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Agrément Certificate

04/4130

Product Sheet 3

XTRATHERM THIN-R INSULATION (XT)

XTRATHERM THIN-R PITCHED ROOF BOARD (XT/PR)

This Agrément Certificate Product Sheet⁽¹⁾ relates to Xtratherm Thin-R Pitched Roof Board (XT/PR), comprising a rigid polyisocyanurate (PIR) foam board with foil-facings, for use as thermal insulation installed above, between and/or below rafters, in tiled or slated timber pitched roofs, horizontal ceilings, dwarf walls and dormer cheeks of new and existing domestic and non-domestic buildings, with height restrictions in some cases.

(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 (λ_D) of $0.022 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ (see section 6).

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

Behaviour in relation to fire — the Certificate holder has not declared a reaction to fire classification in accordance with BS EN 13501-1 : 2018 and hence the use of the product is restricted in some cases (see section 9).

Durability — the product is durable, rot proof and sufficiently stable to remain effective as an insulation for the life of the building (see section 11).

The BBA has awarded this 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

Date of Second issue: 14 October 2020

Originally certificated on 30 September 2013

Hardy Giesler
Chief Executive Officer

The BBA is a UKAS accredited certification body – Number 113.

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

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

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Regulations

In the opinion of the BBA, Xtratherm Thin-R Pitched Roof Board (XT/PR), if installed, used and maintained in accordance with this Certificate, can satisfy or 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: Comment:	B3(3)	Internal fire spread (structure) The product is restricted by this Requirement. See section 9.3 of this Certificate.
Requirement: Comment:	B4(1)	External fire spread When used in dormer cheeks, the product is restricted by this Requirement. See sections 9.1 and 9.2 of this Certificate.
Requirement: Comment:	C2(c)	Resistance to moisture The product can contribute to satisfying this Requirement. See sections 7.1 and 7.6 of this Certificate.
Requirement: Comment:	L1(a)(i)	Conservation of fuel and power The product can contribute to satisfying this Requirement. See sections 6.1 and 6.2 of this Certificate.
Requirement: Comment:	7(1)	Materials and workmanship The product is acceptable. See section 11 and the <i>Installation</i> part of this Certificate.
Requirement: Comment:	7(2)	Materials and workmanship The product is restricted in some cases by this Requirement. See sections 9.1 and 9.2 of this Certificate.
Regulation:	26	CO₂ 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 but compensatory fabric/service measures may be required in some cases. See sections 6.1 and 6.2 of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation: Comment:	8(1)	Durability, workmanship and fitness of materials The product is acceptable. See section 11 and the <i>Installation</i> part of this Certificate.
Regulation: Standard: Comment:	9 2.1	Building standards applicable to construction Compartmentation The product is restricted by this Standard with reference to clauses 2.1.15 ⁽²⁾ and 2.1.16 ⁽²⁾ . See section 9.3 of this Certificate.
Standard: Comment:	2.2	Separation The product is restricted by this Standard with reference to clause 2.2.10 ⁽¹⁾ . See section 9.3 of this Certificate
Standard: Comment:	2.6	Spread to neighbouring buildings When used in dormer cheeks, the product is restricted by this Standard with reference to clauses 2.6.5 ⁽¹⁾ and 2.6.6 ⁽²⁾ . See sections 9.1 and 9.2 of this Certificate.

Standard:	3.15	Condensation
Comment:		The product can contribute to satisfying this Standard, with reference to clauses 3.15.1 ⁽¹⁾⁽²⁾ , 3.15.3 ⁽¹⁾⁽²⁾ , 3.15.4 ⁽¹⁾⁽²⁾ , 3.15.5 ⁽¹⁾⁽²⁾ and 3.15.7 ⁽¹⁾⁽²⁾ . See sections 7.1 and 7.7 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 6.1.1 ⁽¹⁾ , 6.1.2 ⁽²⁾ , 6.1.6 ⁽¹⁾ , 6.2.1 ⁽¹⁾⁽²⁾ , 6.2.3 ⁽¹⁾ , 6.2.4 ⁽²⁾ , 6.2.5 ⁽²⁾ , 6.2.6 ⁽¹⁾ , 6.2.7 ⁽¹⁾ , 6.2.8 ⁽²⁾ , 6.2.9 ⁽¹⁾⁽²⁾ , 6.2.10 ⁽¹⁾ , 6.2.11 ⁽¹⁾⁽²⁾ , 6.2.12 ⁽²⁾ and 6.2.13 ⁽¹⁾⁽²⁾ . See sections 6.1 and 6.2 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 ⁽¹⁾⁽²⁾ [Aspects 1 ⁽¹⁾⁽²⁾ and 2 ⁽¹⁾], 7.1.6 ⁽¹⁾⁽²⁾ [Aspects 1 ⁽¹⁾⁽²⁾ and 2 ⁽¹⁾] and 7.1.7 ⁽¹⁾⁽²⁾ [Aspect 1 ⁽¹⁾⁽²⁾]. See section 6.1 of this Certificate.
Regulation:	12	Building standards applicable to conversions
Comment:		All comments given for the product under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ .

