

## Ballytherm Ltd

Annagh Industrial Park  
Ballyconnell  
Co Cavan  
Ireland

Tel: 00 353 49 9527000 Fax: 00 353 49 9527002  
e-mail: info@ballytherm.ie  
website: www.ballytherm.ie



Agrément Certificate  
**07/4427**  
Product Sheet 3

## BALLYTHERM INSULATION

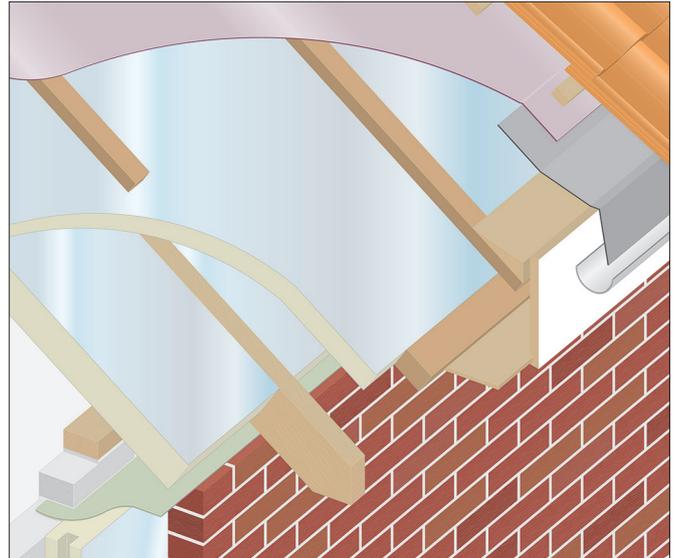
### BALLYTHERM BTR PITCHED ROOF INSULATION

This Agrément Certificate Product Sheet<sup>(1)</sup> relates to Ballytherm BTR Pitched Roof Insulation, comprising foil-faced rigid polyisocyanurate (PIR) foam boards, for use as pitched roof insulation above, between and/or below rafters, in tiled or slated pitched roofs in new and existing dwellings or similar buildings.

(1) Hereinafter referred to as 'Certificate'.

#### CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.



#### KEY FACTORS ASSESSED

**Thermal performance** — the product has a declared thermal conductivity ( $\lambda_D$ )\* of 0.022 W·m<sup>-1</sup>·K<sup>-1</sup> (see section 6).

**Condensation** — the product can contribute to limiting the risk of condensation (see section 7).

**Behaviour in relation to fire** — the product has a reaction to fire classification of Class F\* to BS EN 13501-1 : 2007 (see section 8).

**Resistance to moisture** — the product will not be adversely affected by rain showers during installation, nor by wind-driven snow or rain penetrating the tiling in service (see section 11).

**Durability** — the product will have a life equivalent to that of the roof structure in which it is incorporated (see section 13).

The BBA has awarded this Agrément Certificate to the company named above for the product described herein. This product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

A handwritten signature in black ink, appearing to read 'John Albon'.

John Albon — Head of Approvals  
Construction Products

A handwritten signature in black ink, appearing to read 'Claire Curtis-Thomas'.

Claire Curtis-Thomas  
Chief Executive

Date of First issue: 24 February 2015

Originally certified on 27 March 2007

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

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

British Board of Agrément  
Bucknalls Lane  
Watford  
Herts WD25 9BA

tel: 01923 665300  
fax: 01923 665301  
clientservices@bba.star.co.uk  
[www.bbacerts.co.uk](http://www.bbacerts.co.uk)

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# Regulations

In the opinion of the BBA, Ballytherm BTR Pitched Roof Insulation, if installed, used and maintained in accordance with this Certificate, can contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



## The Building Regulations 2010 (England and Wales) (as amended)

Requirement:	C2(c)	Resistance to moisture
Comment:		The product can contribute to satisfying this Requirement. See sections 7.1 and 7.5 of this Certificate.
Requirement:	L1(a)(i)	Conservation of fuel and power
Comment:		The product can contribute to satisfying this Requirement. See section 6 of this Certificate.
Regulation:	7	Materials and workmanship
Comment:		The product is acceptable. See section 13 and the <i>Installation</i> part of this Certificate.
Regulation:	26	CO <sub>2</sub> emission rates for new buildings
Regulation:	26A	Fabric energy efficiency rates for new dwellings (applicable to England only)
Regulation:	26A	Primary energy consumption rates for new buildings (applicable to Wales only)
Regulation:	26B	Fabric performance values for new dwellings (applicable to Wales only)
Comment:		The product can contribute to satisfying these Regulations. See section 6 of this Certificate.



