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Agrément Certificate
94/3080
Product Sheet 1

CELOTEX INSULATION

CELOTEX CW4000 AND CG4000 PIR INSULATION FOR CAVITY WALLS

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to Celotex CW4000 and CG4000 PIR Insulation for Cavity Walls, rigid polyisocyanurate (PIR) foam, faced on both sides with low emissivity aluminium foil facings. The products can be used as partial fill cavity wall insulation.

AGRÉMENT 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 thermal conductivity ($\lambda_{90/90}$ value) of 0.022 W·m⁻¹·K⁻¹ (see section 5).

Rain penetration — when the products 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 (see section 6).

Condensation — the foil facings have a water vapour resistance exceeding 70 MN·s·g⁻¹ and the insulation core has a water vapour resistivity of 300 MN·s·g⁻¹m⁻¹ and, therefore, will provide a significant resistance to water vapour transmission (see section 7).

Behaviour in relation to fire — the products may be classified as:

- \bullet Celotex CW4000 Class 1 according to BS 476-7 : 1997 (25 mm-90 mm only)
- Celotex CG4000 Class 0 as described in the national Building Regulations (see section 8).

Durability — the products will have a life equivalent to that of the wall structure in which they are incorporated (see section 11).

The BBA has awarded this Agrément 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.

12 St

On behalf of the British Board of Agrément

Date of Second issue: 12 October 2010

Originally certificated on 19 December 1994

Chris Hunt

Head of Approvals — Physics

Greg Cooper

Chief Executive

Certificate amended on 3 November 2010 with updated information in the Thermal performance section.

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

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

British Board of Agrément

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Regulations

In the opinion of the BBA, Celotex CW4000 and CG4000 PIR Insulation for Cavity Walls, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations:

The Building Regulations 2010 (England and Wales)

Requirement: C2(a) Resistance to moisture

Comment: The products do not absorb water by capillary action and, therefore, may be used in situations where they

bridge the dpc of the inner and outer leaves. See section 6.1 of this Certificate.

Requirement: C2(b) Resistance to moisture

Comment: Tests by the BBA indicate that a wall incorporating these products can resist rain penetration and satisfy

this Requirement. See sections 3.2, 3.5 and 6.2 of this Certificate.

Requirement: C2(c) Resistance to moisture

Comment: The products can contribute to satisfying this Requirement. See sections 7.1 and 7.3 of this Certificate.

Requirement: L1(a)(i) Conservation of fuel and power

Comment: The products can contribute to meeting this Requirement. See sections 5.3 to 5.6 of this Certificate.

Requirement: Regulation 7 Materials and workmanship

Comment: The products are acceptable. See section 11 and the *Installation* part of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation: 8(1) Fitness and durability of materials and workmanship

Comment: The products can contribute to a construction satisfying this Regulation. See section 11 and the *Installation*

part of this Certificate.

 Regulation:
 9
 Building standards — construction

 Standard:
 2.6
 Spread to neighbouring buildings

Comment: The products are 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(1)(2) and 2.6.6(2). See section 8.4 of this

Certificate.

Standard: 3.4 Moisture from the ground

Comment: The products do not absorb water by capillary action and, therefore, may be used where it bridges the

dpc of the inner or outer leaf, with reference to clause 3.4.1(1)(2). See section 6.1 of this Certificate.

Standard: 3.10 Precipitation

Comment: Walls incorporating the products can satisfy this Standard, with reference to clauses 3.10.1⁽¹⁾⁽²⁾ and

 $3.10.3^{(1)(2)}$. See sections 3.2, 3.5 and 6.2 of this Certificate.

Standard: 3.15 Condensation

Comment: The products can contribute to satisfying this Standard, with reference to clauses 3.15.1⁽¹⁾, 3.15.4⁽¹⁾ and

 $3.15.5^{(1)}$. See sections 7.2 and 7.3 of this Certificate.

Standard: 6.1(b) Carbon dioxide emission
Standard: 6.2 Building insulation envelope

Comment: The products can contribute to satisfying clauses, or parts of clauses, 6.1.1^[1], 6.1.2^[2], 6.1.6^[1], 6.2.1^{[1][2]},

 $6.2.3^{(1)}$, $6.2.4^{(2)}$, $6.2.9^{(1)}$, $6.2.10^{(2)}$, $6.2.11^{(1)}$ and $6.2.12^{(2)}$. See sections 5.3 to 5.6 of this Certificate.

