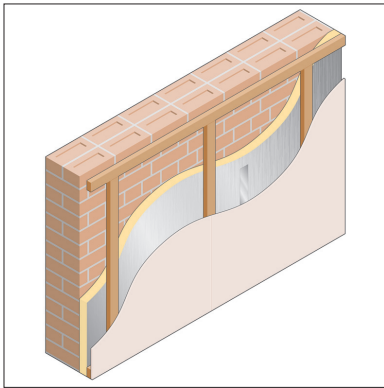


Product



- THIS DETAIL SHEET RELATES TO CELOTEX T-BREAK TB3000 AND TUFF-R GA3000 (INSULATED DRY LINING).
- The products are for use in conjunction with appropriate internal lining boards as an insulating dry lining system to improve the thermal insulation of existing and new, solid or cavity masonry walls or timber-frame walls of dwellings or buildings of similar occupancy, type and conditions.
- The products may also be used in locations where the insulated surface is inaccessible, eg existing ceilings of flat roofs.

This Detail Sheet must be read in conjunction with the Front Sheets, which give the Conditions of Certification.

Technical Specification

1 Description

1.1 Celotex T-Break TB3000 and tuff-R GA3000 (Insulated Dry Lining) are rigid polyisocyanurate-modified polyurethane foam board with a foil/kraft/foil tri-laminate facing on both sides. The boards are installed in conjunction with an appropriate lining panel, for example standard gypsum plasterboard to BS EN 520 : 2004.

1.2 The insulation boards are available in nominal dimensions⁽¹⁾ of:

length (mm)	2400
width (mm)	1200
thickness (insulation) (mm)	
TB3000	12-45
GA3000	50-100

(1) Other sizes may be available to special order.

1.3 Ancillary materials include large-headed nails, screws, washers, self adhesive aluminium foil and sealant.

Design Data

2 General

2.1 Celotex T-Break TB3000 and tuff-R GA3000 (Insulated Dry Lining) will significantly improve the thermal insulation of new and existing, solid or cavity masonry walls (masonry includes clay and calcium silicate bricks, concrete blocks, natural and reconstituted stone blocks) or timber-frame walls of dwellings and buildings of similar occupancy, type and condition.

2.2 The walls of new buildings should be designed and constructed in accordance with the

relevant codes of practice, eg BS 5628-3 : 2005 and BS 8000-3 : 2001.

2.3 All walls must be in a good state of repair with no evidence of rain penetration, damp or frost damage.

2.4 The surfaces of masonry walls should be sound and free from loose material; large projections should be removed and holes filled and levelled. A survey of the wall may be required to establish the extent of any packing that may be required to ensure the support battens provide a uniform plane for the boards to be fixed.

2.5 The installation of insulated dry lining systems requires careful detailing around doors and windows to achieve a satisfactory surface for finishing. In addition, every attempt should be made to minimise the risk of cold bridging at reveals and where heavy separating walls are attached to the external wall. In new work, the construction must be designed to accommodate the thickness of the dry lining, particularly at reveals, heads, sills and in relation to ceiling height. On existing walls consideration should be given to lining the reveals with a thinner layer of insulation and lining board.

2.6 Services can be incorporated in the void formed between the insulation and the lining boards, making chasing of the wall unnecessary. Where the services have a greater depth than the void, the wall should be chased in preference to the insulation. It is recommended that services penetrating the insulation or any vapour check lining board, eg light switches, power outlets, be kept to a minimum to limit possible penetration of water vapour.

2.7 When the products are to be installed in existing buildings it should be realised that a small reduction in room size will occur and that permanent fixtures, eg baths, will present difficulties.

3 Thermal insulation

3.1 Calculations of the thermal transmittance (U value) of a specific construction using insulated dry lining 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 ($\lambda_{90/90}$ value) thermal conductivity of $0.023 \text{ Wm}^{-1}\text{K}^{-1}$ for the dry lining, comprising a PIR board with composite Kraft paper facings. The U value of a typical wall construction will depend on the insulation value of the wall and its finish. Example U values are given in Table 1.

Table 1 Example U values ($\text{Wm}^{-2}\text{K}^{-1}$)

Insulation thickness (mm)	U value ($\text{Wm}^{-2}\text{K}^{-1}$)
40	0.38
60	0.28
80	0.23

Note:

- Gypsum plaster, thickness 13 mm (λ 0.51 $\text{Wm}^{-1}\text{K}^{-1}$), CIBSE Guide A : 2006 *Environmental design*, Table 3.38.
- Timber battens, softwood, thickness 22 mm (λ 0.13 $\text{Wm}^{-1}\text{K}^{-1}$), CIBSE Guide A, Table 3.39.
- Gypsum plasterboard, thickness 12.5 mm (λ 0.16 $\text{Wm}^{-1}\text{K}^{-1}$), CIBSE Guide A, Table 3.38.



