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Agrément Certificate

16/5332

Product Sheet 1 Issue 3

KINGSPAN THERMAROOF RANGE INSULATION

THERMAROOF TR26, THERMATAPER TT46, THERMAROOF TR27 AND THERMATAPER TT47 ROOFING BOARDS

This Agrément Certificate Product Sheet⁽¹⁾ relates to Thermarroof TR26, Thermataper TT46, Thermarroof TR27 and Thermataper TT47 Roofing Boards, comprising a rigid polyisocyanurate (PIR) foam board with facings on both sides. The products are for use as a thermal insulation layer on limited access concrete, timber or metal flat roof decks, in domestic and non-domestic buildings. Thermataper TT46 and Thermataper TT47 are also suitable for use on zero fall roofs to create or improve falls. The products are for use in conjunction with an air and vapour control layer (AVCL) and adhesively bonded or mechanically fixed roof waterproofing systems.

(1) Hereinafter referred to as 'Certificate'.

The assessment includes

Product factors:

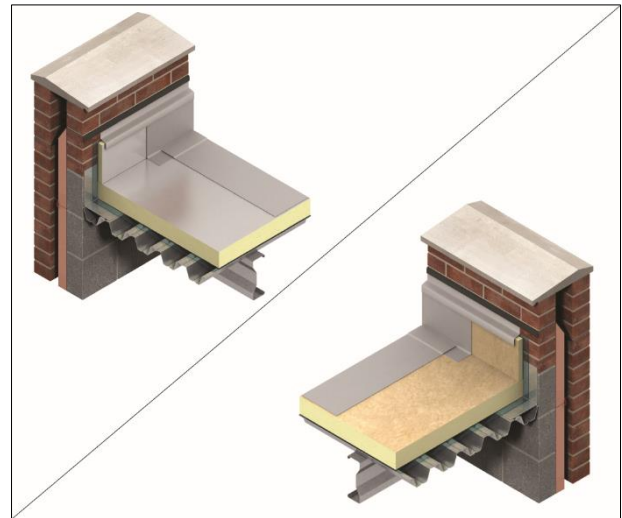
- compliance with Building Regulations
- compliance with additional regulatory or non-regulatory information where applicable
- evaluation against technical specifications
- assessment criteria and technical investigations
- uses and design considerations

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 Third issue: 26 September 2024

Originally certified on 30 June 2016

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.

British Board of Agrément

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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 Thermarroof TR26, Thermataper TT46, Thermarroof TR27 and Thermataper TT47 Roofing 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. 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. 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 these Standards, 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)	Energy demand
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 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⁾ , 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 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 7.1.4 ⁽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 – conversion
Comment:		All comments given for the 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:	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
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 2024

In the opinion of the BBA, Thermarroof TR26, Thermataper TT46, Thermarroof TR27 and Thermataper TT47 Roofing 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 Thermarroof TR26, Thermataper TT46, Thermarroof TR27 and Thermataper TT47 Roofing Boards to be satisfactory for use as described in this Certificate. The products have been assessed as a thermal insulation layer on limited access concrete, timber or metal flat roof decks, in domestic and non-domestic buildings. Thermataper TT46 and Thermataper TT47 are also suitable for use on zero fall roofs to create or improve falls. The products are for use in conjunction with an air and vapour control layer (AVCL) and adhesively bonded or mechanically fixed roof waterproofing membranes.

ASSESSMENT

Product description and intended use

The Certificate holder provided the following description for the products under assessment. Thermarroof TR26 and Thermataper TT46 Roofing Boards are PIR insulation boards with a composite foil facing on both sides. Thermarroof TR27 and Thermataper TT47 Roofing Boards are PIR insulation boards with a glass tissue facing on both sides.

The products have the nominal characteristics given in Table 1.