 $\label{eq:Regulation: 12 Building standards - conversions} \text{ } \text{Building standards - conversions}$

Comment: All comments given for this product under Regulation 9, also apply to this Regulation, with reference to

clause 0.12.1⁽¹⁾ and Schedule 6⁽¹⁾.

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic)

The Building Regulations (Northern Ireland) 2000 (as amended)

Regulation: B2 Fitness of materials and workmanship

Comment: The products are acceptable. See section 11 and the *Installation* part of this Certificate.

Regulation: C4(a) Resistance to ground moisture and weather

Comment: The products do not absorb water by capillary action and, therefore, may be used where it bridges the

dpc of the inner or outer leaf. See section 6.1 of this Certificate.

Regulation: C4(b) Resistance to ground moisture and weather

Comment: Walls incorporating the products can satisfy this Regulation. See sections 3.2, 3.5 and 6.2 of this

Certificate.

Regulation: C5 Condensation

Comment: The products can contribute to satisfying this Regulation. See section 7.3 of this Certificate.

Regulation: F2(a)(i) Conservation measures

Comment: The products can satisfy or contribute to satisfy this Regulation. See sections 5.3 to 5.6 of this Certificate.

Regulation: F3(2) Target carbon dioxide Emissions Rate

Comment: The products can contribute to a building satisfying its target emission rate. See sections 5.4 and 5.6 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.

Non-regulatory Information

NHBC Standards 2010

NHBC accepts the use of Celotex CW4000 and CG4000 PIR Insulation for Cavity Walls, when installed and used in accordance with this Certificate, in relation to NHBC Standards, Chapter 6.1 External masonry walls.

<u>General</u>

This Certificate relates to Celotex CW4000 and CG4000 PIR Insulation for Cavity Walls, rigid polyisocyanurate (PIR) foam faced on both sides with low emissivity aluminium foil facings, for use as thermal insulation in new external masonry partial fill cavity walls up to 25 m in height, subject to the conditions contained in the *Design Considerations* part of this Certificate.

The products are installed during construction and are for use as a partial fill board to reduce the thermal transmittance of new cavity walls with masonry inner and outer leaves.

Technical Specification

1 Description

- 1.1 Celotex CW4000 and CG4000 PIR Insulation for Cavity Walls comprises rigid PIR foam, faced on both sides with low emissivity aluminium foil facings.
- 1.2 The nominal characteristics of the boards are shown in Table 1.

Table 1	Nominal character	ristics
Product	Size (mm)	Thickness (mm)
CW4000	1200 x 450	25, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90 and 100
CG4000	1200 x 450	40, 50, 60, 75, 85, 90 and 100

- 1.3 Only BBA-approved insulation retaining fixings and compatible wall ties should be used with the boards.
- $1.4\,$ Cavity wall ties in accordance with BS DD 140-2:1987 or BS EN 845-1:2003 and BS EN 1996-2:2006, approved by the BBA, are suitable.
- 1.5 Where the overall cavity width exceeds 75 mm, additional vertical twist ties may be required for structural stability in accordance with BS EN 1996-2 : 2006 (see section 12 of this Certificate).

2 Delivery and site handling

- 2.1 The boards are delivered in wrapped packs. Each pack of boards contains a label with the manufacturer's name and the BBA identification mark incorporating the number of this Certificate.
- 2.2 Boards must be protected from prolonged exposure to sunlight and should be stored either under cover or protected with opaque polythene sheeting. Where possible, packs should be stored inside. If stored outside the products should be stacked flat and raised above ground level and not in contact with ground moisture.
- 2.3 Care must be exercised in handling individual boards to avoid crushing the edges or corners.
- 2.4 Boards 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 CG4000 PIR Insulation for Cavity Walls.

Design Considerations

3 General

3.1 Celotex CW4000 and CG4000 PIR Insulation for Cavity Walls, when installed in accordance with this Certificate, 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, natural and reconstituted stone blocks). It is essential that such walls are designed and constructed so as to incorporate the precautions given in this Certificate to prevent moisture penetration.



- 3.2 Buildings subject to notional Building Regulations should be constructed in accordance with the relevant recommendations of:
- BS EN 1996-2 : 2006 • BS 8000-3 : 2001.
- 3.3 Other buildings not subject to these Regulations should also be built in accordance with the Standards given in section 3.2 of this Certificate.
- 3.4 As with any other form of cavity wall insulation, where buildings need to comply with NHBC Standards 2010, specifiers should observe the requirements of these Standards.