3.2 Subject to the selection of an appropriate insulation thickness and construction, the product can contribute to a wall construction achieve the following design U values:

England and Wales and Northern Ireland

- $0.30 \text{ Wm}^{-2}\text{K}^{-1}$ standard for new thermal elements such as those constructed as part of an extension specified in Approved Documents; L1B (Table 4), L2B (Table 6)
- $0.35 \text{ Wm}^{-2}\text{K}^{-1}$ thermal elements constructed as replacements for existing elements as specified in Approved Documents; L1B (Table 4), L2B (Table 6).
- $0.35 \text{ Wm}^{-2}\text{K}^{-1}$ required for 'notional' dwellings in SAP 2005 and buildings other than dwellings in SBEM
- $0.35 \text{ Wm}^{-2}\text{K}^{-1}$ limit average U value specified in Approved Documents; L1A (Table 2), L2A (Table 4), Technical Booklets F1 (Table 2.2) and F2 (Table 2.4)
- $0.70 \text{ Wm}^{-2}\text{K}^{-1}$ limit U value for an individual element specified in Approved Document L1A (Table 2), L2A (Table 4), Technical Booklets F1 (Table 2.2) and F2 (Table 2.4).

Scotland

- $0.20 \text{ Wm}^{-2}\text{K}^{-1}$ U value required for the 'simplified approach – solid fuel package 6' 'notional' dwelling in Mandatory Standard 6.1, clause 6.1.6⁽¹⁾ (see section 3.3)
- $0.25 \text{ Wm}^{-2}\text{K}^{-1}$ required for 'notional' dwellings in SAP 2005 (for Scotland) and the 'simplified approach – packages 1 to 5' in Mandatory Standard 6.1, clause 6.1.6⁽¹⁾
- $0.27 \text{ Wm}^{-2}\text{K}^{-1}$ maximum U value for building elements of the insulation envelope for extensions

or reconstruction of elements, in Mandatory Standard 6.2, clauses 6.2.9⁽¹⁾, 6.2.10⁽²⁾, 6.2.11⁽¹⁾ and 6.2.12⁽²⁾

- $0.30 \text{ Wm}^{-2}\text{K}^{-1}$ limit average specified in Mandatory Standard 6.2, clause 6.2.1⁽¹⁾⁽²⁾
- $0.70 \text{ Wm}^{-2}\text{K}^{-1}$ limit for an individual element specified in Mandatory Standard 6.2, clauses 6.2.1⁽¹⁾⁽²⁾, 6.2.9⁽¹⁾ and 6.2.10⁽²⁾.

Technical Handbook (Domestic).

Technical Handbook (Non-Domestic).

3.3 Where a proposed wall U value is greater than, the 'notional' value specified in section 3.2 additional energy saving measures will be required in the building envelope and/or services to achieve the required overall carbon dioxide emission rate reduction of about 20% in dwellings (18% to 25% in Scotland) and 23% to 28% in buildings other than dwellings.

3.4 Compliance with the guidance referred in section 3.5 will allow the use of the default psi values from Table 3 of BRE Information Paper IP 1/06 *Assessing the effects of thermal bridging at junctions and around openings* and Table K1 of *The Government's Standard Assessment Procedure for Energy Rating of Dwellings* (SAP 2005), in Target Emission Rate calculations to SAP 2005 or the Simplified Building Energy Model (SBEM)⁽¹⁾.

(1) Use 'simplified approach' for Scotland



3.5 The product can maintain, or contribute to maintaining, continuity of thermal insulation at junctions between the external wall and other building elements. Guidance in this respect, and on limiting heat loss by air infiltration, can be found in:

England and Wales

Limiting thermal bridging and air leakage : Robust construction details for dwellings and similar buildings TSO 2002.

Scotland

Accredited construction details (Scotland)

Northern Ireland

Accredited Construction Details (version 1.0).

4 Condensation

4.1 It can be shown by calculations that it is feasible to design dry-lined walls and ceilings that will not suffer from condensation within the structure. However, when using the boards as a vapour control layer, consideration must be taken in the overall installation to minimise perforations by services. Joints at wall/ceiling and wall/floor level must be well sealed.

4.2 As with other types of insulation applied to the inside of a wall, there may be a risk of cold bridging from the floors or ceilings, particularly in concrete slab construction. It has been demonstrated that the use of coving at the wall ceiling joint will significantly reduce this risk.

