

## Ballytherm Ltd

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Agrément Certificate  
**07/4422**  
Product Sheet 1

## BALLYTHERM PARTIAL FILL CAVITY WALL INSULATION

## BALLYTHERM BTCW CAVITY WALL INSULATION

This Agrément Certificate Product Sheet<sup>(1)</sup> relates to Ballytherm BTCW Cavity Wall Insulation, 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. The product is 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

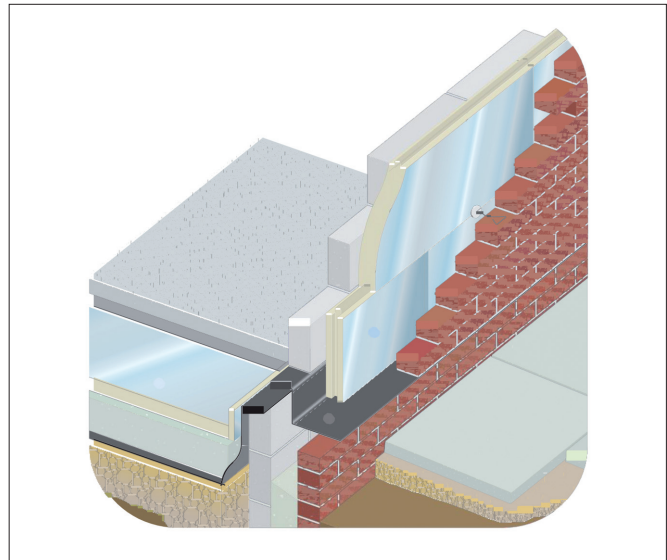
**Thermal performance** — the product has a declared thermal conductivity ( $\lambda_D$ ) of  $0.022 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$  (see section 6).

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

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

**Behaviour in relation to fire** — the product has an F reaction to fire classification to BS EN 13501-1 : 2007 (see section 9).

**Durability** — the product will have a life equivalent to that of the wall structure in which it is incorporated (see section 12).



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

On behalf of the British Board of Agrément

John Albon — Head of Approvals

Claire Curtis-Thomas

Date of Second issue: 29 January 2015

Construction Products

Chief Executive

Originally certificated on 16 March 2007

Certificate amended on 3 April 2019 to include Regulation 7(2) for England and associated text.

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.

Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.

British Board of Agrément

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# Regulations

In the opinion of the BBA, Ballytherm BTCW Cavity Wall Insulation, 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> B3(4)	<b>Internal fire spread (structure)</b>
Comment:	The product is restricted by this Requirement. See sections 9.1 to 9.3 and 9.5 of this Certificate.
<b>Requirement:</b> B4(1)	<b>External fire spread</b>
Comment:	The product is restricted in some cases by this Requirement. See sections 9.1 to 9.3 and 9.5 of this Certificate.
<b>Requirement:</b> C2(a)	<b>Resistance to moisture</b>
Comment:	The product can contribute to satisfying this Requirement. See section 7.1 of this Certificate.
<b>Requirement:</b> C2(b)	<b>Resistance to moisture</b>
Comment:	The product can contribute to satisfying this Requirement. See section 7.2 of this Certificate.
<b>Requirement:</b> C2(c)	<b>Resistance to moisture</b>
Comment:	The product can contribute to satisfying this Requirement. See sections 8.1 and 8.4 of this Certificate.
<b>Requirement:</b> L1(a)(i)	<b>Conservation of fuel and power</b>
Comment:	The product can contribute to satisfying this Requirement. See section 6 of this Certificate.
<b>Regulation:</b> 7	<b>Materials and Workmanship (applicable to Wales only)</b>
<b>Regulation:</b> 7(1)	<b>Materials and Workmanship (applicable to England only)</b>
Comment:	The product is acceptable. See section 12 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b> 7(2)	<b>Materials and Workmanship (applicable to England only)</b>
Comment:	The product is restricted by this Regulation. See sections 9.1 and 9.2 of this Certificate.
<b>Regulation:</b> 26	<b>CO<sub>2</sub> emission rates for new dwellings</b>
<b>Regulation:</b> 26A	<b>Fabric energy efficiency rates for new dwellings (applicable to England only)</b>
<b>Regulation:</b> 26A	<b>Primary energy consumption rates for new buildings (applicable to Wales only)</b>
<b>Regulation:</b> 26B	<b>Fabric performance values for new dwellings (applicable to Wales only)</b>
Comment:	The product 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>
Comment:	The product is acceptable. See section 12 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b> 9	<b>Building standards applicable to construction</b>
Standard:	2.6 Spread to neighbouring buildings
Comment:	The product is restricted by this Standard with respect to clauses 2.6.5 <sup>(1)</sup> and 2.6.6 <sup>(2)</sup> . See sections 9.1, 9.4 and 9.5 of this Certificate.
Standard:	2.7 Spread on external walls
Comment:	The product is restricted by this Standard with respect to clauses 2.7.1 <sup>(1)</sup> and 2.7.2 <sup>(2)</sup> . See sections 9.1, 9.4 and 9.5 of this Certificate.
Standard:	3.4 Moisture from the ground
Comment:	The product 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 product 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 product 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 product 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 product 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 product 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>
Comment:	All comments given for this product under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 <sup>(1)(2)</sup> and Schedule 6 <sup>(1)(2)</sup> .

