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**Agrément Certificate**

**16/5343**

Product Sheet 1

**CELOTEX INSULATION**

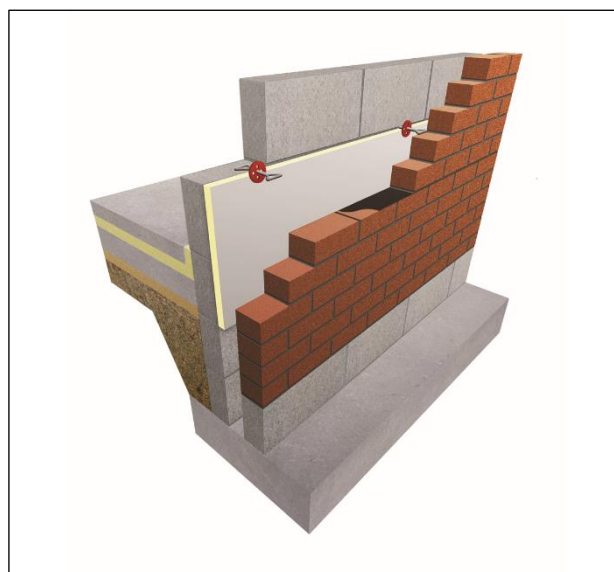
**CELOTEX CW4000 AND CELOTEX CG5000 PIR INSULATION FOR PARTIAL FILL CAVITY WALLS**

This Agrément Certificate Product Sheet<sup>(1)</sup> relates to Celotex CW4000 and Celotex CG5000 PIR Insulation for Partial Fill Cavity Walls, comprising foil-faced rigid polyisocyanurate (PIR) foam board, for use as partial fill insulation to reduce the thermal transmittance of cavity walls in new buildings of a domestic or non-domestic nature with masonry inner and outer leaves, without height restriction (additional requirements apply for buildings above 25 m). The products are installed during construction.

(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 performance** — the products have declared thermal conductivities ( $\lambda_D$ ) of  $0.022 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$  for Celotex CW4000, and  $0.021 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$  for Celotex CG5000 (see section 6).

**Water resistance** — the products will resist water transfer across the cavity (see section 7).

**Condensation risk** — the products can contribute to limiting the risk of condensation (see section 8).

**Behaviour in relation to fire** — use of the products does not prejudice the fire resistance properties of the wall (see section 9).

**Durability** — the products are durable, rot proof, water resistant and sufficiently stable to remain effective as insulation for the life of the building (see section 12).



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

John Albon – Head of Approvals  
Construction Products

Claire Curtis-Thomas  
Chief Executive

Date of First issue: 12 August 2016

*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, Celotex CW4000 and Celotex CG5000 PIR Insulation for Partial Fill Cavity Walls, 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>	<b>B3(4)</b>	<b>Internal fire spread (structure)</b>
Comment:		The products can contribute to satisfying this Requirement. See sections 9.1, 9.2 and 9.4 of this Certificate.
<b>Requirement:</b>	<b>C2(a)</b>	<b>Resistance to moisture</b>
Comment:		The products can contribute to satisfying this Requirement. See section 7.1 of this Certificate.
<b>Requirement:</b>	<b>C2(b)</b>	<b>Resistance to moisture</b>
Comment:		The products can contribute to satisfying this Requirement. See section 7.2 of this Certificate.
<b>Requirement:</b>	<b>C2(c)</b>	<b>Resistance to moisture</b>
Comment:		The products can contribute to satisfying this Requirement. See sections 8.1 and 8.4 of this Certificate.
<b>Requirement:</b>	<b>L1(a)(i)</b>	<b>Conservation of fuel and power</b>
Comment:		The products can contribute to satisfying this Requirement. See section 6 of this Certificate.
<b>Regulation:</b>	<b>7</b>	<b>Materials and workmanship</b>
Comment:		The products are acceptable. See section 12 and the <i>Installation</i> part 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>
Comment:		The products can contribute to satisfying these Regulations. See section 6 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>
Comment:		The products are acceptable. See section 12 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	<b>9</b>	<b>Building standards applicable to construction</b>
Standard:	2.4	Cavities
		The products can contribute to satisfying this Standard, with reference to clause 2.4.2 <sup>(1)(2)</sup> . See sections 9.1, 9.3 and 9.4 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Comment:		The products are not non-combustible but may be used in walls of buildings in accordance with the exceptions permitted in this Standard, with reference to clauses 2.6.5 <sup>(1)</sup> and 2.6.6 <sup>(2)</sup> . See sections 9.1, 9.3 and 9.4 of this Certificate.
Standard:	3.4	Moisture from the ground
Comment:		The products can contribute to satisfying this Standard, with reference to clauses 3.4.1 <sup>(1)(2)</sup> and 3.4.5 <sup>(1)(2)</sup> . See section 7.1 of this Certificate.

