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Agrément Certificate
00/3776
Product Sheet 5

DUROX AIRCRETE BLOCKS

DUROX SYSTEM 500, 600 AND 700

This Agrément Certificate Product Sheet⁽¹⁾ relates to Durox System 500, 600 and 700, comprising aircrete blocks bonded on site with a thin layer (2 mm to 3 mm) of mortar in the construction of masonry 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

Thermal insulation — the thermal conductivity (λ value) of the systems may be taken as ranging from 0.11 to 0.19 $\text{W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ ⁽²⁾ in 'protected blockwork' applications (see section 6).

(2) 0.11-0.17 $\text{W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ ($\lambda_{10, \text{dry}}$), declared dry value*.

Sound insulation — the blocks have a mean compressive strength of 3.6 to 7.3 $\text{N}\cdot\text{mm}^{-2}$ and may be used in separating walls and flanking elements to separating walls and floors (see section 7).

Properties in relation to fire — the blocks are 'non-combustible' as defined in the national Building Regulations (see section 8).

Structural aspects — the blocks are suitable for use in walls designed and constructed in accordance with BS 5628-1 : 2005, BS 5628-3 : 2005, BS EN 1996-1-1 : 2005, BS EN 1996-1-2 : 2005, BS EN 1996-2 : 2005 and BS EN 1996-3 : 2006 and their UK National Annexes, and PD 6697 : 2010 (see section 11).

Durability — walls constructed using the thin joint systems will have a durability equivalent to those of traditional masonry (see section 14).

The BBA has awarded this Certificate to the company named above for the systems described herein. These systems 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

A handwritten signature in black ink, appearing to read 'Simon Wroe'.

Simon Wroe
Head of Approvals — Materials

A handwritten signature in black ink, appearing to read 'Claire Curtis-Thomas'.

Claire Curtis-Thomas
Chief Executive

Date of First issue: 9 January 2014

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

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, Durox System 500, 600 and 700, if installed, used and maintained in accordance with this Certificate, will meet or contribute to meeting 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 using the systems can meet these Requirements. See sections 4, 11.1 and 11.2 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 systems can contribute to a construction meeting these Requirements. See sections 8.1 to 8.3 of this Certificate.	
Requirement:	C2(b)	Resistance to moisture
Comment:	Suitably finished walls designed and constructed from the systems can contribute to meeting this Requirement. See sections 4.3, 10.1 and 10.2 of this Certificate.	
Requirement:	C2(c)	Resistance to moisture
Comment:	Walls designed and constructed from the systems will contribute to limiting the risk of condensation. See section 9 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 systems can meet these Requirements. See sections 7.1 to 7.3, 7.5 and 7.6 of this Certificate.	
Requirement:	L1 (a)(i)	Conservation of fuel and power
	Walls designed and constructed from the systems will contribute to limiting heat loss through walls. See sections 6.2, 6.3, 6.6 and 6.8 of this Certificate.	
Regulation:	7	Materials and workmanship
	The systems are acceptable. See section 14 and the <i>Installation</i> part of this Certificate.	
Regulation:	26	CO ₂ emission rates for new buildings
	Walls designed and constructed from the systems will contribute to limiting heat loss through walls. See sections 6.2, 6.3, 6.6 and 6.8 of this Certificate.	



