve or improve on (as appropriate) the mean design U values in accordance with the national Building Regulations.

7.3 The product 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 the documents supporting the national Building Regulations.

7.4 Further information can be found in the NHBC Foundation's NF16 (June 2009).

## 8 Sound insulation

### Separating walls



8.1 Separating walls, excluding those covered by the Robust Details Ltd scheme, are subject to pre-completion testing. However, specific constructions, with their associated flanking elements, should achieve acceptable resistance to airborne sound transmission in accordance with the national Building Regulations. Contact the Certificate holder for guidance.



8.2 Separating walls constructed with a cavity comprising two 100 mm thick leaves and complying with the following provisions will adequately limit airborne sound transmission:

- the wall cavity must not be less than 75 mm wide and must be continued into the roof space
- all vertical and horizontal joints must be filled with mortar not exceeding a strength of 1:1:6
- penetration by structural members and services must be avoided; where such penetration is unavoidable, full sealing must be applied at the construction stage
- where joists are at right angles to the separating wall, joist hangers must be used
- wall ties should be of type A to Approved Document E, or an alternative proven not to increase transmission of airborne sound in comparison; this may be determined by test evidence or by reference to an Agrément Certificate
- electrical and TV sockets must not be placed on the wall where avoidable, and never within a block length of each other on opposite sides of the wall
- gas flues must not be built into the separating wall; where such construction is unavoidable, full sealing must be applied at the construction stage
- the walls must be finished with plasterboard on dabs or plaster to both room faces (this finish need not be carried into the roof space)
- the use of lightweight ceiling boards, eg foam-filled, must be avoided.

### Walls flanking a separating wall or floor



8.3 The blocks can form the inner leaf of an external masonry cavity wall where any leaf surface mass, excluding finishes, is acceptable, eg where a separating floor is not present, in accordance with the national Building Regulations.





8.4 The blocks can form the inner leaf of an external masonry wall flanking a Type 2 separating wall without a separating floor and with a minimum block density of  $450 \text{ kg}\cdot\text{m}^{-3}$  as described in the Building Standards Division Publication *Example construction and generic internal constructions*, section *Generic Internal Constructions*.

### Internal walls — new buildings and conversions



8.5 Internal walls between a bedroom, or a room containing a toilet, and other rooms (England and Wales), or between an apartment in a dwelling and a room in a residential building capable of being used for sleeping (in Scotland), are acceptable when following the national Building Regulations guidance.



8.6 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 at least  $120 \text{ kg}\cdot\text{m}^{-2}$ . Guidance on circumstances (eg where a separating floor is not present) where any surface mass can be acceptable can be found in the national Building Regulations.

## 9 Performance in relation to fire



9.1 The fire resistance of walls constructed with aircrete masonry can be determined by reference to:

- BS EN 1996-1-2 : 2005, Annex B, Table NB 4.6, and its UK National Annex, Tables NA 4.1, NA 4.2 and NA 4.6.
- BRE Report BR 128 : 1988.

9.2 The blocks are classified as Class A1 for reaction to fire in accordance with BS EN 13501-1 : 2018. Their use is not subject to any restrictions on building height or proximity to boundaries.

9.3 With regard to the placing of cavity barriers, the surface of the product may be taken as Class A1.

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 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.

10.2 The blocks are suitable for use in classes DS1, DS2 and DS3 of soil or groundwater as defined in BRE Special Digest 1 : 2005 Concrete in aggressive ground, Part C Assessing the aggressive chemical environment.

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 the national Building Regulations.

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 (see sections 4.4, 6, 7 and 8).

(2) The exposure is defined in PD 6697 : 2019.

11.3 For use in external elements with exposed faces, the water absorption values are given in Table 4.

**Table 4 Water absorption to BS EN 772-11 : 2011**

	Mean water absorption ( $\text{g}\cdot\text{m}^{-2}\times\text{s}^{0.5}$ )
After 10 minutes	106
After 30 minutes	86
After 90 minutes	72

## 12 Condensation

### Surface condensation



12.1 For buildings in England and Wales, walls will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed  $0.7 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$  at any point, and the junctions with other elements are designed in accordance with the guidance referred to in section 7.3 of this Certificate.