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).



## The Building Regulations (Northern Ireland) 2012

Regulation:	23	Fitness of materials and workmanship
Comment:		The product is acceptable. See section 12 and the <i>Installation</i> part of this Certificate.
Regulation:	28(a)	Resistance to moisture and weather
Comment:		The product can contribute to satisfying this Regulation. See section 7.1 of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		The product can contribute to satisfying this Regulation. See section 7.2 of this Certificate.
Regulation:	29	Condensation
Comment:		The product can contribute to satisfying this Regulation. See section 8.1 of this Certificate.
Regulation:	35(4)	Internal fire spread – structure
Comment:		The product is restricted by this Regulation. See sections 9.1, 9.3 and 9.5 of this Certificate.
Regulation:	36(a)	External fire spread
Comment:		The product is restricted by this Regulation. See sections 9.1, 9.3 and 9.5 of this Certificate.
Regulation:	39(a)(i)	Conservation measures
Regulation:	40(2)	Target carbon dioxide emission rate
Comment:		The product 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 Ballytherm BTCW Cavity Wall Insulation, provided it is 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 product 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

Ballytherm BTCW Cavity Wall Insulation comprises a foil-faced rigid polyisocyanurate (PIR) board, with the nominal characteristics given in Table 1.

Table 1 Nominal characteristics

Length x height (mm)	1200 x 450
Thickness <sup>(1)</sup> (mm)	25 to 150
Nominal density (kg·m <sup>-3</sup> )	30 to 40
Edge profile (3 options)	Tongue-and-groove rebated Plain edge (butt jointed)

(1) Other thicknesses available subject to quantity.

### 2 Manufacture

2.1 Ballytherm BTCW Cavity Wall Insulation is manufactured by blending together polyol and MDI in a continuous foaming process aided by a blowing agent, and sandwiched between two aluminium foil-facings. After formation, the boards are left to cure and are cut to size.

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 Ballytherm Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 and/or BS EN ISO 14001 : 2004 by EQA (Ireland) Ltd (Certificates Q3874 and E3874).

### 3 Delivery and site handling

3.1 The product is 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 product must be protected from prolonged exposure to sunlight, and should be 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 product is light and easy to handle and care should be exercised to avoid crushing the edges or corners. If damaged, the product should be discarded.

3.4 The product 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 Ballytherm BTCW Cavity Wall Insulation.

### Design Considerations

#### 4 Use

4.1 Ballytherm BTCW Cavity Wall Insulation is satisfactory for use as partial fill cavity wall insulation and is 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 product is for use in new domestic and non-domestic buildings. 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 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, BTCW boards must be installed with the correct orientation of their printed foil-facing. See section 1.3.2.

#### Buildings up to and including 25 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 25 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 product
- 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 product is designed to be installed by a competent general builder, or a contractor, experienced with this type of product.

## 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 declared thermal conductivity ( $\lambda_p$ )\* of 0.022 W·m<sup>-1</sup>·K<sup>-1</sup> for the insulation, and an aged emissivity ( $\epsilon_p$ ) (to BS EN 15976 : 2011) of 0.05 for the foil-facings.

