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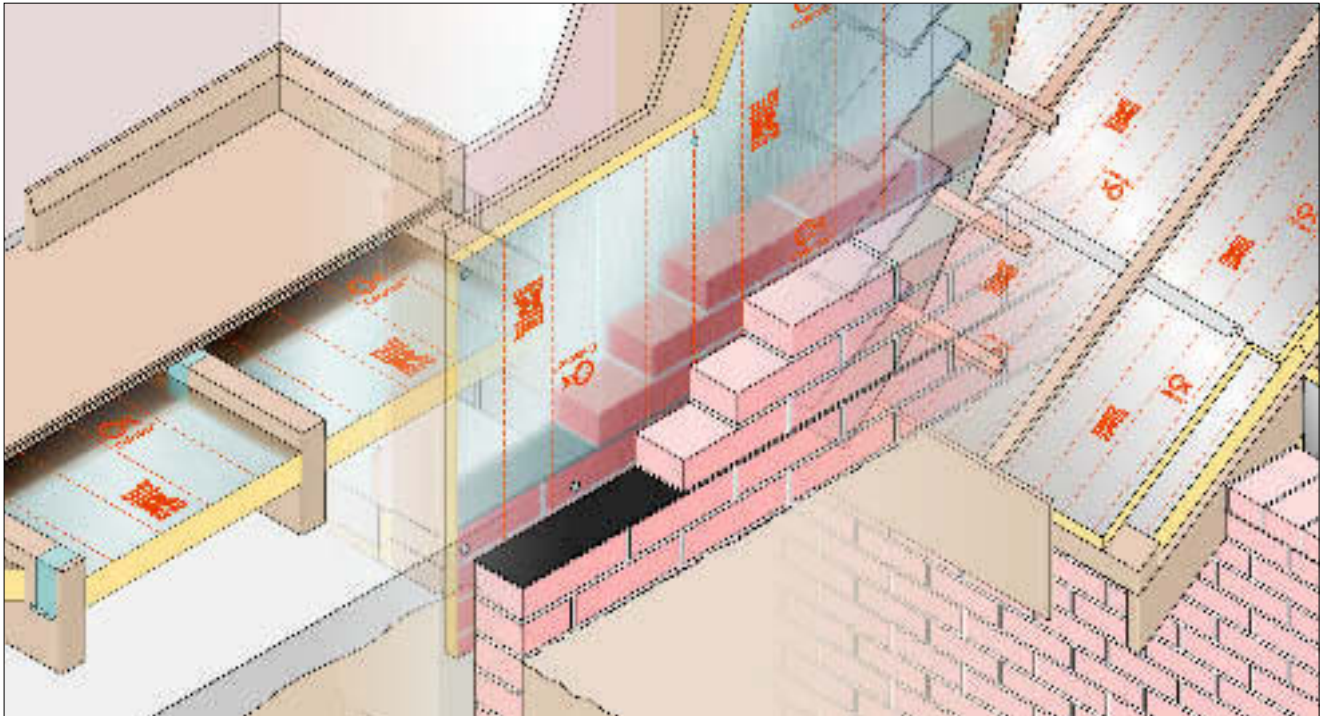
**Agrément  
Certificate  
No 95/3197**  
Second issue\*

Designated by Government  
to issue  
European Technical  
Approvals

## CELOTEX DOUBLE-R GA2000 AND TUFF-R ZERO GA3000Z

Isolation  
Wärmedämmung

## Product



- THIS CERTIFICATE RELATES TO CELOTEX DOUBLE-R GA2000 AND TUFF-R ZERO GA3000Z, RIGID POLYISOCYANURATE-MODIFIED POLYURETHANE FOAM BOARD WITH A FOIL/KRAFT/FOIL TRI-LAMINATE FACING ON BOTH SIDES.

- The product is manufactured and marketed by the Certificate holder.

These Front Sheets must be read in conjunction with the accompanying Detail Sheets, which provide information specific to the particular boards and application.

## 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 thermal insulation with the Building Regulations. In the opinion of the BBA, Celotex double-R GA2000 and tuff-R Zero GA3000Z, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements.

<p>Requirement: <b>B3(2)</b> Comment:</p>	<p>Internal fire spread (structure) When the product is used as an insulation in pitched roofs, junctions between roofs and compartment walls must be fire-stopped. See the relevant tinted area of the <i>Behaviour in relation to fire</i> section of the accompanying Detail Sheet.</p>
<p>Requirement: <b>B4(2)</b> Comment:</p>	<p>External fire spread The product will not affect the external fire rating of a tiled or slated roof in which it is installed. See the relevant tinted area of the <i>Behaviour in relation to fire</i> section of the accompanying Detail Sheet.</p>
<p>Requirement: <b>F2</b> Comment:</p>	<p>Condensation in roofs The product used as a pitched roof insulation is acceptable. See the relevant tinted area of <i>Condensation</i> section of the accompanying Detail Sheet.</p>

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Requirement:	L1	Dwellings
Requirement:	L2	Buildings other than dwellings
Comment:		The product can meet or contribute to meeting this Requirement. See the relevant tinted areas of the <i>Thermal insulation</i> section of the accompanying Detail Sheets.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The product is acceptable. See the tinted areas of the <i>Durability</i> section of the accompanying Detail Sheets.

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



In the opinion of the BBA, Celotex double-R GA2000 and tuff-R Zero GA3000Z, 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 the accompanying Detail Sheet.
Standard:	B2.2	Selection and use of materials, fittings, and components, and workmanship
Comment:		The product is an acceptable material. See the relevant tinted area of the <i>Durability</i> section of the accompanying Detail Sheets.
Regulation:	12	Structural fire precautions
Standard:	D3.16	Compartmentation — Junctions
Standard:	D5.10	Separating walls and separating floors — Junctions
Comment:		When the product is used as an insulation in pitched roofs, junctions between roofs and compartment walls, separating walls or walls enclosing a protected zone must be fire stopped. See the relevant tinted area of the <i>Behaviour in relation to fire</i> section of the accompanying Detail Sheet.
Standard:	D9.1	Fire spread from an adjoining building
Comment:		The product will not affect the external fire rating of a tiled or slated roof in which it is incorporated. See the relevant tinted area of the <i>Behaviour in relation to fire</i> section of the relevant Detail Sheet.
Regulation:	18	Resistance to condensation
Standard:	G4.1	Condensation — Interstitial condensation
Standard:	G4.2	Condensation — Surface condensation
Comment:		The product used in wall/roof and floor applications can satisfy these Standards. See the tinted areas of the <i>Condensation</i> section of the accompanying Detail Sheets.
Regulation:	22	Conservation of fuel and power
Standard:	J3.1	Buildings in purpose group 1 — Building fabric
Standard:	J4.1	Buildings in purpose group 1 — Limiting thermal bridging at junctions and around openings
Standard:	J8.1	Buildings in purpose groups 2 to 7
Standard:	J9.1	Buildings in purpose groups 2 to 7 — Limiting thermal bridging at junctions and around openings
Comment:		The product can satisfy or contribute to satisfying these Standards. See the tinted areas of the <i>Thermal insulation</i> section of the accompanying Detail Sheets.