Standard:	3.10	Precipitation
Comment:		The products can contribute to satisfying this Standard, with reference to clauses 3.10.1 <sup>(1)(2)</sup> and 3.10.3 <sup>(1)(2)</sup> . See section 7.2 of this Certificate.
Standard:	3.15	Condensation
Comment:		The products can contribute to satisfying this Standard, 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 8.1 and 8.5 of this Certificate.
Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		The products can contribute to satisfying this Standard with reference to clauses, or parts of, 6.1.1 <sup>(1)</sup> , 6.1.2 <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> , 6.2.9 <sup>(1)</sup> , 6.2.10 <sup>(1)</sup> , 6.2.11 <sup>(1)(2)</sup> and 6.2.13 <sup>(2)</sup> . See section 6 of this Certificate.
Standard:	7.1(a)(b)	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. In addition, the products can contribute to a construction meeting a higher level of sustainability as defined in this Standard, with reference to clauses 7.1.4 <sup>(1)(2)</sup> [Aspects 1 <sup>(1)(2)</sup> and 2 <sup>(1)</sup> ], 7.1.6 <sup>(1)(2)</sup> [Aspects 1 <sup>(1)(2)</sup> and 2 <sup>(1)</sup> ] and 7.1.7 <sup>(1)(2)</sup> [Aspect 1 <sup>(1)(2)</sup> ]. See section 6 of this Certificate.
<b>Regulation:</b>	<b>12</b>	<b>Building standards applicable to conversions</b>
Comment:		All comments given for 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)

<b>Regulation:</b>	<b>23</b>	<b>Fitness of materials and workmanship</b>
Comment:		The products are acceptable. See section 12 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	<b>28(a)</b>	<b>Resistance to moisture and weather</b>
Comment:		The products can contribute to satisfying this Regulation. See section 7.1 of this Certificate.
<b>Regulation:</b>	<b>28(b)</b>	<b>Resistance to moisture and weather</b>
Comment:		The products can contribute to satisfying this Regulation. See section 7.2 of this Certificate.
<b>Regulation:</b>	<b>29</b>	<b>Condensation</b>
Comment:		The products can contribute to satisfying this Regulation. See section 8.1 of this Certificate.
<b>Regulation:</b>	<b>35(4)</b>	<b>Internal fire spread — structure</b>
Comment:		The products can contribute to satisfying this Regulation. See sections 9.1, 9.2 and 9.4 of this Certificate.
<b>Regulation:</b>	<b>39(a)(i)</b>	<b>Conservation measures</b>
<b>Regulation:</b>	<b>40(2)</b>	<b>Target carbon dioxide emission rate</b>
Comment:		The products can contribute to satisfying these Regulations. See section 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 section: 3 *Delivery and site handling* (3.4) of this Certificate.

### Additional Information

#### NHBC Standards 2016

Subject to a 50 mm minimum residual cavity being maintained, NHBC accepts the use of Celotex CW4000 and Celotex CG5000 PIR Insulation for Partial Fill Cavity Walls, provided they are installed, used and maintained in accordance with this Certificate, in relation to *NHBC Standards 2016*, Chapter 6.1 *External masonry walls*.

#### CE marking

The Certificate holder has taken the responsibility of CE marking the products in accordance with harmonised European Standard BS EN 13165 : 2012. An asterisk (\*) appearing in this Certificate indicates that data shown are given in the manufacturer's Declaration of Performance.

### Technical Specification

#### 1 Description

Celotex CW4000 and Celotex CG5000 PIR Insulation for Partial Fill Cavity Walls comprise rigid polyisocyanurate (PIR) foam boards with foil-facings, with the nominal characteristics given in Table 1.

Table 1 Nominal characteristics

Product	Facings	Board size (mm)	Thickness range (mm)	Edge profile
Celotex CW4000	Composite foil-facing both sides (printed on one side only) <sup>(1)</sup>	1200 x 450	25 to 100	square edge or tongue-and-groove
Celotex CG5000	Aluminium foil-facing both sides (no printing)	1200 x 450	41 to 100	square edge or tongue-and-groove

(1) See sections 4.8 and 13.4 of this Certificate.