- 🦅 3.5 The products are for use in any exposure zone in buildings up to 25 m in height. However, the use of the product does not preclude the need to apply an external render coat or other suitable finish in severe exposure zones where such application would be normal practice.
- 3.6 To reduce the risk of water penetration, raked or recessed mortar joints should be avoided in severe or very severe exposure zones.
- 3.7 The use of cavity battens and/or boards is strongly recommended to prevent bridging by mortar droppings.
- 3.8 Installation should be carried out to the highest level on each wall unless the top edge of the insulation is protected by a cavity tray.
- 3.9 As with all cavity wall insulation, the construction and detailing should comply with good practice as described in the BBA joint publication Cavity Insulation of Masonry Walls — Dampness Risks and How to Minimise Them. They are particularly important in areas subject to severe or very severe driving rain.

Buildings up to and including 12 m high

- 3.10 The minimum residual cavity width to be maintained during construction must be 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 may either:
- design a cavity width by consideration of the dimensional tolerances of the components which make up the wall by reference to the British Standards relating to the bricks, blocks and insulation boards or use the data from their respective manufacturers. In addition allowance may need to be made for the quality of available building operatives and the degree of site supervision or control available, or
- design a nominal residual cavity width of 50 mm (a residual cavity nominally 50 mm wide will be required by the NHBC, where normal standards of tolerance and workmanship are adopted).
- 3.11 The size of residual cavity obtained in the processes described in section 3.9 is also subject to the following limitations in respect of exposure of the proposed building as set out in Table 2.

Construction	Maximum allowable exposure factor $E^{(1)}$
All external masonry walls protected by: rendering (to BS EN 13914 : 2005) slate hanging timber, plastic or metal weatherboarding or cladding	No restriction No restriction 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 given in BS 5618: 1985 and also outlined in BBA Information Sheet No 10.

Buildings over 12 m high and up to and including 25 m high

- 3.12 The width of 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 m; above 12 m the maximum height of continuous cavity wall must not exceed 7 m. 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. Site supervision is recommended during the 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 inclusion of cavity trays with weepholes.

4 Practicability of installation

The products are designed to be installed by a competent general builder, or a contractor, experienced with these type of products.

5 Thermal performance

- 5.1 Calculations of the thermal transmittance (U value) of specific external wall constructions should be carried out in accordance with BS EN ISO 6946: 1997 and BRE Report (BR 443: 2006) Conventions for U-value calculations, using the declared thermal conductivity ($\lambda_{90/90}$ value) of 0.022 W·m⁻¹·K⁻¹ and an emissivity of the outer layer of 0.05.
- 5.2 The U value of a completed wall will depend on the selected insulation thickness and the insulating value of the masonry and the internal finishes. Calculated U values for example constructions are given in Table 3.

Table 3 Examples of cavity wall U values					
	U value (W·m ⁻² ·K ⁻¹)				
Product	Aerated concrete block	Dense concrete block			
thickness	insulation thickness	insulation thickness			
(mm)	(mm)	(mm)			
50	0.30	0.35			
60	0.26	0.31			
75	0.23	0.26			
85	0.21	0.23			
100	0.18	0.20			

5.3 When considering insulation requirements, designers should refer to the detailed guidance contained in the documents supporting the national Building Regulations. The U values shown in Table 3 indicate that the product can enable, or contribute to enable, a wall to achieve typical design U values referred to in those supporting documents. See Tables 4, 5 and 6.

Table 4 Mean design wall U value — England and Wales ⁽¹⁾				
Construction	U value (W·m ⁻² ·K ⁻¹)			
Notional non-domestic building	0.26			
Existing building — new and replaced wall	0.28			
Dwelling new-build limit	0.30			
Existing building — renovated or retained walls	0.30			
Notional dwelling	0.35			
Non-domestic new-build limit	0.35			

⁽¹⁾ Flexible approaches on existing buildings are given in the Approved Documents.