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## 3 The Building Regulations (Northern Ireland) 2000



In the opinion of the BBA, Celotex double-R GA2000 and tuff-R Zero GA3000Z, 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 the tinted areas of the <i>Durability</i> section of the accompanying Detail Sheets.
Regulation:	C5	Condensation
Comment:		The product used in wall/ceiling and floor applications is acceptable. See the tinted areas of the <i>Condensation</i> section of the accompanying Detail Sheets.
Regulation:	E4	Internal fire spread — Structure
Comment:		Junctions between roofs and compartment walls must be fire-stopped. When the product is used as an insulated dry lining with the appropriate internal lining the construction may be used on the internal surfaces of buildings in every purpose group. See the relevant tinted area of the <i>Behaviour in relation to fire</i> section of the accompanying Detail Sheet.
Regulation:	E5	External fire spread
Comment:		When the product is used as insulation in pitched roofs, the product will not affect the external fire rating of a tiled or slated roof in which it is incorporated. See the relevant tinted area of the <i>Behaviour in relation to fire</i> sections of the accompanying Detail Sheet.
Regulation:	F2	Building fabric
Comment:		The product can meet or contribute to meeting this Regulation. See the tinted areas of the <i>Thermal Insulation</i> section of the accompanying Detail Sheets.

## 4 Construction (Design and Management) Regulations 1994 (as amended)

### 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 sections: 5 *Delivery, storage and site handling* (5.3) of these Front Sheets and the *General (Installation)* section of the relevant Detail Sheet.

## Technical Specification

### 5 Delivery and site handling

5.1 Celotex double-R GA2000 and tuff-R Zero GA3000Z is delivered to site in packs. Each pack contains a label bearing the manufacturer's name, board dimensions and the BBA identification mark incorporating the number of this Certificate. The batch number is also marked on each pack.

5.2 Boards should be stored off the ground on a clean, level surface and under cover to protect from precipitation and prolonged exposure to sunlight.

5.3 Care must be exercised when handling individual boards to avoid crushing the edges and corners. Care must also be taken to avoid exposure to open flame or other ignition sources

and contact with solvents and materials containing volatile organic components such as coal tar, pitch or timber newly treated with creosote

## Additional Information

The management systems of Celotex Limited have been assessed and registered as meeting the requirements of BS EN ISO 9002 : 1994 by the British Standards Institution Quality Assurance (Certificate No 91/504).

## Bibliography

BS EN ISO 9002 : 1994 *Quality systems — Model for quality assurance in production, installation and servicing*

## Conditions of Certification

### 6 Conditions

6.1 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.

6.2 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.

6.3 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.

6.4 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.

6.5 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 double-R GA2000 and tuff-R Zero GA3000Z, are fit for their intended use provided they are installed, used and maintained as set out in this Certificate. Certificate No 95/3197 is accordingly awarded to Celotex Limited.

On behalf of the British Board of Agrément

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

Date of Second issue: 30th March 2004

Chief Executive

*\*Original Front Sheet issued 31st March 1996. This amended version includes change of product name and Certificate holder's address, reference to revised national Building Regulations and CDM Regulations, addition of Delivery and site handling, and new Conditions of Certification.*



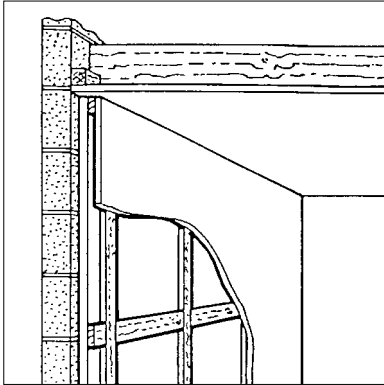
**Celotex Limited**

**Certificate No 95/3197**

**CELOTEX DOUBLE-R GA2000 AND TUFF-R ZERO GA3000Z (INSULATED DRY LINING)**

**DETAIL SHEET 1**  
Second issue\*

## Product



- THIS DETAIL SHEET RELATES TO CELOTEX DOUBLE-R GA2000 AND TUFF-R ZERO GA3000Z (INSULATED DRY LINING).
- The product is 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 product 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 double-R GA2000 and tuff-R Zero GA3000Z (Insulated Dry Lining) is installed in conjunction with an appropriate lining panel, for example standard gypsum plasterboard to BS 1230-1 : 1985.

1.2 The insulation boards are available in nominal dimensions<sup>(1)</sup> of:

length (mm)	2400
width (mm)	1200
thickness (insulation) (mm)	10 to 90

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

1.3 Ancillary materials include large-headed nails, screws, washers, aluminium joint tape and sealant.

## Design Data

### 2 General

2.1 Celotex double-R GA2000 and tuff-R Zero GA3000Z (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 : 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 party 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 system is 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 For the purpose of U value calculations to determine if the requirements of the Building (or other statutory) Regulations are met, the thermal conductivity ( $\lambda_{90/90}$  value) of the boards may be taken as declared by the Certificate holder:

GA2000	0.019 Wm <sup>-1</sup> K <sup>-1</sup>
GA3000Z	0.023 Wm <sup>-1</sup> K <sup>-1</sup>

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

### **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, Tables 1.2 and 1.4.

3.3 Alternative approaches are also described in these documents which allow for some flexibility in design of U values for individual constructional elements.

3.4 The ultimate thermal performance of the system will depend on the construction of the wall or ceiling against which it is installed. The dynamic performance of a structure can be determined by the admittance procedure given in CIBSE Guide A : 1999 *Environmental Design*.


3.5 The dynamic thermal performance of a building can be expressed as a ratio called the response factor (Equation 5.13 of the CIBSE Guide A). Factors  $\leq 4$  are achieved for thermally lightweight buildings and Factors  $>4$  for heavyweight buildings. The use of any form of insulation will affect this factor and it should be considered when designing heating systems for new buildings. Modifications to existing heating systems may also have to be considered in buildings upgraded by the application of the product. Methods of sizing heating plant are given in Section 5 of the CIBSE Guide A.

3.6 If the system is to be used to upgrade existing ceilings it is essential to insulate pipework, water tanks and similar installations existing in the space above.

 3.7 Care should be taken to ensure that the design allows for limiting excessive additional heat loss and risk of surface condensation at openings within the boards and at junctions between the boards and other building elements. Reference can be made to *Limiting thermal bridging and air leakage: Robust construction details for dwellings and similar buildings : 2002* or BR262 : 2002 *Thermal insulation: avoiding risks*.