#### 2 Manufacture

2.1 Celotex PIR insulation is manufactured by a lamination process formed between foil-facings that are glued together in a continuous laminator, where the 'adhesive' is a mixture of two primary chemicals, polyol and MDI. An added blowing agent causes the adhesive to expand into foam that hardens, which is then cut to its finished board size and packed.

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 Celotex has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 and BS EN ISO 14001 : 2004 by SGS UK Ltd (Certificate GB91/504 and GB11/83526 respectively).

### 3 Delivery and site handling

3.1 The products are delivered to site in polythene-wrapped packs. Each pack of boards contains a label with the manufacturer's name, board dimensions and the BBA logo incorporating the number of this Certificate.

3.2 The products must be protected from prolonged exposure to sunlight, and stored dry, flat and raised above ground level (to avoid contact with ground moisture). Where possible, packs should be stored inside. If stored outside, they should be under cover, or protected with opaque polythene sheeting.

3.3 The products are light and easy to handle; care should be exercised to avoid crushing the edges or corners. If damaged, the products should be discarded.

3.4 The products must not be exposed to open flame or other ignition sources, or to solvents or other chemicals.

## Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Celotex CW4000 and Celotex CG5000 PIR Insulation for Partial Fill Cavity Walls.

### Design Considerations

## 4 Use

4.1 Celotex CW4000 and Celotex CG5000 PIR Insulation for Partial Fill Cavity Walls are satisfactory for use as partial fill cavity wall insulation and are effective in reducing the thermal transmittance (U value) of external cavity walls with masonry inner and outer leaves (where masonry includes clay and calcium silicate bricks, concrete blocks, and natural and reconstituted stone blocks). The products are for use in new domestic and non-domestic buildings without height restriction (additional requirements apply above 25 m). It is essential that such walls are designed and constructed to incorporate the precautions in this Certificate to prevent moisture penetration.

4.2 Buildings subject to the national Building Regulations should be designed and constructed in accordance with the relevant recommendations of:

- 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 respective UK National Annexes
- BS EN 845-1 : 2013 and BS 8000-3 : 2001.

4.3 Other new buildings not subject to the national Building Regulations should also be built in accordance with the Standards given in section 4.2 of this Certificate.

4.4 As with other forms of cavity wall insulation, where buildings need to comply with *NHBC Standards 2016*, specifiers should observe the requirements of that document.

4.5 Cavity wall ties with insulation-retaining fixings and, if required, any additional ties to BS EN 845-1 : 2013 should be used for structural stability in accordance with BS EN 1996-1-1 : 2005, BS EN 1996-2 : 2006 and BS EN 1996-3 : 2006.

4.6 Care must be taken in the overall design and construction of walls incorporating the products to ensure the provision of appropriate:

- cavity trays and damp-proof courses (dpc's)

- cavity barriers and fire dampers
- resistance to the ingress of precipitation, moisture and dangerous gases from the ground
- resistance to sound transmission when flanking separating walls and floors.

4.7 The use of cavity battens or boards is strongly recommended to prevent thermal bridging by mortar droppings.

4.8 For optimum thermal performance, boards with printed foil-facings (Celotex CW4000) must be installed with the correct orientation. See section 13.4.

**Buildings up to and including 25 metres high**

4.9 The minimum residual cavity width to be maintained during construction must be 25 mm. To achieve this, a greater nominal residual cavity width may need to be specified at the design stage (to allow for inaccuracies inherent in the building process). The specifier may either:

- design a nominal residual cavity width of 50 mm (a residual cavity nominally at least 50 mm wide will be required by the NHBC), or
- design a cavity width which takes into account the dimensional tolerances of the components which make up the wall (by reference to the British Standards relating to the bricks, blocks and boards, or by using the data from the respective manufacturers). Allowances may need to be made for the quality of building operatives and the degree of site supervision or control available. The limitations in respect of exposure of the proposed building as set out in Table 2 must also be observed.

*Table 2 Maximum allowable total exposure factors of different constructions*

Construction	Maximum allowable exposure factor $E^{(1)}$
All external masonry walls protected by: rendering (to BS EN 13914-1 : 2005), tile hanging, slate hanging or timber, plastic or metal weatherboarding or cladding	No restriction
One or more external masonry walls constructed from facing clay brickwork or natural stone, the porosity of which exceeds 20% by volume. Mortar joints must be flush pointed or weatherstruck	100
One or more external masonry walls constructed from calcium silicate bricks, concrete blocks, reconstituted stone, or natural stone, the porosity of which is less than 20% by volume, or any material with raked mortar joints	88

(1) To BS 5618 : 1985.