Table 5 Mean design wall U values — Scotland ⁽¹⁾				
Construction	U value (W·m ⁻² ·K ⁻¹)			
Notional dwelling	0.19			
New dwelling simplified method	0.19			
Conversion unheated building (into dwellings)	0.19			
Extension to dwelling	0.19			
Alterations and reconstructions to a dwelling	0.22			
Stand-alone building <50 m² to a dwelling	0.22			
New non-dwelling limit for shell and fit out	0.23			
New dwelling limit	0.25			
Conversion of unheated building	0.25			
Non-domestic extension, alteration and reconstructions	0.25			
New non-domestic limit	0.27			
Conversion of heated building	0.30			
Notional non-dwelling	0.30			

⁽¹⁾ Flexible approaches on existing buildings are given in the Technical Handbooks.

Table 6 Mean design wall U values — Northern Ireland ⁽¹⁾				
Construction	U value (W·m ⁻² ·K ⁻¹)			
Existing building — new wall	0.30			
Notional dwelling	0.35			
Notional non-domestic building	0.35			
Building new-build limit	0.35			
Existing building $-$ replaced, renovated and retained wall	0.35			

⁽¹⁾ Flexible approaches on existing buildings are given in the Technical Booklets.

New buildings

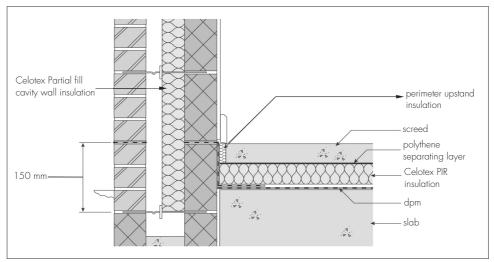
- 5.4 Walls with U values lower than (or the same as, for dwellings in Scotland) the relevant 'notional' value specified in Tables 4, 5 or 6 will contribute to a building meeting its Target Emission Rate. Walls with higher U values will require additional energy saving measures in the building envelope and/or services.
- 5.5 The products can maintain, or contribute to maintaining, continuity of thermal insulation at junctions between elements. Example junction details shown in Figure 1 are acceptable and the corresponding psi values in BRE Information Paper IP1/06 Assessing the effects of thermal bridging at junctions and around openings, Table 3 may be used in carbon emission calculations in Scotland and Northern Ireland. Detailed guidance for other junctions and on limiting heat loss and 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 Junctions between walls and floors



Existing buildings

5.6 For existing buildings, in such work as extensions and conversions, walls will be acceptable where they do not exceed the relevant U value given in Tables 4, 5 or 6 and junctions and openings comply with the details given in section 5.5.

6 Rain penetration



6.1 When the products bridge the 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

England and Wales — Approved Document C, section 5

Scotland — Mandatory Standard 3.4, clause 3.4.1(1)(2)

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

Northern Ireland — Technical Booklet C, Section 1.6

6.2 Constructions built in accordance with BS EN 1996-2: 2006, will prevent water reaching the inner leaf in damaging amounts. Water penetrating the outer leaf of the wall, will drain down the cavity face of the outer leaf and the product will contribute to satisfy the national Building Regulations:

England and Wales — Requirement C2(b)

Scotland — Mandatory Standard 3.10, clause 3.10.1(1)(2)

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

Northern Ireland — Regulation C4.

- 6.3 In all situations, it is particularly important to ensure during installation that:
- the dpc should not project into the cavity at ground-floor level as it can lead to the entrapment of mortar droppings
- installation is to be carried out to the highest level on each wall or the top edge of the insulation is protected by a cavity tray
- wall ties are installed correctly and are thoroughly clean
- boards are properly installed with weathered lap
- at lintel level, a cavity tray, stop ends and weepholes, must be provided
- 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

7 Condensation

Surface condensation



7.1 Walls will limit the risk of surface condensation adequately when the thermal transmittance (U value) does not exceed $0.7~\rm W\cdot m^{-2}\cdot K^{-1}$ at any point and the junctions with floors, roofs and openings are designed in accordance with section $5.5~\rm of$ this Certificate.

7.2 For buildings in Scotland, constructions will be acceptable where the thermal transmittance (U value) of the wall does not exceed $1.2~{\rm W\cdot m^{-2}\cdot K^{-1}}$ at any point and openings and junctions with other elements comply with the guidance given in BS 5250 : 2002, Section 8, or BRE Report (BR 262 : 2002) *Thermal insulation*: avoiding risks.

Interstitial condensation



7.3 Walls will limit the risk of interstitial condensation adequately when they are designed and constructed in accordance with BS 5250 : 2002, Section 8 and Annex D.

