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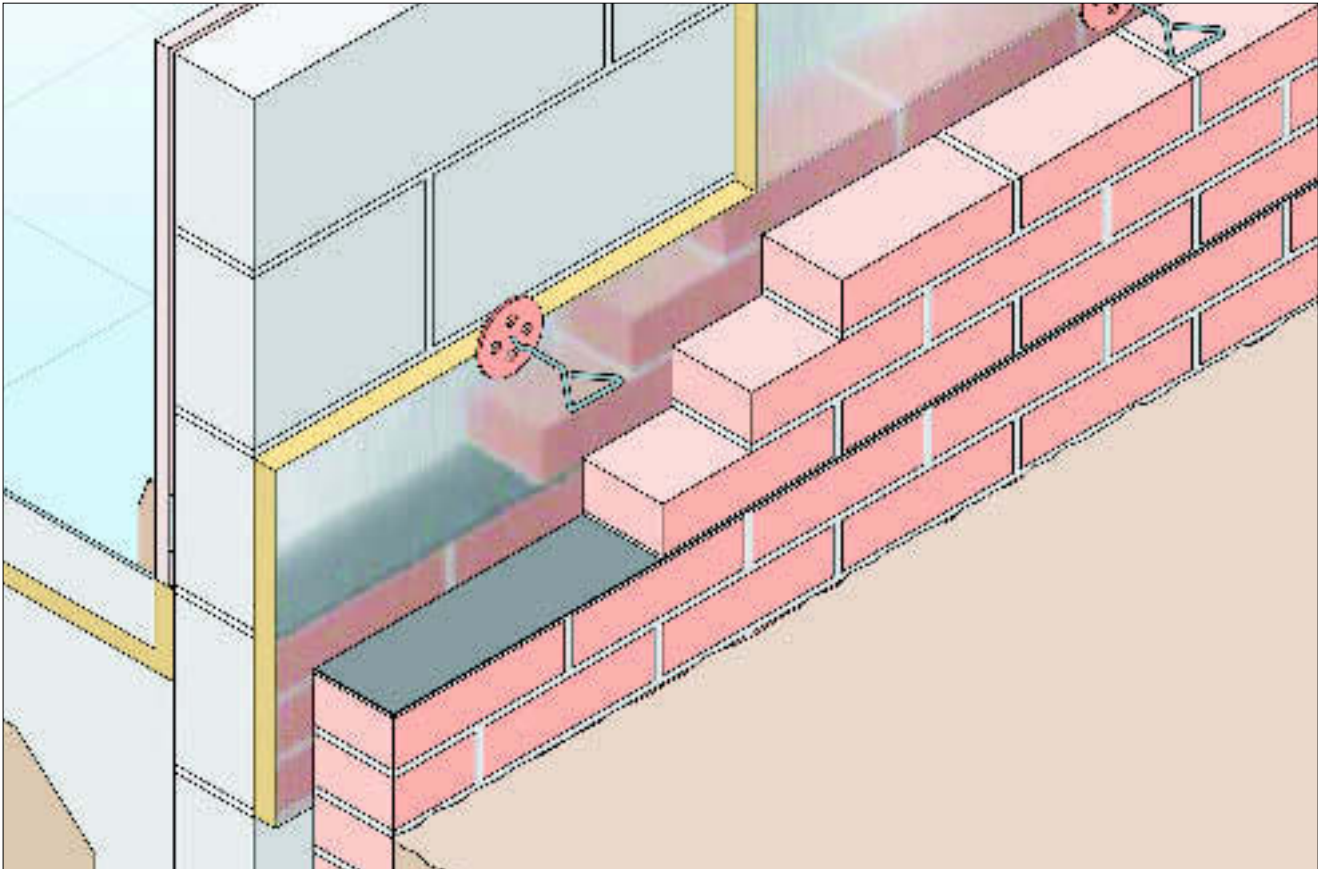
**Agrément  
Certificate  
No 94/3080**  
Third issue\*

Designated by Government  
to issue  
European Technical  
Approvals

## CELOTEX TUFF-R CW2000 AND TUFF-R ZERO CW3000Z CAVITY WALL INSULATION BOARDS

Isolant pour murs creux  
Kerndämmung

## Product



- THIS CERTIFICATE RELATES TO CELOTEX TUFF-R CW2000 AND TUFF-R ZERO CW3000Z CAVITY WALL INSULATION BOARDS, RIGID POLYISOCYANURATE-MODIFIED POLYURETHANE FOAM BOARDS FOR CAVITY WALL INSULATION.