## **4 Condensation**

4.1 The boards provide an effective control to the passage of water vapour.

 4.2 The boards have a vapour resistance of better than  $20000 \text{ MNsg}^{-1}$  provided all joints between boards are sealed and/or taped in accordance with the Certificate holder's literature and, therefore, can offer significant resistance to water vapour transmission.

4.3 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.

4.4 When used on ceilings, the recommendations of BS 5250 : 2002 should be followed to minimise the risk of condensation within the roof structure. Perforations for services must be well sealed.

4.5 The product can assist in limiting the amount of water vapour penetrating into a loft space and therefore will assist in meeting the requirements of Regulation F2 of the Building Regulations (England and Wales).

4.6 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.

4.7 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.

## **5 Infestation**

The use of the system does 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 product 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**

Technical Standards, (Part F)

### **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 double-R GA2000 and tuff-R Zero GA3000Z (Insulated Dry Lining) is 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 product, 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 taped with aluminium jointing 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 ( $\geq 25$  mm) and spacing ( $\leq 600$  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.

Figure 1 General configuration

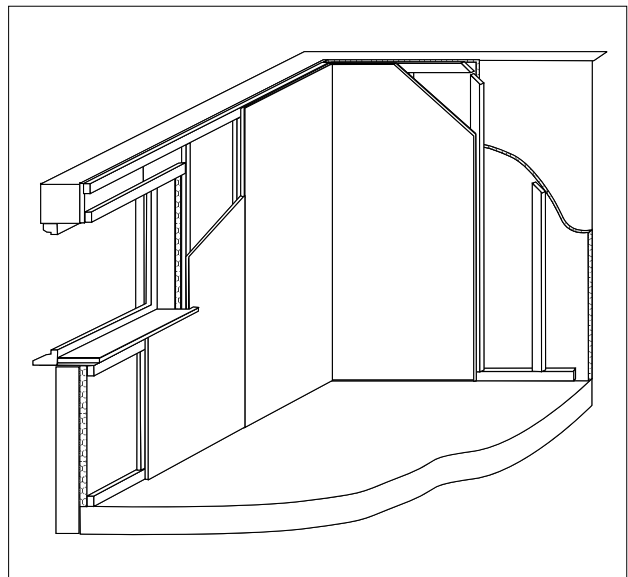
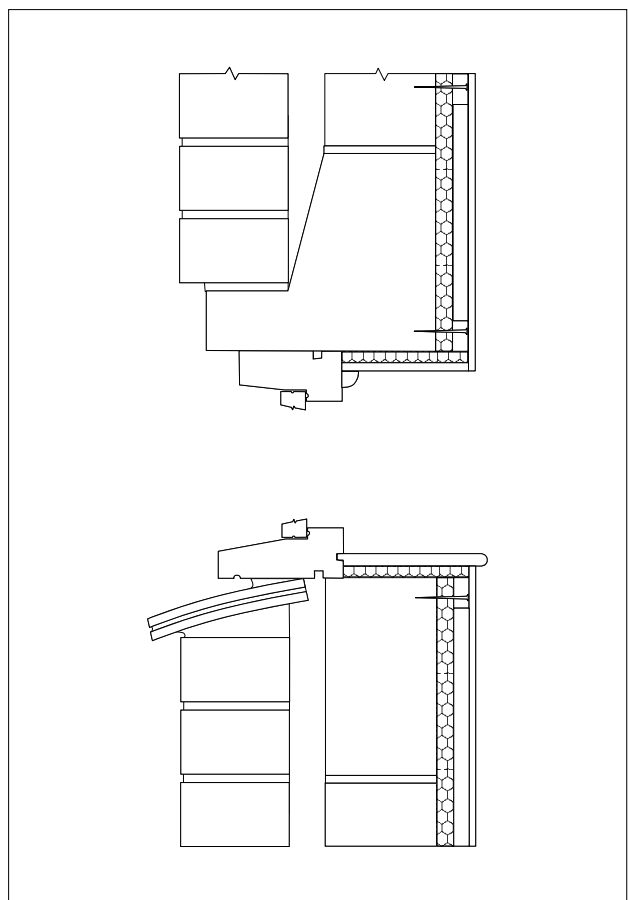


Figure 2 Wall detail



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 taped joints and perforations. 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.

## Technical Investigations

The following is a summary of the technical investigations carried out on Celotex double-R GA2000 and tuff-R Zero GA3000Z (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 1230-1 : 1985 *Gypsum plasterboard — Specification for plasterboard excluding materials submitted to secondary operations*

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

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



On behalf of the British Board of Agrément

Date of Second issue: 30th March 2004

A handwritten signature in black ink, appearing to read 'P. C. Hewson'.

Chief Executive

*\*Original Detail Sheet issued on 31st March 1996. This amended version includes change of product name and addition to product range, and reference to revised national Building Regulations and British Standards.*

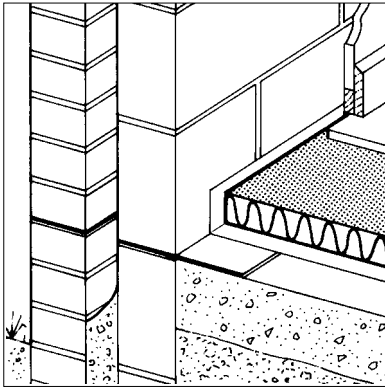


Celotex Limited

Certificate No 95/3197

**CELOTEX DOUBLE-R GA2000 AND TUFF-R  
ZERO GA3000Z (FLOORING INSULATION)**
**DETAIL SHEET 2**  
*Second issue\**

## Product



• THIS DETAIL SHEET RELATES TO CELOTEX DOUBLE-R GA2000 AND TUFF-R ZERO GA3000Z (FLOORING INSULATION).

- The product is for use on ground-supported or suspended concrete or timber floors and also for use with exposed or semi-exposed intermediate concrete or timber floors.
- The product is used to reduce the thermal transmittance of new or existing floors of dwellings or buildings of similar occupancy, type and condition.
- It is essential that the floors comply with the conditions set out in the Design Data and Installation parts of this Certificate.

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

## Technical Specification

### 1 Description

Celotex double-R GA2000 and tuff-R Zero GA3000Z (Flooring Insulation) boards are available in nominal dimensions of:

length (mm)	2400
width (mm)	1200
thickness (mm)	10 to 90

## Design Data

### 2 General

2.1 Celotex double-R GA2000 and tuff-R Zero GA3000Z (Flooring Insulation) is effective in reducing the U value (thermal transmittance) of new or existing concrete or timber floors.

2.2 Ground-supported floors incorporating the boards must include a suitable damp-proof membrane, for example, laid in accordance with CP 102 : 1973 , BS 8102 : 1990 and/or BS 8215 : 1991 (see section 4).