Table 1 Nominal characteristics⁽¹⁾

Characteristic (unit)	Value	
	Thermarroof TR26 / Thermataper TT46 ⁽²⁾	Thermarroof TR27 / Thermataper TT47 ⁽²⁾
Length (mm)	1200 and 2400	600, 1200 and 2400
Width (mm)	1200	1200
Thickness (mm)	25 to 160	25 to 160
Edge detail	Plain	Plain
Facing	Composite foil	Glass tissue

(1) Other board sizes within this range may be available on request.

(2) Thermataper TT46 and Thermataper TT47 are available in tapered versions for falls of 1:120, 1:80, 1:60, 1:40 and 1:30.

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
- AVCL
- adhesives and/or mechanical fixings.

Applications

The products are for use as a fully supported thermal insulation layer on limited access flat roofs with concrete, timber, and profiled metal roof decks, in conjunction with suitable roof waterproofing membrane systems.

Thermarroof TR26 and Thermataper TT46 Roofing Boards are mechanically fixed to the AVCL substrate including mechanically fixed single-ply waterproofing membranes, which are the subject of a current BBA Certificate and laid in accordance with, and within the limitations imposed by, that Certificate.

Thermarroof TR27 and Thermataper TT47 Roofing Boards are either adhesively or mechanically fixed to the AVCL substrate including one of the following waterproofing specifications:

- 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
- single-ply waterproofing membranes, such as polyvinyl chloride (PVC), reverse osmosis membrane (CSM), chlorinated polyethylene (CPE), flexible polyolefin (FPO) including thermoplastic polyolefin (TPO), vinyl ethylene terpolymer (VET), polyisobutylene (PIB) or ethylene propylene diene terpolymer (EPDM), which are the subject of a current BBA Certificate and laid in accordance with the requirements of that Certificate
- liquid-applied waterproofing systems, which are the subject of a current BBA Certificate and laid in accordance with, and within the limitations imposed by, that Certificate.

Definitions for products and applications inspected

The following terms have been defined for the purpose of this Certificate as:

- 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 no more than 10°
- zero fall roofs — those having a finished fall from 0 to 1:80.

Product assessment – key factors

The products were assessed for the following key factors, and the outcome of the assessment 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 2.

Table 2 Wind uplift resistance

Product assessed	Assessment method	Requirement	Result
Thermarroof TR26 fixed to a profiled steel deck substrate with mechanical fixings	Wind uplift test to BRL 1309 (Dutch National Assessment Guideline)	Peak load for completed wind uplift cycle without damage	3.0 kPa
Thermarroof TR27 adhesively fixed to a plywood substrate with a single-ply fleece backed PVC waterproofing membrane	Wind uplift test to EOTA TR005 : 2003	Maximum suction pressure for completed wind uplift cycle without damage	-9.0 kPa
Thermarroof TR27 adhesively fixed to a plywood substrate with a single-ply unbacked TPO waterproofing membrane			-7.0 kPa

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 the principles of 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 3.

Product assessed	Assessment method	Requirement	Result
Thermarroof TR26 Thermataper TT46 Thermarroof TR27 Thermataper TT47	Compressive strength to BS EN 826 : 1996	Declared minimum value at 10% deformation	150 kPa
Thermarroof TR26 Thermataper TT46 Thermarroof TR27 Thermataper TT47	Tensile strength perpendicular to faces to BS EN 1607 : 1997	Declared value	TR40 TR40 TR80 TR80
Thermarroof TR26 Thermataper TT46 Thermarroof TR27 Thermataper TT47	Behaviour on exposure to mechanical stress under distributed static load and increased temperatures to MOAT 50 : 1992	Maximum deformation ≤ 10%	Pass
Thermarroof TR26 Thermataper TT46 Thermarroof TR27 Thermataper TT47	Behaviour on exposure to mechanical stress under concentrated loads in the middle of a free span to MOAT 50 : 1992	No breakage	See Table 4

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 4.

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 4.

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 5.