- The product is for use in buildings up to and including 25 metres in height, subject to the conditions contained in the Design Data part of this Certificate.

## Regulations

### 1 The Building Regulations 2000 (as amended) (England and Wales)

The Secretary of State has agreed with the British Board of Agrément the aspects of performance to be used by the BBA in assessing the compliance of cavity wall insulation with the Building Regulations. In the opinion of the BBA, Celotex tuff-R CW2000 and tuff-R Zero CW3000Z Cavity Wall Insulation Boards, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements.

Requirement: <b>B3(4)</b>	Internal fire spread (structure)
Comment:	Walls incorporating the product can meet this Requirement. See sections 8.2 to 8.4 of this Certificate.
Requirement: <b>C4</b>	Resistance to weather and ground moisture
Comment:	Walls incorporating the product can meet this Requirement. See sections 7.2 and 10.2 of this Certificate. In addition the product may be used in situations where it bridges the dpc. See section 10.1 of this Certificate.

continued


continued

- The product is installed during construction and is for use as a partial fill board to reduce the thermal transmittance of cavity walls with masonry inner and outer leaves.
- It is essential that the walls are built in accordance with the conditions set out in the Design Data and Installation parts of this Certificate.
- Tuff-R is a registered trademark of Celotex Limited.

# Electronic Copy


Requirement: L1	Dwellings
Requirement: L2	Buildings other than dwellings
Comment:	The product can meet or contribute to meet these Requirements. See section 12.2 of this Certificate.
Requirement: Regulation 7	Materials and workmanship
Comment:	The product is acceptable. See section 13 of this Certificate.

## 2 The Building Standards (Scotland) Regulations 1990 (as amended)

 In the opinion of the BBA, Celotex tuff-R CW2000 and tuff-R Zero CW3000Z Cavity Wall Insulation Boards, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Regulations and related Technical Standards as listed below.

Regulation: 10	Fitness of materials and workmanship
Standard: B2.1	Selection and use of materials, fittings, and components, and workmanship
Comment:	The product can contribute to a construction meeting this Standard. See the <i>Installation</i> part of this Certificate.
Standard: B2.2	Selection and use of materials, fittings, and components, and workmanship
Comment:	The product is an acceptable material. See section 13 of this Certificate.
Regulation: 12	Structural fire precautions
Standards: D6.1 and D6.2	Concealed spaces — Principles
Standard: D6.8	Concealed spaces — Junctions
Comment:	Walls incorporating the product can satisfy these Standards. See section 8.4 of this Certificate.
Standard: D8.2	Fire spread to adjoining buildings — Non-combustible materials
Comment:	The product is combustible but its use is unrestricted by this Standard. See section 8.5 of this Certificate.
Regulation: 17	Resistance to moisture
Standard: G2.6	Preparation of a site and resistance to moisture from the ground — Resistance to moisture from the ground
Comment:	The product can satisfy this Standard. See section 10.1 of this Certificate.
Standard: G3.1	Resistance to precipitation — Resistance to precipitation
Comment:	Walls incorporating the product can satisfy this Standard. See sections 7.2 and 10.2 of this Certificate.
Regulation: 22	Conservation of fuel and power
Standard: J3.1	Buildings in purpose group 1 — Building fabric
Standard: J8.1	Buildings in purpose groups 2 to 7
Comment:	The product can satisfy or contribute to satisfying these Standards. See section 12.2 of this Certificate.

## 3 The Building Regulations (Northern Ireland) 2000

 In the opinion of the BBA, Celotex tuff-R CW2000 and tuff-R Zero CW3000Z Cavity Wall Insulation Boards, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Building Regulations as listed below.

Regulation: B2	Fitness of materials and workmanship
Comment:	The product is acceptable. See section 13 of this Certificate.
Regulation: C4	Resistance to ground moisture and weather
Comment:	Walls incorporating the product can satisfy this Regulation. See sections 7.2 and 10.2 of this Certificate. In addition the product may be used where it bridges the dpc. See section 10.1 of this Certificate.
Regulation: E4	Internal fire spread — Structure
Comment:	Walls incorporating the product can satisfy this Regulation. See sections 8.2 to 8.4 of this Certificate.
Regulation: F2	Building fabric
Comment:	The product can satisfy this Regulation. See section 12.2 of this Certificate.

