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Agrément Certificate

16/5365

Product Sheet 1 Issue 2

BAUDER ROOF INSULATION

BAUDER PIR ROOF INSULATION BOARDS

This Agrément Certificate Product Sheet⁽¹⁾ relates to Bauder PIR Roof Insulation Boards, comprising a range of rigid polyisocyanurate (PIR) foam boards with and without foil facings on both sides. The products are for use as a thermal insulation layer on limited access, zero fall, flat roofs, and pitched roofs of less than 70° pitch, in domestic and non-domestic buildings. The products are for use in conjunction with an air and vapour control layer (AVCL).

(1) Hereinafter referred to as 'Certificate'.

The assessment includes

Product factors:

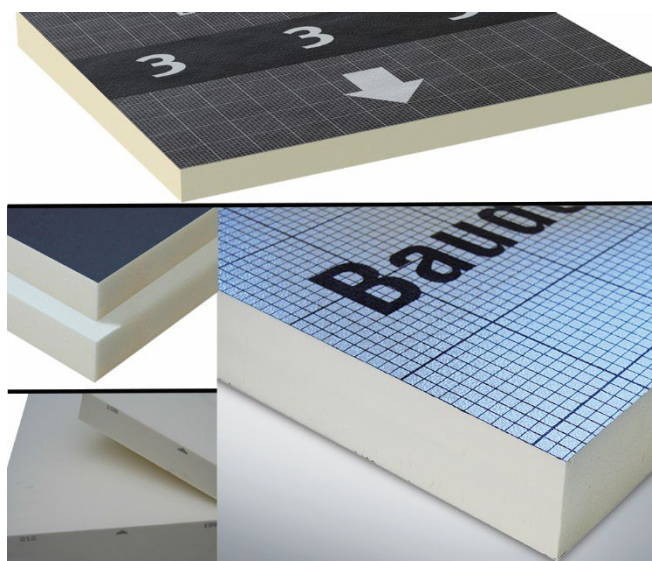
- compliance with Building Regulations
- compliance with additional regulatory or non-regulatory information where applicable
- evaluation against technical specifications
- assessment criteria and technical investigations
- uses and design considerations

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 Second issue: 31 July 2024

Originally certified on 02 February 2017

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 Bauder PIR Roof Insulation Boards, 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: A1	Loading
Comment:	The products can contribute to satisfying this Requirement. See section 1 of this Certificate.
Requirement: B3(2)	Internal fire spread (structure)
Comment:	The products may be restricted by this Requirement in some circumstances. See section 2 of this Certificate.
Requirement: B4(2)	External fire spread
Comment:	The products may be restricted by this Requirement. See section 2 of this Certificate.
Requirement: C2(c)	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; however, compensating fabric measures may be required. 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: 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; however, compensating fabric/service measures may be required. 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: 9	Building standards – construction
Standard: 1.1(b)	Structure
	The products can contribute to satisfying this Standard, with reference to clause 1.1.1 ⁽¹⁾⁽²⁾ . See section 1 of this Certificate.

Standard:	2.1	Compartmentation
Standard:	2.2	Separation
Comment:		The products may be restricted by this Standard, with reference to clauses 2.1.15 ⁽²⁾ , 2.2.7 ⁽²⁾ and 2.2.10 ⁽¹⁾ . See section 2 of this Certificate.
Standard:	2.8	Spread from neighbouring buildings
Comment:		The products may be restricted by this Standard, with reference to clause 2.8.1 ⁽¹⁾⁽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 3.15.6 ⁽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⁾ ; however, compensating fabric/service measures may be required. See section 6 of this Certificate.
Standard:	6.2	Building insulation envelope
Comment:		The products can contribute to satisfying this Standard, with reference to 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⁾ and 6.2.12 ⁽¹⁾ ; however, compensating fabric measures may be required. 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 at least 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 7.1.2 ⁽¹⁾ , 7.1.4 ⁽¹⁾ , 7.1.6 ⁽¹⁾ and 7.1.7 ⁽¹⁾ . See section 6 of this Certificate.
Regulation:	12	Building standards – conversion
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(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:	29	Condensation
Comment:		The products can contribute to satisfying this Regulation. See section 3 of this Certificate.
Regulation:	30	Stability
Comment:		The products can contribute to satisfying this Regulation. See section 1 of this Certificate.
Regulation:	35(2)	Internal fire spread – structure
Comment:		The products may be restricted by this Regulation in some circumstances. See section 2 of this Certificate.
Regulation:	36(b)	External fire spread
Comment:		The products may be restricted by this Regulation. See section 2 of this Certificate.

Regulation:	39(a)(i)	Conservation measures The products can contribute to satisfying this Regulation; however, compensating fabric measures may be required. 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; however, compensating fabric/service measures may be required. See section 6 of this Certificate.

Additional Information

NHBC Standards 2024

In the opinion of the BBA, Bauder PIR Roof Insulation Boards, 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 7.1 *Flat roofs, terraces and balconies*.