4.10 From ground level, the maximum height of continuous cavity walls must not exceed 12 metres; above 12 metres, the maximum height of continuous cavity walls must not exceed 7 metres. In both cases, breaks should be in the form of continuous horizontal cavity trays and weepholes discharging to the outside.

4.11 An external render coat or other suitable finish should be applied in locations where such application would be normal practice; care should be taken to ensure that the residual cavity is not bridged by mortar.

**Buildings over 25 metres in height**

4.12 The width of the residual clear cavity to be achieved is to be in excess of 50 mm, and the following additional requirements apply:

- the specifier must take extra care when detailing to ensure that the introduction of the insulation does not affect the weather resistance of the wall. Above average site supervision is recommended during installation of the products
- where, for structural reasons, the cavity width is reduced, eg by the intrusion of ring beams, a minimum residual cavity width of 25 mm must be maintained and extra care must be taken with fixings and weatherproofing, eg the inclusion of cavity trays with weepholes.

## 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 Thermal performance



6.1 Calculations of the thermal transmittance (U value) of specific external wall constructions should be carried out in accordance with BS EN ISO 6946 : 2007 and BRE Report BR 443 : 2006, using the following values:

### Celotex CW4000

- PIR insulation core — declared thermal conductivity ( $\lambda_D$ )\* of  $0.022 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$
- composite foil-facings both sides, printed on one side only — for unprinted facing, an aged emissivity ( $\epsilon_D$ ) (to BS EN 15976 : 2011) of 0.05.

### Celotex CG5000

- PIR insulation core – declared thermal conductivity ( $\lambda_D$ )\* of  $0.021 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$
- aluminium foil-facings both sides, unprinted — aged emissivity ( $\epsilon_D$ ) (to BS EN 15976 : 2011) of 0.03.

6.2 The U value of a completed wall will depend on the selected insulation thickness, number and type of fixings, the insulating value of the substrate masonry and its internal finish. Calculated U values for example constructions are given in Table 3.

Table 3 Example U values<sup>(1)</sup> — partial fill insulation (50 mm residual cavity)

U value ( $\text{W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ )	Insulation thickness (mm)			
	13 mm dense plaster, 100 mm dense block		Plasterboard on dabs, 100 mm AAC block	
	Celotex CW4000	Celotex CG5000	Celotex CW4000	Celotex CG5000
0.18	—	100	85	80
0.19	100	90	80	75
0.25	70	65	50	50
0.26	65	60	50	45
0.27	60	60	40	40
0.30	55	50	35	30
0.35	45	40	25	20

(1) The U value calculations are based on the following:

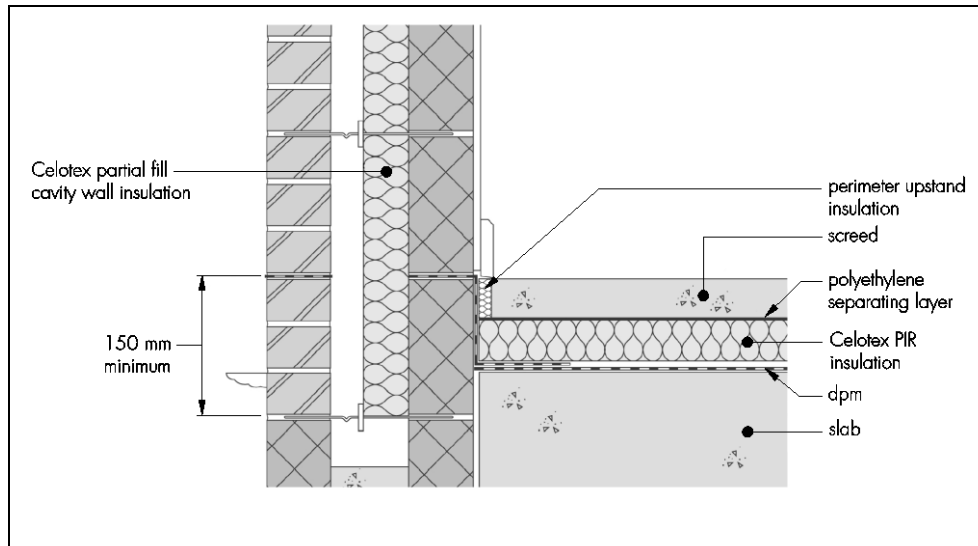
- 5 mm increments of product thickness, rounded upwards
- assumption that the unprinted foil-face of the insulation board faces the 50 mm cavity and the printed side faces the internal leaf. See section 13.2
- wall ties: mild steel, 2.5 per  $\text{m}^2$ ,  $12.5 \text{ mm}^2$  cross-section
- 102 mm brick with conductivity  $0.77 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$
- 50 mm low e cavity
- 100 mm dense block with conductivity  $1.13 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$  or
- 100 mm AAC block with conductivity  $0.12 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$  bridged by mortar (6.7%) with conductivity  $0.88 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$
- 13 mm dense plaster with conductivity  $0.57 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$  or
- 12.5 mm plasterboard with conductivity  $0.21 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ , on 15 mm dabs (20%) with conductivity  $0.43 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ .