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)	Fitness and durability of materials and workmanship
Comment:	Use of the systems satisfies the requirements of this Regulation. See section 14 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 systems can satisfy this Standard, with reference to clauses 1.1.1 ⁽¹⁾⁽²⁾ to 1.1.3 ⁽¹⁾⁽²⁾ . See sections 4, 11.1 and 11.2 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 systems can contribute to a construction satisfying these Standards, with reference to clauses 2.1.1 ⁽²⁾ , 2.1.4 ⁽²⁾ , 2.1.5 ⁽²⁾ , 2.1.8 ⁽²⁾ , 2.1.9 ⁽²⁾ , 2.1.10 ⁽²⁾ , 2.1.11 ⁽²⁾ , 2.1.12 ⁽²⁾ , 2.1.13 ⁽²⁾ , 2.1.15 ⁽²⁾ , 2.2.1 to 2.2.5 ⁽¹⁾⁽²⁾ , 2.2.6 ⁽¹⁾ , 2.2.7 ⁽¹⁾⁽²⁾ , 2.2.8 ⁽¹⁾ , 2.2.10 ⁽¹⁾ , 2.3.1 ⁽¹⁾⁽²⁾ to 2.3.5 ⁽¹⁾⁽²⁾ , 2.4.1 ⁽¹⁾⁽²⁾ , 2.4.2 ⁽¹⁾⁽²⁾ , 2.6.1 ⁽¹⁾⁽²⁾ , 2.6.5 ⁽¹⁾ , 2.6.6 ⁽¹⁾⁽²⁾ and 2.6.7 ⁽²⁾ . See sections 8.1 to 8.3 of this Certificate.	
Standard:	3.10	Precipitation
Comment:	Suitably finished walls designed and constructed from the systems can contribute to satisfying this Standard, with reference to clauses 3.10.1 ⁽¹⁾⁽²⁾ to 3.10.6 ⁽¹⁾⁽²⁾ . See sections 4.3 and 9 of this Certificate.	
Standard:	3.15	Condensation
Comment:	Walls designed and constructed using the systems can contribute to limiting the risk of condensation, with reference to clauses 3.15.1 ⁽¹⁾⁽²⁾ , 3.15.4 ⁽¹⁾⁽²⁾ and 3.15.5 ⁽¹⁾⁽²⁾ . See sections 10.1 and 10.2 of this Certificate.	
Standard:	5.1	Noise separation
Comment:	Walls designed and constructed from the systems can satisfy this Standard, with reference to clauses 5.1.1 ⁽¹⁾⁽²⁾ to 5.1.5 ⁽¹⁾⁽²⁾ . See sections 7.1, 7.4, and 7.5 of this Certificate.	
Standard:	5.2	Noise reduction between rooms
Comment:	Walls designed and constructed from the systems can satisfy this Standard, with reference to clauses 5.2.1 ⁽¹⁾⁽²⁾ and 5.2.2 ⁽¹⁾⁽²⁾ . See sections 7.1, 7.4 and 7.5 of this Certificate.	

Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:	Walls designed and constructed from the systems can contribute to satisfying these Standards, with reference to clauses 6.1.1 ⁽¹⁾ , 6.1.2 ⁽¹⁾ , 6.1.4 ⁽²⁾ , 6.1.6 ⁽¹⁾ , 6.2.1 ⁽¹⁾⁽²⁾ , 6.2.3 ⁽¹⁾ , 6.2.4 ⁽²⁾ , 6.2.5 ⁽²⁾ , 6.2.6 ⁽¹⁾ , 6.2.7 ⁽¹⁾ , 6.2.8 ⁽¹⁾⁽²⁾ , 6.2.9 ⁽¹⁾ , 6.2.10 ⁽²⁾ , 6.2.11 ⁽¹⁾⁽²⁾ , 6.2.12 ⁽¹⁾ and 6.2.13 ⁽¹⁾⁽²⁾ . See sections 6.2, 6.3, 6.7 and 6.8 of this Certificate.	
Standard:	7.1(a)	Statement of sustainability
Comment:	The systems 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.	
Regulation:	12	Building standards applicable to conversions
Comment:	Comments made in relation to the systems under Regulation 9, Standards 1 to 6 also apply to this Regulation, with reference to clause 0.12.1 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ . (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic)	