## 4 Construction (Design and Management) Regulations 1994

### Construction (Design and Management) Regulations (Northern Ireland) 1995 (as amended)

Information in this Certificate may assist the client, planning supervisor, designer and contractors to address their obligations under these Regulations.

See section: 6 *Delivery and site handling.*

## Technical Specification

### 5 Description

5.1 Celotex tuff-R CW2000 and tuff-R Zero CW3000Z Cavity Wall Insulation Boards comprise a rigid polyisocyanurate-modified polyurethane foam core with a foil facing on both sides.

5.2 The boards have the characteristics of:

length (mm)	1200
width (mm)	450
thickness (mm) <sup>(1)</sup>	10 to 90
edge profile	plain

(1) In thicknesses over 35 mm the foam core is reinforced with glass fibre.

5.3 Only insulation retaining fixings approved by the BBA should be used with the boards. Names and addresses of suppliers of approved fixings are available from the Certificate holder and the BBA.

5.4 It should be noted that whilst approved ties are suitable for use for insulation retaining purposes, additional vertical twist ties to BS 1243 : 1978 may be required for structural stability in accordance with BS 5628-3 : 2001 where the overall cavity width exceeds 75 mm (see section 1.5 of this Certificate).

### 6 Delivery and site handling

6.1 The boards are delivered to site in packs containing a label with the manufacturer's trade name and the BBA identification mark incorporating the number of this Certificate.

6.2 The boards must be protected from prolonged exposure to sunlight and should be stored either under cover or protected with opaque polythene. Care must be taken to avoid contact with solvents and with materials containing volatile organic components such as coal tar, pitch, timber newly treated with creosote.

6.3 The boards must not be exposed to open flame or other ignition sources.

## Design Data

### 7 General

7.1 Celotex tuff-R CW2000 and tuff-R Zero CW3000Z Cavity Wall Insulation Boards are effective in reducing the U value (thermal transmittance) of new external cavity walls with masonry inner and outer leaves (masonry includes clay and calcium silicate bricks, concrete blocks, natural and reconstituted stone blocks). It is essential that such walls are designed and constructed to incorporate the normal precautions to prevent moisture penetration.



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

- BS 5628-3 : 2001. In particular, Clause 5.5.2 of the Code of Practice *Rain penetration* should be followed in that the designer should select a construction appropriate to the local wind-driven rain index paying due regard to the design detailing, workmanship and materials to be used.
- BS 8000-3 : 2001.

7.3 Other buildings not subject to these Regulations should also be built in accordance with the Standards given in section 7.2 of this Certificate.

7.4 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.

7.5 The use of cavity battens and/or boards during construction is strongly recommended to prevent bridging by mortar droppings.

7.6 As with any other form of cavity wall insulation, where buildings need to comply with NHBC Standards or Zurich Building Guarantees Technical Standards, specifiers should observe the requirements of these documents.

### Buildings up to and including 12 metres high

7.7 Where a residual cavity width of 50 mm or greater is specified the product can be used in any exposure zone. However, the use of the boards does not preclude the need to apply any external render coat or other suitable finish in severe exposure zones where such application would be normal practice.

7.8 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 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).

7.9 The size of residual cavity obtained in the processes described in section 7.8 of this Certificate is also subject to the following limitations in respect of exposure of the proposed building as set out in Table 1.

*Table 1 Maximum allowable total exposure factors of different constructions<sup>(1)</sup>*

Construction	Maximum allowable exposure factor <i>E</i>
All external masonry walls protected by rendering (to BS 5262 : 1991) tile hanging 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 high and up to and including 25 metres high

7.10 The width of residual clear cavity to be achieved is to be a minimum 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
- the specifier must take care when detailing to ensure that the introduction of the insulation does not affect the weather resistance of the wall. More than average site supervision is recommended during the installation of the product
- the exposure factor does not exceed 120
- 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 a cavity tray.

## 8 Behaviour in relation to fire

8.1 The use of the boards does not prejudice the fire resistance properties of the wall. They are unlikely to become ignited within the cavity when used in the context of this Certificate. If fire does penetrate into an unventilated cavity, the amount of air present will be insufficient to support combustion, and flame spread will be minimal.

 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 detailed in:

### England and Wales

Approved Document B, Diagram 32

### Northern Ireland

Technical Booklet E, Diagram 3.5.