Fulfilment of Requirements

The BBA has judged Bauder PIR Roof Insulation Boards to be satisfactory for use as described in this Certificate. The products have been assessed as a thermal insulation layer on limited access, zero fall, flat roofs and pitched roofs (of up to 70° pitch), in domestic or non-domestic buildings.

ASSESSMENT

Product description and intended use

The Certificate holder provided the following description for the products under assessment. Bauder PIR Roof Insulation Boards consist of rigid polyisocyanurate (PIR) foam boards with or without foil facings on both sides.

The products have the nominal characteristics given in Table 1.

Table 1 Nominal characteristics

Product name	Core/Facings	Edge Profile	Length x width (mm)	Thickness (mm)
BauderPIR FA-TE	PIR core with printed aluminium foil-facings on both sides	Straight	1200 x 600	20 to 240
BauderPIR FA	PIR core with black-coloured aluminium foil-facings on both sides	Rebated 15 mm on all sides	1200 x 2400 nominal (1185 x 2385 installed)	60 to 240
BauderPIR FA G	Tapered boards (1:60) PIR core with black-coloured aluminium foil-facings on both sides	Straight	1200 x 1200	30/50 50/70 70/90 90/110 110/130 130/150 150/170 170/190
BauderPIR T G	PIR block tapered board with no facings	Straight	1200 x 800	20 to 400

Ancillary Items

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

- waterproofing membrane/system
- air and vapour control layer (AVCL)
- adhesives and/or mechanical fixings.

Application

The products are for use as a fully supported thermal insulation layer on zero fall, flat roofs and pitched roofs with concrete, timber and profiled metal decks, in conjunction with suitable roof waterproofing membrane systems, with limited access only. Table 2 gives the application assessed for each product.

Table 2 Application

Insulation	Reinforced bitumen membrane (torch-on) ⁽¹⁾	Reinforced bitumen membrane (self-adhered) ⁽¹⁾	Single-ply fleece-backed membrane (adhered) ⁽²⁾	Single-ply membrane (mechanically fixed) ⁽²⁾	Cold applied liquid waterproofing ⁽³⁾
BauderPIR FA-TE	X	✓	✓	✓	✓
BauderPIR FA	X	✓	✓	✓	✓
BauderPIR FA G	X	✓	✓	✓	✓
BauderPIR T G	✓	✓	✓	✓	✓

(1) Reinforced bitumen membranes to BS 8747 : 2007 in accordance with the recommendations of Table 5 and installed to the relevant clauses of BS 8217 : 2005, including the following:

- Bauder Total Roof Waterproofing Systems (Agrément Certificate 10/4744, PS1)
- Bauderflex Roof Waterproofing Systems (Agrément Certificate 10/4744, PS3).

(2) Single-ply roof waterproofing systems (adhesively bonded or mechanically fixed), such as PVC, CSM, CPE, FPO (including TPO), VET, PIB or EPDM, which are the subject of a current Agrément Certificate and laid in accordance with the requirements of that Certificate and the manufacturer's recommendations, including the following:

- Thermoplan T (Agrément Certificate 04/4120, PS1)
- Thermofol U (Agrément Certificate 06/4354, PS1).

(3) Liquid-applied waterproofing systems with a current Agrément Certificate and laid in accordance with the requirements of that Certificate and the manufacturer's recommendations, including the following:

- Bauder LiquiTEC Roof System (Agrément Certificates 14/5152, PS1 and PS2, and 20/5789 PS1 and PS2).

Definitions for products and applications inspected

- limited access roofs – those subject only to pedestrian traffic for maintenance of the roof covering, cleaning of gutters, etc
- flat roofs – those with a pitch of no more than 10°
- zero fall roofs – those having a finished fall from 0 to 1:80
- pitched roofs – sloping roofs with a fall greater than 1:6, but with a pitch less than 70 degrees.

Product assessment – key factors

The products were assessed for the following key factors, and the outcome of the assessments is 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 characteristics.

1.1 Wind loading

1.1.1 The result for the wind uplift performance of the products is given in Table 3.

Table 3 Wind uplift resistance

Product assessed ⁽¹⁾	Assessment method	Requirement	Result
BauderPIR FA-TE	Large scale wind uplift test to MOAT 65 : 2001 Section 4.3.2	Peak load for completed wind uplift cycle without damage	-3.5 kPa

- (1) 50 mm insulation boards in brickbond pattern
 (2) Insulation adhesive applied in a snaking pattern
 (3) External finish: adhered built-up felt system

1.1.2 On the basis of data assessed, the insulation boards, when used in accordance with the design wind resistance and properly installed on suitable flat roof decks, can adequately transfer negative and positive (suction and pressure) wind loads to the roof deck.

1.1.3 The resistance to wind uplift for other construction specifications must be determined on a case-by-case basis.

1.1.4 The design wind resistance for a particular site must be determined by using the appropriate partial factors, to be calculated by a suitably experienced and competent individual in accordance with BS EN 1991-1-4 : 2005 and its UK National Annex.