The Building Regulations (Northern Ireland) 2012

Regulation:	23(a)(i)(iii)(b)	Fitness of materials and workmanship
Comment:	The systems are acceptable. See section 14 and the <i>Installation</i> part of this Certificate.	
Regulation:	28(b)	Resistance to ground moisture and weather
Comment:	Suitably finished walls designed and constructed from the systems can contribute to meeting this Regulation. See sections 4.3 and 9 of this Certificate.	
Regulation:	29	Condensation
Comment:	Walls designed and constructed using the systems can contribute to limiting the risk of condensation. See sections 10.1 and 10.2 of this Certificate.	
Regulation:	30(a)	Stability
Comment:	Walls designed and constructed from the systems can meet this Regulation. See sections 4, 11.1 and 11.2 and the <i>Installation</i> part of this Certificate.	
Regulation:	35(1)(2)(4)	Internal fire spread – Structure
Regulation:	36(a)	External fire spread
Comment:	The systems can contribute to a construction meeting these Regulations. See sections 8.1 to 8.3 of this Certificate.	
Regulation:	39(a)(i)	Conservation measures
Comment:	Walls designed and constructed from the systems can contribute to limiting heat loss through walls. See sections 6.2, 6.3, 6.6 and 6.8 of this Certificate.	
Regulation:	40(2)	Target carbon dioxide Emissions Rate
Comment:	Walls designed and constructed using the systems can contribute to meeting this Regulation. See sections 6.2, 6.3, 6.6 and 6.8 of this Certificate.	
Regulation:	50(a)	Protection against sound within a dwelling or room for residential purposes
Comment:	Walls designed and constructed from the systems may be used to satisfy this Regulation. See sections 7.1 to 7.3 and 7.6 of this Certificate.	

Construction (Design and Management) Regulations 2007

Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors 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 2014

NHBC accepts the use of Durox System 500, 600 and 700, provided they are 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 systems in accordance with harmonised 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.

Technical Specification

1 Description

1.1 Durox System 500, 600 and 700 are jointing systems for Durox general purpose aircrete building blocks (see Product Sheets 1, 2 and 3), using a thin layer mortar complying with BS EN 998-2 : 2010.

1.2 The blocks are described and are available with the product characteristics shown in Product Sheets 1, 2, and 3 (Supabloc 7, Supabloc 4 or Supabloc). The blocks meet the requirements for Thin Layer Mortar category A (TLMA) as given in BS EN 771-4 : 2011.

1.3 Other components which may be used with the systems, but which are outside the scope of this Certificate, are as follows:

- cavity wall ties — these should be manufactured in accordance with BS EN 845-1 : 2003. Such ties should be suitable for fixing directly to the thin-jointed leaf and embedded into the mortar joints of the outer leaf. A minimum of 2.5 ties per m² should be used
- helical and other wall ties — advice on the use of these should be sought from the Certificate holder. A minimum of 2.5 ties per m² should be used
- movement joint ties — strip-form dowels, manufactured from appropriate materials as set out in PD 6697 : 2010 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 : 2003. Alternatively, a movement control mesh may be used. Advice should be sought from the Certificate holder for particular applications.

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

2 Manufacture

2.1 The thin layer mortar is manufactured from a mixture of Portland cement-based polymer-reinforced powder mix, graded sand, shrinkage compensating components and plasticising agents and is manufactured to meet the requirements of BS EN 998-2 : 2010.

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 Tarmac Building Products has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by BSI (Certificate FM 00948).

3 Delivery and site handling

3.1 The thin-joint mortar is supplied in 25 kg bags and must be stored off the ground in dry, frost-free conditions.

3.2 In common with other cementitious products, suitable protective clothing must be worn when handling the dry mortar powder. Contact with the eyes and respiratory system must be avoided. Wet mortar in contact with the skin should be washed off immediately.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Durox System 500, 600 and 700.

Design Considerations

4 Use



4.1 Durox System 500, 600 and 700 blocks are suitable for use above the damp-proof course in the construction of inner and outer leaves of cavity walls, solid walls or internal partition walls.

4.2 The systems are intended to be used in constructions built from Durox aircrete blocks. Background information on this type of construction can be found in BRE Digest 432 : 1998 *Aircrete : thin joint mortar systems*.

4.3 Walls must be designed and constructed in accordance with BS 5250 : 2011, BS 5628-1 : 2005, 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 : 2010.

