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BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

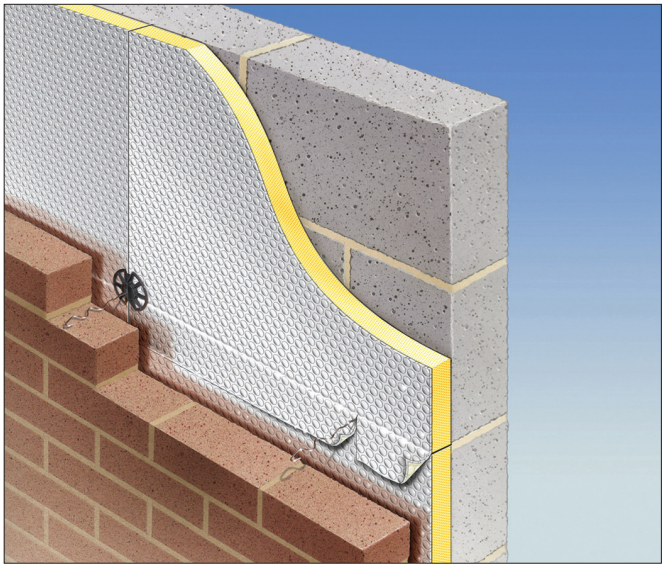
Agrément Certificate
93/2861
Product Sheet 3

ALREFLEX RANGE OF CAVITY WALL INSULATION AND CAVITY RAIN BARRIERS

ALREFLEX ULTRATHERM

This Agrément Certificate Product Sheet(1) relates to Alreflex Ultratherm, a single-layer polyethylene bubble sheet faced on one side with aluminium foil, attached to a foil-faced rigid urethane foam board, for use as thermal insulation. When installed with overlap, it can also act as a cavity rain barrier in masonry cavity walls in new domestic and non-domestic buildings with a nominal residual cavity of 50 mm, with height restrictions in some cases.

(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 (λ_D)* of 0.022 $W \cdot m^{-1} \cdot K^{-1}$ for the insulation board, a thermal resistance of 0.10 $m^2 \cdot K \cdot W^{-1}$ for the bubble sheet and an emissivity of 0.03 for the foil (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 insulation core of the product has a Class F reaction to fire classification in accordance with BS EN 13501-1 : 2007 and its use is restricted in some cases by the national Building Regulations (see section 9).

Durability — the product 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 product described herein. This product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of Second issue: 23 January 2015

Originally certificated on 28 January 2010

John Albon — Head of Approvals
Construction Products

Claire Curtis-Thomas
Chief Executive

Certificate amended on 20 June 2019 to include Regulation 7(2) for England and associated text.

Certificate amended on 13 January 2020 to include new regulatory guidance for fire in Scotland and Wales.

Regulations

In the opinion of the BBA, Alreflex Ultratherm, 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)

Requirement:	B3(4)	Internal fire spread (structure)
Comment:		The product may be restricted by this Requirement. See sections 9.1, 9.3 and 9.5 of this Certificate.
Requirement:	C2(a)	Resistance to moisture
Comment:		The product can contribute to satisfying this Requirement. See section 7.1 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		The product can contribute to satisfying this Requirement. See section 7.2 of this Certificate.
Requirement:	C2(c)	Resistance to moisture
Comment:		The product can contribute to satisfying this Requirement. See sections 8.1 and 8.3 of this Certificate.
Requirement:	L1(a)(i)	Conservation of fuel and power
Comment:		The product can contribute to satisfying this Requirement. See section 6 of this Certificate.
Regulation:	7(1)	Materials and workmanship
Comment:		The product is acceptable. See section 12 and the *Installation* part of this Certificate.
Regulation:	7(2)	Materials and workmanship
Comment:		The product is restricted by this Regulation. See sections 9.1 and 9.2 of this Certificate.
Regulation:	26	CO_2 emission rates for new buildings
Regulation:	26A	Fabric energy efficiency rates for new dwellings (applicable to England only)
Regulation:	26A	Primary energy consumption rates for new buildings (applicable to Wales only)
Regulation:	26B	Fabric performance values for new dwellings (applicable to Wales only)
Comment:		The product can contribute to satisfying these Regulations. See section 6 of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)	Durability, Workmanship and Fitness of materials
Comment:		The product is acceptable. See section 12 and the *Installation* part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	2.4	Cavities
Comment:		The product may be restricted by this Standard with respect to clauses 2.4.2[1][2], 2.4.4[1] and 2.4.6[2]. See section 9.1 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Comment:		The product can be restricted by this Standard with respect to clauses 2.6.5[1] and 2.6.6[2]. 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[1][2] and 3.4.5[1][2]. 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[1][2] and 3.10.3[1][2]. 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[1][2], 3.15.4[1][2] and 3.15.5[1][2]. See sections 8.2 and 8.3 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 clauses 6.1.1[1], 6.1.2[2], 6.1.6[1], 6.2.1[1][2], 6.2.3[1], 6.2.5[2], 6.2.9[1], 6.2.10[1], 6.2.11[2] and 6.2.13[2]. 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[1][2] [Aspects 1[1][2] and 2[1]], 7.1.6[1][2] [Aspects 1[1][2] and 2[1]] and 7.1.7[1][2] [Aspect 1[1][2]]. See section 6.1 of this Certificate.
Regulation:	12	Building standards applicable to conversions
Comment:		All comments given for these product under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1[1][2] and Schedule 6[1][2].