### Junctions



6.3 Care must be taken in the overall design and construction of junctions with other elements and openings to minimise thermal bridges and air infiltration. Detailed guidance can be found in the documents supporting the national Building Regulations. An example of an acceptable junction detail is shown in Figure 1.

Figure 1 Junction between the wall and the floor



## 7 Water resistance



7.1 These products may be used in situations where they bridge the damp-proof course (dpc) in walls; dampness from the ground will not pass through to the inner leaf provided the wall is detailed in accordance with the requirements and provisions of the national Building Regulations.

7.2 Constructions incorporating the products, and built in accordance with the Standards listed in section 4.2, will resist the transfer of precipitation to the inner leaf and satisfy the national Building Regulations.

7.3 In all situations, it is particularly important to ensure during installation that:

- installation is carried out to the highest level on each wall or the top edge of the insulation is protected by a cavity tray
- cavity trays are used with appropriate stop ends and weepholes at lintel level
- cavity battens and/or boards are used during construction to prevent bridging by mortar droppings
- wall ties are installed correctly and are thoroughly clean
- excess mortar is cleaned from the cavity face of the leading leaf and any debris removed from the cavity
- mortar droppings are cleaned from the exposed edges of installed boards
- dpc's at ground level do not project into the cavity, as they can form a trap for mortar bridging
- insulation boards are properly installed and butt-jointed
- raked or recessed mortar joints are avoided in very severe exposure areas.

7.4 Window and door opening reveals should be constructed incorporating a cavity barrier/closer/dpc, as required.

## 8 Condensation risk

### Interstitial condensation



8.1 Walls will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2011, Annexes D and G, and the relevant guidance.

8.2 The foil-facings have a water vapour resistance of  $1000 \text{ MN}\cdot\text{s}\cdot\text{g}^{-1}$ , and the insulation core has a water vapour resistivity of  $300 \text{ MN}\cdot\text{s}\cdot\text{g}^{-1}\text{m}^{-1}$  and, therefore, will provide significant resistance to water vapour transmission. Joints between boards will facilitate the passage of water vapour under normal conditions of temperature and humidity.

8.3 If the products are to be used in the external walls of rooms expected to have high humidity, care must be taken to provide adequate permanent ventilation to avoid possible problems from the formation of interstitial condensation.



## Surface condensation



8.4 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 6.3 of this Certificate.



8.5 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 : 2011, Annex G. Further guidance may be obtained from BRE Report BR 262 : 2002 and section 6.3 of this Certificate.

## 9 Behaviour in relation to fire



9.1 The products are not classified as non-combustible or of limited combustibility, and the Certificate holder has not declared a reaction to fire classification in accordance with BS EN 13501-1 : 2007.



9.2 The requirements of the national Building Regulations relating to fire spread in cavity walls can be met in buildings of all-purpose groups without the need for cavity barriers or height restrictions, provided the construction complies with the provisions detailed in:

**England and Wales** — Approved Document B, Volume 1, Diagram 13 and Volume 2, Diagram 34

**Northern Ireland** — Technical Booklet E, Diagram 4.5.



9.3 The products may be used without height restriction in a wall on, or less than 1 m from, a relevant boundary provided they are installed in a cavity that is between two leaves of masonry at least 75 mm thick, and which has a cavity barrier around all openings in the wall and at the top of the wall head.