Surface condensation



4.3 Walls will limit the risk of surface condensation adequately when the thermal transmittance (U value) does not exceed $0.7 \text{ Wm}^{-2}\text{K}^{-1}$ at any point, and the junctions with other elements are designed in accordance with the relevant requirements of TSO publication (see section 3.4 of this Certificate) or of BRE Information Paper IP 1/06.



4.4 Walls and ceilings will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed $1.2 \text{ Wm}^{-2}\text{K}^{-1}$ at any point. Guidance may be obtained from Section 8 of BS 5250 : 2002 and BRE report (BR 262 : 2002) *Thermal insulation : avoiding risks*.

4.5 Insulated dry lining has been used successfully in the rehabilitation of buildings suffering from surface condensation of walls where the dampness has been caused by the lack of thermal insulation.

Interstitial condensation



4.6 Walls incorporating the products will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2002 (Section 8 and Annex D).

4.7 The boards have a minimum water vapour resistance of 150 MNsg^{-1} and will therefore provide a significant resistance to water vapour transmission, provided that all joints between the boards are taped in accordance with the Certificate holder's literature.

5 Infestation

The use of the products do not in itself promote infestation. The creation of voids within the structure, ie gaps between the wall lining and the boards, may provide habitation for insects or vermin in areas already infested. Care should be taken to ensure, wherever possible, that all voids are sealed, as any infestation may be difficult to eradicate. There is no food value in the materials used.

6 Behaviour in relation to fire

6.1 When properly installed, the insulation will be contained between the wall and internal lining board until one is destroyed. Therefore, the insulation will not contribute to the development stages of a fire or present a smoke or toxic hazard.

6.2 With regard to the national Building Regulations the product can be used in all situations requiring a Class 0 surface where the lining board has a Class 0 surface. Details of such situations are contained in the relevant documents.

6.3 Recessed lighting must not be used in ceilings with this form of insulation.

7 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 acceptable:

England and Wales

Approved Document J

Scotland

Mandatory Standard 3.19

Northern Ireland

Technical Booklet L.

8 Impact resistance

Impact damage would be no greater than would be expected from the internal lining alone.

9 Materials in contact – wiring installations

The boards do not present a risk of reaction between them and PVC insulated electric cables when they are in contact. As with any other form of insulation, de-rating of electrical cables should be considered where the insulation restricts the air cooling of cables.

10 Wall-mounted fittings

The recommendations of the Certificate holder should be followed. Any object fixed to the wall, other than lightweight items, eg framed pictures, should be fixed through the lining board, timber battens and insulation into the wall behind, using recommended proprietary fixings. Ceiling fixtures will require longer screws to secure them to the structure.

11 Durability



The durability of the boards is satisfactory. Provided they are used in accordance with the Certificate holder's instructions, and are fixed to satisfactory stable and durable backgrounds by fully trained site labour, they should have a life equal to that of the building in which they are installed. Under normal conditions of occupancy the wall lining is unlikely to suffer damage, but if damage does occur repairs can be carried out.

Installation

12 General

12.1 It is recommended that Celotex T-Break TB3000 and tuff-R GA3000 (Insulated Dry Lining) are installed by trained dry lining operatives.

12.2 The boards are for installation on internal walls and ceilings.

12.3 Installation should be in accordance with good dry lining practice and the relevant parts of the Certificate holder's literature, which should be referred to for a detailed description of the method of installation.

12.4 Before fixing the products, sufficient time must be allowed for the dispersion of solvents contained in some wood preservatives and damp-proofing treatments where applied. Backgrounds should be allowed to dry out before fixing the system.

12.5 All installations of insulated dry lining require careful planning and setting out.

13 Procedure

13.1 The wall is surveyed to establish its flatness and suitability for receiving the system. This system may be used on any stable, dry walls capable of taking the fixings for the timber battens.

13.2 The insulation boards are cut to fit and placed against the wall; joints and perforations are sealed with self-adhesive aluminium foil tape. The insulation boards are temporarily secured in place. Permanent fixing is provided by the timber battens and internal lining board with suitable mechanical fixings (see Figures 1 and 2). The timber battens are placed against the insulation boards and mechanically fixed through the insulation into the wall substrate.

13.3 The battens must be of sufficient thickness (greater than 25 mm) and spacing (up to 600 mm) to provide adequate grounds to which the lining board can be fixed, and provide for any services that are to be incorporated into the void between the insulation board and lining board. Horizontal battens should be fitted at the top and bottom of walls and openings.

13.4 It is recommended that the timber battens be treated with preservative.

13.5 Jointing and finishing of the lining is carried out in the appropriate manner. Timber skirting can be fixed into the horizontal batten at floor level.