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 (W·m <sup>-2</sup> ·K <sup>-1</sup> )	BTCW Insulation thickness (mm)	
	13 mm dense plaster, 100 mm dense block	Plasterboard on dabs, 100 mm AAC block
0.18	–	90
0.19	100	80
0.25	70	50
0.26	65	50
0.27	65	50
0.30	60	35
0.35	50	25

Note:

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

- standard product thicknesses
- 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 m<sup>2</sup>, 12.5 mm<sup>2</sup> cross-section
- 102 mm brick with conductivity 0.77 W·m<sup>-1</sup>·K<sup>-1</sup>
- 50 mm low e cavity
- 100 mm dense block with conductivity 1.13 W·m<sup>-1</sup>·K<sup>-1</sup> or
- 100 mm AAC block with conductivity 0.12 W·m<sup>-1</sup>·K<sup>-1</sup> bridged by mortar (6.7%) with conductivity 0.88 W·m<sup>-1</sup>·K<sup>-1</sup>
- 13 mm dense plaster with conductivity 0.57 W·m<sup>-1</sup>·K<sup>-1</sup> or
- 12.5 mm plasterboard with conductivity 0.21 W·m<sup>-1</sup>·K<sup>-1</sup>, on 15 mm dabs (20%) with conductivity 0.43 W·m<sup>-1</sup>·K<sup>-1</sup>.

## 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.

## 7 Water resistance



7.1 Where the product is used in situations where it bridges 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 product, 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 boards
- insulation boards are properly installed and either butt jointed, or interlocked using the tongue and groove or rebated edges
- 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

### 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 exceeding  $140 \text{ MN}\cdot\text{s}\cdot\text{g}^{-1}$  and the insulation core has a water vapour resistivity exceeding  $50 \text{ MN}\cdot\text{s}\cdot\text{g}^{-1}\cdot\text{m}^{-1}$  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.

8.3 If the product is 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.

### 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 product has an F\* reaction to fire classification to BS EN 13501-1 : 2007. It is not classified as non-combustible or of limited combustibility.





9.2 In England, the product should not be used on buildings with a storey 18 m or more above ground level that contains: one or more dwellings, an institution, a room for residential purposes (excluding any room in a hostel, hotel or boarding house), student accommodation, care homes, sheltered housing, hospitals or dormitories in boarding schools.



9.3 In England, Wales and Northern Ireland, the product is unrestricted in terms of proximity to a boundary and, for constructions complying with section 9.5, is unrestricted in terms of height. For other constructions, the product should not be used in buildings with a floor more than 18 m above the ground.



9.4 In Scotland, the product may be used without restriction on height or proximity to a relevant boundary, provided it is 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. For other constructions, the product should not be used 1 m or less from a boundary or in a building with a floor more than 18 m above the ground.



9.5 Cavity barriers are required in accordance with the relevant provisions of the national Building Regulations, unless the construction complies with:

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

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

**Scotland** — Technical Handbook – Domestic – Clauses 2.4.1, 2.4.2 and 2.4.7, or Technical Handbook – Non-Domestic – Clauses 2.4.1 and 2.4.2

9.6 Designers should refer to the relevant national Building Regulations and guidance for detailed conditions of use, particularly in respect of requirements for substrate fire performance, cavity closers and barriers, fire stopping of service penetrations and combustibility limitations for other materials and components used in the overall wall construction.

## 10 Proximity of flues and appliances

When installing the product in close proximity to certain flue pipes and/or heat-producing appliances, the following provisions to 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 product is confined within the wall cavity and has suitable durability (see section 12), maintenance is not required.