1.2 Behaviour under loading

1.2.1 The results of the behaviour under loading tests are given in Table 4.

Table 4 Behaviour under loading

Product assessed	Assessment method	Requirement	Result
BauderPIR FA-TE BauderPIR FA BauderPIR FA G BauderPIR T G	Compressive strength to EN 826 : 1996	Value achieved	≥ 120 kPa
BauderPIR FA-TE BauderPIR FA BauderPIR FA G BauderPIR T G	Tensile strength perpendicular to faces to EN 1607 : 1997	Declared value	TR40 TR40 TR40 TR100
BauderPIR FA-TE BauderPIR FA	Deformation under specified compressive load and temperature conditions to EN 13165	Declared value	DLT(2)5

1.2.2 The products were tested for resistance to loading when spanning ribs on profiled decks and the results were used to assess the maximum span that may be achieved. The conclusions are given in Table 5.

Clear span range (mm)	Minimum roofboard thickness (mm)
≤ 75	25
> 75 ≤ 100	30
> 100 ≤ 125	35
> 125 ≤ 150	40
> 150 ≤ 175	45
> 175 ≤ 200	50
> 200 ≤ 225	55
> 225 ≤ 250	60

1.2.3 The products must not exceed the maximum permissible spans given in Table 5.

1.2.4 The products have not been assessed for use with permanent distributed or concentrated loads, such as air conditioning units, mechanical plants, water tanks, etc. Such loads must be supported directly on the roof construction or on suitably designed support systems.

2 Safety in case of fire

Data were assessed for the following characteristics.

2.1 External fire spread

The resistance to fire exposure of a built-up roofing system will be dependent on the fire performance of the combined individual components and cannot be predicted from the classification of the insulation alone. The classification of a specific roof system must be confirmed by reference to the requirements of the documents supporting the national Building Regulations.

2.2 Reaction to fire

The products were tested for reaction to fire and the classification is given in Table 6.

Product assessed	Assessment method	Requirement	Result
BauderPIR FA-TE BauderPIR FA BauderPIR FA G BauderPIR T G	EN 13501-1 : 2007 and EN 13501-1 : 2018	Value achieved	Class E ⁽¹⁾

(1) Reports issued by FIW Munchen: H.K 3ae/22 (25 October 2022); H.K-6e/21 (22 February 2021); FZ-21-1452-34 (21 September 2021); H-K-035ae/18 (01 March 2021); FZ-23-1326-03 (26 July 2023). Copies are available from the Certificate holder on request.

2.3 Resistance to fire

Where the roof forms a junction with a compartment wall, the junction must maintain the required period of fire resistance.

3 Hygiene, health and the environment

Data were assessed for the following characteristics.

3.1 Water vapour permeability

For the purposes of assessing the risk of interstitial condensation, the water vapour resistance/resistivity values may be taken as given in Table 7.

Table 7 Water vapour resistance/resistivity

Material	Assessment method	Requirement	Result
PIR foam core (BauderPIR FA-TE, BauderPIR FA, BauderPIR FA G)	DIN EN 12086 : 2013	Value achieved	390 MN·s·g ⁻¹ ·m ⁻¹
PIR foam (BauderPIR T G)			705 MN·s·g ⁻¹ ·m ⁻¹
Composite foil facing (both sides of BauderPIR FA-TE, BauderPIR FA, BauderPIR FA G)	BS 5250 : 2021		1000 MN·s·g ⁻¹

3.2 Condensation

3.2.1 The BBA has assessed the products for the risk of interstitial condensation, and the following factors must be implemented.

3.2.2 An assessment of the risk of interstitial condensation for the specific construction must be carried out in accordance with BS 5250 : 2021 and the relevant guidance, using the water vapour resistivity/resistance values given in Table 7 of this Certificate.

3.2.3 To minimise moisture vapour entering the roof, an AVCL with sealed and lapped joints must be used below the product, which must be turned up around the insulation and bonded to the waterproofing finish.

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 8.

Table 8 Thermal conductivity

Product tested	Thickness	Assessment method	Requirement	Thermal conductivity
BauderPIR FA-TE BauderPIR FA BauderPIR FA G	All	EN 13165 : 2012	Declared value (λ _D)	0.022 W·m ⁻¹ ·K ⁻¹
	20 to 79 mm			0.026 W·m ⁻¹ ·K ⁻¹
	80 to 119 mm			0.025 W·m ⁻¹ ·K ⁻¹
	≥ 120 mm			0.024 W·m ⁻¹ ·K ⁻¹

6.2 Thermal performance

6.2.1 The U value of a completed roof will depend on the insulation thickness, its structure, the fixings, and its internal finish. Example U-values are given in Table 9.