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

The Building Regulations (Northern Ireland) 2012

Regulation:	23	Fitness of materials and workmanship
Comment:		The product is acceptable. See section 12 and the *Installation* 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 8.3 of this Certificate.
Regulation:	35(4)	Internal fire spread — Structure
Comment:		The product may be 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

In the opinion of the BBA, there is no information in this Certificate which relates to the obligations of the client, CDM co-ordinator, designer and contractors under these Regulations.

Additional Information

NHBC Standards 2014

In the opinion of the BBA, and subject to a 50 mm minimum residual cavity being maintained, NHBC accepts the use of Alreflex Ultratherm, as 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 Manufacturer of the foil-faced rigid urethane foam insulation 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

1.1 Alreflex Ultratherm consists of a polyethylene bubble sheet faced on one side with aluminium foil attached to a foil-faced rigid urethane foam insulation board. The product is manufactured with an overlap of the foil-faced bubblewrap.

1.2 The nominal characteristics are given in Table 1.

Table 1 Nominal characteristics

Length (mm)	1200
Width (mm)	450
Thickness of the bubble film (mm)	3
Thickness of the rigid board (mm)	25 to 140 mm in 5 mm increments
Density of board (kg·m^{-3})	30
Edge detail	Square with bubble wrap/foil overlap

2 Manufacture

2.1 Aluminium foil is laminated to the back of the polyethylene bubble sheet, and at a preset point, a third layer of the low density material) is laminated and a flat surface is given to both sides. The product is then sent to another location where it is bonded to the rigid urethane foam insulation.

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 the manufacturer has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 and/or BS EN ISO 14001 : 2004 by BSI (Certificate MF82602).

3 Delivery and site handling

3.1 The product is delivered to site wrapped in polythene with the production code printed on each board. Each pallet carries a label bearing the production date, board size and thickness.

3.2 The product should be stored off the ground and under cover to protect it from precipitation and in clean and dry conditions. Damaged and wet product should be discarded.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Alreflex Ultratherm.

Design Considerations

4 General

4.1 Alreflex Ultratherm is used to reduce the thermal transmittance (U value) and provides a rain barrier in new cavity walls with masonry inner and outer leaves (where masonry includes clay and calcium silicate bricks, concrete blocks and natural and reconstituted stone blocks). When it is installed with overlap, it can also act as a rain barrier. It is essential that such walls are designed and constructed to incorporate the normal precautions to prevent moisture penetration. The product can be installed in such a way that the foil-faced bubble wrap component sits within the nominal residual 50 mm cavity, with height restrictions in some cases.

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, 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 listed in section 4.2 of this Certificate.

4.4 the Certificate holder can advise on suitable insulation retaining fixings and compatible wall ties for use with the product. These items are outside the scope of this Certificate.

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

4.7 It is recommended that installation is carried out to the highest level on each wall or that the top edge of the insulation is protected by a cavity tray.

Buildings up to and including 12 metres in height

4.8 The residual cavity width to be maintained during construction must be a minimum of 25 mm. To achieve this requirement, 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 must:

- 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 their 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) • slate hanging • 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) Based upon the approach in BS 5618 : 1985.