## The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)	Durability, workmanship and fitness of materials
Comment:		The product is acceptable. See section 13 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	3.15	Condensation
Comment:		The product can contribute to satisfying this Standard, with reference to clauses 3.15.1 <sup>(1)(2)</sup> , 3.15.4 <sup>(1)</sup> and 3.15.7 <sup>(1)(2)</sup> . See sections 7.1 and 7.6 of this Certificate.
Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		The product can contribute to satisfying these Standards, with reference to clauses, or parts of clauses 6.1.1 <sup>(1)</sup> , 6.1.6 <sup>(1)</sup> , 6.2.1 <sup>(1)(2)</sup> , 6.2.3 <sup>(1)</sup> , 6.2.4 <sup>(1)(2)</sup> , 6.2.5 <sup>(2)</sup> , 6.2.6 <sup>(1)(2)</sup> , 6.2.7 <sup>(1)</sup> , 6.2.8 <sup>(2)</sup> , 6.2.9 <sup>(1)(2)</sup> , 6.2.10 <sup>(1)</sup> , 6.2.11 <sup>(1)(2)</sup> , 6.2.12 <sup>(2)</sup> and 6.2.13 <sup>(1)(2)</sup> . See section 6 of this Certificate.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The product can contribute to satisfying the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard. In addition, the product can contribute to a construction meeting a higher level of sustainability as defined in this Standard, with reference to clauses 7.1.4 <sup>(1)(2)</sup> [Aspects 1 <sup>(1)(2)</sup> and 2 <sup>(1)</sup> ], 7.1.6 <sup>(1)(2)</sup> [Aspects 1 <sup>(1)(2)</sup> and 2 <sup>(1)</sup> ] and 7.1.7 <sup>(1)(2)</sup> [Aspect 1 <sup>(1)(2)</sup> ]. See section 6 of this Certificate.
Regulation:	12	Building standards applicable to conversions
Comment:		Comments made in relation to this product under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 <sup>(1)</sup> and Schedule 6 <sup>(1)</sup> . (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



## The Building Regulations (Northern Ireland) 2012

Regulation:	23	Fitness of materials and workmanship
Comment:		The product is acceptable. See section 13 and the <i>Installation</i> part of this Certificate.
Regulation:	29	Condensation
Comment:		The product can contribute to satisfying this Regulation. See section 7.1 of this Certificate.
Regulation:	39(a)(i)	Conservation measures
Regulation:	40(2)	Target carbon dioxide emission rate
Comment:		The product can contribute to satisfying these Regulations. See section 6 of this Certificate.

## Construction (Design and Management) Regulations 2007

## Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See sections: 3 *Delivery and site handling* (3.4) and 14 *General* (14.2) of this Certificate.

# Additional Information

## NHBC Standards 2014

NHBC accepts the use of Ballytherm BTR Pitched Roof Insulation, when installed and used in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 7.2 *Pitched roofs*.

## CE marking

The Certificate holder has taken the responsibility of CE marking the product in accordance with harmonised European Standard BS EN 13165 : 2012. An asterisk (\*) appearing in this Certificate indicates that data shown is given in the manufacturer's Declaration of Performance.

# Technical Specification

## 1 Description

Ballytherm BTR Pitched Roof Insulation comprises a foil-faced rigid polyisocyanurate (PIR) board with the nominal characteristics given in Table 1.

Table 1 Nominal characteristics

Length (mm)	2400
Width (mm)	1200
Thickness <sup>(1)</sup> (mm)	20 to 200
Nominal density (kg·m <sup>-3</sup> )	30 to 40
Edge detail	Plain square edge
Minimum compressive stress at 10% deformation (kPa)*	140

(1) Other thicknesses available subject to quantity.

## 2 Manufacture

2.1 Ballytherm BTR Pitched Roof Insulation is manufactured by blending together polyol and MDI in a continuous foaming process aided by a blowing agent, and sandwiched between two aluminium foil-facings. After formation, the boards are left to cure and cut to size.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the Certificate holder/manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

2.3 The management system of Ballytherm Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 and/or BS EN ISO 14001 : 2004 by EQA (Ireland) Ltd Certificates Q3874 and E3874.

## 3 Delivery and site handling

3.1 The product is delivered to site in polythene-wrapped packs. Each pack of boards contains a label bearing the manufacturer's name, board dimensions and the BBA logo incorporating the number of this Certificate.

