

## Celotex Limited

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Agrément Certificate  
**94/3080**  
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 boards, 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 12 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

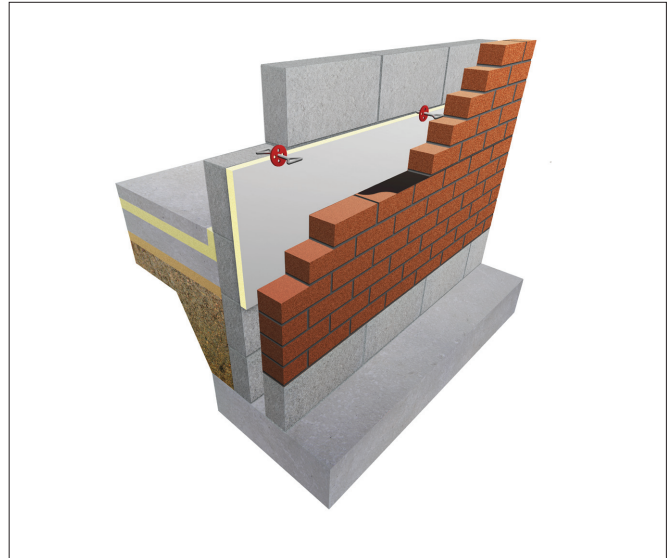
**Thermal performance** — the products have a declared thermal conductivity ( $\lambda_D$ )\* of 0.022 W·m<sup>-1</sup>·K<sup>-1</sup> for Celotex CW4000 and 0.021 W·m<sup>-1</sup>·K<sup>-1</sup> for Celotex CG5000 (see section 6).

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

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

**Behaviour in relation to fire** — the products, once installed, will not prejudice the fire resistance of the wall (see section 9).

**Durability** — the products will have a life equivalent to that of the wall structure in which they are incorporated (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

A handwritten signature in black ink, appearing to read 'John Albon'.

John Albon — Head of Approvals  
Energy and Ventilation

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

Claire Curtis-Thomas  
Chief Executive

Date of Third issue: 6 June 2014

Originally certificated on 19 December 1994

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

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

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# Regulations

In the opinion of the BBA, Celotex CW4000 and Celotex CG5000 PIR Insulation for Partial Fill Cavity Walls, if installed, used and maintained in accordance with this Certificate, can 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>	B3(4)	<b>Internal fire spread (structure)</b>
<b>Comment:</b>		The products can contribute to satisfying this Requirement. See Sections 9.1 and 9.5 of this Certificate.
<b>Requirement:</b>	C2(a)	<b>Resistance to moisture</b>
<b>Comment:</b>		The products can contribute to satisfying this Requirement. See section 7.1 of this Certificate.
<b>Requirement:</b>	C2(b)	<b>Resistance to moisture</b>
<b>Comment:</b>		The products can contribute to satisfying this Requirement. See section 7.2 of this Certificate.
<b>Requirement:</b>	C2(c)	<b>Resistance to moisture</b>
<b>Comment:</b>		The products can contribute to satisfying this Requirement. See sections 8.1 and 8.3 of this Certificate.
<b>Requirement:</b>	L1(a)(i)	<b>Conservation of fuel and power</b>
<b>Comment:</b>		The products can contribute to satisfying this Requirement. See section 6 of this Certificate.
<b>Regulation:</b>	7	<b>Materials and workmanship</b>
<b>Comment:</b>		The products are acceptable. See section 12 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	26	<b>CO<sub>2</sub> emission rates for new buildings</b>
<b>Regulation:</b>	26A	<b>Fabric energy efficiency rates for new buildings (applicable to England only)</b>
<b>Comment:</b>		The products can contribute to satisfying these Regulations. See section 6 of this Certificate.



