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Agrément Certificate

17/5405

Product Sheet 7 Issue 1

CELOTEX INSULATION

CELOTEX TB4000, GA4000 AND XR4000 PIR INSULATION BOARDS FOR PITCHED ROOF INSULATION

This Agrément Certificate Product Sheet⁽¹⁾ relates to Celotex TB4000, GA4000 and XR4000 PIR Insulation Boards for Pitched Roof Insulation, comprising rigid polyisocyanurate (PIR) foam boards with composite foil-facings, for use as insulation installed above, between and/or below rafters in tiled or slated pitched roofs in new or existing domestic and non-domestic buildings, with height restrictions in some cases.

(1) Hereinafter referred to as 'Certificate'.

The assessment includes

Product factors:

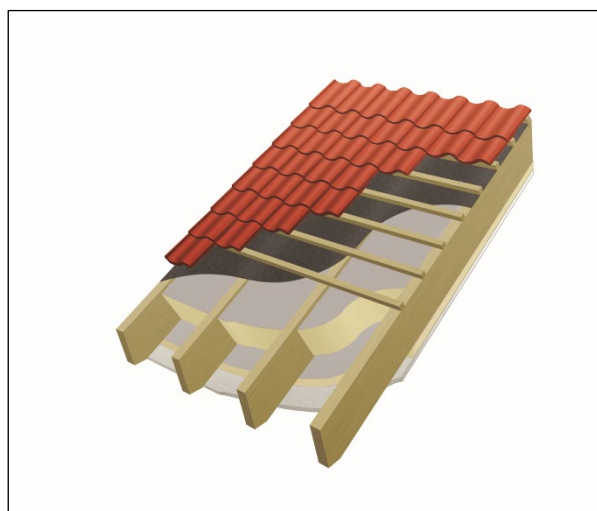
- compliance with Building Regulations
- compliance with additional regulatory or non-regulatory information where applicable
- evaluation against technical specifications
- assessment criteria and technical investigations
- uses and design considerations

Process factors:

- compliance with Scheme requirements
- installation, delivery, handling and storage
- production and quality controls
- maintenance and repair

Ongoing contractual Scheme elements†:

- regular assessment of production
- formal 3-yearly review



KEY FACTORS ASSESSED

- Section 1. Mechanical resistance and stability
- Section 2. Safety in case of fire
- Section 3. Hygiene, health and the environment
- Section 4. Safety and accessibility in use
- Section 5. Protection against noise
- Section 6. Energy economy and heat retention
- Section 7. Sustainable use of natural resources
- Section 8. Durability

The BBA has awarded this Certificate to the company named above for the products described herein. These products have been assessed by the BBA as being fit for their intended use provided they are installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of First issue: 5 December 2023

Hardy Giesler
Chief Executive Officer

This BBA Agrément Certificate is issued under the BBA's Inspection Body accreditation to ISO/IEC 17020. Sections marked with † are not issued under accreditation.

The BBA is a UKAS accredited Inspection Body (No. 4345), Certification Body (No. 0113) and Testing Laboratory (No. 0357).

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

The Certificate should be read in full as it may be misleading to read clauses in isolation.

Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.

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SUMMARY OF ASSESSMENT AND COMPLIANCE

This section provides a summary of the assessment conclusions; readers should refer to the later sections of this Certificate for information about the assessments carried out.

Compliance with Regulations

Having assessed the key factors, the opinion of the BBA is that Celotex TB4000, GA4000 and XR4000 PIR Insulation Boards for Pitched Roof Insulation, 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 Building Regulations 2010 (England and Wales) (as amended)

Requirement: B3(4)	Internal fire spread (structure)
Comment:	The products are restricted by this Requirement. See section 2 of this Certificate.
Requirement: B4(1)	External fire spread
Comment:	The use of the products is restricted by this Requirement in some cases. See Section 2 of this Certificate.
Requirement: C2I	Resistance to moisture
Comment:	The products can contribute to satisfying this Requirement. See section 3 of this Certificate.
Requirement: L1(a)(i)	Conservation of fuel and power
Comment:	The products can contribute to satisfying this Requirement. See section 6 of this Certificate.
Regulation: 7(1)	Materials and workmanship
Comment:	The products are acceptable. See sections 8 and 9 of this Certificate.
Regulation: 7(2)	Materials and workmanship
Comment:	The products are restricted by this Regulation in some cases. See section 2 of this Certificate.
Regulation: 25B	Nearly zero-energy requirements for new buildings
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 rates for new buildings (applicable to Wales only)
Regulation: 26B	Fabric performance values for new dwellings (applicable to Wales only)
Regulation: 26C	Target primary energy rates for new buildings (applicable to England only)
Regulation: 26C	Energy efficiency rating (applicable to Wales only)
Comment:	The products can contribute to satisfying these Regulations. See section 6 of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation: 8(1)	Fitness and durability of materials and workmanship
Comment:	The products are acceptable. See sections 8 and 9 of this Certificate.
Regulation: 8(3)	Fitness and durability of materials and workmanship
Comment:	The products are restricted by this Regulation in some cases. See section 2 of this Certificate.