3.2 The product must be protected from prolonged exposure to sunlight and should be stored dry, flat and raised above ground level (to avoid contact with ground moisture). Where possible, packs should be stored inside. If stored outside, they should be under cover, or protected with opaque polythene sheeting.

3.3 The product is light and easy to handle and care should be exercised to avoid crushing the edges or corners. If damaged the product should be discarded.

3.4 The product must not be exposed to open flame or other ignition sources.

# Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Ballytherm BTR Pitched Roof Insulation.

## 4 Use

4.1 Ballytherm BTR Pitched Roof Insulation is suitable for use as insulation within new or existing pitched roofs, for use above, between and/or below rafters in conjunction with internal lining board, roof tile underlay, timber counter battens and tiling battens in tiled or slated, pitched roofs of dwellings or similar buildings.

4.2 Roofs should be designed and constructed in accordance with the relevant clauses of BS 5250 : 2011, BS 5534 : 2014, BS 8212 : 1995 and BS EN 1995-1-1 : 2004.

4.3 The product is for use in constructions where the ceiling follows the pitch of the roof and encloses a habitable space. For optimum thermal performance, boards with printed foil-facings shall be installed with the correct orientation. See section 14.3.

4.4 The product is not a structural component.

4.5 During installation, care should be exercised to ensure that the product is not subjected to any construction, or foot traffic loads. Roof timbers of adequate strength should be used to support such loads.

4.6 It is essential that detailing and jointing of the boards achieves a convection-free envelope of high vapour resistance. 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.

4.7 The requirements/provisions of fire stops should be considered with regard to national Building Regulations.

## 5 Practicability of installation

The product is designed to be installed by a competent general builder, or a contractor, experienced with this type of product.

## 6 Thermal performance

 6.1 Calculations of the thermal transmittance (U value) of specific roof constructions should be carried out in accordance with BS EN ISO 6946 : 2007 and BRE Report BR 443 : 2006, using the declared thermal conductivity ( $\lambda_D$ )\* value of  $0.022 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$  for the PIR insulation core, and aged emissivity ( $\epsilon_D$ ) of 0.05 (to BS 15976 : 2011) of the outer foil-facings.

6.2 The U value of a completed roof will depend on the insulation thickness, and number and type of fixings, the roof structure and its internal finish. Calculated U values for example constructions in accordance with the national Building Regulations are given in Table 2.

Table 2 Roof U values — pitched roof

Target U value ( $\text{W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ )	Insulation Thickness (mm)		
	Over Rafters	Between Rafters	Between and Under Rafters
0.13	150	–	100 + 90
0.15	120	–	100 + 65
0.16	120	–	100 + 60
0.18	100	–	100 + 50
0.20	90	–	100 + 35
0.25	65	130 <sup>*(1)</sup>	80 + 25

(1) With additional 38 mm timber battens added beneath 150 mm rafters to maintain 50 mm vented cavity (138 mm maximum depth of insulation between rafters).

## Junctions

6.3 Care must be taken in the overall design and construction of junctions with other elements and openings to minimise thermal bridges and air infiltration. Detailed guidance can be found in the documents supporting the national Building Regulations.

## 7 Condensation

### Interstitial condensation

 7.1 Roofs will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2011 Annex H and the relevant guidance.

7.2 The risk of interstitial condensation will be minimal under normal conditions of use. The foil-facings have a water vapour resistance exceeding  $140 \text{ MN}\cdot\text{s}\cdot\text{g}^{-1}$  and the insulation core has a water vapour resistivity exceeding  $50 \text{ MN}\cdot\text{s}\cdot\text{g}^{-1}\cdot\text{m}^{-1}$  and, therefore, when installed with tightly-butted joints, filled/sealed gaps and joints, will 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. When using a high resistance (type HR) underlay, the space below it must be ventilated in accordance with BS 5250 : 2011 Annex H.

7.3 Where the product is installed in a roof with either a horizontal or sloping ceiling (ie room-in-the-roof), a 'warm roof' space is created and ventilation is not required. However, any insulation in a horizontal ceiling should be removed.

7.4 Where high humidity may be expected, a vapour control layer (VCL) such as 0.125 mm thickness polythene with sealed and lapped joints, should also be used unless a condensation risk analysis in accordance with BS 5250 : 2011 shows that it is not necessary.

### Surface condensation



7.5 Roofs will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed  $0.35 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$  at any point and the junctions with walls are designed in accordance with section 6.3 of this Certificate.



7.6 Roofs will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed  $1.2 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$  at any point. Guidance may be obtained from BS 5250 : 2011 Annex H. Further guidance may be obtained from BRE Report BR 262 : 2002 and section 6.3 of this Certificate.