2.3 Suspended concrete or timber ground floors incorporating the boards must include suitable ventilation or a damp-proof membrane (see section 4 of this Detail Sheet).

2.4 The overlay to the boards should be:

- a floor screed, laid in accordance with the relevant clauses of BS 8204-1 : 2003 and BS 8204-2 : 2003, or
- particle board of Grade P5 or P7 or oriented strand board of Grade OSB/3 or OSB/4 in accordance with the relevant clauses of ENV 12872 : 2000, or
- a concrete slab.

### 3 Behaviour in relation to fire

3.1 The boards do not prejudice the fire resistance properties of the floor.

3.2 When properly installed on concrete or timber floors the boards will not add significantly to any existing fire hazard. The boards will be contained within the floor by the overlay until the overlay itself is destroyed and therefore will not contribute to the development stages of a fire or present a smoke or toxic hazard.

### 4 Moisture penetration

4.1 The boards are not a water vapour control layer, however, they will not allow moisture to cross the completed floor construction.

4.2 For floors subject to national Building Regulations, construction should be as detailed or designed in accordance with:

#### England and Wales

Approved Document C, Technical Solutions 3.9 to 3.14

#### Scotland

Technical Standards (G2.3), (G2.5) and (G2.6), Section A (above DPM), B, C or D

#### Northern Ireland

Technical Booklet C, Section 1.

### 5 Thermal insulation

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

GA2000	0.019 Wm <sup>-1</sup> K <sup>-1</sup>
GA3000Z	0.023 Wm <sup>-1</sup> K <sup>-1</sup>



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

#### England and Wales

Approved Documents L1 and L2, Table 1

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## Scotland

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

## Northern Ireland

Technical Booklet F, Tables 1.2 and 1.4.

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

5.4 The U values for floors may be calculated in accordance with CIBSE Guide A3 : 1999 *Thermal properties of building structures* or BS EN ISO 13370 : 1998 [see also BRE Digest 262 (2002)] *Thermal insulation — avoiding risks*.



5.5 Care should be taken to ensure that the design allows for limiting excessive additional heat loss and risk of surface condensation at openings within the boards and at junctions between the boards and other building elements. Reference can be made to *Limiting thermal bridging and air leakage: Robust construction details for dwellings and similar buildings : 2002* or BR 262 : 2002 *Thermal insulation: avoiding risks*.

## 6 Condensation



For floors subject to the national Building Regulations, construction should be in accordance with BS 5250 : 2002, clause 8.5 and with Annex D as appropriate.

## 7 Floor loading

7.1 The design loadings for self-contained dwelling units as defined in BS 6399-1 : 1996 are:

intensity of distributed load (kPa)	1.5
concentrated load (kN)	1.4

7.2 The boards covered with particle board or screed can support these design loadings without undue deflection.

7.3 A BRE survey of imposed floor loading in domestic buildings (see BRE current paper No 2/77 *Floor loadings in domestic buildings — the results of a survey* indicates that loadings in flats are commonly in the region of 0.6 kPa and loadings of 1.5 kPa are normally associated with fixed items.

7.4 Where the boards are used under a concrete slab, resistance to concentrated and distributed loads is a function of the slab specification.

## 8 Durability



The boards are rot-proof, dimensionally stable and, when installed with the overlays specified in this Detail Sheet, will remain effective as an insulating material for the life of the building in which they are incorporated.

## Installation

### 9 General

9.1 Typical methods of installing Celotex double-R GA2000 and tuff-R Zero GA3000Z (Flooring Insulation) are shown in Figures 1 and 2. Reference should also be made to BR 262 : 2002 *Thermal insulation — avoiding risks*.

Figure 1 Ground supported concrete floor

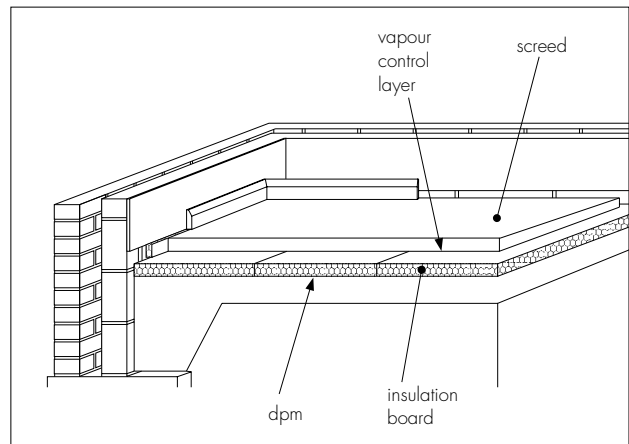
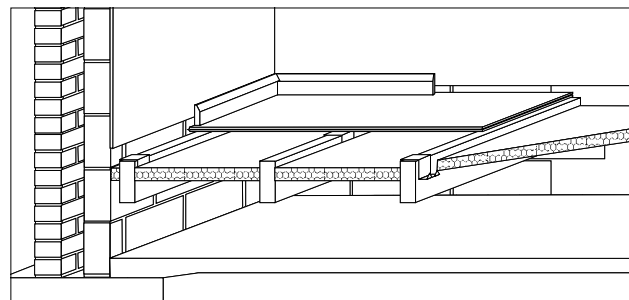


Figure 2 Suspended timber floor



9.2 The concrete floor over which the boards are to be laid should be left for as long as possible to maximise drying out.

9.3 The floor surface should be smooth and flat to within 5 mm when measured with a three-metre straight-edge. Irregularities greater than this must be removed. Minor irregularities (up to 10 mm deep) may be levelled with mortar.

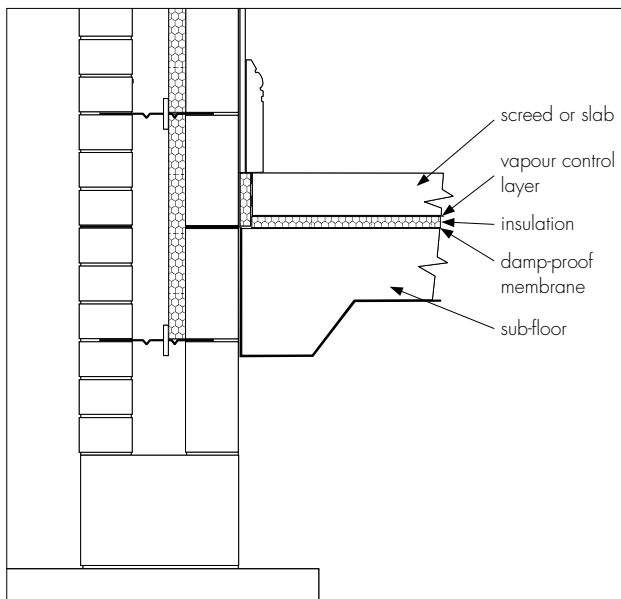
9.4 The boards can be used on a beam and block suspended concrete floor that is the subject of a current Agrément Certificate and installed in accordance with, and within the limitations imposed by, that Certificate. Where the board is laid over a suspended block and beam floor a levelling screed or compound may be required.