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation:	23(a)(b)	Fitness of materials and workmanship
Comment:		The product is acceptable. See section 11 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:	35(b)	Internal fire spread - structure
Comment:		The product is restricted by this Regulation. See section 9.3 of this Certificate.
Regulation:	36(a)	External fire spread
Comment:		When used in dormer cheeks, the product is restricted by this Regulation. See sections 9.1 and 9.2 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 sections 6.1 and 6.2 of this Certificate.

Construction (Design and Management) Regulations 2015

Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See sections: 3 *Delivery and site handling* (3.4) and 12 *General* (12.2 and 12.3) of this Certificate.

Additional Information

NHBC Standards 2020

In the opinion of the BBA, Xtratherm Thin-R Pitched Roof Board (XT/PR), if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements 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.

Technical Specification

1 Description

1.1 Xtratherm Thin-R Pitched Roof Board (XT/PR) comprises a rigid polyisocyanurate (PIR) foam board with composite foil-facings on both sides. The boards have the nominal characteristics shown in Table 1.

Table 1 Nominal characteristics

Length (mm)	2400
Width (mm)	1200
Thickness (mm)	25 to 165 (in 5 mm increments)
Minimum compressive strength at 10% compression (kPa)	150
Edge profile	Square, tongue-and-groove, rebated

1.2 Ancillary items for use with this product but outside the scope of this Certificate:

- roof tile underlay
- spiral fixings
- galvanized slab nails, ring shank nails and clout nails
- pre-treated counter battens and tiling laths
- roofing slates or tiles
- vapour control layer (VCL) and plasterboard.
- adhesive foil tape.

2 Manufacture

2.1 Raw materials are injected onto the lower foil-facer on a conveyor belt. The exothermic reaction expands the foam, which then contacts the upper foil-facer. An automated process cures the product and cuts it to the required size.

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

- agreed with the 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 Xtratherm Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 and BS EN ISO 14001 : 2015 by the Loss Prevention Certification Board (Certificates 851 and 851-EMS respectively).

3 Delivery and site handling

3.1 The product is delivered to site in polythene-wrapped packs. Each pack of boards contains a label with 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 either under cover or protected with opaque polythene sheeting. Where possible, packs should be stored inside. If outside, the product should be stacked flat, and raised above ground level away from contact with ground moisture.

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, or to solvents or other chemicals.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Xtratherm Thin-R Pitched Roof Board (XT/PR).

Design Considerations

4 General

4.1 Xtratherm Thin-R Pitched Roof Board (XT/PR) is suitable for use as thermal insulation within tiled or slated pitched roofs with a pitch of up to 70°, and dormer cheeks, in new and existing domestic and non-domestic buildings, and may be installed:

- above and between sloping rafters
- between and below sloping rafters
- below horizontal ceilings joists
- between and/or to the inner face of studs in dwarf walls and dormer cheeks.

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 and its UK National Annex.

4.3 Vapour permeable roof tile underlays used in conjunction with the product must have a current BBA Certificate and must be used in accordance with, and within the limitations of, that Certificate.

4.4 The product is 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.

4.5 It is essential that detailing and jointing of the boards achieves a convection-free envelope (see section 7.3). 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.

4.6 A ventilated air space of minimum 50 mm may be required between the underside of the roof tile underlay and the upper face of the product, depending on the specification of the roof tile underlay used (see section 7.2).

4.7 The product is not a structural component. During installation, care should be taken to ensure that the product is not subjected to any construction or traffic loads. Roof timbers of adequate strength should be used to support such loads.

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 external roof constructions should be carried out in accordance with BS EN ISO 6946 : 2017 and BRE Report BR 443 : 2006, using the declared thermal conductivity (λ_D) of 0.022 $W \cdot m^{-1} \cdot K^{-1}$ for the insulation, and a design emissivity (ϵ) of 0.2 for the printed foil-facing.