## 12 Durability



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

# Installation

## 13 General

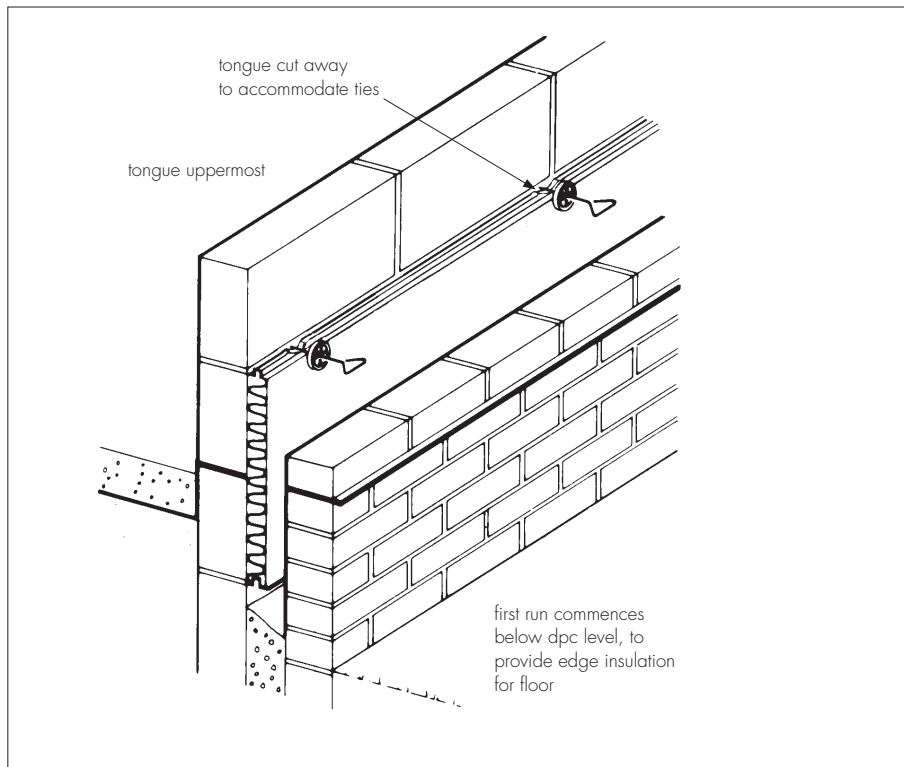
13.1 It is recommended that the inner leaf be constructed ahead of the outer leaf, as the boards are fastened to the cavity face of the inner leaf. It is essential that the spacing of wall ties/clips allows one long edge of each board to be secured at a minimum of three points.

13.2 BTCW insulation boards have 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.

## 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 may commence below the dpc level to provide some edge insulation for the floor (see Figure 1).

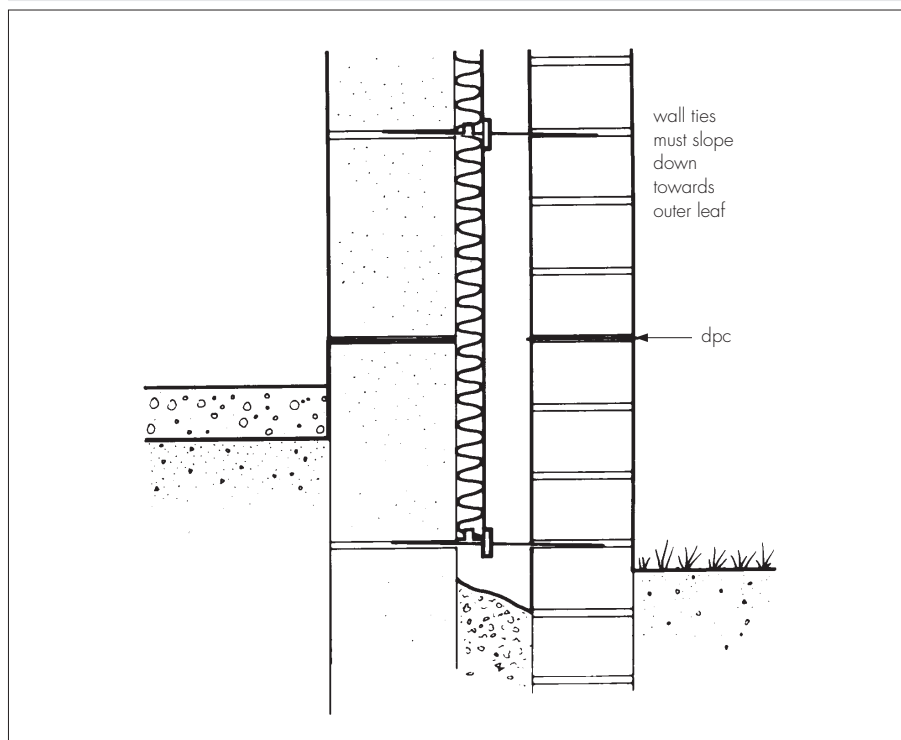
Figure 1 Insulation installed below dpc level to provide edge insulation for floor



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 jointed run. See section 14.6 for different board edges.