Timber-frame walls

13.6 Insulation boards may be cut to fit and placed against the timber frame with joints and perforations sealed with self-adhesive aluminium foil tape. Temporary fixing may be achieved with large-headed clout nails. The lining board may then be mechanically fixed through insulation and into the timber frame in the conventional manner. Alternatively, timber battens may first be fixed over the insulation boards to create a service void, if required.

Figure 1 General configuration

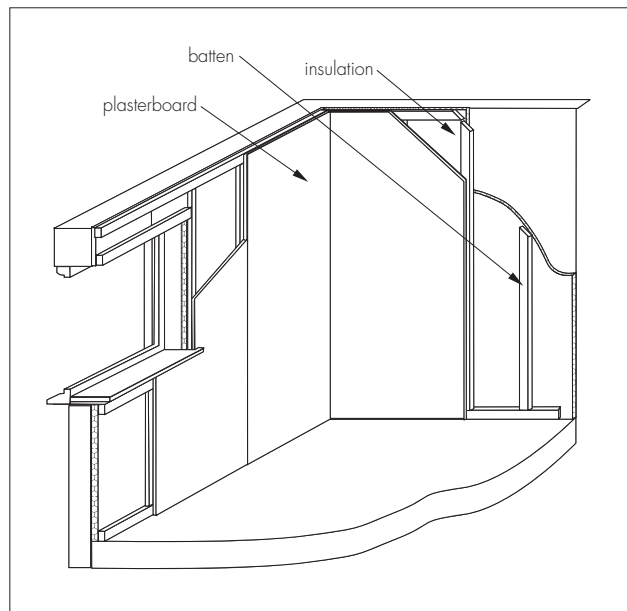
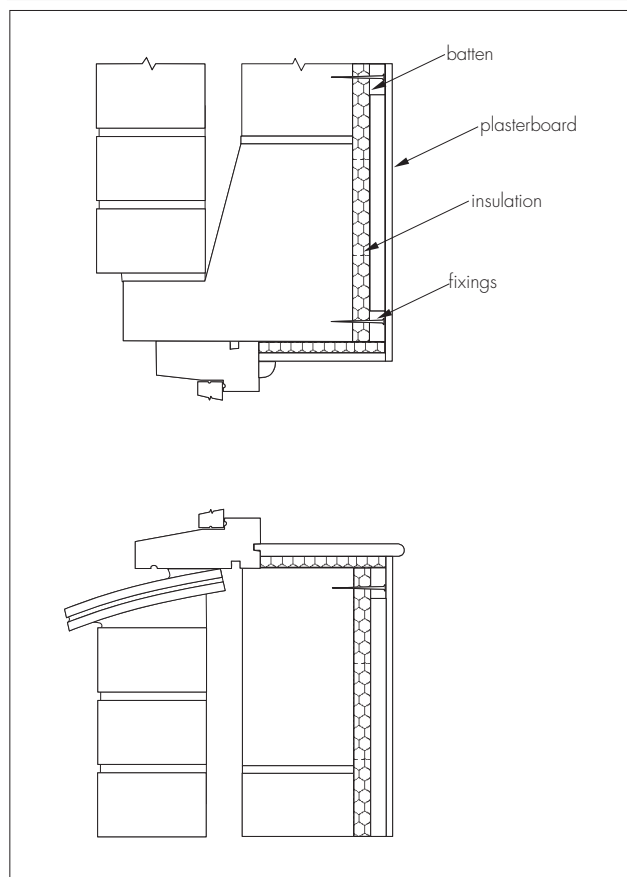


Figure 2 Opening detail



Technical Investigations

The following is a summary of the technical investigations carried out on Celotex T-Break TB3000 and tuff-R GA3000 (Insulated Dry Lining).

14 Tests

Tests were carried out to determine thermal conductivity.

15 Investigations

An examination was made of data relating to:

- dimensional accuracy
- density
- compressive strength
- thermal conductivity
- vapour resistance.

16 Other investigations

16.1 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.

16.2 A theoretical analysis of the hygrothermal behaviour of various installations was carried out.

Bibliography

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

BS 5628-3 : 2005 *Code of practice for the use of masonry — Materials and components, design and workmanship*

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

BS EN 520 : 2004 *Gypsum plasterboards — Definitions, requirements and test methods*

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



On behalf of the British Board of Agrément

Date of Third issue: 13th November 2007

A handwritten signature in black ink, appearing to read 'G. A. Cooper', is written over a light grey background.

Chief Executive

**Original Detail Sheet issued on 31st March 1996. This amended version includes change of product names, reference to revised national Building Regulations and British Standards, updated Thermal insulation and Condensation sections.*