6.2 The U value of a completed roof will depend on the insulation thickness, number and type of fixings, and the roof structure and its internal finish. Calculated U values for example constructions in accordance with the national Building Regulations are given in Tables 2 to 4.

Table 2 Example U values — pitched roof⁽¹⁾

U value ($W \cdot m^{-2} \cdot K^{-1}$)	Insulation thickness (mm) ⁽²⁾			
	Over rafters ⁽³⁾⁽⁴⁾	Between and over rafters	Between rafters ⁽⁵⁾	Between and under rafters ⁽³⁾
0.13	150	80 + 90	—	100 + 85
0.15	125	70 + 75	—	100 + 65
0.16	120	65 + 70	—	100 + 60
0.18	105	60 + 60	—	100 + 45
0.20	90	50 + 55	—	100 + 35
0.25	70	40 + 40	130	80 + 25

(1) Plasterboard taken as 12.5 mm at 0.25 $W \cdot m^{-1} \cdot K^{-1}$.

(2) Nearest available thickness.

(3) Based on a ventilated pitched roof with 50 x 150 mm deep timber rafters at 400 mm centres = 12.5%. $\lambda = 0.13 W \cdot m^{-1} \cdot K^{-1}$.

(4) Helical fixings for the insulation over the rafter of 6.7 per m^2 , consisting of stainless steel $\lambda = 17 W \cdot m^{-1} \cdot K^{-1}$, with a cross-sectional area of 7.45 mm^2 .

(5) Based on a ventilated pitched roof with 50 x 200 mm deep timber rafters at 400 mm centres = 12.5%. $\lambda = 0.13 W \cdot m^{-1} \cdot K^{-1}$.

Table 3 Example U values — horizontal ceiling

U value ($W \cdot m^{-2} \cdot K^{-1}$)	Insulation thickness (mm)
0.13	110
0.15	90
0.16	80
0.18	65
0.20	55
0.25	35

Notes:

- Plasterboard taken as 12.5 mm at 0.25 $W \cdot m^{-1} \cdot K^{-1}$
- Xtratherm Thin-R XT/PR board at 0.022 $W \cdot m^{-1} \cdot K^{-1}$
- Mineral wool at 100 mm taken at 0.040 $W \cdot m^{-1} \cdot K^{-1}$ (bridged at 11.75% timber)
- Loft space.

Table 4 Example U values — dormer cheek

U value ($W \cdot m^{-2} \cdot K^{-1}$)	Insulation thickness (mm)
0.18	—
0.19	—
0.25	—
0.26	—
0.27	—
0.28	—
0.30	—
0.35	80

Notes:

- Plasterboard taken as 12.5 mm at 0.25 $W \cdot m^{-1} \cdot K^{-1}$
- Low emissivity airspace at 9 mm (bridged at 15% with timber frame)
- Xtratherm Thin-R XT/PR board at 0.022 $W \cdot m^{-1} \cdot K^{-1}$ (bridged at 15% with timber frame)
- OSB board taken as 11 mm at 0.13 $W \cdot m^{-1} \cdot K^{-1}$
- Cavity at 25 mm.

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 risk

Interstitial condensation



7.1 Roofs and walls will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2011, Annexes D, G and H, for roofs in England and Wales, BRE Report BR 262 : 2002, and the relevant guidance.

7.2 The foil-facings have a water vapour resistance of $7000 \text{ MN}\cdot\text{s}\cdot\text{g}^{-1}$, and the insulation core has a water vapour resistivity of $300 \text{ MN}\cdot\text{s}\cdot\text{g}^{-1}\cdot\text{m}^{-1}$.

7.3 The product, when installed on the internal surface of rafters, joists or studs, has an intrinsically high vapour resistance and, when installed in a continuous layer with tightly butted joints and durably taped filled/sealed gaps and joints, will provide a convection-free envelope of high vapour resistance. Therefore, a suitable vapour-permeable roof tile underlay may be laid over the insulation boards without a 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.

7.4 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 should be designed in accordance with BS 5250 : 2011 Annex H. Any insulation in a horizontal ceiling (ie room-in-the-roof floor) should be removed.

7.5 A vapour control layer (VCL) such as 0.125 mm thickness polyethylene with sealed and lapped joints, should also be used unless a construction-specific condensation risk analysis in accordance with BS 5250 : 2011 indicates otherwise.

Surface condensation



7.6 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.



7.7 In Scotland, 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 Strength and stability (over rafter application)

8.1 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. During installation, care should be taken 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.