Table 5 Reaction to fire classification

Product assessed	Assessment method	Requirement	Result
Thermarroof TR26 Thermataper TT46 Thermarroof TR27 Thermataper TT47	BS EN 13501-1 : 2007	Value achieved	F

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

The products were tested/assessed for water vapour permeability and the results are given in Table 6.

Table 6 Water vapour resistivity/resistance

Product assessed	Assessment method	Requirement	Result
PIR insulation core	BS EN ISO 10456 : 2007	Declared value	300 MN·s·g ⁻¹ ·m ⁻¹
Composite foil facing Glass tissue facing	BS EN 12086 : 1997	Value achieved	80 MN·s·g ⁻¹ 1 MN·s·g ⁻¹

3.2 Condensation

3.2.1 The BBA has assessed the products for the risk of 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 6 of this Certificate.

3.2.3 To minimise the moisture entering the roof, an effective AVCL, such as 0.25 mm minimum thickness polyethylene, must be used below the products with sealed and lapped joints, turned up around the insulation and bonded to the waterproofing finish.

4 Safety and accessibility in use

Not applicable.

5 Protection against noise

Data were assessed for the following characteristic.

5.1 Acoustic properties

5.1.1 Thermaroom TR26 and Thermaroom TR27 were tested for acoustic properties and the results are given in Tables 7 and 8.

Table 7 Airborne sound transmission

Test method	Method calculated	Substrate deck ⁽¹⁾	Insulation	Waterproofing membrane ⁽¹⁾	Fixing method ⁽¹⁾	Roof inclination	Airborne sound reduction
BS EN ISO 140-3 : 1995 BS 2750-3 : 1980 BS EN ISO 140-6 : 1998	BS EN ISO 717-1 : 1997	0.7 mm thick galvanized steel deck	80 mm Thermaroom TR26 TR27	single ply	Mechanical	0°	Rw (C;Ctr) = 27 (-1;-3) dB

(1) These items are outside the scope of the Certificate. Specific constructions used should be tested.

Table 8 Rain-generated impact sound reduction

Test method	Substrate deck ⁽¹⁾	AVCL ⁽¹⁾	Insulation	Waterproofing membrane ⁽¹⁾	Roof inclination	Rain-generated impact sound reduction
BS EN ISO 140-18 : 2006	0.7 mm thick galvanized steel deck	Polyethylene	100 mm Thermaroom TR26	1.2 mm single-ply membrane	0°	LIA = 60.2 dB
	0.7 mm thick profiled metal deck (MF) ⁽³⁾	1.5 mm bituminous felt (A) ⁽²⁾	110 mm Thermaroom TR27 (A) ⁽²⁾	1.2 mm single-ply membrane with a fleece backing (A) ⁽²⁾	0°	LIA = 56.1 dB
		0.2 mm polyethylene (MF) ⁽³⁾	110 mm Thermaroom TR27 (MF) ⁽³⁾			LIA = 57.0 dB
	0.7 mm thick galvanized steel deck	Polyethylene	100 mm Thermaroom TR26	1.2 mm single-ply membrane with a fleece backing	0°	LIA = 57.4 dB

(1) These items are outside the scope of the Certificate. Specific constructions used should be tested.

(2) (A) Adhesively fixed.

(3) (MF) Mechanically fixed.

Note: Copies of above reports can be obtained from the Certificate holder.

5.1.2 On the basis of data assessed, the degree of sound insulation achieved for completed constructions will depend substantially on the design and quality of construction of the roof and their associated flanking elements. Further improvements may be achieved using additional acoustic insulation.

6 Energy economy and heat retention

Data were assessed for the following characteristics.

6.1 Thermal conductivity

The products were tested for thermal conductivity and the results are given in Table 9.

Table 9 Thermal conductivity

Product assessed	Insulation thickness	Assessment method	Requirement	Result
Thermaroom TR26 Thermataper TT46	All	BS EN 13165 : 2012	Declared value (λ_D)	0.022 W·m ⁻¹ ·K ⁻¹
Thermaroom TR27 Thermataper TT47	< 80 mm			0.027 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 Tables 10 and 11.