9.5 Where the boards are used over ground-supported concrete floor slabs a suitable damp-proof membrane, for example, in accordance with CP 102 : 1973, should be incorporated to resist moisture from the ground. If a liquid-type damp-proof membrane is applied to the slabs, it should be of a type compatible with the boards and be allowed to dry out fully before laying the boards.

9.6 Where the boards are used on hard core bases under ground-supported concrete slabs, the hard core must be blinded and a dpm laid over before the boards are laid.

9.7 Where a screed or concrete slab is laid over the product, vertical upstands of insulation should be provided and be of sufficient depth to fully separate the screed or slab from the wall. In addition, a polythene vapour-check (minimum 0.125 mm thick) should be laid over the boards with 150 mm laps and turned up at abutments before laying the screed or slab (see Figure 3).

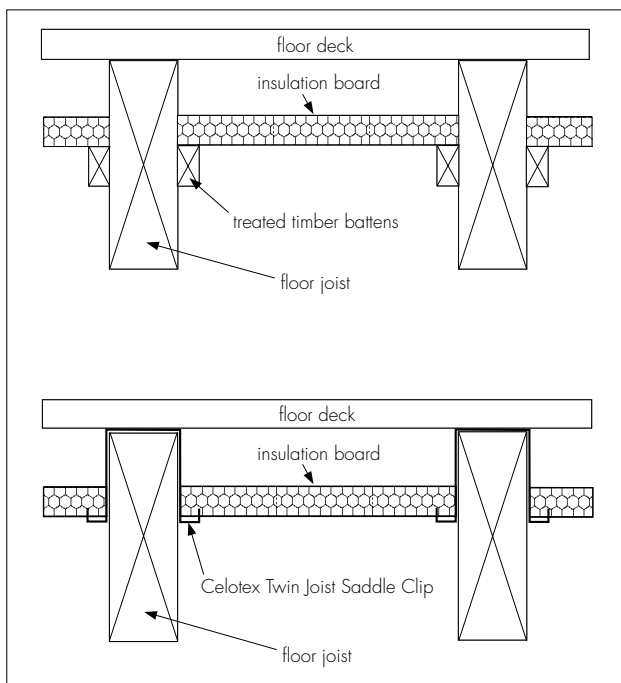
Figure 3 Ground supported floor



9.8 To limit the risk of damage from condensation and other sources of dampness, the boards and the overlay should only be laid after the construction is made substantially weathertight, eg after glazing. The boards must also be protected from water spillage, plaster droppings, traffic, during construction.

9.9 Boards are installed between floor joists on saddle clips or timber stop beads. Tongue-and-groove particle board flooring or softwood floor boarding is then installed in the conventional manner (see Figure 4).

Figure 4 Suspended timber floors



## 10 Procedure

10.1 The boards are cut to size, as necessary, and laid with closely butted joints.

### Screed overlay

10.2 A polythene vapour control layer, minimum 0.125 mm thick, is laid over the boards with 150 mm laps. A properly-compacted screed of mean thickness 65 mm is then laid over. The relevant clauses of

BS 8204-1 : 2002 should be followed, and BRE Digest 224 (1981) *Cellular Plastics for Buildings. Floors* and BRE Digest 104 (1973) *Floor Screeds* should be consulted.

### Particle board or oriented strand board (OSB) overlay

10.3 Before laying the boards, preservative-treated battens, in accordance with BS 1282 : 1999, are positioned at doorways and to support partitions. Adequate time should be allowed for CCA-based preservatives to be fixed, and the solvents from solvent-based preservatives to evaporate.

10.4 Tongue-and-groove particle board Grade P5 or P7 or OSB/3 or OSB/4 18 mm thick, to the relevant clauses in ENV 12872 : 2000 is laid with staggered cross-joints.

10.5 An expansion gap between the particle board and the perimeter walls should be provided at the rate of 2 mm per metre run or a minimum of 10 mm, whichever is the greater.

10.6 Where there are long, uninterrupted lengths of floor, eg corridors, proprietary expansion joints should be installed at intervals on the basis of a 2 mm gap per metre run of particle board.

10.7 Before the boards are interlocked, either a PVA or mastic adhesive is applied to the joints.

10.8 Once the particle board is laid, temporary wedges are inserted between the walls and the floor to maintain tight joints until the adhesive has set.

10.9 To prevent cold-bridging a suitable compressible filler, eg pieces of insulation, should be fitted around the perimeter of the floor between the particle board and the walls when the wedges are removed and before the skirting boards are affixed.

10.10 Where there is a likelihood of regular water spillage (such as kitchens, bathrooms, shower and utility rooms), additional particle board protection may be considered, eg by the use of flexible vinyl sheet flooring with welded joints and cove skirtings.

### Concrete slab overlay (ground bearing only)

10.11 Perimeter edge pieces are cut and placed around the edges and taped at joints. A vapour control layer, minimum 0.125 mm thick, is laid over the boards with 150 mm laps. The concrete slab is laid to the required thickness.

### Timber floors

10.12 Celotex Twin Joist Saddle Clips are placed at intervals not exceeding one metre along the timber floor joists. Where the boards are to be installed only on one side of a joist, twin clips can be cut into single clips and nailed into place with galvanized nails.

10.13 If the saddle clips are not used, the boards may be retained by preservative-treated timber beads. Beads should be wide enough to retain the boards in place and secured in place with corrosion protected nails at a depth that will accommodate the thickness of the insulation board and leave an air gap (minimum 25 mm) between the top of the insulation board and the underside of the flooring deck.

10.14 Boards are cut to fit between joists and pushed down onto the spikes of the saddle clips, or onto the beads. Small gaps should be insulated with cut strips of insulation.

## 11 Incorporation of services

11.1 The maximum continuous working temperature of the boards is 100°C. De-rating of electrical cables should be considered where installation restricts air cooling of cables. Where underfloor heating systems are to be used, the advice of the Certificate holder should be sought.

11.2 Where the boards are installed on a floor of a suspended beam and block design, all services must be installed in accordance with the Agrément Certificate for that floor.

11.3 Where possible, electrical conduits, gas and water pipes or other services should be contained within ducts or channels within the concrete slab. Where this is not possible, the services may be accommodated within the insulation, provided they are securely fixed to the concrete slab (see section 3.2). Electric cables should be enclosed in a suitable conduit. With hot pipes the insulation must be cut back to maintain an air space.