9.4 For constructions not covered by sections 9.2 and 9.3, the use of the products is restricted to 18 m in height and cavity barriers must be provided to comply with:

**England and Wales** — Approved Document B, Volume 1, section 6 and Volume 2, section 9

**Scotland** — Mandatory Standard 2.4, clauses 2.4.1<sup>(1)(2)</sup>, 2.4.2<sup>(1)(2)</sup>, 2.6.5<sup>(1)</sup> and 2.6.6<sup>(2)</sup>

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

**Northern Ireland** — Technical Booklet E, Paragraphs 4.36 to 4.39.

## 10 Proximity of flues and appliances

When installing the products in close proximity to certain flue pipes and/or heat-producing appliances, the relevant provisions of the national Building Regulations are applicable:

**England and Wales** — Approved Document J, sections 1 to 4

**Scotland** — Mandatory Standard 3.19, clauses 3.19.1<sup>(1)(2)</sup> to 3.19.9<sup>(1)(2)</sup>

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

**Northern Ireland** — Technical Booklet L, sections 1 to 6.

## 11 Maintenance

As the products are confined within the wall cavity and have suitable durability (see section 12), maintenance is not required.

## 12 Durability



The products are unaffected by the normal conditions in a wall, and are durable, rot proof, water resistant and sufficiently stable to remain effective as insulation for the life of the building.

## Installation

## 13 General

13.1 The Certificate holder will provide on-site demonstrations on request, to ensure correct installation from the outset.

13.2 Adequate supervision of the installation should be maintained and the Certificate holder must have right of access to site to ensure correct installation.

13.3 It is recommended that the inner leaf be constructed ahead of the outer leaf, as the boards are fastened to the cavity face of the inner leaf. It is essential that the spacing of wall ties/clips allows one long edge of each board to be secured at a minimum of two points.

13.4 Celotex CW4000 has printed logos applied to the foil-facing on one side only. To ensure optimum thermal performance, these boards must be installed with the unprinted foil-face always facing the cavity side. (This does not apply to Celotex CG5000 as it does not have any printed logo applied to its foil-facings.)

13.5 Vertical joints in the boards must be staggered and all joints tightly butted. Where protrusions occur in the cavity, the boards should be carefully cut to fit.

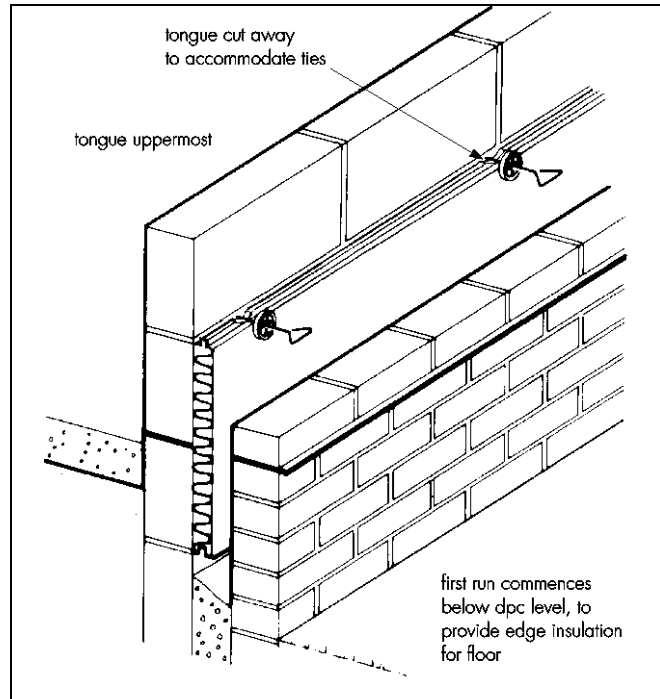
13.6 If installation of the boards is terminated below the highest level of the wall, the top edge of the insulation must be protected by a cavity tray and alternate perpend joints raked out, to provide adequate drainage of water from the tray.

13.7 Where required, door and window reveals should incorporate a suitable cavity barrier/closer. It is recommended that BBA-approved cavity closers are used.

## 14 Procedure

14.1 A section of the inner leaf is built, with the first row of wall ties, at approximately 600 mm horizontal spacings, where the insulation is to begin. The wall ties should not be placed directly on the dpc. The first run of boards should commence below the dpc level to provide some edge insulation for the floor (see Figure 2).