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

<b>Regulation:</b>	8(1)	<b>Durability, Workmanship and Fitness of materials</b>
<b>Comment:</b>		The products are acceptable. See section 12 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	9	<b>Building standards applicable to construction</b>
<b>Standard:</b>	2.6	<b>Spread to neighbouring buildings</b>
<b>Comment:</b>		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 and 9.5 of this Certificate.
<b>Standard:</b>	3.4	<b>Moisture from the ground</b>
<b>Comment:</b>		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.
<b>Standard:</b>	3.10	<b>Precipitation</b>
<b>Comment:</b>		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.
<b>Standard:</b>	3.15	<b>Condensation</b>
<b>Comment:</b>		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 8.2 and 8.3 of this Certificate.
<b>Standard:</b>	6.1(b)	<b>Carbon dioxide emissions</b>
<b>Standard:</b>	6.2	<b>Building insulation envelope</b>
<b>Comment:</b>		The products can contribute to satisfying this Standard with reference to clauses, or parts of clauses, 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> , 6.2.5 <sup>(2)</sup> , 6.2.9 <sup>(1)</sup> , 6.2.10 <sup>(1)</sup> , 6.2.11 <sup>(2)</sup> and 6.2.13 <sup>(2)</sup> . See section 6 of this Certificate.
<b>Standard:</b>	7.1(a)(b)	<b>Statement of sustainability</b>
<b>Comment:</b>		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>	12	<b>Building standards applicable to conversions</b>
<b>Comment:</b>		All comments given for these products under Regulation 9 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

<b>Regulation:</b>	23	<b>Fitness of materials and workmanship</b>
<b>Comment:</b>		The products are acceptable. See section 12 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	28(a)	<b>Resistance to moisture and weather</b>
<b>Comment:</b>		The products can contribute to satisfying this Regulation. See section 7.1 of this Certificate.
<b>Regulation:</b>	28(b)	<b>Resistance to moisture and weather</b>
<b>Comment:</b>		The products can contribute to satisfying this Regulation. See section 7.2 of this Certificate.

Regulation:	29	Condensation
Comment:		The products can contribute to satisfying this Regulation. See section 8.3 of this Certificate.
Regulation:	35(4)	Internal fire spread – structure
Comment:		The products can contribute to satisfying this Regulation. See sections 9.1 and 9.5 of this Certificate.
Regulation:	39(a)(i)	Conservation measures
Regulation:	40(2)	Target carbon dioxide emission rate
Comment:		The products can contribute to satisfying these Regulations. See section 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 section: 3 *Delivery and site handling* (3.4) of this Certificate.

## Additional Information

### NHBC Standards 2014

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*, 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 is 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 foil-faced rigid polyisocyanurate (PIR) foam boards manufactured to comply with BS EN 13165 : 2012, with the nominal characteristics given in Table 1 of this Certificate.

Table 1 Nominal characteristics

Product	Board size (mm)	Thickness range (mm)	Edge profile
Celotex CW4000	1200 x 450	25 to 100	square edge
Celotex CG5000	1200 x 450	41 to 100	square edge

### 2 Manufacture

2.1 Celotex PIR insulation is manufactured by a lamination process – formed between aluminium 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 this 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 Ltd 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 (Certificates GB91/504 and GB11/83526 respectively).

### 3 Delivery and site handling

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

3.2 The boards 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.

## 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 new 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 12 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 these Regulations should also be built in accordance with the Standards given in section 4.2 of this Certificate.

4.4 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.

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

4.6 For optimum thermal performance, boards with printed foil-facings (Celotex CW4000) must be installed with the correct orientation. See section 13.2.

### Buildings up to and including 12 metres high

4.7 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 <sup>(1)</sup>
All external masonry walls protected by: rendering (to BS EN 13914 : 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

4.8 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 12 metres in height

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

- 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.
- 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 ( $\lambda_p$ )\* of  $0.022 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$
- outer foil facer – aged emissivity ( $\epsilon_p$ ) (to BS EN 15976 : 2011) of 0.05

### Celotex CG5000

- PIR insulation core – Declared thermal conductivity ( $\lambda_p$ )\* of  $0.021 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$
- outer foil facing – aged emissivity ( $\epsilon_p$ ) (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 above '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 boards faces the 50 mm cavity and the printed foil-face 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  $0.43 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ .

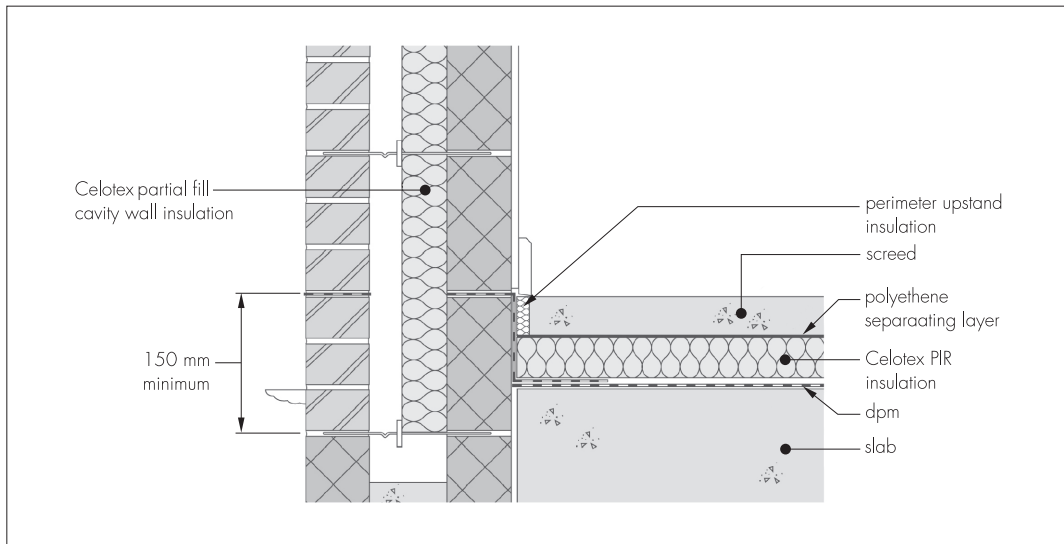
6.3 The products can maintain, or contribute to maintaining, continuity of thermal insulation at junctions between elements and openings. Example junction details shown in Figure 1 are acceptable, and the corresponding  $\psi$ -values (psi) in BRE Information Paper IP 1/06, Table 3, may be used in carbon emission calculations in Scotland and Northern Ireland. Detailed guidance for other junctions and on limiting heat loss by air infiltration can be found in:

**England and Wales** — Approved Documents to Part L and, for new thermal elements to existing buildings, Accredited Construction Details (version 1.0). See also SAP 2009 Appendix K and the *iSBEM User Manual* for new-build

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

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

Figure 1 Junction between the wall and the floor



## 7 Water resistance



7.1 Where the products are 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:

**England and Wales** — Approved Document C, section 5

**Scotland** — Mandatory Standard 3.4, clauses 3.4.1<sup>(1)(2)</sup> and 3.4.5<sup>(1)(2)</sup>

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

**Northern Ireland** — Technical Booklet C, Sections 6.3 to 6.6.

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:

**England and Wales** — Approved Document C, section 5

**Scotland** — Mandatory Standard 3.10, clauses 3.10.1<sup>(1)(2)</sup> and 3.10.3<sup>(1)(2)</sup>

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

**Northern Ireland** — Technical Booklet C, section 6.

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

- 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 slabs
- insulation boards are properly installed and butt-jointed
- installation is carried out to the highest level on each wall, or the top edge of the insulation is protected by a cavity tray
- at lintel level, a cavity tray, stop ends and weep holes are provided
- cavity battens and/or boards are used during construction to prevent bridging by mortar droppings
- dpc's at ground level do not project into the cavity as they can form a trap for mortar bridging
- raked or recessed mortar joints are avoided in very severe exposure areas.

## 8 Condensation

### Surface condensation



8.1 Walls will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed  $0.7 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$  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.



8.2 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 : 2011 Annex G. Further guidance may be obtained from BRE Report BR 262 : 2002 and section 6.3 of this Certificate.

### Interstitial condensation



8.3 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.

8.4 The foil-facings have a water vapour resistance exceeding  $70 \text{ MN}\cdot\text{s}\cdot\text{g}^{-1}\cdot\text{m}^{-1}$ , and the insulation core has a water vapour resistivity of  $300 \text{ MN}\cdot\text{s}\cdot\text{g}^{-1}\cdot\text{m}^{-1}$  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.