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 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 (λ^*_D value) 0.022 $W \cdot m^{-1} \cdot K^{-1}$ of the foil-faced rigid urethane board and the following data:

- 0.03 outer surface emissivity of the product
- 0.10[1] $m^2 \cdot K \cdot W^{-1}$ core *R* value of the bubble sheet
- 0.71[1][2] $m^2 \cdot K \cdot W^{-1}$ *R* value of an air cavity adjacent to the product ≥20 mm thick (horizontal heat flow).

(1) Unventilated cavity with a width and length at least 10 times the thickness and one high emissivity surface.

(2) For guidance on U value calculations refer to the BBA Information Bulletin No 3.

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 Typical cavity wall U[1] values ($W \cdot m^{-2} \cdot K^{-1}$)

U values ($W \cdot m^{-2} \cdot K^{-1}$)	Urethane board thickness required (mm)		
	λ = 0.12 ($W \cdot m^{-1} \cdot K^{-1}$) density = 400 $kg \cdot m^{-3}$	λ = 0.32 ($W \cdot m^{-1} \cdot K^{-1}$) density = 1300 $kg \cdot m^{-3}$	λ = 1.13 ($W \cdot m^{-1} \cdot K^{-1}$) density = 1800 $kg \cdot m^{-3}$
0.35	25	35	40
0.30	35	45	50
0.27	40	50	55
0.25	50	55	60
0.22	60	70	75
0.19	75	85	90
0.18	80	90	95

(1) The above U value calculations are based on the following:
— 5 mm increments of product thickness, rounded upwards
— cavity wall ties — mild steel, 2.5 per m^2, 3.30 mm^2 cross-section
— 102 mm brick with conductivity 0.77 $W \cdot m^{-1} \cdot K^{-1}$
— 50 mm low emissivity cavity
— 100 mm dense block with conductivity 1.13 $W \cdot m^{-1} \cdot K^{-1}$ or,
— 100 mm AAC block with conductivity 0.12 $W \cdot m^{-1} \cdot K^{-1}$ bridged by mortar (6.7%) with conductivity 0.88 $W \cdot m^{-1} \cdot K^{-1}$
— 13 mm dense plaster with conductivity 0.57 $W \cdot m^{-1} \cdot K^{-1}$ or
— 12.5 mm plasterboard with conductivity 0.21 $W \cdot m^{-1} \cdot K^{-1}$, on 15 mm dabs (20%) with conductivity 0.43 $W \cdot m^{-1} \cdot K^{-1}$.

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[1][2] and 3.4.5[1][2]

(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[1][2] and 3.10.3[1][2]

(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:

- cavity wall ties are installed correctly and are thoroughly clean and slop downwards towards the external face of the construction
- 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
- any 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, must be 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 should be avoided in very severe exposure areas.

8 Condensation

Surface condensation

8.1 Walls incorporating the product will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 0.7 $W \cdot m^{-2} \cdot K^{-1}$ 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 $W \cdot m^{-2} \cdot K^{-1}$ 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 incorporating the product 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 rigid board has a nominal vapour resistance exceeding 12.5 $MN \cdot s \cdot g^{-1}$ and the bubble sheet has a vapour resistance exceeding 125 $MN \cdot s \cdot g^{-1}$. Joints between boards will facilitate the passage of water vapour under normal conditions of temperature and humidity.

8.5 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 in the internal wall leaf.

9 Behaviour in relation to fire

9.1 The insulation core of the product has a Class F* reaction to fire classification in accordance with BS EN 13501-1 : 2007. The product has a Class 1 surface spread of flame classification when tested to BS 476-7 : 1997. It is not classified as non-combustible or of limited combustibility.

9.2 In England and Wales, 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, other than those described in section 9.2. 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 11 m above the ground.

9.5 Cavity barriers should be provided in accordance with the relevant provisions of the documents supporting the national Building Regulations.

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 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[1][2] to 3.19.9[1][2]

(1) Technical Handbook (Domestic).
(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet L, section 2.

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 found in a wall construction, and it is durable, rot-proof, water resistant and sufficiently stable to remain effective as insulation for the life of the building.