*Figure 2 Insulation installed below dpc level to provide edge insulation for floor*

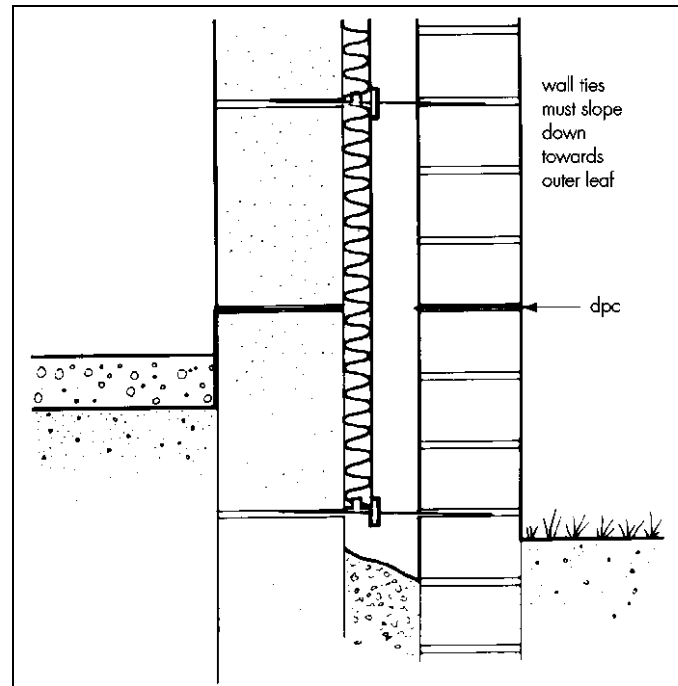


14.2 The leading leaf is then built up to the required height, with wall ties placed at a vertical spacing of 450 mm ensuring the drip of the tie is located halfway across the residual cavity width. Excess mortar should be cleaned from the cavity face of the leading leaf, and the boards placed on the wall ties behind the retaining clips, to form a closely butt-jointed run.

14.3 The second row of wall ties is fitted to retain the tops of the boards. It is essential that all wall ties slope downwards towards the outer leaf (see Figure 3), and are placed at centres not exceeding 900 mm to ensure that each board is secured at a minimum of three points. It is also important that the first row of insulation boards should not be in contact with the ground.

14.4 Additional ties may be required to satisfy the structural requirements of BS EN 845-1 : 2013, BS EN 1996-1-1 : 2005, BS EN 1996-2 : 2006 and BS EN 1996-3 : 2006 to ensure adequate retention of boards or cut pieces.

Figure 3 Installation of wall ties



14.5 The other leaf is built up to the level of the top of the boards.

14.6 All boards should be either close-butted together (for plain edge boards) or interlocked (for tongue-and-groove boards), with vertical joints staggered. Insulation boards and wall ties should be staggered as construction proceeds and carried up to the highest level of the wall, except where protected by a cavity tray. Boards with a tongue-and-groove edge require slots to be cut in the top tongue, to allow for placement of the wall ties, complete with insulation retainers.

#### **Mortar droppings**

14.7 After each section of the leading leaf is built, excess mortar should be removed from the cavity face and mortar droppings cleaned from exposed edges of the installed board, before installation of the next run of boards. Use of a cavity board or a cavity batten will protect the installed board edges and help to keep the cavity clean as the following leaf is built (see Figures 4 and 5).