8.5 If the products are to be used in the external wall 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 in the internal wall leaf.

## 9 Behaviour in relation to fire



9.1 The products have a reaction to fire classification of Class F\* to 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, 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 For buildings subject to the Building Standards in Scotland, cavity barriers are not required to limit the area of a cavity or at junctions with other wall cavities. Cavity barriers are required around openings, penetrations and junctions with roof or floor cavities, with reference to 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).

9.4 For constructions not covered by sections 9.2 and 9.3, 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>, 2.4.7<sup>(1)</sup> and 2.4.9<sup>(2)</sup>.

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

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



9.5 The products are not classified as 'non-combustible' or of 'limited combustibility', but 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. The use of the products in constructions not meeting this specification is limited to 18 m in height.

9.6 Cavity walls should always have a cavity closer at the top of the cavity and around openings. The materials must not be taken past fire stops. If fire does penetrate into an unventilated cavity, the amount of air present will be insufficient to support combustion and flame spread will be minimal.

## 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, section 2.

## 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

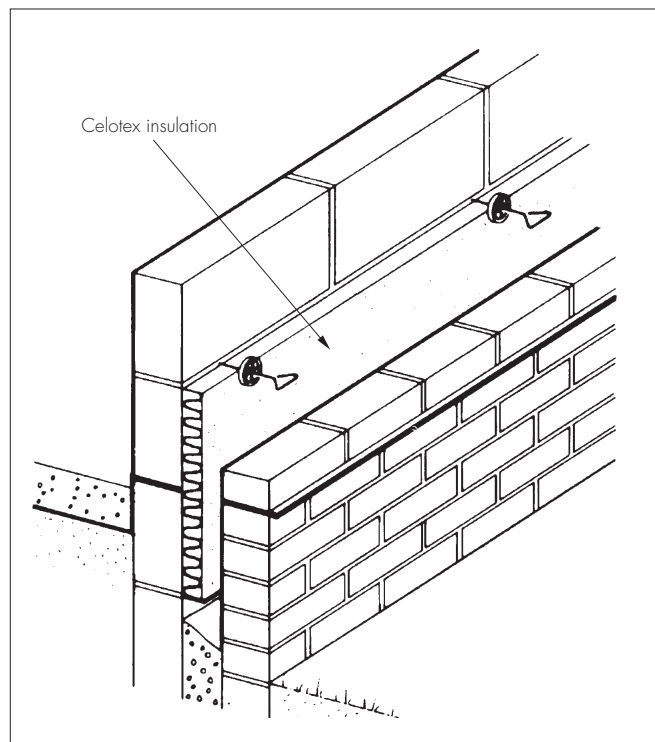
13.1 It is recommended that the inner leaf be constructed ahead of the outer leaf, as the boards are fastened to the cavity face of the inner leaf. It is essential that the spacing of wall ties/clips allows one long edge of each board to be secured at a minimum of two points.

13.2 Celotex CW4000 has printed logos applied to the outer 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.

### 14 Procedure

14.1 A section of the inner leaf is built with the first row of wall ties, at approximately 600 mm horizontal spacing, 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