Regulation:	9	Building standards - construction
Standard:	2.4	Cavities
Comment:		The products are restricted by this Standard in some cases, with reference to clauses 2.4.4 ⁽¹⁾ and 2.4.6 ⁽²⁾ . See section 2 of this Certificate.
Standard:	3.15	Condensation
Comment:		The products 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 section 3 of this Certificate.
Standard:	6.1(b)(c)(d)	Energy demand and carbon dioxide emissions
Comment:		The products can contribute to satisfying this Standard, with reference to clauses 6.1.1 ⁽¹⁾ , and 6.1.2 ⁽²⁾ . See section 6 of this Certificate.
Standard:	6.2	Building insulation envelope
Comment:		The products can contribute to satisfying these Standards, with reference to clauses, or parts of clauses, 6.2.1 ⁽¹⁾⁽²⁾ , 6.2.3 ⁽¹⁾ , 6.2.4 ⁽²⁾ , 6.2.6 ⁽¹⁾ , 6.2.7 ⁽¹⁾⁽²⁾ , 6.2.8 ⁽¹⁾⁽²⁾ , 6.2.9 ⁽¹⁾⁽²⁾ , 6.2.10 ⁽¹⁾⁽²⁾ , 6.2.11 ⁽²⁾ and 6.2.12 ⁽¹⁾ . See section 6 of this Certificate.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The products 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 products can contribute to a construction meeting a higher level of sustainability as defined in this Standard, with reference to clauses 7.1.4 ⁽¹⁾ , 7.1.6 ⁽¹⁾⁽²⁾ , 7.1.7 ⁽¹⁾ , 7.1.9 ⁽²⁾ and 7.1.10 ⁽²⁾ . See section 6 of this Certificate.
Regulation:	12	Building standards - conversions
Comment:		Comments made in relation to these products 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(1)(a)(i)	Fitness of materials and workmanship
Comment:	(iii)(b)(i)(ii)	The products are acceptable. See sections 8 and 9 of this Certificate.
Regulation:	23(2)	Fitness of materials and workmanship
Comment:		The products are restricted by this Regulation in some cases. See section 2 of this Certificate.
Regulation:	29	Condensation
Comment:		The products can contribute to satisfying this Regulation. See section 3 of this Certificate.
Regulation:	35(4)	Internal fire spread - structure
Comment:		The products are restricted by this Regulation. See section 2 of this Certificate.
Regulation:	36(a)	External fire spread
Comment:		The products are restricted by this Regulation in some cases. See section 2 of this Certificate.
Regulation:	39(a)(i)	Conservation measures
Comment:		The products can contribute to satisfying this Regulation. See section 6 of this Certificate.

Regulation:	40(2)	Target carbon dioxide emission rate
Regulation:	43(1)(2)	Renovation of thermal elements
Regulation:	43B	Nearly zero-energy requirements for new buildings
Comment:	The products can contribute to satisfying these Regulations. See section 6 of this Certificate.	

Additional Information

NHBC Standards 2023

In the opinion of the BBA, Celotex TB4000, GA4000 and XR4000 PIR Insulation Boards for Pitched Roof Insulation, 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*.

Fulfilment of Requirements

The BBA has judged Celotex TB4000, GA4000 and XR4000 PIR Insulation Boards for Pitched Roof Insulation to be satisfactory for use as described in this Certificate. The products have been assessed for use as insulation within tiled or slated pitched roofs, in conjunction with internal lining board, roof tile underlay, timber counter battens and tiling battens, in new and existing domestic or non-domestic buildings, with height restrictions in some cases.

ASSESSMENT

Product description and intended use

The Certificate holder provided the following description for the products under assessment. Celotex TB4000, GA4000 and XR4000 PIR Insulation Boards for Pitched Roof Insulation consist of rigid polyisocyanurate (PIR) foam boards with composite foil-facings.