Table 10 Example U values — flat roof — insulation adhesively fixed

Target U value ($W \cdot m^{-2} \cdot K^{-1}$)	Insulation thickness ⁽¹⁾ (mm)		
	Concrete deck ⁽²⁾		Metal deck ⁽⁴⁾
	TR27 only	Timber deck ⁽³⁾ TR27 only	TR27 only
0.09	125 + 125 ⁽⁵⁾	120 + 120 ⁽⁵⁾	125 + 125 ⁽⁵⁾
0.11	110 + 105 ⁽⁵⁾	105 + 100 ⁽⁵⁾	110 + 105 ⁽⁵⁾
0.12	100 + 95 ⁽⁵⁾	95 + 95 ⁽⁵⁾	100 + 100 ⁽⁵⁾
0.13	90 + 90 ⁽⁵⁾	90 + 85 ⁽⁵⁾	95 + 90 ⁽⁵⁾
0.15	150	145	155
0.16	140	135	145
0.18	125	120	130
0.20	120	110	120

(1) Nearest available thickness.

(2) 150 mm dense concrete deck ($\lambda = 1.65 W \cdot m^{-1} \cdot K^{-1}$); AVCL; TR27 insulation adhesively fixed; single-ply waterproofing membrane (adhered).

(3) 12.5 mm plasterboard ($\lambda = 0.25 W \cdot m^{-1} \cdot K^{-1}$); 150 mm timber joists (12.5%)/air cavity (87.5%); 18 mm oriented strand board (OSB) deck ($\lambda = 0.13 W \cdot m^{-1} \cdot K^{-1}$); AVCL; TR27 insulation adhesively fixed; single-ply waterproofing membrane (adhered).

(4) Metal deck (not included in calculation); AVCL; TR27 insulation adhesively fixed; single-ply waterproofing membrane (adhered).

(5) Two layers of insulation used.

Table 11 Example U values — flat roof — insulation mechanically fixed

Target U value ($W \cdot m^{-2} \cdot K^{-1}$)	Insulation thickness ⁽¹⁾ (mm)					
	Concrete deck ⁽²⁾		Timber deck ⁽³⁾		Metal deck ⁽⁴⁾	
	TR26	TR27	TR26	TR27	TR26	TR27
0.09	125 + 120 ⁽⁵⁾	135 + 130 ⁽⁵⁾	120 + 115 ⁽⁵⁾	130 + 125 ⁽⁵⁾	125 + 120 ⁽⁵⁾	135 + 130 ⁽⁵⁾
0.11	100 + 100 ⁽⁵⁾	115 + 110 ⁽⁵⁾	100 + 95 ⁽⁵⁾	110 + 105 ⁽⁵⁾	100 + 100 ⁽⁵⁾	115 + 115 ⁽⁵⁾
0.12	95 + 90 ⁽⁵⁾	105 + 100 ⁽⁵⁾	90 + 85 ⁽⁵⁾	100 + 100 ⁽⁵⁾	95 + 90 ⁽⁵⁾	105 + 105 ⁽⁵⁾
0.13	85 + 85 ⁽⁵⁾	95 + 95 ⁽⁵⁾	160	95 + 90 ⁽⁵⁾	85 + 85 ⁽⁵⁾	100 + 95 ⁽⁵⁾
0.15	145	85 + 80 ⁽⁵⁾	140	150	150	85 + 85 ⁽⁵⁾
0.16	140	150	130	140	140	155
0.18	125	135	115	125	125	135
0.20	110	120	105	115	115	125

(1) Nearest available thickness.

(2) 150 mm dense concrete deck ($\lambda = 1.65 W \cdot m^{-1} \cdot K^{-1}$); AVCL; TR26 or TR27 insulation secured using 5.56 fully-penetrating stainless steel ($\lambda = 17 W \cdot m^{-1} \cdot K^{-1}$) fixings per m^2 with a cross-sectional area of 18.1 mm^2 ; single-ply waterproofing membrane (adhered or mechanically fixed).