Figure 4 Use of cavity batten

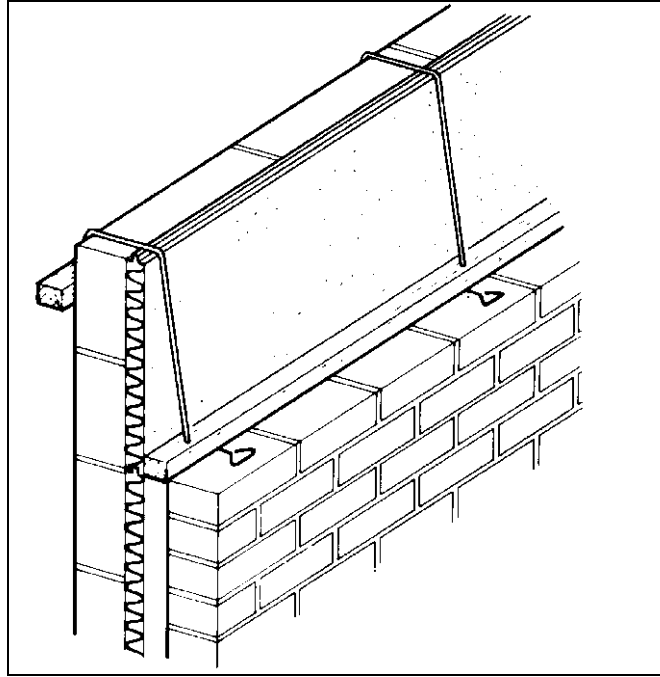
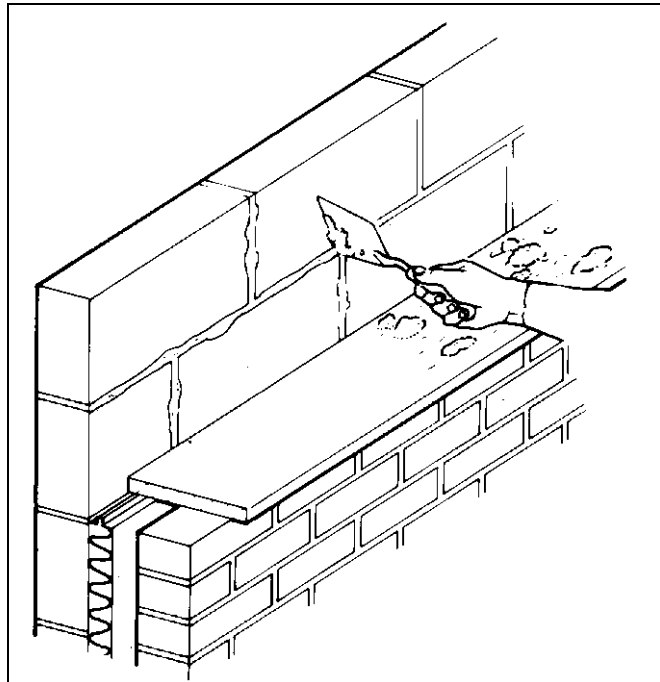


Figure 5 Use of cavity board



### Wall openings

14.8 Where openings such as doors and windows are in close proximity, it is recommended that a continuous lintel or cavity tray is used. Individual lintels or cavity trays should have stopends and be adequately drained. Insulation boards should be cut to butt tightly against the cavity barrier/closer/dpc.

### Cut pieces

14.9 The products can be cut, using a sharp knife or fine-toothed saw, to fit openings, eg around windows, doors and airbricks. It is essential that cut pieces completely fill the spaces for which they are intended and are adequately secured.

## Protection

14.10 Exposed areas of slabs should always be covered at the end of a day's work or in driving rain.

14.11 All building involving the products, particularly interrupted work, must conform to BS EN 1996-2 : 2006, Sections 3.2 *Acceptance, handling and storage of materials* and 3.6 *Curing and protective procedures during execution*.

## Technical Investigations

### 15 Tests

Results of tests were assessed to determine:

- thermal conductivity
- emissivity.

### 16 Investigations

16.1 An examination of data was made to analyse:

- thermal conductivity
- dimensional accuracy
- compressive strength
- dimensional stability under specific temperature and humidity conditions
- water absorption
- water vapour transmission
- reaction to fire.

16.2 A condensation risk analysis was carried out.

16.3 A series of U value calculations was carried out.

16.4 A calculation was undertaken to confirm the declared thermal conductivities.

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

## Bibliography

- BS 5250 : 2011 *Code of practice for control of condensation in buildings*
- BS 5618 : 1985 *Code of practice for thermal insulation of cavity walls (with masonry or concrete inner and outer leaves) by filling with urea-formaldehyde (UF) foam systems*
- BS 8000-3 : 2001 *Workmanship on building sites — Code of practice for masonry*
- BS EN 845-1 : 2013 *Specification for ancillary components for masonry — Wall ties, tension straps, hangers and brackets*
- 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*
- BS EN 1996-1-2 : 2005 *Eurocode 6 — Design of masonry structures — General rules for reinforced and unreinforced masonry structures*
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- BS EN 1996-3 : 2006 *Eurocode 6 — Design of masonry structures — Simplified calculation methods for unreinforced masonry structures*
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- BS EN 15976 : 2011 *Flexible sheets for waterproofing — Determination of emissivity*
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- BS EN ISO 9001 : 2008 *Quality management systems — Requirements*
- BS EN ISO 14001 : 2004 *Environmental management systems — Requirements with guidance for use*
- BRE Report 262 : 2002 *Thermal insulation : avoiding risk*
- BRE Report 443 : 2006 *Conventions for U-value calculations*

### 17 Conditions

17.1 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 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
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- is subject to English Law.

17.2 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.

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- 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.

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

17.5 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:

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- any claims by the manufacturer relating to CE marking.

17.6 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.