11.4 Where water pipes are installed below the insulation they should be pre-lagged. Generally, insulation will be relatively thin so it would not be possible to install pipes within the insulation. Pipes installed above the insulation will not require lagging, although some provision needs to be made for expansion and contraction.

11.5 For floors incorporating particle board overlays, where access to the services is desirable, a duct may be formed by mechanically fixing to the floor timber bearers of the same thickness as the insulation to provide support for a particle board cover. The duct should be as narrow as possible and not exceed 400 mm in width without intermediate support.

11.6 On intermediate/exposed floors all the services should be incorporated beneath the existing floor, above the insulation if possible.

## Technical Investigations

The following is a summary of the technical investigations carried out on Celotex double-R GA2000 and tuff-R Zero GA3000Z (Flooring Insulation).

## 16 Tests

Tests were carried out to determine:

- load compression characteristics
- effect of cyclic loading
- thermal conductivity
- compressive strength.

## 17 Investigations

17.1 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.

17.2 An examination was made of data relating to:

- thermal conductivity (fresh and aged)
- dimensional accuracy
- dimensional stability
- water vapour resistance
- compressive strength at 10% compression
- density
- fire risk.

17.3 An assessment of the risk of interstitial condensation in typical constructions was made.

## Bibliography

BS 1282 : 1999 *Wood preservatives — Guidance on choice, use and application*

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

BS 6399-1 : 1996 *Loading for buildings — Code of practice for dead and imposed loads*

BS 8102 : 1990 *Code of practice for protection of structures against water from the ground*

BS 8204-1 : 2002 *Screeds, bases and in-situ floorings — Concrete bases and cement sand levelling screeds to receive floorings — Code of practice*

BS 8204-2 : 2002 *Screeds, bases and in-situ floorings — Concrete wearing surfaces — Code of practice*

BS 8215 : 1991 *Code of practice for design and installation of damp-proof courses in masonry construction*

BS EN ISO 13370 : 1998 *Thermal performance of buildings — Heat transfer via the ground — Calculation methods*

CP 102 : 1973 *Code of practice for protection of buildings against water from the ground*

ENV 12872 : 2000 *Wood-based panels. Guidance on the use of load-bearing boards in floors, roofs and walls*



On behalf of the British Board of Agrément

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

Date of Second issue: 30th March 2004

Chief Executive

*\*Original Detail Sheet issued on 31st March 1996. This amended version includes reference to revised national Building Regulations and British Standards, change of product name and an additional product.*

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For technical or additional information, contact the Certificate holder (see front page).  
For information about the Agrément Certificate, including validity and scope, tel: Hotline 01923 665400, or check the BBA website.



Celotex Limited

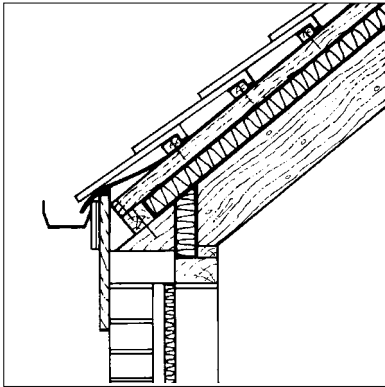
Certificate No 95/3197

## CELOTEX DOUBLE-R GA2000 AND TUFF-R ZERO GA3000Z (PITCHED ROOF INSULATION)

### DETAIL SHEET 3

Second issue\*

## Product



- THIS CERTIFICATE RELATES TO CELOTEX DOUBLE-R GA2000 AND TUFF-R ZERO GA3000Z (PITCHED ROOF INSULATION).
- The product is for use as insulation above, between and/or below rafters in tiled or slated pitched roofs designed and constructed in accordance with the relevant clauses of BS 5534 : 2003.
- The boards are for use where the ceiling follows the pitch of the roof and encloses a habitable space, or where the ceiling is horizontal and encloses a loft space.
- The product must be used in conjunction with a suitable water vapour permeable roof tile underlay.

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 double-R GA2000 and tuff-R Zero GA3000Z (Pitched Roof Insulation) boards are available in nominal dimensions<sup>(1)</sup> of:

length (mm)	2400
width (mm)	1200
thickness (mm)	10 to 90

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

1.2 Ancillary products used with the boards are:

- roof tile underlay — fully-supportable vapour permeable and the subject of a current Agrément Certificate
- aluminium foil self-adhesive tape
- Helifix InSkew 600
- stainless steel fixings
- nails
- battens
- roofing slates or tiles
- internal lining board.

1.3 Other proprietary fixings approved by the BBA can be used with the boards. Names and addresses of suppliers of approved fixings are available from the Certificate holder.

## Design Data

### 2 General

2.1 Celotex double-R GA2000 and tuff-R Zero GA3000Z (Pitched Roof Insulation) boards are satisfactory for use above, between and/or below roof rafters in conjunction with internal lining board, roof tile underlay, timber counter battens and tiling battens in tiled or slated, pitched roofs, designed and constructed in accordance with the relevant clauses of BS 5534 : 2003 for dwellings or other buildings with similar temperature and humidity conditions.

2.2 The boards are for use in constructions where the ceiling follows the pitch of the roof and encloses a

habitable space, or where the ceiling is horizontal and encloses a loft space.

2.3 Although the boards will contribute to the buckling and racking strengths of the roof, normal cross-bracing is necessary when using them.

2.4 During installation the boards must not be walked on except over supporting roof timbers. The boards have insufficient nail holding ability to be considered as an alternative to timber sarking.

2.5 It is essential that detailing and jointing of the boards achieves a convection-free envelope of high vapour resistance (see section 8). Any gaps should be filled, and/or taped. Ridges, abutments and penetrations should also be sealed. Flue pipes passing through the insulation should be suitably sleeved.

### 3 Strength

The boards, when installed in accordance with the Certificate holder's instructions, will resist the loads likely to be met during installation and in service, (see sections 2.4 and 11.2).

### 4 Structural stability

4.1 The resistance to wind uplift and likely dead loads depends upon factors peculiar to each project, ie roof geometry, geographical location. The effect of wind loading should be calculated in accordance with BS 6399-2 : 1997 and snow loadings should be calculated in accordance with BS 6399-3 : 1988, for each case.

4.2 When calculating the fixing spacing required to resist the calculated loadings the requirements of BS 5268-2 : 2002 should be followed where possible. When using proprietary fixings and improved nails, the Certificate holder must advise on the correct type in accordance with BS 5268-2 : 2002.

### 5 Behaviour in relation to fire

5.1 The boards must not be carried over junctions between roofs and walls required to provide a minimum period of fire resistance. The continuity of fire resistance must be maintained, for example as described in:



## England and Wales

Approved Document B, paragraphs 9.28 to 9.31

## Scotland

Technical Standards (D3.16) and (D5.10)

## Northern Ireland

Technical Booklet E, paragraph 3.15.