Table 9 Example U values

BauderPIR FA-TE, BauderPIR FA and BauderPIR FA G			
Target U value (W·m ⁻² ·K ⁻¹)	Insulation thickness ⁽¹⁾ (mm)		
	Concrete deck ⁽²⁾	Timber deck ⁽³⁾	Metal deck ⁽⁴⁾
0.09	_(6)	240	_(6)
0.11	200	195	205
0.12	185	180	190
0.13	170	165	175
0.15	150	140	150
0.16	140	130	140
0.18	125	115	125
0.20	110	105	115
BauderPIR T G ⁽⁵⁾			
U value (W·m ⁻² ·K ⁻¹)	Insulation thickness ⁽¹⁾ (mm)		
	Concrete deck ⁽²⁾	Timber deck ⁽³⁾	Metal deck ⁽⁴⁾
0.09	265	260	270
0.11	220	210	220
0.12	200	195	205
0.13	185	180	190
0.15	160	155	165
0.16	150	145	155
0.18	135	125	135
0.20	120	115	125

(1) Nearest available thickness.

(2) 150 mm concrete deck — 1.33 W·m⁻¹·K⁻¹, AVCL, BauderPIR insulation secured using 6.67 fully-penetrating stainless steel ($\lambda = 17 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$) fixings per m² with a cross-sectional area of 18.1 mm², mechanically fixed single-ply waterproofing membrane.

(3) 12.5 mm plasterboard ($\lambda = 0.21 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$), 150 mm timber joists (12.5%)/air cavity (87.5%), 18 mm OSB decking, AVCL, BauderPIR insulation secured using 6.67 fully penetrating stainless steel ($\lambda = 17 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$) fixings per m² with a cross-sectional area of 18.1 mm², mechanically fixed single-ply waterproofing membrane.

(4) Metal deck (not included in calculation), AVCL, BauderPIR insulation secured using 6.67 fully penetrating stainless steel ($\lambda = 17 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$) fixings per m² with a cross-sectional area of 18.1 mm², mechanically fixed single-ply waterproofing membrane.

(5) Thicknesses shown for BauderPIR T G insulation are for illustrative purposes, as each tapered insulation project will be designed to suit the building and U values calculated accordingly.

(6) See section 6.2.3

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

6.2.3 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 these products were assessed.

8.2 Specific test data were assessed, as given in Table 10.

Table 10 Dimensional stability

Product assessed	Test method	Requirement	Result
	Dimensional stability to BS EN 1604 : 2013 (70°C and 90-100% RH for 48 hours)	Length and width ≤ 5 % change, thickness ≤ 10 % change	Pass
BauderPIR FA-TE BauderPIR FA BauderPIR FA G BauderPIR T G	Dimensional stability to BS EN 1604 : 2013 (-20°C for 48 hours)	Length and width ≤ 1 % change, thickness ≤ 2 % change	Pass
	Bowing under the effects of a thermal gradient to MOAT 50 : 1992 Section 4.3.2	< 10 mm	Pass

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

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

9.1.2 Decks to which the products are to be applied must comply with the relevant requirements of BS 6229 : 2018, BS 8217 : 2005 and, where appropriate, *NHBC Standards 2024*, Chapter 7.1.

9.1.3 Imposed loads, dead loading and wind loads must be calculated by a suitably experienced and competent individual in accordance with BS EN 1991-1-1 : 2002, BS EN 1991-1-3 : 2003 and BS EN 1991-1-4 : 2005, and their UK National Annexes.

9.1.4 For design purposes on flat roofs, twice the minimum finished fall must be assumed, unless a detailed analysis of the roof is available, including overall and local deflections, direction of falls etc.

9.1.5 On zero fall roofs, it is particularly important to identify the correct drainage points to ensure that drainage provided is effective. Reference should be made to the appropriate clauses of the LRWA Guidance Note No 7 – *Specifier guidance for flat roof falls*, which generally requires surface drainage falls in most situations.

9.1.6 BauderPIR FA Tapered and BauderPIR Tapered insulation boards may be used where appropriate, to achieve minimum finished falls of between 1:80 and 1:6.

9.1.7 The suitability of the substrate, for any specified adhesive bond or mechanical fixings must be established before installation. Mechanical fixings must be checked before installation by carrying out in-situ pull-out or pull-through tests to determine the minimum safe working load the fixings can resist. The advice of the Certificate holder must also be sought in respect of suitable mechanical fixings, but such advice is outside the scope of this Certificate.

9.1.8 The fixing method and, if necessary, the number and type of mechanical fixings required will vary depending on the geographical location of the building, the topographical data, and height and width of the roof concerned, etc; the Certificate holder’s advice must be sought in this respect, but such advice is outside the scope of this Certificate.

9.1.9 For adhesive fixing applications, the substrate must be dry and free from dust, and installation must be in accordance with the instructions of the adhesive manufacturer. The surface of the substrate must have sufficient cohesive strength to resist the calculated wind load acting upon the structure.

9.1.10 When adhesively fixed, adhesion between the insulation board component and AVCL, and between the boards and overlay, is adequate to resist the effects of wind suction and thermal cycling likely to be experienced under normal conditions. Metal deck profiles must give a bonding area of at least 33% of the total projected surface area. In areas where high wind speeds can be expected, mechanical fixing must be considered, and the advice of the Certificate holder must be sought as to the method of fixing. Reference must be made to BS EN 1991-1-4 : 2005 where a calculation is required for a specific building project.