The products have the nominal characteristics given in Table 1.

Table 1 Nominal characteristics of the products

Characteristic (unit)	Celotex PIR Insulation Boards		
	TB4000	GA4000	XR4000
Board size (mm)	1200 x 2400	1200 x 2400	1200 x 2400
Thickness (mm)	20 to 45	50 to 100	110 to 200
Edge profile	square edge	square edge	square edge
Facings	Composite foil-facing both sides (printed on one side only)	Composite foil-facing both sides (printed on one side only)	Composite foil-facing both sides (printed on one side only)
Deviation from flatness (mm) board length \leq 2.5m	≤ 10 (area $> 0.75 \text{ m}^2$)	≤ 10 (area $> 0.75 \text{ m}^2$)	≤ 10 (area $> 0.75 \text{ m}^2$)

Ancillary Items

The Certificate holder recommends the following ancillary items for use with the product, but these materials have not been assessed by the BBA and are outside the scope of this Certificate.

- tile or slate roof finish
- roof tile underlay
- treated timber battens/rafters
- air and vapour control layer (AVCL)
- fixings
- proprietary airtightness tape
- gypsum plasterboard lining.

Application

The products are for use as insulation in the following applications, on new and existing domestic or non-domestic buildings, with height restrictions in some cases (see section 2 of this Certificate):

- on tiled or slated pitched roofs, with a roof pitch of between 10 and 75°.
- above sloping rafters
- above and between sloping rafters
- between sloping rafters
- between and below sloping rafters.

Product assessment – key factors

The products were assessed for the following key factors, and the outcomes of the assessments are shown below. Conclusions relating to the Building Regulations apply to the whole of the UK unless otherwise stated.

1 Mechanical resistance and stability

Data were assessed for the following characteristic.

1.1 Behaviour under loading

The compressive strength of the products was assessed and the results of tests are given in Table 2.

Table 2 Compressive strength

Product assessed	Assessment method	Requirement	Result
Celotex TB4000	BS EN 826 : 2013	Value achieved	≥ 120 kPa
Celotex GA4000	BS EN 826 : 2013	Value achieved	≥ 140 kPa

2 Safety in case of fire

Data were assessed for the following characteristic.

2.1 Reaction to fire

2.1.1 The Certificate holder has declared a reaction to fire classification for the products of Class F to BS EN 13501-1 : 2018.

2.1.2 On the basis of data assessed, the products will be restricted in use under the documents supporting the national Building Regulations in some cases.

2.1.3 In England, the products, when used in roof pitches greater than 70°, must not be used on residential buildings with a storey 11 m or more in height, or on any other building with a storey 18 m or more in height.

2.1.4 In Wales and Northern Ireland, the products, when used in roof pitches greater than 70°, must not be used on buildings with a storey 18 m or more in height.

2.1.5 In Scotland, the products, when used in roof pitches greater than 70° must not be used less than 1 m from a relevant boundary or on buildings that have a storey 11 m or more above ground level.

2.1.6 Designers must refer to the relevant national Building Regulations and guidance for detailed conditions of use, particularly in respect of requirements for substrate fire performance, cavity closers and barriers, fire stopping of service penetrations and combustibility limitations for other materials and components used in the overall wall construction.

3 Hygiene, health and the environment

3.1 Water vapour permeability

3.1.1 The resistance to water vapour diffusion was assessed and the results are given in Table 3.

Table 3 Water vapour resistance/resistivity			
Material	Assessment method	Requirement	Result
PIR insulation	BS EN ISO 10456 : 2007	Value achieved	300 MN·s·g ⁻¹ ·m ⁻¹
Composite foil facer	BS 5250 : 2021		1000 MN·s·g ⁻¹

3.1.2 For the purposes of assessing the risk of interstitial condensation, the water vapour resistance/resistivity values may be taken as stated in Table 3.

4 Safety and accessibility in use

Not applicable.

5 Protection against noise

Not applicable.

6 Energy economy and heat retention

Data were assessed for the following characteristics.