5.2 The use of the boards will not affect the rating obtained by tiled or slated roofs when evaluated by assessment or tested to BS 476-3 : 1958.

5.3 When installed with an internal lining board the insulation will be contained between the roof 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 Thermal insulation

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

GA2000	0.019 Wm <sup>-1</sup> K <sup>-1</sup>
GA3000Z	0.023 Wm <sup>-1</sup> K <sup>-1</sup>



6.2 The requirement for limiting heat loss through the building fabric can be satisfied if U values of the building elements (including thermal bridging) do not exceed the maximum values in the relevant Elemental Method 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, Tables 1.2 and 1.4.

6.3 Guidance is also given in these documents on selecting the thickness of insulation required to enable a floor 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.

6.4 Care should be taken to ensure that the design allows for limiting excessive additional heat loss and risk of surface condensation at openings within the boards and at junctions between the boards and other building elements. Reference can be made to *Limiting thermal bridging and air leakage: Robust construction details for dwellings and similar buildings : 2002* or BR 262 : 2002 *Thermal insulation: avoiding risks*.

## 7 Condensation



7.1 The risk of interstitial condensation will be minimal under normal conditions of use. The boards have an intrinsically high vapour resistance and, when installed with tightly-butted joints, and filled sealed gaps and joints provide a continuous convection-free envelope of high vapour resistance. Therefore a suitable vapour permeable roof tile underlay may be laid over the insulation boards without ventilated air space. Where traditional roof tile underlays are used, ventilation to the air space should be considered in accordance with the recommendations of BS 5250 : 2002 or relevant BBA Certificate for the roof tile underlay.

7.2 Where the boards are installed in a roof with an existing horizontal ceiling, a 'warm space' is created and no ventilation is required. Any insulation at ceiling level, however, should be removed.

7.3 Where high humidities may be expected, a vapour control layer should be used unless a condensation risk assessment in accordance with BS 5250 : 2002 shows that it is not necessary. A vapour control layer should also be used where the insulation is fitted only between the rafters.

7.4 Guidance on preventing interstitial condensation from various sources is given in BRE Digest 369 *Interstitial condensation and fabric degradation* and BRE Report 262 *Thermal Insulation : avoiding risks*.

7.5 The risk of interstitial condensation is greatest when the building is drying out after construction. To prevent condensation problems arising, additional ventilation, other than that normally required, may be needed.

## 8 Resistance to moisture

The boards will not be adversely affected by rain showers during installation, nor by wind-driven snow or rain penetrating the tiling in service. Water absorption is low and its influence on the  $\lambda$  value is minimal.

## 9 Maintenance and repair

Damaged boards can be replaced easily prior to the installation of counter battens.

## 10 Durability



The boards will have a life equivalent to that of the roof structure in which they are incorporated.

# Installation

## 11 General

11.1 Installation of Celotex double-R GA2000 and tuff-R Zero GA3000Z (Pitched Roof Insulation) boards must be in accordance with the relevant clauses of BS 5534 : 2003 and the manufacturer's instructions, and can be carried out in all conditions normal to roof work.

11.2 The boards are light to handle but some handling difficulties may be experienced in windy conditions. Once laid the boards will not support the weight of operatives, appropriate care must be taken during installation and tiling.

11.3 The boards can be cut easily but care must be taken to prevent damage particularly to edges. Damaged boards should not be used. Small areas of damaged facer may be repaired with self-adhesive aluminium foil tape.

11.4 It is important to fill/seal gaps and joints in the insulation envelope (see section 2.5).

11.5 Roof tiles or slates are installed in accordance with the relevant clauses of BS 5534 : 2003.

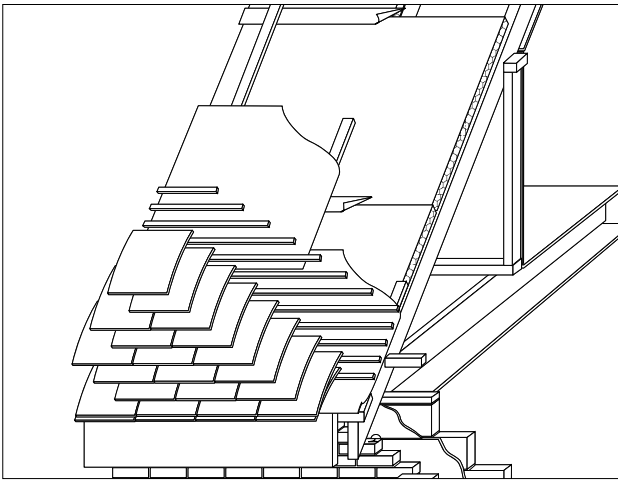
11.6 When applying roof tiles or slates to a warm roof construction, the recommendations of the manufacturer should be followed.

## 12 Procedure

**Over rafters insulation** (see Figure 1)

12.1 A treated timber stop batten, equal in thickness to the insulation board, is fixed at eaves level and the boards butted directly against it.

Figure 1 Over rafters insulation



12.2 The boards should be temporarily fixed onto the rafters using broad-headed clout nails and with joints running up the roof slope occurring over the rafters. Cross-joints may be unsupported.

12.3 All board joints should be tightly butted. At ridges and verges the boards should be cut to achieve a close butt joint.

12.4 Once the boards have been fixed to the rafters, all joints between boards and between boards and stop battens should be sealed using self-adhesive aluminium foil tape.

12.5 Counter battens, underlay and tiling battens should be installed using one of the following alternative methods of fixing:

#### Method 1

12.6 Counter battens (38 mm by 50 mm) should be fixed using Helifix InSkew fixings at maximum centre-to-centre spacing of 400 mm. These fixings should pass through the counter batten and insulation and penetrate the supporting timber by a minimum of 37 mm.

12.7 The roof tile underlay should be installed in the conventional manner. Tiling battens should be nailed through the underlay into the counter batten in accordance with BS 5534 : 2003 at the required batten gauge. Where permeable tile underlays are used they should be installed in accordance with the appropriate Agrément Certificate.

#### Method 2

12.8 Counter battens 12 mm by 50 mm (or 19 mm by 50 mm in Scotland) should be fixed using Helifix InSkew fixings at maximum centre-to-centre spacing of 900 mm. These fixings should pass through the counter batten and the insulation and penetrate the supporting timber by a minimum of 37 mm.

12.9 The roof tile underlay should be installed in the conventional manner and held in place by tiling battens fixed by the Helifix InSkew fixings passing through the tiling batten, roof tile underlay, counter batten and insulation and penetrating the supporting timber by a minimum of 37 mm at the required batten gauge in accordance with BS 5534 : 2003. Where vapour permeable tile underlays are used they should be installed in accordance with the appropriate Agrément Certificate.