9.1.11 The Certificate holder recommends a minimum number of fixings for each board but the requirement for additional fixings must be assessed by a suitably experienced and competent individual in accordance with BS EN 1991-1-4 : 2005. Fixings and washers must not overlap board joints.

9.1.12 Each fixing must incorporate a thermally broken head or washer which is a maximum of 50 mm diameter if round, or 50 mm by 50 mm if square. For adhered single-ply roofing membranes, the SPRA Design Guide recommends a 75 mm diameter round head or a 70 x 70 mm washer. Fixings located along the edge or at corners of the boards must be situated no less than 50 mm and no more than 150 mm from the board edge. For non-bituminous AVCLs, the fixings penetrating the AVCL must be self-sealing. For bituminous AVCLs, the nail heads must be blanked out with hot bitumen.

9.1.13 On multi-storey buildings or in areas subject to high wind loads, additional mechanical fixings may be required.

9.1.14 Roofs must incorporate an AVCL below the product which is compatible both with the product and the waterproofing system. Design and installation must be in accordance with BS 5250 : 2021. In the case of single-ply roofing membranes, the recommendations of the SPRA Design guide must be followed.

9.1.15 Roof waterproofing covering systems must be installed in accordance with the relevant BBA Certificates and the associated Certificate holder's guidance.

9.1.16 Calculations of thermal transmittance (U-value) must be carried out in accordance with BS EN ISO 6946 : 2017 and BRE Report BR 443 : 2019.

9.1.17 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.

9.1.18 Roofs will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2021, and BRE report BR 262 : 2002 and the relevant guidance.

9.1.19 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 other elements are designed in accordance with the guidance referred to in section 9.1.17 of this Certificate.

9.1.20 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 9.1.17 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, the relevant clauses of BS 6229 : 2018, BS EN 13956 : 2012, BS 8000-0 : 2014, BS 8000-4 : 1989 and BS 8217 : 2005 and the Certificate holder's instructions. A summary of instructions and guidance is provided in Annex A.

9.2.3 Care must be taken to ensure the substrate deck is graded to the correct falls, and is dry, clean and free from any projections or gaps. Any hollows, depressions and backfalls found in the roof deck must be rectified prior to laying the insulation.

9.2.4 For tapered boards to be effective in providing a uniform fall, it is essential that the structural deck is true and even. Any hollows, depressions or backfalls found in the roof deck must be rectified prior to laying the insulation.

9.2.5 The deck to which the AVCL is to be applied must be even, dry, sound, free from dust and grease and other defects which may impair the restraint of the insulation boards (ie adhering and/or mechanically fixing). For adhered systems, all deck joints must be taped and, where necessary, the deck coated with bitumen primer to BS 3416 : 1991.

9.2.6 The AVCL must be turned up around the insulation and sealed to the waterproof finish at all edges and penetrations, such as rooflights, for linking to the waterproofing.

9.2.7 Where the specified AVCL is other than a reinforced bitumen membrane or bitumen-coated foil, any fixings that penetrate the AVCL should be of the self-sealing type. Advice should be sought from the Certificate holder, but such advice is outside the scope of this Certificate.

9.2.8 The products are either adhesively bonded to the AVCL or mechanically fixed to the roof deck and are for use in conjunction with a suitable roof waterproofing system (as defined in Table 2 of the *Product description and intended use* section of this Certificate).

9.2.9 The boards must be installed in a break-bonded pattern. Multiple insulation layers must be installed, where possible, in a staggered pattern.

9.2.10 Boards must be protected during laying and before the application of the roof waterproofing, or the roof covering must be laid at the same time as the boards. Boards accidentally wetted must be replaced or allowed to dry fully before application of the waterproof layer.

9.2.11 Boards must not be installed when the ambient temperature is below 5°C, to prevent condensation.

9.2.12 The products can be cut with a sharp knife or fine-toothed saw, to fit around projections through the roof.

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 products must be carried out by a Bauder Approved Contractor.

9.4 Maintenance and repair

9.4.1 The products, once installed, do not require any regular maintenance and have suitable durability provided the roof waterproof layers are inspected and maintained at regular intervals to the requirements of BS 6229 : 2018.

9.4.2 When maintenance of the roof waterproofing is required, protective boarding must be laid over the roof surface to avoid concentrations of loads.

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 products are delivered to site in packaging bearing the product name, Certificate holder's name, and batch number.

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

11.2.1 It is essential that the products are stored off the ground, inside or under cover on a flat, dry, level surface in a well-ventilated area, and with nothing stored on top. The products must be protected from rain, snow and prolonged exposure to sunlight.

11.2.2 Care must be taken when handling the boards to avoid crushing the edges or corners.

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

11.2.4 Boards that are damaged or wet must not be used

Supporting information in this Annex is relevant to the products 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.

CE marking

The Certificate holder has taken the responsibility of CE marking the products in accordance with harmonised European 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 DIN EN ISO 9001 : 2008 (Certificate 70499/03-15_d) and DIN EN ISO 14001 : 2004 (Certificate 70499/03-15_e) by ESC Cert GmbH.