## 8 Behaviour in relation to fire

8.1 The product has a reaction to fire classification of Class E\* to BS EN 13501-1 : 2007.

8.2 When installed between, under or over rafters, with an internal lining board securely fixed to timber, eg 12.5 mm thick plasterboard, the product will be contained between the element and internal lining board until one is destroyed. Therefore, the product will not contribute to the development stages of a fire until the lining is compromised.

8.3 Elements must incorporate cavity barriers at edges, around openings, at junctions with fire resisting elements and in cavities in accordance with the relevant provisions of the national Building Regulations and relevant purpose group. The design and installation of cavity barriers must take into account any anticipated differential movement.

8.4 The use of the product will not affect the fire rating obtained by tiled or slated roofs when evaluated by assessment or test to BS 476-3 : 2004 or BS EN 13501-5 : 2005.

## 9 Strength

The product, when installed in accordance with the manufacturer's instructions and this Certificate, will resist the loads likely to be met during installation and in service.

## 10 Structural stability (over rafter application only)

10.1 Resistance to wind uplift will depend largely on the building geometry and its geographical location and should be calculated in accordance with BS EN 1991-1-3 : 2003 and its UK National Annex. Snow loadings should be calculated in accordance with BS EN 1991-1-3 : 2003 and its UK National Annex.

10.2 When calculating the fixing spacing required to resist the calculated loadings, the requirements of BS EN 1995-1-1 : 2004 and its National Annex, should be followed where possible. Further guidance can be obtained from the Certificate holder. The Certificate holder and fixing manufacture must advise on the use of the correct proprietary fixings and approved nails and fixing capacity in accordance with BS EN 1995-1-1 : 2004 and its UK National Annex.

## 11 Resistance to moisture

An effective roof tile underlay will protect the product from wind-driven snow or rain penetrating the tiling in service.

## 12 Maintenance

As the product is confined within the pitched roof by the overlay and has suitable durability (see section 13), maintenance is not required.

## 13 Durability



The product is durable, rot-proof and sufficiently stable, and will remain effective as an insulating material for the life of the roof structure in which it is incorporated.

## Installation

### 14 General

14.1 Installation of Ballytherm BTR Pitched Roof Insulation must be in accordance with the relevant Clauses of BS 5534 : 2014, and the manufacturer's instructions. Installation can be carried out in all conditions normal to roofing work.

14.2 The product is light to handle but some handling difficulties may be experienced in windy conditions. Since the product will not support the weight of operatives, appropriate care must be taken during installation and tiling.

14.3 The product has printed logos applied to the outer foil-facing on one side only. To ensure optimum thermal performance these boards must be installed with the unprinted foil face always facing the cavity side.

14.4 The product can be cut easily using a sharp knife or fine tooth saw. Care must be taken to prevent damage particularly to edges. Damaged boards should not be used. Small areas of damaged facing may be repaired with self-adhesive aluminium foil tape.

14.5 It is important to fill/seal gaps and joints in the insulation envelope including at all service penetrations.

14.6 For installation of internal lining boards see section 15.7 of this Certificate.

## 15 Procedure

### Over-rafter insulation

15.1 A treated timber stop batten, the same thickness as the insulation board, is fixed to the rafters close to the eaves to provide a firm fixing point for the counter battens. The product is laid over the rafters commencing at the stop batten. The product should be tightly butted and positioned in a staggered pattern with all the joints running from eaves to ridge occurring over the rafters. The procedure is continued until the whole area is covered.

15.2 Any gaps must be sealed with flexible sealant or expanded foam. Large-headed clout nails can be used as a temporary securing measure until the counter battens are secured into place. All joints between boards and stop battens should be sealed using self-adhesive aluminium foil-tape.