6.1 Thermal conductivity

6.1.1 The products were tested for thermal conductivity and the results are given in Table 4.

Table 4 Thermal conductivity				
Product assessed	Insulation thickness	Assessment method	Requirement	Result
Celotex TB4000	20 to 45 mm	Thermal conductivity to BS EN 13165: 2012	Declared value (λ_D)	0.022 W·m ⁻¹ ·K ⁻¹
Celotex GA4000	50 to 100 mm			
Celotex XR4000	110 to 200 mm			

6.2 Thermal performance

6.2.1 The unprinted side of the foil-facing was tested for emissivity and the result is given in Table 5.

Table 5 Emissivity of the foil-facing

Product assessed	Assessment method	Requirement	Result
Unprinted foil-facing	Aged emissivity to BS EN 15976 : 2011	Declared value	0.05

6.2.2 Example U values are given in Table 6.

Table 6 Example U values — pitched roof

Target U value (W·m ⁻² ·K ⁻¹)	Celotex TB40000, GA4000 and XR4000 insulation thickness (mm)		
	Over rafters ⁽⁴⁾	Between rafters ⁽⁵⁾	Between and under rafters ⁽⁶⁾
0.09	– ⁽⁸⁾	– ⁽⁸⁾	150 ⁽³⁾⁽⁷⁾ + 150 ⁽³⁾
0.11	200 ⁽³⁾	– ⁽⁸⁾	150 ⁽³⁾⁽⁷⁾ + 100 ⁽²⁾
0.12	200 ⁽³⁾	– ⁽⁸⁾	130 ⁽³⁾⁽⁷⁾ + 100 ⁽²⁾
0.13	165 ⁽³⁾	– ⁽⁸⁾	120 ⁽³⁾⁽⁷⁾ + 90 ⁽²⁾
0.15	140 ⁽³⁾	– ⁽⁸⁾	100 ⁽²⁾ + 80 ⁽²⁾
0.16	130 ⁽³⁾	200 ⁽³⁾⁽⁷⁾	100 ⁽²⁾ + 70 ⁽²⁾
0.18	110 ⁽³⁾	200 ⁽³⁾⁽⁷⁾	100 ⁽²⁾ + 50 ⁽²⁾
0.20	100 ⁽²⁾	165 ⁽³⁾⁽⁷⁾	100 ⁽²⁾ + 40 ⁽¹⁾
0.25	75 ⁽²⁾	130 ⁽³⁾⁽⁷⁾	100 ⁽²⁾ + 20 ⁽¹⁾

(1) Celotex TB4000.

(2) Celotex GA4000.

(3) Celotex XR4000.

(4) Pitched roof construction — concrete tiles on 25 mm timber tile battens (well ventilated) on low-resistance (LR) breather membrane, insulation secured with 11 fixings per m² — stainless steel ($\lambda = 17 \text{ W} \cdot \text{m}^{-1} \cdot \text{K}^{-1}$) with a cross-sectional area of 9 mm², on 47 by 150 mm timber rafters (11.75%; $\lambda = 0.13 \text{ W} \cdot \text{m}^{-1} \cdot \text{K}^{-1}$), with a low-e ($\epsilon_0 = 0.05$) air cavity between the timbers, AVCL and 12.5 mm plasterboard ($\lambda = 0.25 \text{ W} \cdot \text{m}^{-1} \cdot \text{K}^{-1}$).

(5) Pitched roof construction — concrete tiles on 25 mm timber tile battens (well ventilated) on low-resistance (LR) breather membrane, 50 mm clear well vented cavity above the insulation fitted tightly between the 47 by 150 mm timber rafters (11.75%; $\lambda = 0.13 \text{ W} \cdot \text{m}^{-1} \cdot \text{K}^{-1}$), AVCL and 12.5 mm plasterboard ($\lambda = 0.25 \text{ W} \cdot \text{m}^{-1} \cdot \text{K}^{-1}$).

(6) Pitched roof construction — concrete tiles on 25 mm timber tile battens (well ventilated) on low-resistance (LR) breather membrane, 50 mm clear well vented cavity above the insulation fitted tightly between the 47 by 150 mm timber rafters (11.75%; $\lambda = 0.13 \text{ W} \cdot \text{m}^{-1} \cdot \text{K}^{-1}$), insulation, AVCL and 12.5 mm plasterboard ($\lambda = 0.25 \text{ W} \cdot \text{m}^{-1} \cdot \text{K}^{-1}$) secured with 14.58 fixings per m² — mild steel ($\lambda = 50 \text{ W} \cdot \text{m}^{-1} \cdot \text{K}^{-1}$) with a cross-sectional area of 10.46 mm².

(7) With additional timber battens ($\lambda = 0.13 \text{ W} \cdot \text{m}^{-1} \cdot \text{K}^{-1}$) added beneath the 150 mm rafters, to maintain a 50 mm ventilated cavity above the insulation.

(8) See section 6.2.5.