Additional information on installation

Procedure

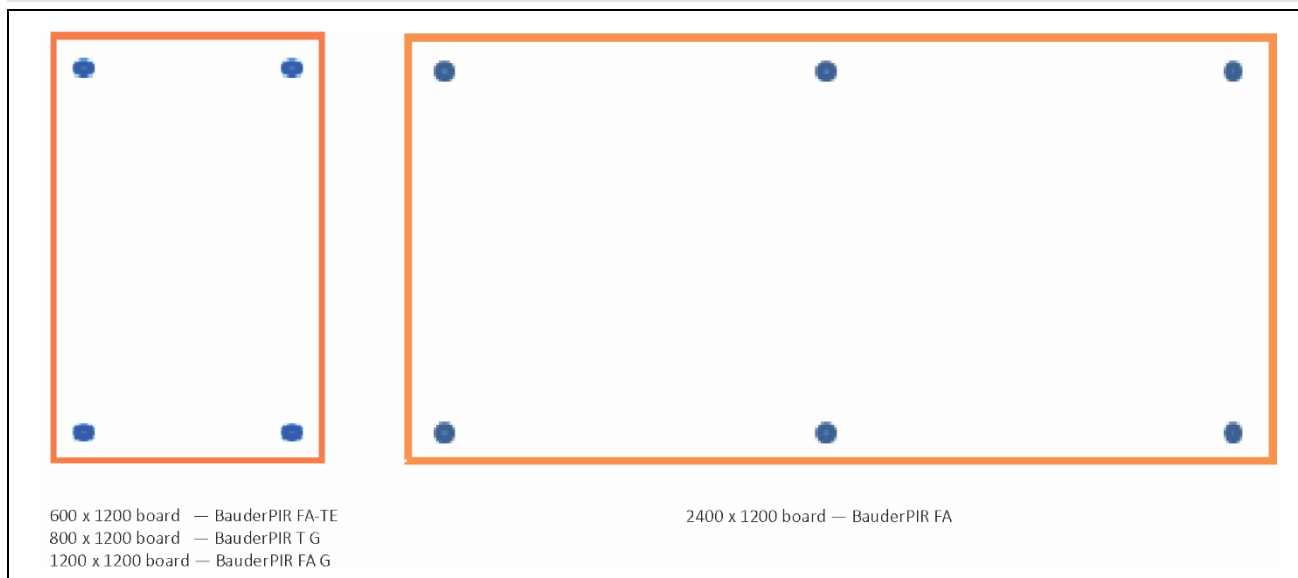
Timber decks (eg tongue-and-groove boards, plywood, OSB)

A.1 An AVCL is applied in accordance with the manufacturer's instructions.

A.2 The AVCL should be laid with sealed laps, turned up around the insulation and sealed to the waterproof finish at all edges and penetrations such as roof lights, with detailing in accordance with the standards and guidance in sections 9.1.2 and A.1. See section 9.1.14 in relation to single-ply roofing membranes.

A.3 The insulation boards are adhesively or mechanically fixed to the AVCL and deck below in a break-bonded pattern with the minimum number of mechanical fixings placed within the individual board area as shown in Figure 1. The actual number of mechanical fixings required to fix the board must be determined by a suitably experienced and competent individual to suit the wind uplift requirements for the particular site.

Figure 1 Minimum fixing pattern



A.4 The single-ply roof waterproofing membrane is mechanically fixed, in accordance with the manufacturer's instructions.

Concrete decks

A.5 Before applying the AVCL, an appropriate levelling screed must be applied where necessary. The whole deck must be primed, if necessary, in accordance with the manufacturer's instructions. The advice of the Certificate holder should be sought in respect of a suitable primer, but such advice and materials are outside the scope of this Certificate.

A.6 The AVCL is fully bonded and the laps are sealed. The insulation boards and roof waterproofing membrane are then applied in the manner described for timber decks (see sections A.2 and A.5).

Metal decks

A.7 Before applying the AVCL, the deck must be primed, if necessary, in accordance with the manufacturer's instructions. The advice of the Certificate holder should be sought in respect of a suitable primer, but such advice and materials are outside the scope of this Certificate.

A.8 A reinforced AVCL is fully bonded to the metal deck and the laps are sealed. The insulation boards and roof waterproofing membrane are then applied in the manner described for timber decks (see sections A.2 and A.5).

A.9 The insulation boards are laid with the long edges at right angles to the ribs and all board ends must be fully supported on a rib.

A.10 The thickness of the roofboard used depends on the width of the rib openings of the metal deck, as indicated in section 1.2.2, Table 5.