15.3 Counter battens, underlay and tiling battens should be installed.

### Insulation between rafters

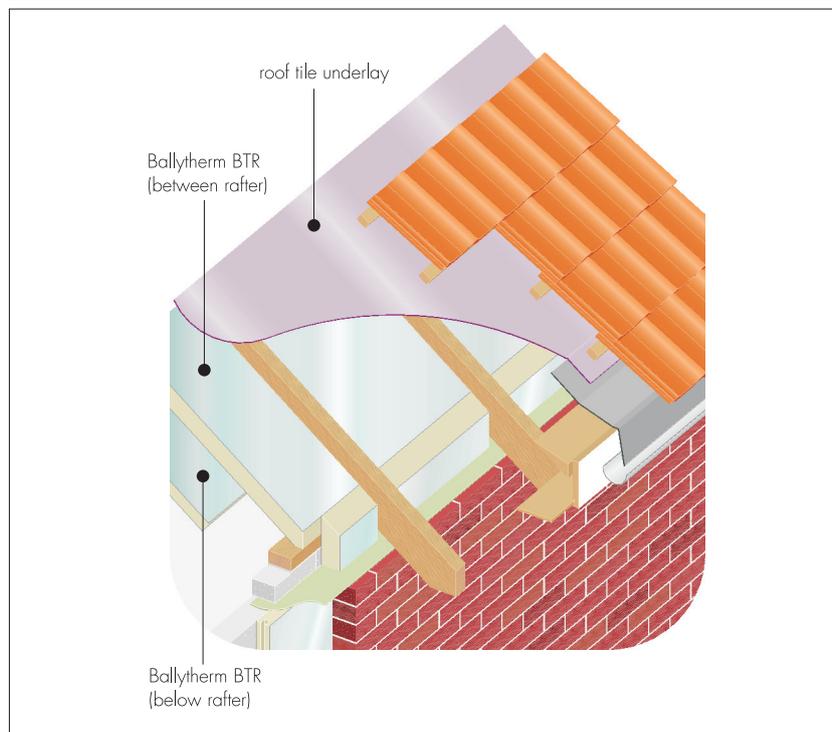
15.4 Following completion of the roof cladding, the product is cut to size and placed between the rafters. Timber battens or clips are fixed to the inner face of the rafters allowing sufficient depth for the insulation to sit flush with the underside of the rafters. A ventilation gap of 50 mm must be maintained between the product and roof tile underlay to minimise the risk of condensation, unless a vapour permeable underlay is used.

### Insulation between and under rafters

15.5 If required, after installation between rafters as described in section 15.4, a second layer of the product may be added below the rafters, running transverse to the first, to provide a staggered layer, and secured accordingly.

15.6 The product should be butted tightly against each other to prevent gaps. Taping the joints with a self-adhesive aluminium foil tape provides an effective air permeability barrier. To achieve an adequate bond, the product should be clean and free from any contamination.

Figure 1 Ballytherm BTR Pitched Roof Insulation



## Finishing

15.7 Roof tiles or slates are installed in accordance with the relevant Clauses of BS 5534 : 2014. When applying roof tiles or slates to a warm roof construction, the recommendations of the manufacturer should be followed.

15.8 A sealed polythene VCL with a minimum thickness of 0.125 mm with lapped and sealed joints is placed over the rafter face before applying the internal finishing plasterboard lining to BS EN 520 : 2004, fixed in accordance with BS 8212 : 1995.

## Technical Investigations

### 16 Tests

Tests were carried out on Ballytherm BTR Pitched Roof Insulation to determine:

- dimensional stability at specified temperature and humidity conditions
- flatness after one-sided wetting
- thermal conductivity
- deformation under elevated temperature and specified compressive load
- long term water absorption by total immersion
- 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:

- dimensions
- squareness
- thermal conductivity
- water vapour resistance
- density
- diffusion tight property of facings.

17.3 An assessment of the risk of interstitial condensation was made.

## Bibliography

BS 476-3 : 2004 *Fire tests on building materials and structures — Classification and method of test for external fire exposure to roofs*

BS 5250 : 2011 *Code of practice for control of condensation in buildings*

BS 5534 : 2014 *Slating and tiling for pitched roofs and vertical cladding — Code of practice*

BS 8212 : 1995 *Code of practice for dry lining and partitioning using gypsum plasterboard*

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

BS 15976 : 2011 *Flexible sheets for waterproofing — Determination of emissivity*

BS EN 1991-1-3 : 2003 *Eurocode 1 : Actions on structures — General actions — Snow loads*

NA to BS EN 1991-1-3 : 2003 *UK National Annex to Eurocode 1 : Actions on structures — General actions — Snow loads*

BS EN 1995-1-1 : 2004 *Eurocode 5 : Design of timber structures — General — Common rules and rules for buildings*

BS EN 13165 : 2012 *Thermal insulation products for buildings — Factory made rigid polyurethane foam (PU) products — Specification*

BS EN 13501-1 : 2007 *Fire classification of construction products and building elements — Classification using test data from reaction to fire tests*

BS EN 13501-5 : 2005 *Fire classification of construction products and building elements — Classification using data from external fire exposure to roof tests*

BS EN ISO 6946 : 2007 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*

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

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

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

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

## 18 Conditions

18.1 This Certificate:

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

18.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

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

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

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

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

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

18.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.