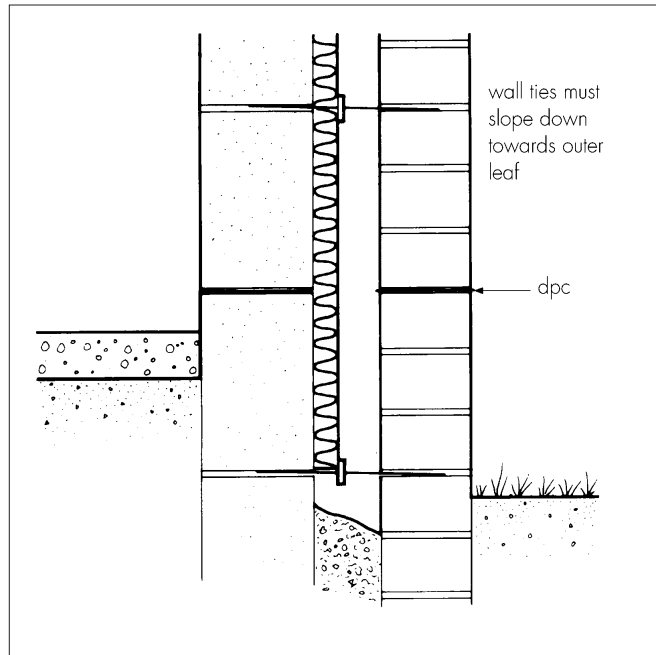


14.2 The leading leaf is then built up to the required height, with wall ties placed at a vertical spacing of 450 mm ensuring the drip of the tie is located halfway across the residual cavity width. Excess mortar should be cleaned from the cavity face of the leading leaf, and the boards placed on the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



Figure 3 Installation of wall ties



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.

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

14.6 All boards should be butted with vertical joints staggered. Insulation boards and wall ties should be staggered as construction proceeds and carried up to the highest level of wall, except where protected by a cavity tray.

#### 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

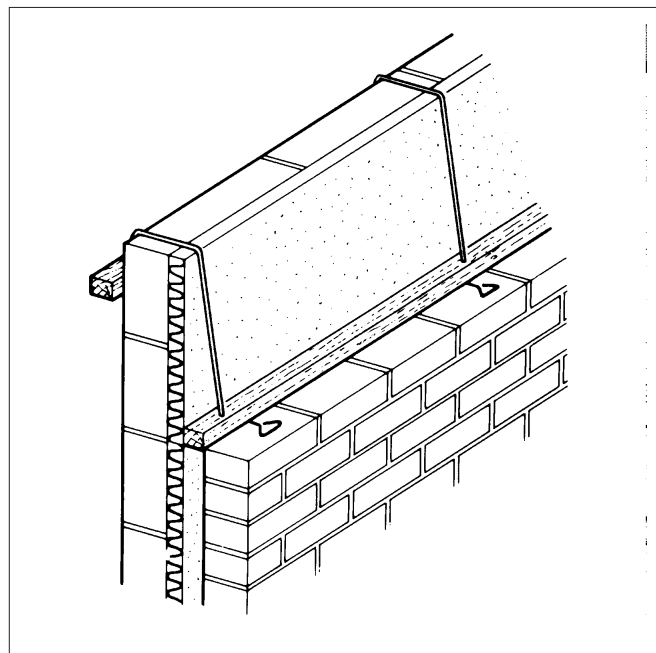
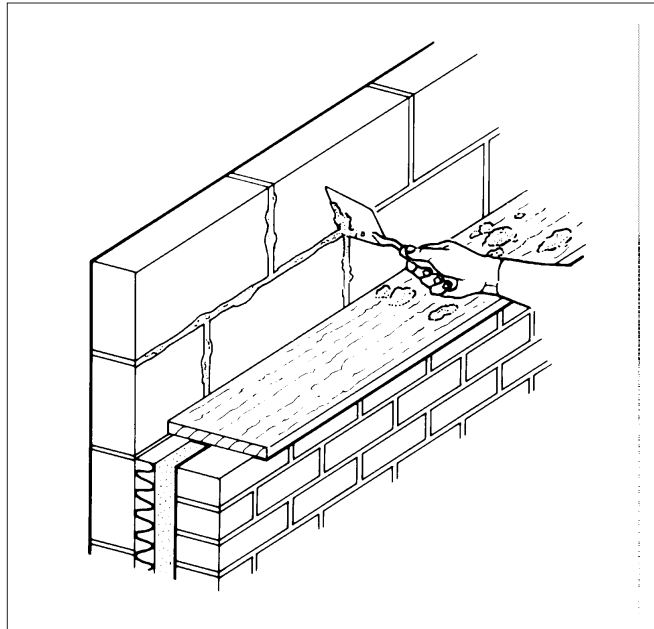


Figure 5 Use of cavity board



### 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.

### 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.

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

## Bibliography

- 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*
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## 17 Conditions

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- 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
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