(3) 12.5 mm plasterboard ($\lambda = 0.25 W \cdot m^{-1} \cdot K^{-1}$); 150 mm timber joists (12.5%)/air cavity (87.5%); 18 mm oriented strand board (OSB) deck ($\lambda = 0.13 W \cdot m^{-1} \cdot K^{-1}$); AVCL; TR26 or TR27 insulation secured using 5.56 fully penetrating stainless steel ($\lambda = 17 W \cdot m^{-1} \cdot K^{-1}$) fixings per m^2 with a cross-sectional area of 18.1 mm^2 ; single-ply waterproofing membrane (adhered or mechanically fixed).

(4) Metal deck (not included in calculation); AVCL; TR26 or TR27 insulation secured using 5.56 fully penetrating stainless steel ($\lambda = 17 W \cdot m^{-1} \cdot K^{-1}$) fixings per m^2 with a cross-sectional area of 18.1 mm^2 ; single-ply waterproofing membrane (adhered or mechanically fixed).

(5) Two layers of insulation used.

6.2.2 On the basis of data assessed, the products can contribute towards a construction satisfying the national Building Regulations in respect of energy economy and heat retention.

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 12.

Product assessed	Assessment method	Requirement	Result
Thermarroof TR26 Thermataper TT46 Thermarroof TR27 Thermataper TT47	Dimensional stability to BS EN 1604 : 1997 (70°C and 90-100% RH for 48 hours)	Length and width ≤ 2% change Thickness ≤ 6% change	Pass
	Dimensional stability to BS EN 1604 : 1997 (-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	Maximum deformation ≤ 10 mm	Pass
	Dimensional changes due to variations in temperature to MOAT 50 : 1992	Residual dimensional variation ≤ 0.5%	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 are 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 the principles of 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 The roof construction or immediate substrate to which the boards are fixed must be structurally sound and have sufficient strength and stability to resist all dead, imposed and wind loads. It must also have adequate resistance to the pull-out forces created by the wind forces acting on the specified fixings used.

9.1.6 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.

- 9.1.7 Thermataper TT46 and Thermataper TT47 may be used where appropriate to achieve the minimum finished falls required.
- 9.1.8 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.
- 9.1.9 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. See sections A.6 and A.18; the requirement for additional fixings must be assessed in accordance with BS 6399-2 : 1997 or BS EN 1991-1-4 : 2005. The Certificate holder's advice must be sought, but such advice is outside the scope of this Certificate.
- 9.1.10 For adhesive fixing applications, the substrate must be dry and free from dust, and installation should 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.
- 9.1.11 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, but such advice is outside the scope of this Certificate.
- 9.1.12 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 the principles of BS EN 1991-1-4 : 2005. Fixings and washers must not overlap board joints.
- 9.1.13 Each fixing must incorporate a thermally broken head or washer which is a maximum of 50 mm diameter if round, or 50 x 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.
- 9.1.14 On multi-storey buildings or in areas subject to high wind loads, additional mechanical fixings may be required.
- 9.1.15 Roofs must incorporate an AVCL below the products which is compatible both with the products 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.
- 9.1.16 Roof waterproofing covering systems must be installed in accordance with the relevant BBA Certificates and the associated Certificate holder's guidance.
- 9.1.17 Calculations of thermal transmittance (U value) must be carried out in accordance with BS EN ISO 6946 : 2017 and BRE Report BR 443 : 2019.
- 9.1.18 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.
- 9.1.19 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.
- 9.1.20 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 9.1.18 of this Certificate.

9.1.21 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 9.1.18 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 the *Product description and intended use* section of this Certificate).

9.2.9 The boards must be installed in a break-bonded pattern. In situations where two layers of insulation are required, both layers must be installed, where possible, in a staggered pattern.