8.2 Resistance to wind uplift will depend largely on the building's geometry and its geographical location and should be calculated in accordance with BS EN 1991-1-4 : 2005 and its UK National Annex. Snow loadings should be calculated in accordance with BS EN 1991-1-3 : 2003 and its UK National Annex.

8.3 The Certificate holder and fixing manufacturer must advise on the use of the correct proprietary fixings and fixing capacity. When considering this and calculating the fixing spacing required to resist the calculated loadings, the requirements of BS EN 1995-1-1 : 2004 and its UK National Annex should be followed.

9 Behaviour in relation to fire



9.1 The Certificate holder has not declared a reaction to fire classification in accordance with BS EN 13501-1 : 2018.

9.2 The product should not be used on dormer cheeks on buildings with a floor more than 18 m above the ground.

9.3 The product must not be carried over junctions between roofs and walls that are required to provide a minimum period of fire resistance. The continuity of fire resistance must be maintained, as described in the documents supporting the relevant national Building Regulations.

9.4 Elements must incorporate cavity barriers at edges, around openings, at junctions with fire-resisting elements and in cavities, in accordance with the provisions of the national Building Regulations.

9.5 The product must not be carried over junctions between roofs required to provide a minimum period of fire resistance. The continuity of fire resistance must be maintained, as described in the national Building Regulations.

10 Maintenance

As the product is placed in a roof or confined within the dwarf wall cavity and has suitable durability (see section 11), maintenance is not required.

11 Durability



The product is unaffected by the normal conditions in a wall, and is durable, rot proof, water resistant and sufficiently stable to remain effective as insulation for the life of the building in which it is incorporated.

Installation

12 General

12.1 Xtratherm Thin-R Pitched Roof Board (XT/PR) must be installed in accordance with this Certificate, the relevant clauses of BS 5534 : 2014 and the Certificate holder's instructions. Installation can be carried out in all conditions normal to roofing work.

12.2 The product is light to handle but some handling difficulties may be experienced in windy conditions.

12.3 Since the product will not support the weight of operatives, appropriate care must be taken during installation and tiling.

12.4 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.

12.5 It is important to ensure a tight fit between boards, between boards and rafters, and between boards and other detailed elements. At ridges and verges, boards should be cut to achieve tightly butted joints.

12.6 It is important to fill/seal gaps and joints in the insulation envelope, including all service penetrations (see section 4.5 of this Certificate).

12.7 For installation of roof tiles or slates, see section 13.22 of this Certificate.

13 Procedure

Over rafters

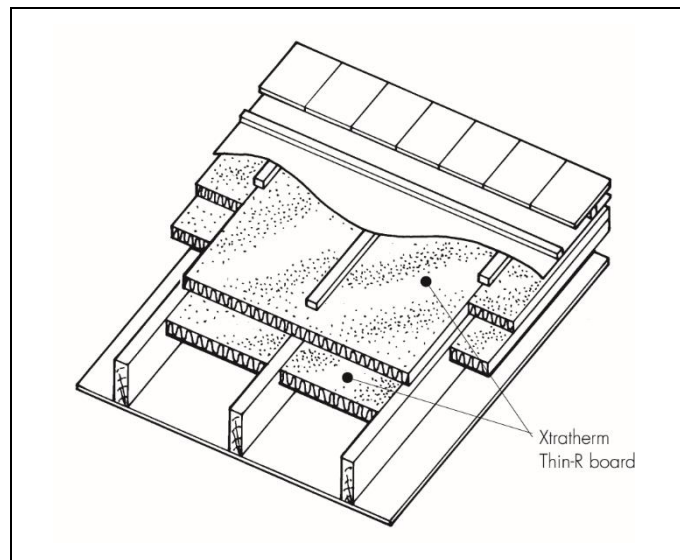
13.1 A treated timber stop rail, the same thickness as the product, is fixed to the rafters close to the eaves to provide a firm fixing point for the counter battens. The product is laid over the rafters commencing at the stop rail. The product should be tightly butted and positioned in a staggered pattern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

13.2 Any gaps must be sealed with flexible sealant or expanding foam. Large-headed clout nails can be used as a temporary securing measure until the counter battens are secured into place.

Between and over rafters

13.3 The product is cut to size and placed between the rafters on timber batten carriers or sarking clips, which are fixed with nails. The upper face of the product must be kept flush with the top of the rafter. The second layer is placed over the rafters as described in sections 13.1 and 13.2.