5 Practicability of installation

The systems are designed to be installed by a competent general builder, or a contractor, experienced with this type of construction.

6 Thermal insulation

6.1 Thermal transmittance (U value) calculations of walls should be carried out in accordance with BS EN ISO 6946 : 2007 and BRE Report (BR 443) *Conventions for U-value calculations* (BR 443), using the properties shown in Table 1.

Table 1 Thermal conductivities

Block Grade	Thermal conductivity for protected conditions ($W \cdot m^{-1} \cdot K^{-1}$)
System 500	0.11
System 600	0.16
System 700	0.19
Durox thin layer mortar	0.88



6.2 External cavity walls incorporating the system 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 and Wales — $0.26 - 0.35 W \cdot m^{-2} \cdot K^{-1}$

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

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

6.3 The system 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).

6.4 Further information can be found in the NHBC Foundation's *A practical guide to building airtight dwellings* (NF 16) (June 2009).

6.5 In the opinion of the BBA, the thin-layer construction will reduce the actual thermal transmittance of the wall compared with a standard 10 mm joint construction. A typical figure of an 8% reduction is quoted for a brick-cavity aircrete wall in BRE Information Paper *Mortars for blockwork : improved thermal performance* (IP 2/98 : January 1998). Use of the larger size unit will further reduce the thermal transmittance.



6.6 Walls constructed with the blocks, in conjunction with an appropriate thickness of insulation, can improve on the U value of $0.35 W \cdot m^{-2} \cdot K^{-1}$ required for walls in the 'notional' building in SAP 2009 *The Government's Standard Assessment Procedure for Energy Rating of Dwellings*, or the Simplified Building Energy Model (iSBEM) calculations. The system can therefore contribute to enabling a building to meet the target Emission Rate 'average' improvements of 25% (dwellings) and 23–28% (buildings other than dwellings) specified in Approved Documents L1A and L2A respectively.



6.7 The requirement for limiting heat loss through the building fabric will be satisfied if the U values of the building elements, including thermal bridging, do not exceed the maximum values given in the Building (Scotland) Regulations, Mandatory Standard 6.2, clause 6.2.1.



6.8 Alternative solutions, which allow for more flexibility in design of U values for individual constructional elements, are also described in these documents.

6.9 For details on limiting excessive heat loss around openings and at junctions between elements, see section 11 of this Certificate.

7 Sound Insulation

Separating walls



7.1 Separating walls in England and Wales, Northern Ireland and Scotland, excluding those covered by the Robust Details Ltd scheme, are subject to pre-completion testing. However, the following constructions, together with their associated flanking elements, should achieve acceptable resistance to airborne sound transmission:

New buildings

England and Wales

- constructed in accordance with the Robust Details Ltd scheme and paragraph 0.2 of Approved Document E, between dwellings or flats
- wall types 2.4 or 3.3 described in Approved Document E

- a wall described in section 7.2 of this Certificate
- a wall meeting the minimum sound insulation values in Table 0.1a or 0.1b as appropriate in Approved Document E

Scotland

- a wall meeting the minimum sound insulation values in clause 5.1.2 of the Technical Handbooks

Northern Ireland

- constructed in accordance with the Robust Details Ltd scheme and paragraph 0.14 of Technical Booklet G, between dwellings or flats
- a wall described in section 7.2 of this Certificate
- a wall meeting the minimum sound transmission values in Table 1a and 1b of Technical Booklet G

Conversions

England and Wales

- a wall meeting the requirements for new buildings
- a wall similar to a wall meeting the requirements for new buildings, as described in Sections 4 or 6 of Approved Document E
- a wall treatment 1 described in paragraphs 4.22 to 4.25 of Approved Document E

Scotland

- a wall meeting the requirements for new buildings

Northern Ireland

- a wall meeting the requirements for new buildings
- a wall similar to a wall meeting the requirements for new buildings, as described in sections 4 or 6 of Technical Booklet G
- a wall treatment 1 described in paragraph 4.22 to 4.25 of Technical Booklet G.