8.3 A summary of these provisions is given here:

### England and Wales and Northern Ireland

(1) The wall must consist of masonry inner and outer leaves, each at least 75 mm thick.

(2) The cavity must not be more than 100 mm wide (in Northern Ireland only).

(3) The cavity must be closed at the top of the wall and at the top of any opening.

(4) In addition to the insulation 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 cables
- dpc, flashing, cavity closer or wall tie
- domestic meter cupboard, provided there are not more than two cupboards 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 fire-stopped.



8.4 For constructions not covered by sections 8.2 and 8.3 of this Certificate cavity barriers must be provided to comply with:

### England and Wales

Approved Document B, Section 9

### Scotland

Technical Standards D6.1 and D6.2

### Northern Ireland

Technical Booklet E, Paragraphs 3.27 to 3.30.



8.5 The product is combustible but may be used in walls of buildings with no storey at a height of more than 18 m above the ground that are on or less than one metre from a relevant boundary in accordance with the exceptions permitted in Technical Standard D8.2.

## 9 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 acceptable:

### England and Wales

Approved Document J

## Scotland

Technical Standards, Part F *Provisions deemed to satisfy the Technical Standards*

## Northern Ireland

Technical Booklet L.

## 10 Liquid water penetration



10.1 When the product is used in situations where it bridges the dpc in walls, dampness from the ground will not pass through to the inner leaf provided the cavity wall is detailed in accordance with the requirements and provisions of the national Building Regulations:

### England and Wales

Approved Document C, Section 4

### Scotland

Technical Standard (G2.6)

### Northern Ireland

Technical Booklet C, Section 1.6.

10.2 Constructions incorporating the product and built in accordance with BS 5628-3 : 2001 will resist the transfer of precipitation to the inner leaf and satisfy the national Building Regulations:

### England and Wales

Requirement C4

### Scotland

Technical Standard G3.1

### Northern Ireland

Regulation C4.

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

- wall ties and fixings 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
- boards are properly installed and butt jointed
- at lintel level, a cavity tray, stopends and weepholes must be provided
- installation is carried out to the highest level on each wall or the top edge of the insulation is protected by a cavity tray.

## 11 Water vapour penetration

11.1 The boards have a nominal vapour resistance in excess of  $1000 \text{ MNsg}^{-1}$  and will therefore provide a significant resistance to the passage of water vapour (and would be considered a vapour control layer as defined in BS 5250 : 2002). Joints between boards will facilitate the passage of water vapour under normal conditions of temperature and humidity.

11.2 If the product is to be used in the external walls of rooms expected to have high humidities, care must be taken to provide adequate permanent ventilation to avoid possible problems from the formation of interstitial condensation in the internal wall leaf.

## 12 Thermal insulation

12.1 For the purpose of U value calculations to determine if the requirements of the Building (or other statutory) Regulations are met, the thermal conductivity ( $\lambda$ ) 90/90 values of the boards may be taken as declared by the Certificate holder:

CW2000 0.020  $\text{Wm}^{-1}\text{K}^{-1}$

CW3000Z 0.023  $\text{Wm}^{-1}\text{K}^{-1}$



12.2 The requirement for limiting the heat loss through the building fabric can be satisfied if the U values of the building elements, including thermal bridging, do not exceed the maximum values in the relevant Elemental Methods given in the national Building Regulations:

### England and Wales

Approved Documents L1 and L2, Table 1

### Scotland

Technical Standards J3.2, Table 1, and J8.3, Table

### Northern Ireland

Technical Booklet F, Table 1.2 or 1.4.

12.3 Guidance is also given in these documents on selecting the thickness of insulation required to enable a wall to achieve the desired U value. Alternative approaches are also described which allow for some flexibility in design of U values for individual constructional elements.

## 13 Durability



The boards are rot-proof, dimensionally stable and durable and will remain effective as an insulation system for the life of the building.