- 7.4 The foil facings have a water vapour resistance exceeding 70 MN·s·g⁻¹ and the insulation core has a water vapour resistivity of 300 MN·s·g⁻¹m⁻¹ and, therefore, will provide a significant resistance to water vapour transmission. Joints between boards will facilitate the passage of water vapour under normal conditions of temperature and humidity.
- 7.5 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.

8 Behaviour in relation to fire

- 8.1 The use of the boards does not prejudice the fire-resistance properties of the wall. It is unlikely to become ignited within the cavity when used in the context of this Certificate. If fire does penetrate an unventilated cavity, the amount of air present will be insufficient to support combustion and flame spread will be minimal. The boards may be classified as:
- CW4000 Class 1 according to BS 476-7: 1997 (25-90 mm only)
- CG4000 Class 0 as described in the national Building Regulations.

8.2 The requirements of the 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 (1) detailed in:

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

Northern Ireland — Technical Booklet E, Diagram 3.5.

(1) A summary of these provisions is given here:

England and Wales and Northern Ireland

- the wall must consist of masonry inner and outer leaves, each at least 75 mm thick
- the cavity must be closed at the top of the wall and at the top of any opening
- domestic meter cupboards may be installed provided there are not more than two to a dwelling, the opening in the outer leaf is not more than 800 mm by 500 mm for each cupboard, and the inner leaf is not penetrated except by a sleeve not more than 80 mm by 80 mm, which is
- combustible materials may be placed within the cavity (England and Wales only)
- the cavity must not be more than 300 mm wide (Northern Ireland only)
- in addition to the insulation, in Northern Ireland, only the following should be placed in, or exposed to, the cavity:
 - timber lintels, window or door frames, or end of timber joists
 - pipe, conduit or cable
 - dpc, flashing, cavity closer or wall tie.
- 8.3 For constructions not covered by section 8.2, 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 $2.4.1^{(1)(2)}$, $2.4.2^{(1)(2)}$, $2.4.7^{(1)(2)}$ and $2.4.9^{(1)(2)}$.

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

Northern Ireland — Technical Booklet E, Paragraphs 3.35 to 3.38.



🐲 8.4 the products are combustible but may be used not more than one metre from a boundary, in walls with two 3 leaves of masonry/concrete at least 75 mm thick, with barriers around all openings and at the top of the wall in Beaves of masonity/ concrete at least 7.5 minimized, 9.5 and 9.5 are also as a superscript of the superscript of t

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

9 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

Scotland — Mandatory Standard 3.19, clause 3.19.4(1)(2).

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

Northern Ireland — Technical Booklet L

10 Maintenance

As the products are confined within the wall cavity and have suitable durability (see section 11), maintenance is not required.

11 Durability



When correctly installed, the products are durable, rot-proof, water resistant and sufficiently stable to remain effective as an insulant for the life of the building.

Installation

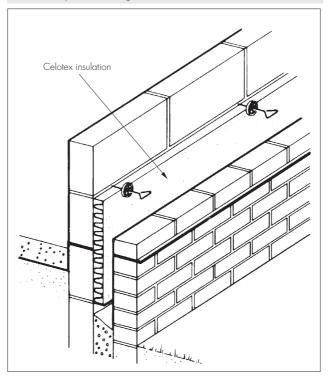
12 General

The walls are constructed leading with either the inner or outer leaf, with the boards fixed to the cavity face of the leading leaf. 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.

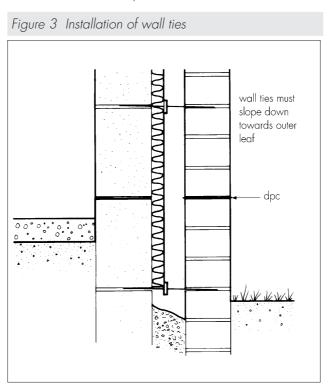
13 Procedure

A section of the leading leaf is built with the first row of wall ties at approximately 600 mm horizontal spacing, where the insulation is to begin. The first run of boards may commence below dpc level to provide some edge insulation for the floor (see Figure 2). It is recommended that the wall ties are not placed directly on the damp-proof course.

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



13.2 The leading leaf is then built up to the required height with wall ties placed at a vertical spacing of 450 mm. 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 closely butt-jointed runs. It is essential that all wall ties slope downwards towards the outer leaf (see Figure 3), and at centres not exceeding 900 mm to ensure that each board is secured at a minimum of three points. Additional ties may on occasion be required to satisfy the structural requirements of BS EN 1996-2: 2006, and/or to ensure adequate retention of boards or cut pieces.