Figure 1 Typical installation



Between rafters

13.4 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.

13.5 A sealed polythene VCL with a minimum thickness 125 µm with lapped and sealed joints is placed over the rafter face before applying the internal finish.

Between and below rafters

13.6 If required, after installation as described in section 13.4, 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.

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

13.8 The insulation is sealed at all service penetrations.

Horizontal ceiling above a room in the roof — below joists only

13.9 Mineral wool is packed between the ceiling joists, flush with the upper surface of the ceiling joist.

13.10 The product is temporarily fixed to the underside of the timber joists.

13.11 The line of the timber joists is marked on the boards to allow fixing of plasterboard. The plasterboard is fixed over the product and secured with conventional nails or screws of the appropriate length, and finished as normal.

External finishing — warm roofs

13.12 The vapour-permeable roof tile underlay is laid in accordance with the manufacturer's instructions.

13.13 Treated counter battens (minimum 38 mm deep) are fixed at each rafter run from eaves to ridge using the proprietary fixings at the required centres in accordance with the fixing manufacturer's instructions. The counter batten is also fixed to the anchor batten, with short lengths being tightly butted together.

13.14 Tiling laths are fixed horizontally at spacings to suit the specified tiles or slates with the nails penetrating the full depth of the laths and counter batten.

Internal finishing

13.15 The VCL and plasterboard are fixed over the product and secured with conventional nails or screws to the appropriate length, and finished as normal.

Dwarf walls and dormer cheeks — between studs and lining

13.16 Timber stop battens or clips are fixed to the inner face of the studs, allowing sufficient depth for the insulation to sit flush with the inside of the studs. The product is cut to size and placed between the studs and held in place with clout nails.

13.17 A second layer of the product is temporarily fixed to the inner face of the timber studding.

13.18 The line of the timber studs is marked on the boards to allow fixing of plasterboard.

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

13.20 The insulation is sealed at all service penetrations.

13.21 The plasterboard is fixed over the product and secured with conventional nails or screws to the appropriate length, and finished as normal.

Finishing

13.22 Roof tiles or slates are installed in accordance with the relevant clauses of BS 5534 : 2014 and the recommendations of the manufacturer should be followed.

14 Tests

Results of tests were assessed to determine:

- dimensional accuracy
- dimensional stability
- compressive strength
- thermal conductivity
- emissivity
- density
- water vapour transmission.

15 Investigations

15.1 Existing data on durability and properties in relation to fire were evaluated.

15.2 A calculation was undertaken to confirm the declared thermal conductivity (λ_D).

15.3 A series of U value calculations was carried out.

15.4 A condensation risk analysis was carried out.

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

Bibliography

BS 5250 : 2011 + A1 : 2016 *Code of practice for control of condensation in buildings inner and outer leaves*

BS 5534 : 2014 + A2 : 2018 *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 9250 : 2007 *Code of practice for design of the airtightness of ceilings in pitched roofs*

BS EN 520 : 2004 + A1 : 2009 *Gypsum plasterboards. Definitions, requirements and test methods*

BS EN 1991-1-3 : 2003 + A1 : 2015 *Eurocode 1: Actions on structures — General actions — Snow loads*

NA + A1 : 15 to BS EN 1991-1-3 : 2003 + A1 : 2015 *UK National Annex to Eurocode 1: Actions on structures — General actions — Snow loads*

BS EN 1991-1-4 : 2005 + A1 : 2010 *Eurocode 1: Actions on structures — General actions — Wind actions*

NA to BS EN 1991-1-4 : 2005 + A1 : 2010 *UK National Annex to Eurocode 1: Actions on structures — General actions — Wind actions*

BS EN 1995-1-1 : 2004 + A2 : 2014 *Eurocode 5: Design of timber structures — General — Common rules and rules for buildings*

NA to BS EN 1995-1-1 : 2004 + A1 : 2008 *UK National Annex to Eurocode 5: Design of timber structures — General — Common rules and rules for buildings*

BS EN 13165 : 2012 + A2 : 2016 *Thermal insulation products for buildings — Factory made rigid polyurethane foam (PUR) products — Specification*

BS EN 13501-1 : 2018 *Fire classification of construction products and building elements — Classification using test data from reaction to fire tests*

BS EN ISO 6946 : 2017 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*

BS EN ISO 9001 : 2015 *Quality management systems — Requirements*

BS EN ISO 14001 : 2015 *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*

16 Conditions

16.1 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.

16.2 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.

16.3 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.

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

16.5 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.

16.6 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.