## Installation

## 14 General

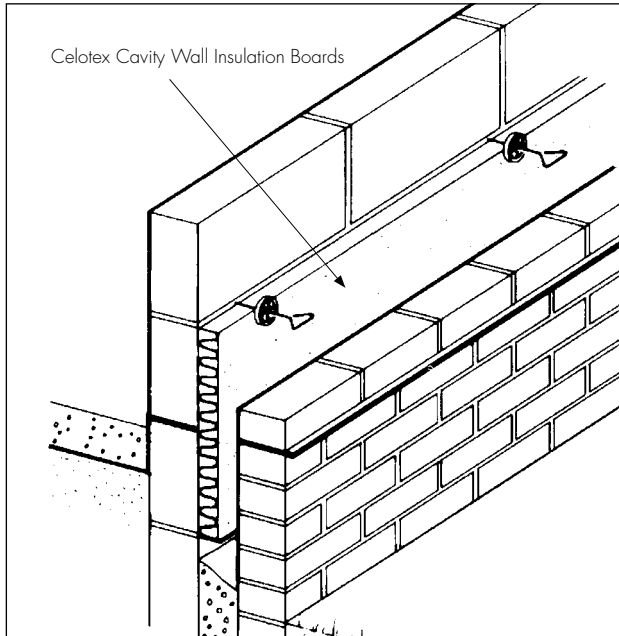
The walls are constructed leading with either the inner or outer leaf. It is recommended that the inner leaf be constructed ahead of the outer leaf, as Celotex tuff-R CW2000 and tuff-R Zero CW3000Z Cavity Wall Insulation Boards fastened to the cavity face of the inner leaf give a slightly-enhanced thermal performance. 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.

## 15 Procedure

15.1 A section of the leading leaf is built with the first row of wall ties, at approximately 600 mm

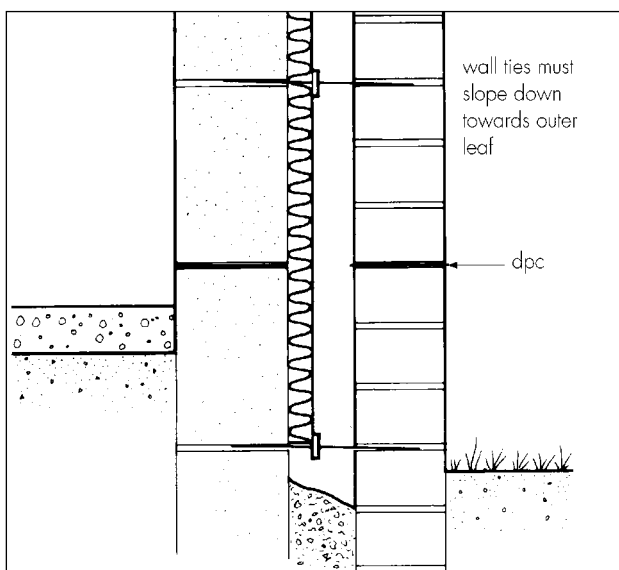
horizontal spacing, where the insulation is to begin. The first run of boards may commence below damp-proof course level to provide some edge insulation for the floor (see Figure 1). It is recommended that the wall ties are not placed directly on the damp-proof course.

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



15.2 The leading leaf is built up to a height of 450 mm. Excess mortar is cleaned from the cavity face of the leading leaf, and the boards are placed on the wall ties, behind the retaining clips, to form a closely butt-jointed run. The second row of wall ties is placed, sloping 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 on occasion be required to satisfy the structural requirements of BS 5628-3 : 2001, and/or to ensure adequate retention of boards or cut pieces.

Figure 2 Installation of wall ties



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

15.4 Progressive staggering of boards and wall ties as construction proceeds should be in accordance with the Certificate holder's recommendations.

## Mortar droppings

15.5 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 3 and 4).