6.2.3 The U value of a completed roof will depend on the insulation thickness, the number and type of fixings, and the roof structure and its internal finish.

6.2.4 The products can contribute towards a construction satisfying the national Building Regulations in respect of energy economy and heat retention.

6.2.5 For improved energy or carbon savings, designers must consider appropriate fabric and/or services measures.

7 Sustainable use of natural resources

Not applicable.

8 Durability

8.1 The potential mechanisms for degradation and the known performance characteristics of the materials in this product were assessed.

8.2 Specific test data were assessed, as given in Table 7.

Table 7 Results of durability tests

Product assessed	Assessment method	Requirement	Declared level / value
Celotex TB4000	Dimensional stability to BS EN 1604 : 2013 (70°C and 90-100% RH for 48 hours)	Declared value	DS(70,90)3
Celotex GA4000			
Celotex XR4000	Dimensional stability to BS EN 1604 : 2013 (-20°C for 48 hours)		DS(-20,-)1
Unprinted foil-facing	Aged emissivity to BS EN 15976 : 2011		0.05

8.3 Service life

Under normal service conditions, the products will have a life equivalent to the structure in which they are incorporated, provided they designed, installed and maintained in accordance with this Certificate and the Certificate holder's instructions.

PROCESS ASSESSMENT

Information provided by the Certificate holder was assessed for the following factors:

9 Design, installation, workmanship and maintenance

9.1 Design

The design process was assessed, and the following requirements apply in order to satisfy the performance assessed in this Certificate.

9.1.1 Roofs must be designed and constructed in accordance with the relevant clauses of BS 5250 : 2021, BS 5534 : 2014, BS 8212 : 1995 and BS EN 1995-1-1 : 2004 and its UK National Annex.

9.1.2 Design wind loading will depend largely on the building geometry and its geographical location and must be calculated by a suitable experienced and competent individual in accordance with BS EN 1991-1-4 : 2005 and its UK National Annex. Snow loadings must be calculated in accordance with BS EN 1991-1-3 : 2003 and its UK National Annex.

9.1.3 The Certificate holder and fixing manufacturer must advise on the use of the correct proprietary fixings and fixing capacity but such advice is outside of the scope of this Certificate. 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 National Annex must be followed.

9.1.4 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.

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

9.1.6 A ventilated air space of minimum depth 25 mm may be required between the underside of the roof tile underlay (at the lowest point of the maximum allowable 15 mm drape) and the upper face of the insulation board, dependent on the specification of the roof tile underlay used (see section 9.1.10).

9.1.7 Calculations of the thermal transmittance (U value) of a wall or roof must be carried out in accordance with BS EN ISO 6946 : 2017 and BRE Report BR 443 : 2019.

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

Interstitial condensation

9.1.9 Roofs will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2021.

9.1.10 When installed with tightly butted joints and filled/sealed gaps and joints, the products will provide a continuous convection-free envelope of high vapour resistance. Therefore, a suitable vapour-permeable (low resistance - LR) roof tile underlay may be laid over the insulation boards without ventilated air space, unless the tiles/slates are tight fitting as defined in BS 5250 : 2021. When using a high resistance (HR) underlay, the space below it must be ventilated in accordance with BS 5250 : 2021 with a minimum 25 mm air gap between the top of the insulation board and the lowest point of the maximum allowable 15mm roof underlay drape.

9.1.11 Where the products are 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 : 2021. However, any insulation in a horizontal ceiling should be removed.

9.1.12 Where high humidity may be expected, an air and vapour control layer (AVCL) with sealed and lapped joints, must also be installed unless a site-specific condensation risk analysis in accordance with BS 5250 : 2021 indicates otherwise.

Surface condensation

9.1.13 In England and Wales, 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 9.1.8 of this Certificate.

9.1.14 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 : 2021. Further guidance may be obtained from BRE Report BR 262 : 2002 and section 9.1.8 of this Certificate.

9.2 Installation

9.2.1 Installation instructions provided by the Certificate holder were assessed and judged to be appropriate and adequate.

9.2.2 Installation must be carried out in accordance with this Certificate and the Certificate holder's instructions. A summary of instructions and guidance is provided in Annex A.

9.2.3 During installation, care must be taken to ensure that the products are not subjected to any construction or foot traffic loads. Roof timbers of adequate strength must be used to support such loads.

9.3 Workmanship

Practicability of installation was assessed by the BBA, on the basis of the Certificate holder's information. To achieve the performance described in this Certificate, installation of the product must be carried out by a competent general builder, or a contractor, experienced with this type of product.