9.2.10 The 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 The 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 competent general builder, or a contractor, experienced with these types of products.

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 Certificate holder's name, product description and characteristics, batch number, production date, and the BBA logo incorporating the number of this Certificate.

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

11.2.1 The products must be protected from prolonged exposure to sunlight and should be stored either under cover or protected with opaque polythene sheeting.

11.2.2 Where possible, packs should be stored inside. If outside, the products must be stacked flat, and raised above ground level and not in contact with ground moisture.

11.2.3 Care must be exercised to avoid crushing the edges or corners.

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

11.2.5 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.

UKCA marking

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

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 BS EN ISO 9001 : 2015 and BS EN ISO 14001 : 2015 by CIBSE Certification Limited (Certificates 0001QMS-0 and 0001EMS-0 respectively for the Pembridge site, and Certificates 0001QMS-1 and 0001EMS-1 respectively for the Selby site).

Additional information on installation

Procedure

Thermarof TR26 and Thermataper TT46 Roofing Boards

General

A.1 Thermarof TR26 Roofing Boards should be laid break-bonded, whilst Thermataper TT46 Roofing Boards are laid using a chequerboard pattern. Both systems should be laid above a suitable AVCL with joints between the insulation boards lightly butted.

A.2 For metal decks, the thickness of the board to be used is dependent on the width of the trough openings of the metal deck as indicated in section 1, Table 4.

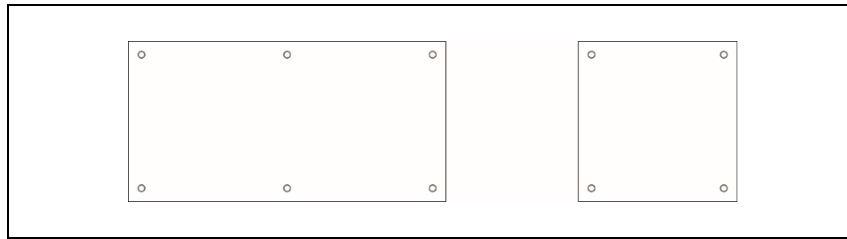
A.3 The specified AVCL should have a minimum of 150 mm side and end laps which should be adequately sealed.

A.4 The AVCL should also be turned up at, but not sealed to, all vertical surfaces which abut the roof, to a minimum height of 250 mm and overhanging the verge or gutter by the same amount.

A.5 Before applying the roof finish, the projecting 250 mm of the AVCL should be turned over the insulation and sealed down to form an envelope.

A.6 A minimum of 6 fixings should be used for 2400 x 1200 mm boards, or a minimum of 4 for 1200 x 1200 mm boards (see section 9.1.9). Fixings located along the edges or at the corners of boards should be situated no less than 50 mm, but less than 150 mm, from the board edges (see Figure 1).

Figure 1 Minimum layout of fixings



A.7 The waterproofing membrane is mechanically fixed, the securing requirements of which should be considered separately.

Thermarroof TR27 and Thermataper TT47 Roofing Boards

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

A.8 If using a bituminised felt AVCL, the felt is nailed to the deck and the nail heads blanked out with hot bitumen. Laps are sealed using the appropriate grade of bitumen, a polyurethane adhesive, or a suitable solvent based adhesive in accordance with BS 8217 : 2005.

A.9 Hot bitumen adhesive (maximum temperature of 240°C), polyurethane adhesive or a suitable solvent-based adhesive is applied over the AVCL, and the roofing boards are fully embedded into it and close butted. Thermarroof TR27 Roofing Boards should be laid break-bonded, whilst Thermataper TT47 Roofing Boards are laid using a chequerboard pattern.

A.10 When using non-bituminous waterproofing systems or adhesives, all board joints and edges should be sealed with 50 mm wide aluminium foil adhesive tape, prior to the application of the adhesive system and roof waterproofing membrane.