7.2 Separating walls constructed with a cavity comprising two 100 mm thick leaves (System 600 and System 700) 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 thin layer mortar
- penetration by structural members and services should 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 the 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, for example, foam-filled, must be avoided.

Walls flanking a separating wall or floor



7.3 The blocks can form the inner leaf of an external masonry cavity wall described in the following documents 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.



7.4 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 construction 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



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



7.6 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 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.

8 Properties in relation to fire



8.1 The fire resistance of walls constructed with autoclaved aerated concrete masonry and thin-layer mortar can be determined by reference to:

- BS EN 1996-1-2 : 2005, Annex B, Tables NB 4.6 and the UK National Annex, Tables NA 3.10 to NA 3.12
- BRE Report (BR 128 : 1988) *Guidelines for the construction of fire-resisting structural elements*.

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

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

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

9 Resistance to moisture



9.1 Walls built from the system and subject to the national Building Regulations should be designed and constructed in accordance with:

England and Wales — Approved Document C

Scotland — Mandatory Standard 3.10, clauses 3.10.1 to 3.10.4 and 3.10.6

Northern Ireland — Technical Booklet C.

9.2 For single leaf constructions, the minimum block thicknesses to be used in solid rendered external walls are given in Table 2.

Table 2 Minimum block thicknesses⁽¹⁾

Exposure ⁽²⁾	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 and 7).

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

10 Condensation risk



10.1 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 6.3.

10.2 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 blocks' water vapour resistance factor (μ) 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.

10.3 Additional guidance can be found in BRE report (BR 262 : 2002) *Thermal insulation : avoiding risks*.

11 Structural aspects

General



1.1 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



11.2 Increased local stresses may be permitted in the masonry provided that 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, clause 30 or BS EN 1996-1-1 : 2005, clause 6.1.3 and its UK National Annex.

11.3 Joist hangers may be used provided that:

- when designing in accordance with BS 5628-1 : 2005, 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 3.6*, 4.2*, and 7.3* N·mm⁻² or above. The dimensions used in the design and the manufacture from appropriate materials are set out in BS 5628-1 : 2005 (Table 1), BS EN 845-1 : 2003 and BS EN 1996-2 : 2006, Annex C, Table C1 and the UK National Annex
- supervision and workmanship⁽¹⁾ 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 or is cut-in and face fixed
 - 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 BRE *Good Building Guide 21 (1996): Joist hangers*.

12 Movement

12.1 The maximum declared moisture movement of the blocks may be taken as a nominal value of 0.4 mm·m⁻¹.*

12.2 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.

12.3 Movement joints must be provided in accordance with BS 5628-3 : 2005, 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.

12.4 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.

13 Maintenance

As the system is generally concealed and has suitable durability (see section 14), maintenance is not required.

14 Durability



Autoclaved aerated concrete (Aircrete) is a durable material. Walls built using Durox System 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

15 General

15.1 Installation of the Durox System 500, 600 and 700 must be carried out strictly in accordance with the provisions detailed in this Certificate. Technical advice should be sought from the Certificate holder.

15.2 The level of supervision during installation of the masonry and the associated structure, as with all masonry, must be sufficient to ensure the quality of workmanship described in BS 8000-3 : 2001.

16 Procedure

16.1 The first course of blocks is bedded in traditional mortar, usually at the damp-proof course.

16.2 The thin-layer mortar is mixed according to the Certificate holder's instructions. An electric, slow-speed drill with a whisk attachment may be used or the mortar may be hand-mixed in a builder's bucket. Once gauged, the mortar remains workable in normal conditions for up to four hours and should not be re-tempered. It is recommended that the mortar bed should be spread to a thickness of 2-3 mm using a notched trowel (similar to a tiling adhesive trowel), or sledge, ensuring all joints are filled. When applied, the thin-layer mortars will normally set within 10 minutes.