12.2 For buildings in Scotland, wall constructions will be acceptable when the thermal transmittance (U value) does not exceed  $1.2 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$  at any point, and the junctions with other elements are designed in accordance with the guidance referred to in BS 5250 : 2021, Section 11.3. Further guidance may be obtained from BRE Report BR 262 : 2002 and section 7.3 of this Certificate.

### Interstitial condensation



12.3 Walls will adequately limit the risk of interstitial condensation when they are constructed in accordance with BS 5250 : 2021 (Section 11.3). For the purpose of calculations, the block's water vapour resistance factor ( $\mu$ ) may be taken as 10 (a resistivity of  $50 \text{ MN}\cdot\text{s}\cdot\text{g}^{-1}\cdot\text{m}^{-1}$ ), as given in BS EN ISO 10456 : 2007, Table 4.

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

(1) Dry cup values generally applicable to materials on the inside of an insulation layer.

(2) Wet cup values generally applicable to materials on the outside of an insulation layer.

12.5 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  $0.58 \text{ mm}\cdot\text{m}^{-1}$ .

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 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 : 2019 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 product will have durability equivalent to those of traditional masonry and will fulfil their intended function for the life of the building in which they have been installed.

## Installation

## 16 General

16.1 Installation of Mannok Aircrete High Ten blocks must be carried out strictly in accordance with BS 8000-3 : 2020, the Certificate holder's instructions and this Certificate.

16.2 Mortar must not be stronger than the blocks, as defined by either:

- BS EN 1996-1-1 : 2005 and Table NA.2 of its UK National Annex, or
- PD 6697 : 2019, Table 15.

## 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 EN 1996-1-1 : 2005, 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. For heavier fixtures, screws and plugs, nailable expansion fixings or helical fixings should be used. 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. A partial load factor of 4 is recommended.

### 20 Tests

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

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

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

### 21 Investigations

21.1 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.

21.2 An evaluation was made of existing test data relating to risk of pattern staining.

21.3 Evaluations were made for:

- acoustic performance
- thermal conductivity
- water vapour permeability
- reaction to fire.

## Bibliography

BRE Special Digest 1 : 2005 *Concrete in aggressive ground*

BRE Good Building Guide 21 : 1996 *Joist hangers*

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 : 2019 *Conventions for U-value calculations*

BS 5250 : 2021 *Management of moisture in buildings – Code of practice*

BS 6073-2 : 2008 *Precast concrete masonry units — Guide for specifying precast concrete masonry units*

BS 8000-3 : 2020 *Workmanship on construction sites. Masonry. Code of practice*

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 772-11 : 2011 *Methods of test for masonry units - Determination of water absorption of aggregate concrete, autoclaved aerated concrete, manufactured stone and natural stone masonry units due to capillary action and the initial rate of water absorption of clay masonry units*

BS EN 845-1 : 2013 + A1 : 2016 *Specification for ancillary components for masonry — Ties, tension straps, hangers and brackets*

BS EN 845-3 : 2013 + A1 : 2016 *Specification for ancillary components for masonry. Bed joint reinforcement of steel meshwork*

BS EN 998-2 : 2016 *Specification for mortar for 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*

BS EN 1996-1-2 : 2005 *Eurocode 6 — Design of masonry structures — General rules — Structural fire design*

NA to BS EN 1996-1-2 : 2005 *UK National Annex to Eurocode 6 — Design of masonry structures — General rules — Structural fire design*

BS EN 1996-2 : 2006 *Eurocode 6 — Design of masonry structures — Design considerations, selection of materials and execution of masonry*

NA to BS EN 1996-2 : 2006 *UK National Annex to Eurocode 6 — Design of masonry structures — Design considerations, selection of materials and execution of masonry*

BS EN 1996-3 : 2006 *Eurocode 6 — Design of masonry structures — Simplified calculation methods for unreinforced masonry structures*

NA to BS EN 1996-3 : 2006 *UK National Annex to Eurocode 6 — Design of masonry structures — Simplified calculation methods for unreinforced masonry structures*

BS EN 13501-1 : 2018 *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 : 2017 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*

BS EN ISO 10456 : 2007 *Building materials and products — Hygrothermal properties — Tabulated design values and procedures for determining declared and design thermal values*

BS EN ISO 9001 : 2015 *Quality management systems — Requirements*

BS EN ISO 14001 : 2015 *Environmental management systems — Requirements with guidance for use*

NHBC Foundation NF16 (June 2009) *A practical guide to building airtight dwellings*

PD 6697 : 2019 *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.