Figure 3 Use of cavity batten

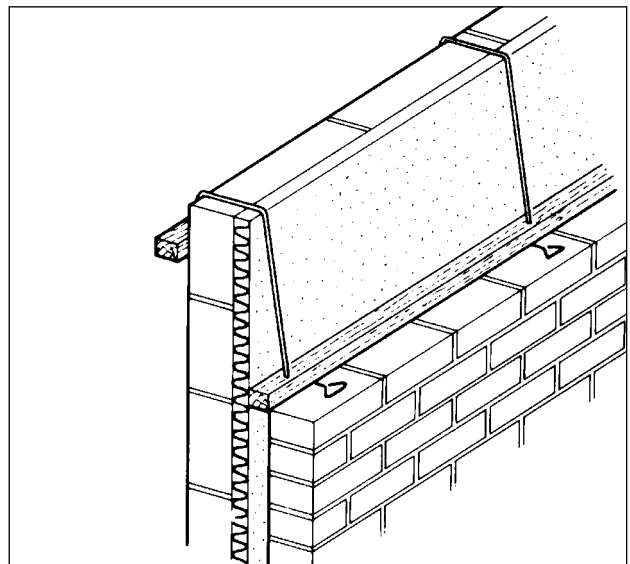
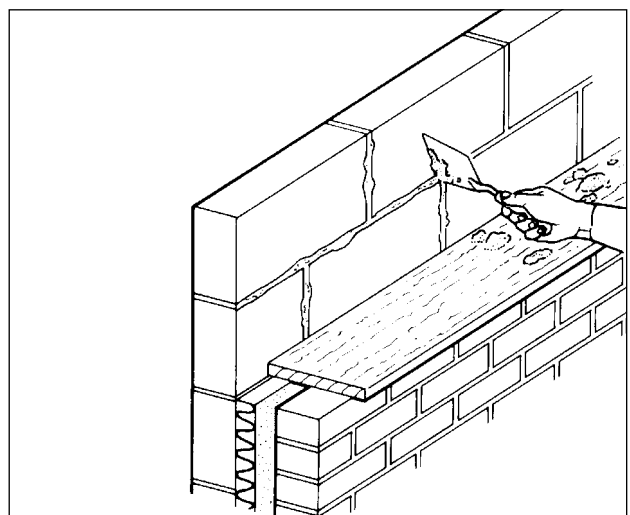


Figure 4 Use of cavity board



## Cut pieces

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

## Protection

15.7 All building involving the boards, particularly work which is interrupted, must conform to BS 5628-3 : 2001, Annex A4.1.3.1 *Handling and Site Storage*, Annex A5.1.1 *Weather Conditions*, Annex A5.4.4 *Installing Instructions*.

## Technical Investigations

The following is a summary of the technical investigations carried out on Celotex tuff-R CW2000 and tuff-R Zero CW3000Z Cavity Wall Insulation Boards.

### 16 Tests

Tests were carried out to determine:

- thermal conductivity
- compressive stress.

### 17 Investigations

An examination of data was made relating to dimensional accuracy.

### 18 Other investigations

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

## Bibliography

BS 1243 : 1978 *Specification for metal ties for cavity wall construction*

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

BS 5262 : 1991 *Code of practice for external renderings*

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 5628-3 : 2001 *Code of practice for use of masonry — Materials and components, design and workmanship*

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

## Conditions of Certification

### 19 Conditions

19.1 This Certificate:

- (a) relates only to the product that is described, installed, used and maintained as set out in this Certificate;
- (b) is granted only to the company, firm or person identified on the front cover — no other company, firm or person may hold or claim any entitlement to this Certificate;
- (c) is valid only within the UK;
- (d) has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective;
- (e) is copyright of the BBA;
- (f) is subject to English law.

19.2 References in this Certificate to any Act of Parliament, Regulation made thereunder, Directive or Regulation of the European Union, Statutory Instrument, Code of Practice, British Standard, manufacturers' instructions or similar publication, are references to such publication in the form in which it was current at the date of this Certificate.

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

- (a) are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA;

(b) continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine; and

(c) are reviewed by the BBA as and when it considers appropriate.

19.4 In granting this Certificate, the BBA is not responsible for:

- (a) the presence or absence of any patent or similar rights subsisting in the product or any other product;
- (b) the right of the Certificate holder to market, supply, install or maintain the product; and
- (c) the nature or standard of individual installations of the product or any maintenance thereto, including methods and workmanship.

19.5 Any recommendations relating to the use or installation of this product which are contained or referred to in this Certificate are the minimum standards required to be met when the product is used. They do 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 or in the future; nor is conformity with such recommendations to be taken as satisfying the requirements of the 1974 Act or of any present or future 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 installation and use of this product.



In the opinion of the British Board of Agrément, Celotex tuff-R CW2000 and tuff-R Zero CW3000Z Cavity Wall Insulation Boards are fit for their intended use provided they are installed, used and maintained as set out in this Certificate. Certificate No 94/3080 is accordingly awarded to Celotex Limited.

On behalf of the British Board of Agrément

A handwritten signature in black ink, appearing to read 'P. Q. Newson', is written over a light grey background.

Date of Third issue: 16th December 2003

Chief Executive

*\*Original Certificate issued on 19th December 1994. This amended version includes change of product name, an additional product, reference to revised national Building Regulations and CDM Regulations and new Conditions of Certification.*