9.4 Maintenance and repair

Once installed, provided that the roof tiles/slates are maintained in a weathertight condition, maintenance is not required.

10 Manufacture

10.1 The production processes for the products have been assessed, and provide assurance that the quality controls are satisfactory according to the following factors:

10.1.1 The manufacturer has provided documented information on the materials, processes, testing and control factors.

10.1.2 The quality control operated over batches of incoming materials has been assessed and deemed appropriate and adequate.

10.1.3 The quality control procedures and product testing to be undertaken have been assessed and deemed appropriate and adequate.

10.1.4 The process for management of non-conformities has been assessed and deemed appropriate and adequate.

10.1.5 An audit of each production location was undertaken, and it was confirmed that the production process was in accordance with the documented process, and that equipment has been properly tested and calibrated.

†10.2 The BBA has undertaken to review 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.

11 Delivery and site handling

11.1 The Certificate holder stated that the product is delivered to site in packaging bearing the product name, Certificate holder's name, batch number, and BBA Certificate number.

11.2 Delivery and site handling must be performed in accordance with the Certificate holder's instructions and this Certificate, including:

11.3 The products 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 and not in contact with ground moisture.

11.4 Some handling difficulties may be experienced in windy conditions. Care must be exercised to avoid crushing the edges or corners. If damaged, the products must not be used.

11.5 The products must not be exposed to open flame or other ignition sources, or to solvents or other chemicals.

Supporting information in this Annex is relevant to the product but has not formed part of the material assessed for the 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.

UKCA marking

The Certificate holder has taken the responsibility of UKCA marking the product in accordance with Designated Standard EN 13165 : 2012.

Management Systems Certification for production

The management system of the manufacturer has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 and BS EN ISO 14001 : 2015 by BSI Assurance UK Ltd (Certificates FM 781023 and EMS 781017 respectively).

Additional information on installation

Installation must be in accordance with the Certificate holder's instructions and this Certificate.

A.1 The boards can be cut to size using a sharp knife or a fine-toothed saw.

A.2 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.

A.3 It is important to fill/seal gaps and joints in the insulation envelope, including at all service penetrations. See section 9.1.5 of this Certificate.

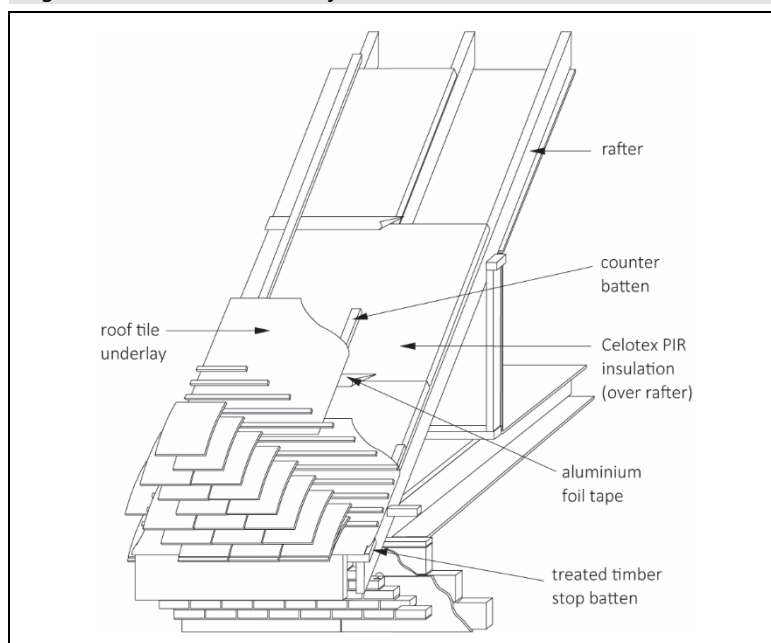
A.4 For installation of roof tiles or slates and internal lining boards, see sections A.19 and A.20.

Procedure

Insulation above rafters

A.5 A treated-timber stop batten, the same thickness as the insulation board, is fixed to the rafters at eaves level, and the insulation boards are butted directly against it (see Figure 1).

Figure 1 *Insulation above rafters*



A.6 The insulation 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.

A.7 All insulation board joints should be tightly butted. At ridges and verges, the boards should be cut to achieve a close butt joint.

A.8 Counter battens, underlay and tiling battens should be installed using one of the following methods of fixing.