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 2), 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 should not be in contact with the ground.

Figure 2 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 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 together (for rebated or 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 or rebated edge require slots to be cut into 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 3 and 4).

Figure 3 Use of cavity batten

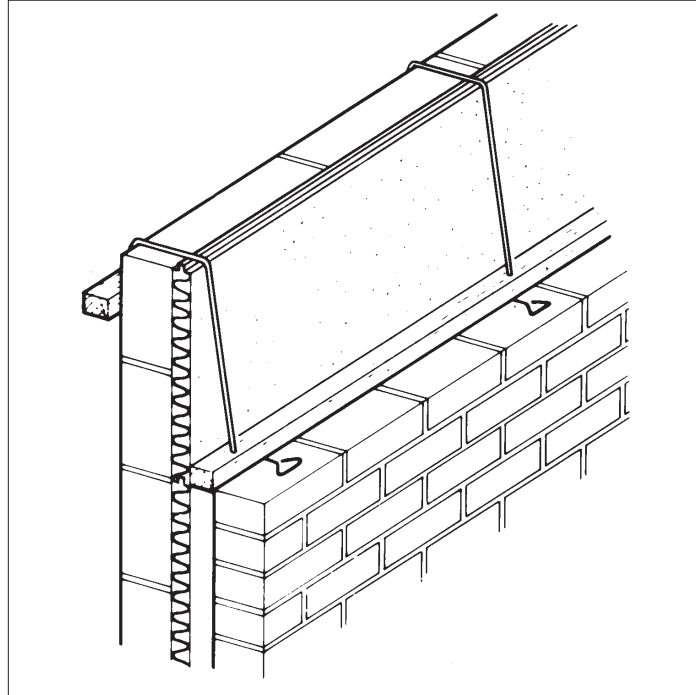
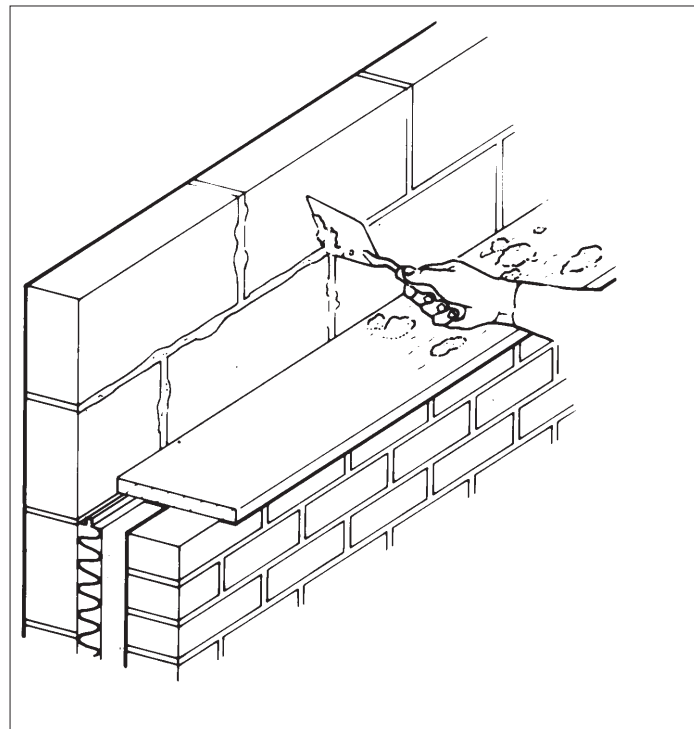


Figure 4 Use of cavity board



## 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 Boards can be cut, using a sharp knife or fine-toothed saw, to fit around 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 Investigations

15.1 An examination was made of test data relating to:

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

15.2 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

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

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