Figure 2 Reinforced bitumen membrane, adhesively fixed on timber deck

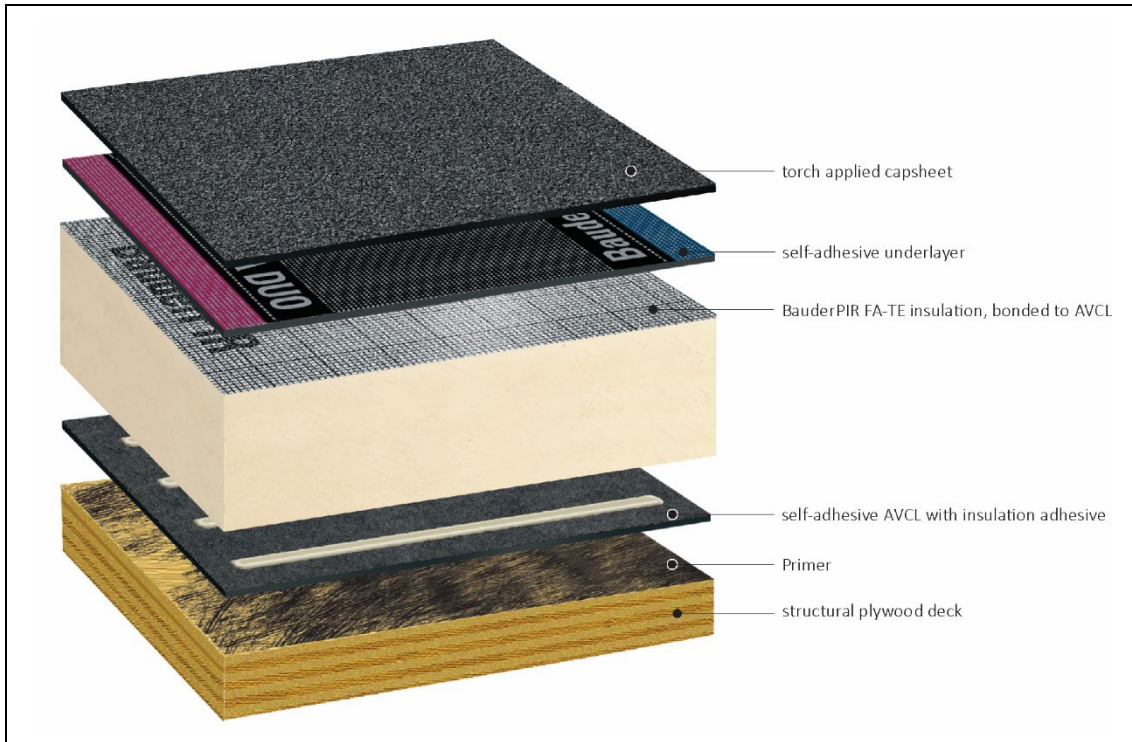


Figure 3 Single-ply waterproofing mechanically fixed on metal deck

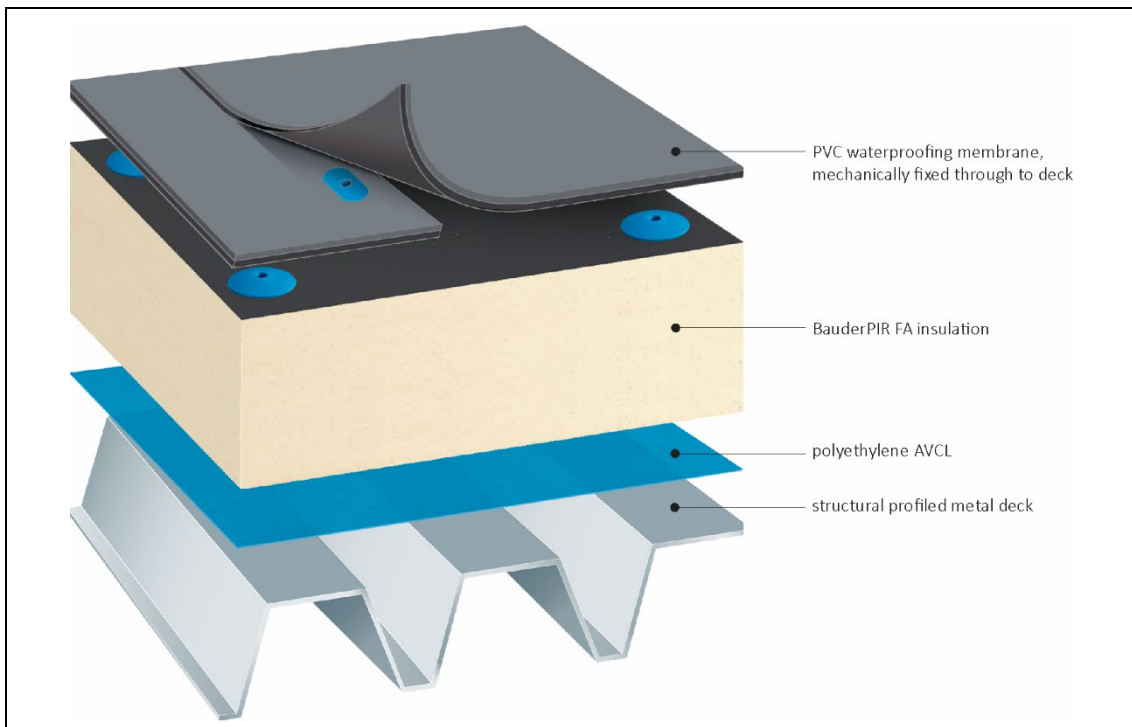
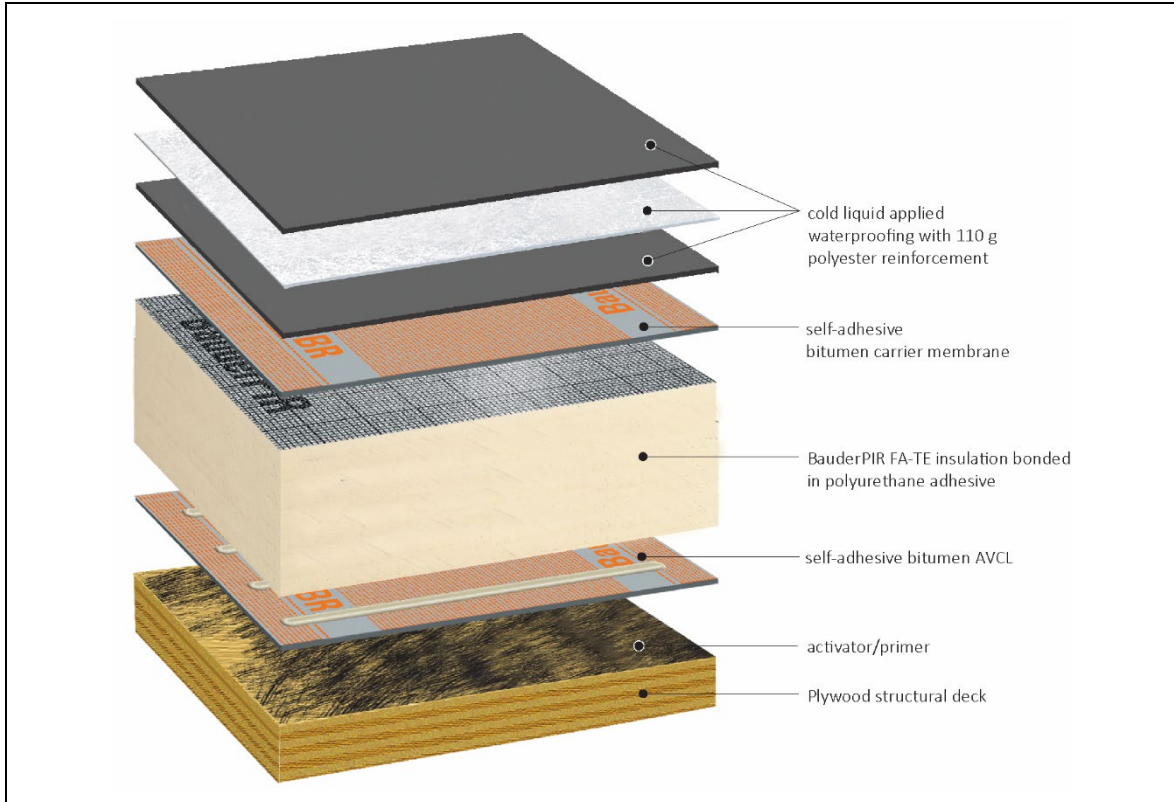


Figure 4 Cold Liquid Applied Waterproofing, adhesively fixed on timber deck



Bibliography

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

BRE Report (BR 443 : 2019) *U-value conventions in practice*

BS 5250 : 2021 *Management of moisture in buildings. Code of practice*

BS 6229 : 2018 *Flat roofs with continuously supported coverings — Code of practice*

BS 8217 : 2005 *Reinforced bitumen membranes for roofing — Code of practice*

BS 8747 : 2007 *Reinforced bitumen membranes (RBMs) for roofing — Guide to selection and specification*

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 *Eurocode 1 — Actions on structures — General actions — Wind actions*

BS EN 13501-1 : 2007 + A1 : 2009 *Fire classification of construction products and building elements — Classification using test data from reaction to fire tests*

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BS EN 13956 : 2012 *Flexible sheets for waterproofing — Plastic and rubber sheets for roof waterproofing. Definitions and characteristics.*

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EN 1604 : 2013 *Thermal insulating products for building applications. Determination of dimensional stability under specified temperature and humidity conditions*

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

MOAT 50 : 1992 *Technical guidelines for the assessment of thermal insulation systems intended for supporting waterproof coverings on flat and sloping roofs*

MOAT 65 : 2001 *UEATC Technical Guide for the Assessment of Non-Reinforced, Reinforced and/or Backed Roof Waterproofing Systems made of PVC.*

Conditions

1 This Certificate:

- relates only to the product 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.

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.

3 This Certificate will be displayed on the BBA website, and the Certificate Holder is entitled to use the Certificate and Certificate logo, provided that the product 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.

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

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

6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product which is contained or referred to in this Certificate is the minimum required to be met when the product 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.