Installation

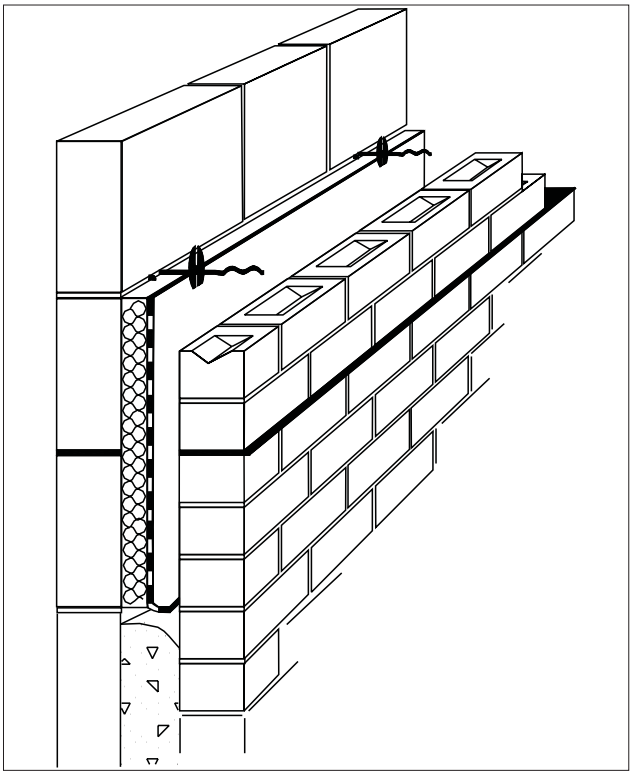
13 General

The walls are constructed leading with either the inner or outer leaf. It is recommended that the inner leaf be constructed ahead of the outer leaf as the product fastened to the cavity face of the inner leaf gives a slightly enhanced thermal performance. It is essential that the spacing of the wall ties/clips allows the long edge of each board to be secured at a minimum of two points.

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. It is recommended that the wall ties are not placed directly on the dpc. The first run of the product may commence below the dpc level to provide some edge insulation for the floor (see Figure 1).

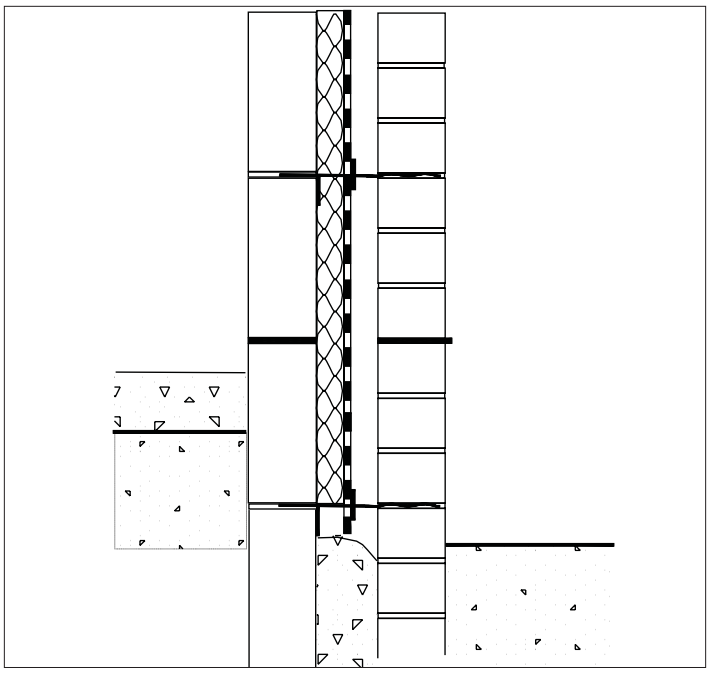
Figure 1 Typical installation detail



14.2 The leading leaf is built up to the required height, with wall ties placed at a vertical height of 450 mm ensuring the drip of the tie is located halfway across the residual cavity width. Excess mortar is cleaned from the cavity face of the leading leaf, and the product is 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 product. It is essential that all wall ties slope downwards towards the outer leaf (see Figure 2) and at centres not exceeding 900 mm to ensure that each board is secured at a minimum of three points. 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 2 Installation of wall ties



14.4 The other leaf is then built up to the level of the top of the product.

14.5 The product 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.

14.6 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 product, before installation of the next run. Use of a cavity board or a cavity batten will protect the installed product and help to keep the cavity clean as the following leaf is built (see Figures 3 and 4).