Method 1

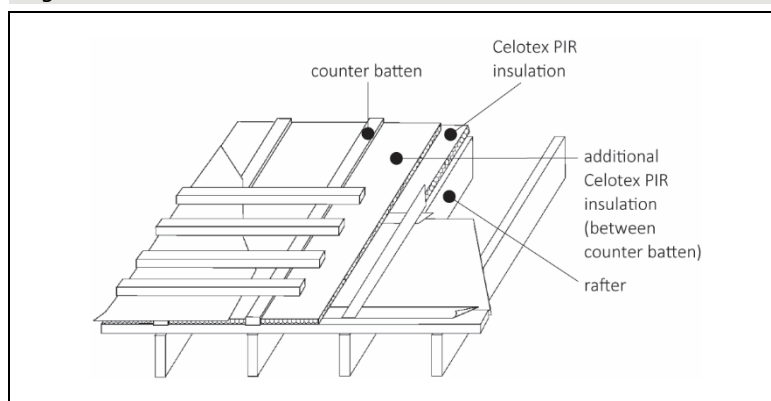
A.9 Counter battens (38 by 50 mm) should be fixed using suitable fixings at maximum centre-to-centre spacing of 400 mm. These fixings should pass through the counter batten and insulation and penetrate the supporting timber by a minimum of 37 mm.

A.10 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 : 2014 at the required batten gauge. Where permeable tile underlays are used, they should be installed in accordance with the appropriate BBA Certificate.

Method 2

A.11 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 (see Figure 2).

Figure 2 Additional insulation



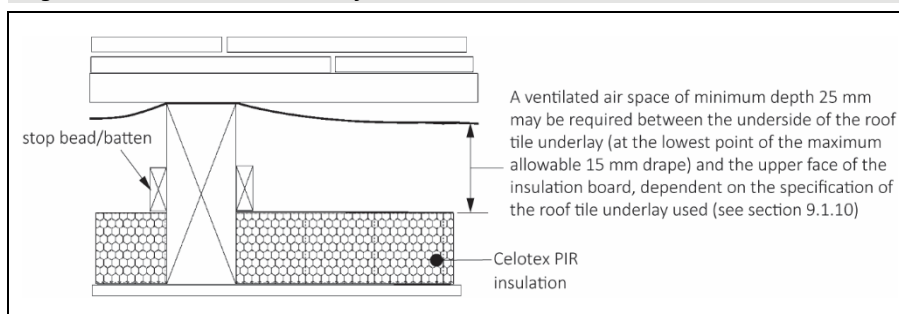
Insulation between and above rafters

A.12 The product is cut and fitted tightly between the rafters and is supported with stop beads or battens. It is to be installed flush with the top of the rafters. The second layer of insulation is then installed above the rafters as described in sections A.5 to A.8.

Insulation between and below rafters

A.13 Following completion of the roof structure, the products are cut and fitted from the inside, tightly between the rafters and flush with the underside, and butted against stop beads or battens which maintain a minimum ventilated air gap at least 40 mm deep (see Figure 3). Where vapour-permeable (LR) roof tile underlays are used, the insulation may be installed without a ventilated air space (see section 9.1.10).

Figure 3 Insulation between rafters



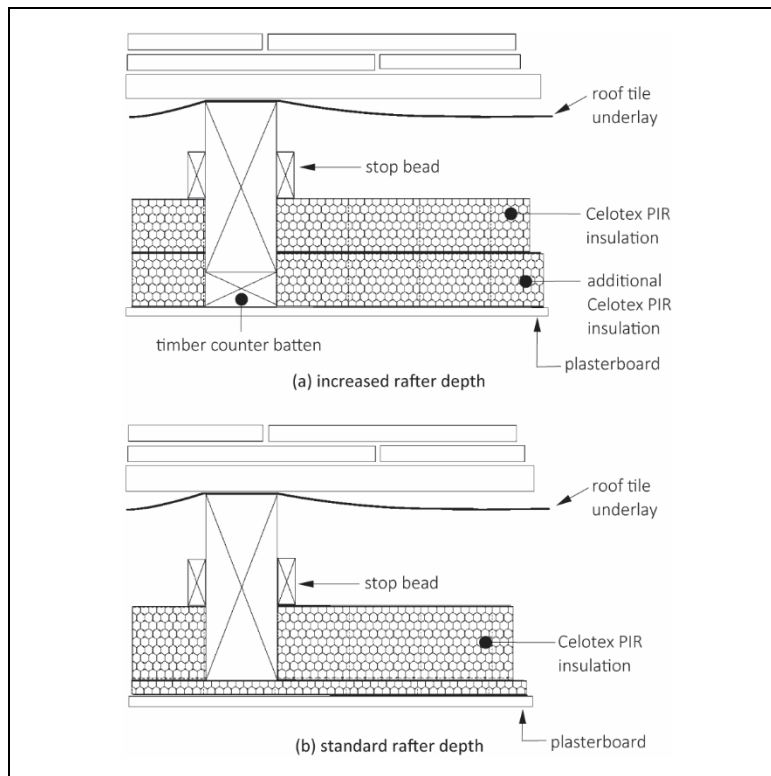
A.14 Horizontal joints in the insulation boards are butted and taped.