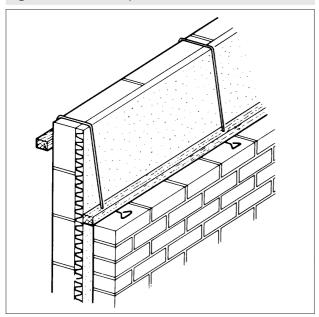


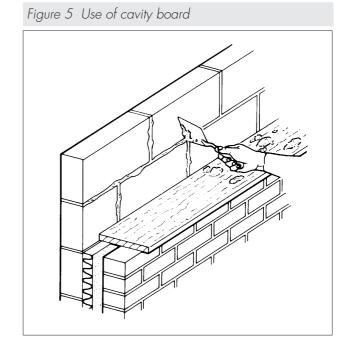
- 13.3 The following leaf is built up to the level of the top of the boards.
- 13.4 Progressive staggering of boards and wall ties as construction proceeds should be in accordance with the Certificate holder's recommendations.

Mortar droppings

13.5 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





Cut pieces

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

Protection

13.7 All building involving the boards, particularly work which is interrupted, must conform to BS EN 1996-2: 2006, Annex A4.1.3.1 Handling and Site Storage, Annex A5.1.1 Weather Conditions, and Annex A5.4.4 Installing Instructions.

Technical Investigations

14 Tests

Tests were carried out on Celotex CW4000 and CG4000 PIR Insulation for Cavity Walls to determine:

- thermal conductivity
- compressive stress
- emissivity.

15 Investigations

- 15.1 An examination of data was made relating to dimensional accuracy.
- 15.2 An examination of data regarding to CG4000 was made to analyse:
- thermal conductivity in accordance with EN 12667: 2001
- dimensional accuracy in accordance with EN 822: 1994
- compressive strength determined in accordance with EN 826: 1996
- dimensional stability under specific temperature and humidity conditions according to EN 1604: 1996
- water absorption in accordance with EN 12087: 1997
- water vapour transmission in accordance with EN 12086: 1997
- reaction to fire.
- 15.3 Regular factory inspections have been carried out to ensure that quality is being maintained.
- 15.4 A user survey was carried out to assess the practicability of installation and to evaluate performance in use.

Bibliography

BS 476-7: 1997 Fire tests on building materials and structures — Method of test to determine the classification of the surface spread of flame of products

BS 5250: 2002 Code of practice for control of condensation in buildings

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

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

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

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

BS EN ISO 6946 : 1997 Building components and building elements — Thermal resistance and thermal transmittance — Calculation method

EN 822 : 1994 Thermal insulating products for building applications — Determination of length and width

EN 826 : 1996 Thermal insulating products for building applications — Determination of compression behaviour

EN 1604 : 1996 Thermal insulating products for building applications — Determination of dimensional stability under specified temperature and humidity conditions

EN 12086 : 1997 Thermal insulating products for building applications — Determination of water vapour transmission properties

EN 12087 : 1997 Thermal insulating products for building applications — Determination of long term water absorportion by immersion

EN 12667 : 2001 Thermal performance of building materials and products — Determination of thermal resistance by means of guarded hot plate and heat flow meter methods — Products of high and medium thermal resistance

Conditions of Certification

16 Conditions

16.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is granted only to the company, firm or person named on the front page no other company, firm or person may hold or claim any entitlement to this Certificate
- 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 and documents referred to in this Certificate are those that the BBA deems to be relevant at the date of issue or re-issue of this Certificate and include any: Act of Parliament; Statutory Instrument; Directive; Regulation; British, European or International Standard; Code of Practice; manufacturers' instructions; or any other publication or document similar or related to the aforementioned.

16.3 This Certificate will remain valid for an unlimited period provided that the product/system and the manufacture and/or fabrication including all related and relevant 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 In granting this Certificate, the BBA is not responsible for:

- 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
- individual installations of the product/system, including the nature, design, methods and workmanship of or related to the installation
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

16.5 Any information relating to the manufacture, supply, installation, use and maintenance 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 and maintained. It does not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date 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. In granting this Certificate, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the manufacture, supply, installation, use and maintenance of this product/system.