Figure 3 Use of a cavity board

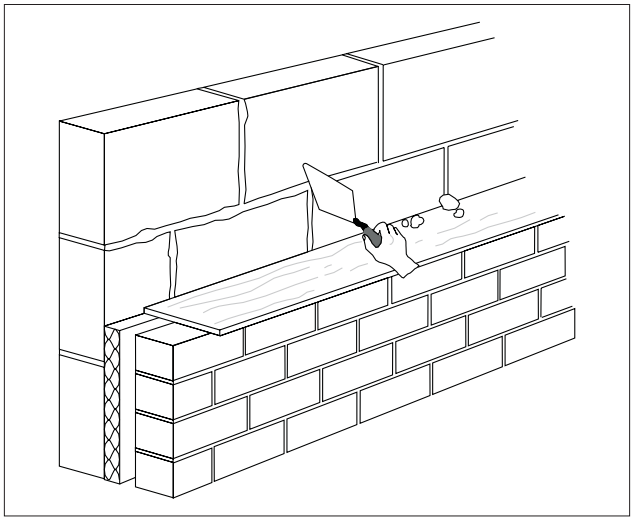
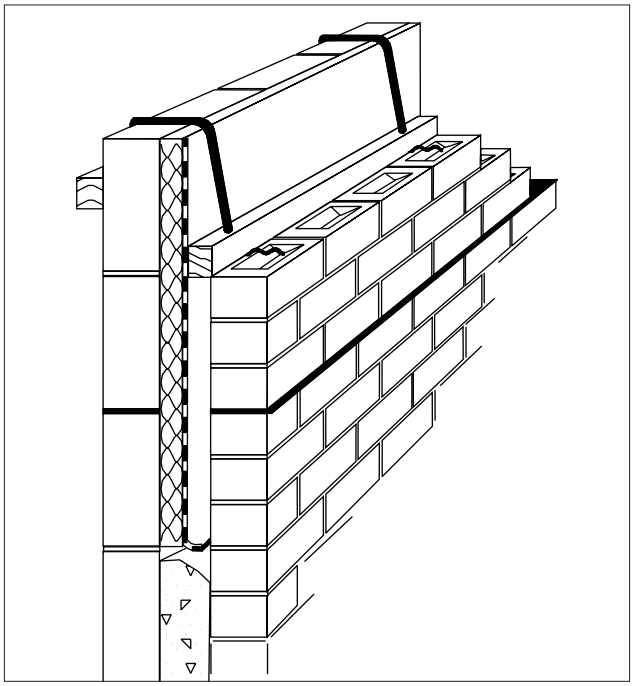


Figure 4 Use of cavity batten



14.7 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 stop ends and be adequately drained.

14.8 The product can be cut, using a sharp knife or fine-toothed saw, to fit around windows, doors or air bricks. It is essential that cut pieces completely fill the spaces for which they are intended and are adequately secured – gaps should not be left in the insulation.

15 Investigations

15.1 Tests and assessment were carried out Alreflex Ultratherm to determine:

For the board:

- water vapour resistance
- density
- compressive strength at 10% strain
- water absorption
- thermal conductivity (fresh and aged)
- dimension accuracy
- closed cell count
- dimensional stability with temperature and humidity
- fire behaviour.

For the bubble sheet:

- emissivity
- thermal resistance.
- For the whole product:
- laminated bond strength.

15.2 The manufacturing process of the product was evaluated, including the methods adopted for quality control, details obtained of the quality and composition of 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 — 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 for reinforced and unreinforced masonry structures*

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

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

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

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

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

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BBA Information Bulletin No 3 *Reflective foil insulation — Conventions for U value calculations*

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

BS EN ISO 14001 : 2004 *Environmental Management systems — Requirements with guidance for use*

BRE Report (BR 262 : 2002) *Thermal insulation: avoiding risks*

BRE Report (BR 443 : 2006) *Conventions for U-value calculations*

16 Conditions

16.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page — no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- is valid only within the UK
- has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

16.2 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.

16.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

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

16.5 In issuing this Certificate, the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

16.6 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.

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