A.15 An AVCL is fitted to the underside of the rafters.

A.16 Where the rafter depth cannot accommodate the required thickness of insulation and maintain the required 25 mm minimum ventilated gap (from the top of insulation board to the lowest point of the maximum allowable 15 mm roof underlay drape), one of the following options may be considered:

- the rafter depth is increased by attaching timber counter battens to the underside of the rafter [see Figure 4(a)], or preferably, or
- a second layer of insulation is added to the underside of the rafters [see Figure 4(b)].

Figure 4 Additional insulation

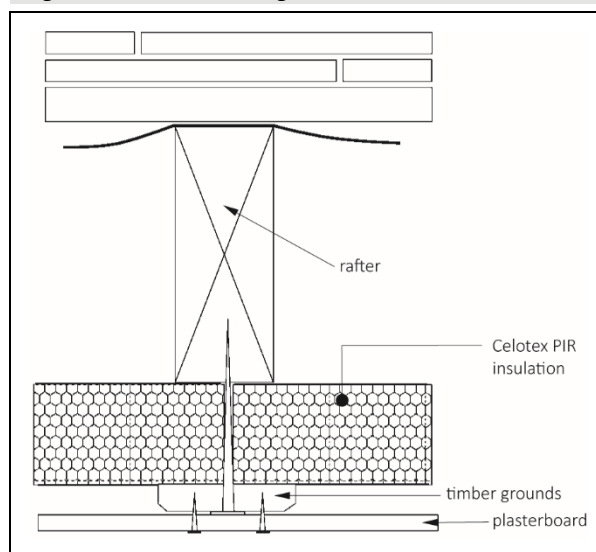


A.17 Boards may be attached to the underside of rafters either as a single layer or in conjunction with insulation boards between the rafters.

A.18 Boards are temporarily fixed with broad-headed clout nails, and joints butted and taped with a proprietary airtightness tape to provide an effective AVCL and air permeability barrier. Appropriate internal lining panels may then be fixed through the insulation and into the underside of the rafters.

A.19 Where the insulation thickness makes securing of the internal lining panels impractical, timber grounds of the appropriate depth may be fixed through to the rafters, and the panels secured to the grounds (see Figure 5).

Figure 5 Added timber grounds



Finishing

A.20 Roof tiles or slates are installed in accordance with the relevant clauses of BS 5534 : 2014. When applying roof tiles or slates, the recommendations of the manufacturer should be followed.

A.21 Internal lining panels appropriate to the application (for example, standard gypsum plasterboard to BS EN 520 : 2004), should be fixed in accordance with BS 8212 : 1995, and the required decoration applied.

Bibliography

- BRE Report BR 262 : 2002 *Thermal insulation: avoiding risks*
- BRE Report BR 443 : 2019 *Conventions for U-value calculations*
- BS 5250 : 2021 *Management of moisture in buildings — Code of practice*
- BS 5534 : 2014 + A2 : 2018 *Code of practice for slating and tiling (including shingles)*
- BS 8212 : 1995 *Code of practice for dry lining and partitioning using gypsum plasterboard*
- BS EN 520 : 2004 + A1 : 2009 *Gypsum plasterboards — Definitions, requirements and test methods*
- BS EN 1604 : 2013 *Thermal insulating products for building applications — Determination of dimensional stability under specified temperature and humidity conditions*
- BS EN 1991-1-3 : 2003 + A1 : 2015 *Eurocode 1 : Actions on structures — General actions — Snow loads*
NA 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*
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- BS EN 13501-1 : 2018 *Fire Classification of construction products and building elements — Part 1 — Classification using data from reaction to fire tests*
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- EN 13165 : 2012 + A2 : 2016 *Thermal insulation products for buildings — Factory made rigid polyurethane foam (PU) products — Specification*

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