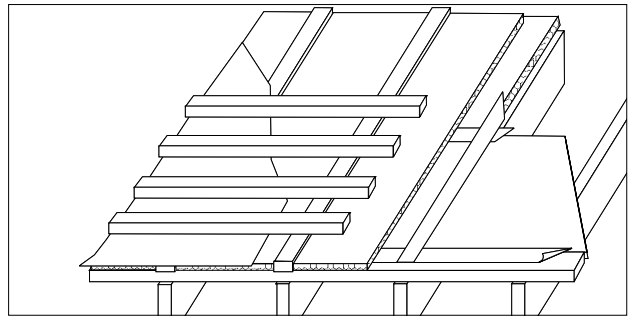
12.10 When the board thickness is not greater than 25 mm, the counter battens (38 mm by 50 mm) may be fixed through the insulation to the supporting timber by means of slab nails (3.35 mm diameter, 100 mm long) at maximum centre-to-centre spacing of 400 mm.

12.11 The roof tile underlay should be installed in the appropriate manner. Tiling battens should be nailed through the underlay into the counter battens in accordance with BS 5534 : 2003 at the required batten gauge. Where vapour permeable tile underlays are used they should be installed in accordance with the appropriate Agrément Certificate.

#### Method 3 (see Figure 2)

12.12 Where additional insulation is required, an additional layer of insulation can be installed between the counter battens, but the counter battens should be at least 12 mm thicker than the insulation boards.

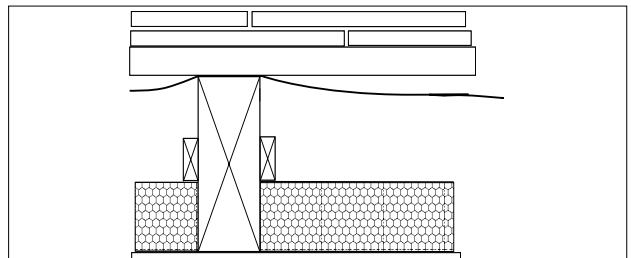
Figure 2 Additional insulation



#### Between rafters insulation

12.13 Boards are cut to fit tightly between the rafters and butt against stop beads or battens which maintain a ventilated air gap at least 50 mm deep (see Figure 3). Where vapour permeable roof tile underlays are used, the insulation may be installed without a ventilated air space (see section 7.1).

Figure 3 Fitted board



12.14 Horizontal joints are butted and taped and a vapour control layer is fitted to the underside of the rafters.

12.15 Where the rafter depth cannot accommodate the required thickness of insulation and maintain the required 50 mm ventilated gap, one of the following options may be considered:

- increase the rafter depth by attaching timber counter battens to the underside of the rafter (see Figure 4), or preferably,
- add a second layer of insulation to the underside of the rafters (see Figure 5).

Figure 4 Increased rafter depth

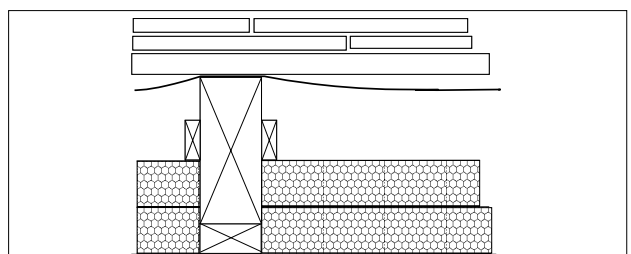
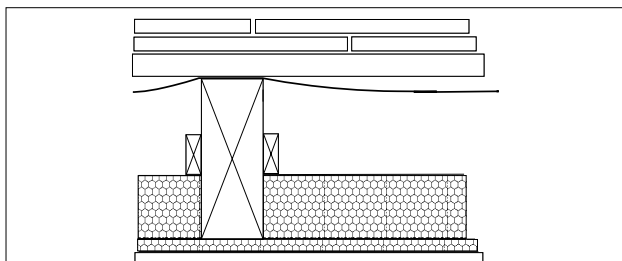


Figure 5 Added insulation



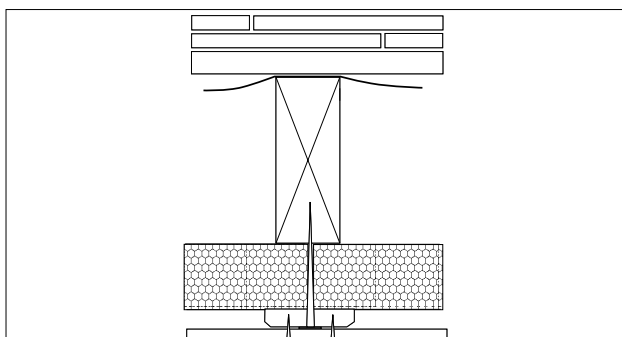
## Under rafters insulation

12.16 Boards may be attached to the underside of rafters either as a single layer or in conjunction with insulation boards between the rafters.

12.17 Boards are temporarily fixed with broad-headed clout nails and joints butted and taped. Appropriate internal lining panels may then be fixed through the insulation and into the underside of the rafters.

12.18 Where the insulation thickness makes securing of the internal lining panels impractical, timber grounds of appropriate depth may be fixed through to the rafters and the panels secured to the grounds (see Figure 6).

Figure 6 Added timber grounds



## Finishing

12.19 Roof tiles or slates are installed in accordance with the relevant clauses of BS 5534:2003.

12.20 Internal lining panels appropriate to the application and required decoration are applied.

## Technical Investigations

The following is a summary of the technical investigations carried out on Celotex double-R GA2000 and tuff-R Zero GA3000Z (Pitched Roof Insulation) boards.

### 13 Tests

Tests were carried out to determine thermal conductivity.

### 14 Investigations

An examination was made of data relating to:

- dimensional accuracy
- density
- compressive strength
- dimensional stability with temperature
- thermal conductivity (fresh and aged)
- closed cell count.

### 15 Other investigations

15.1 The technical content of a similar Certificate (No 95/3093, covering TS2) was examined.

15.2 The hygrothermal properties of typical constructions was assessed.

15.3 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 476-3 : 1958 *Fire tests on building materials and structures — External fire exposure roof test*

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

BS 5268-2 : 2002 *Structural use of timber — Code of practice for permissible stress design, materials and workmanship*

BS 5534 : 2003 *Code of practice for slating and tiling (including shingles)*

BS 6399-2 : 1997 *Loading for buildings — Code of practice for wind loads*

BS 6399-3 : 1988 *Loading for buildings — Code of practice for imposed roof loads*



On behalf of the British Board of Agrément

Date of Second issue: 30th March 2004

  
Chief Executive

\*Original Detail Sheet issued on 31st March 1996. This amended version includes change of product name and addition to product range, and reference to revised national Building Regulations and British Standards.

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