16.3 The dimensional tolerances of the blocks could theoretically result in a mortar joint thickness outside the specified 2-3 mm. However, test and production data indicate a low probability of problems in this respect.

16.4 The inner leaf should lead, with accommodation of movement provided as stated in section 12.2. The blocks may be cut to size using a masonry handsaw.

16.5 It is normally permissible to build the inner leaf to storey height ahead of the outer leaf. However, construction should only proceed where weather and exposure conditions allow. If there is likely to be a significant delay before the outer leaf is built the inner leaf will require propping and may also require protection from the weather.

16.6 The outer leaf should be laid in accordance with the relevant Codes of Practice. In particular, the use of a cavity batten is recommended to catch mortar droppings. A minimum cavity of 50 mm wide must be maintained and cavity wall ties (as described in section 1.3) incorporated at this stage. Helical ties can be hammer driven into the aircrete inner leaf at the appropriate mortar joint level of the outer leaf as construction progresses. Alternatively, ties to be face-fixed to the thin-joint blockwork can be anchored through the hole provided in the tie using an expanding nail or similar fixing. Frame-fix ties must be installed correct side up, and placed horizontally or with a slight fall to the outer leaf.

16.7 In addition, extra ties must be located on either side of movement joints and adjacent to window and door openings at 215 mm vertical centres.

16.8 Surface imperfections must be made good.

16.9 The internal surface of the blockwork should be finished in accordance with BS EN 13914-2 : 2005. The blockwork is suitable to receive low-thickness finishes such as textured paint or thin-coat plaster. The effect on other required properties should always be considered. Plaster should be cut at movement joints while wet.

16.10 Other components (such as cavity trays and restraint straps) can be accommodated by appropriate chasing or other methods, as necessary. The advice of the Certificate holder should be sought.

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 the UK National Annex.

17.2 In accordance with BS 5628-3 : 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 : 2005 and BS EN 13914-2 : 2005. 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. 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 on the blocks to determine:

- dimensional accuracy
- squareness
- dry density.

20.2 Assessments were made of test data on Supabloc 7, Supabloc 4 or Supabloc as described in Product Sheets 1, 2 and 3 respectively of this 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 Sites in progress were evaluated to establish the practicability of installation.

21.3 An assessment was made by the BBA of independent test reports on:

- drying shrinkage
- behaviour in fire
- thermal properties
- acoustic properties
- compressive strength of wallettes
- compressive strength of blocks.

21.4 Structural calculations on the performance specifications of the wall ties and anchors in external cavity walls were assessed.

21.5 Tests of walls, wallettes, the wall ties and on recommended fixings were observed and the results assessed.

21.6 The Certificate holder's recommendations concerning design and installation were assessed.

Bibliography

BS 5250 : 2011 *Code of practice for control of condensation in buildings*

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*

BS 8000-3 : 2001 *Workmanship on building sites — Code of practice for masonry*

BS DD 140-2 : 1987 *Wall ties — Recommendations for design of wall ties*

BS EN 771-4 : 2003 *Specification for masonry units — Autoclaved aerated concrete masonry blocks*

BS EN 998-2 : 2010 *Specification for mortar for masonry — Masonry mortar*

BS EN 1996-1-1 : 2005 *Eurocode 6 : Design of masonry structures — General rules for reinforced and unreinforced masonry structures*

NA to BS EN 1996-1-1 : 2005 *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 845-1 : 2003 *Specification for ancillary components for masonry — Ties, tension straps, hangers and brackets*

BS EN 998-2 : 2003 *Specification for mortar for masonry — Masonry mortar*

BS EN 13501-1 : 2007 *Fire classification of construction products and building elements — Classification using test data from reaction to fire tests*

BS EN 13914-1 : 2005 *Design, preparation and application of external rendering and internal plastering — External rendering*

BS EN 13914-2 : 2005 *Design, preparation and application of external rendering and internal plastering — Design considerations and essential principles for internal plastering*

BS EN ISO 9001 : 2008 *Quality management systems — Requirements*

BS EN ISO 6946 : 2007 *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*

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.