Concrete and screeded concrete decks

A.11 Before applying the AVCL, a screed graded to the appropriate fall should be applied where necessary and, if adhering the AVCL and insulation boards, the whole deck treated with a suitable primer. The advice of the Certificate holder should be sought in respect of a suitable primer, but such advice and products are outside the scope of this Certificate.

A.12 For adhered systems, the AVCL is fully bonded with hot bitumen, polyurethane adhesive or a suitable solvent-based adhesive and the laps sealed. The boards are applied in the manner described for timber decks (see sections A.9 and A.10).

Metal decks

A.13 If adhering the AVCL and insulation boards, the deck should be treated with a suitable primer before applying the AVCL. The advice of the Certificate holder should be sought in respect of a suitable primer, but such advice and products are outside the scope of this Certificate.

A.14 For adhered systems, the reinforced AVCL is fully bonded using hot bitumen, a polyurethane adhesive or a suitable solvent-based adhesive to the metal deck and the boards applied in the manner described for timber decks (see sections A.9 and A.10).

A.15 Boards are laid either with the long axis at right angles to the corrugations of the metal deck or diagonally across the corrugations of the deck, ensuring that all joints are supported on the crown flats of the decking.

A.16 The thickness of the board to be used is dependent on the width of the trough openings of the metal deck as indicated in section 1, Table 4.

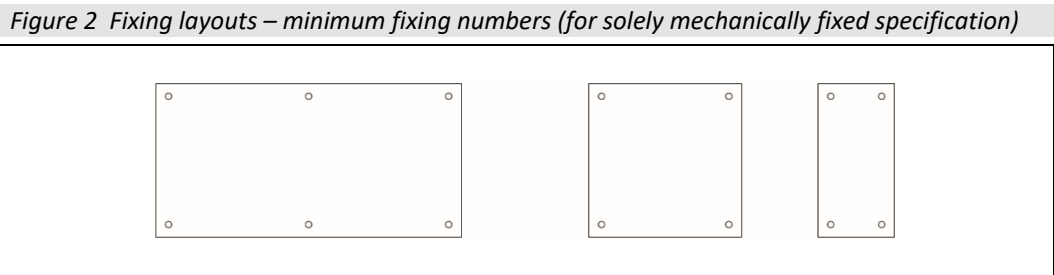
Mechanical fixings

A.17 Alternatively, the boards can be secured to timber, metal, and concrete decks by means of mechanical fixings.

A.18 Each fixing should incorporate a minimum 50 x 50 mm square or 50 mm diameter circular plate countersunk washer, which must not restrain more than one board. The minimum number of fixings for each board size is given in Table 13 and shown in Figure 2 (see section 9.1.9). These should be placed within the individual board area and be sited more than 50 mm and less than 150 mm from the edges and corners of the board, eg, giving a minimum fixing rate of 5.56 fixings per square metre for 1200 x 600 mm boards.

Table 13 Minimum number of fixings (for solely mechanically fixed specification)

Board dimensions (mm)	Minimum number of fixings
2400 x 1200	6
1200 x 1200	4
600 x 1200	4



Bibliography

- BRE Report BR 262 : 2002 *Thermal insulation: avoiding risks*
- BRE Report BR 443 : 2019 *Conventions for U-value calculations*
- BS 2750-3 : 1980 *Measurement of sound insulation in buildings and of building elements — Laboratory measurements of airborne sound insulation of building elements*
- BS 3416 : 1991 *Specification for bitumen-based coatings for cold application, suitable for use in contact with potable water*
- BS 5250 : 2021 *Management of moisture in buildings — Code of practice*
- BS 6229 : 2018 *Flat roofs with continuously supported coverings — Code of practice*
- BS 6399-2 : 1997 *Loading for buildings — Code of practice for wind loads*
- BS 8000-0 : 2014 + A1 : 2024 *Workmanship on construction sites — Introduction and general principles*
- BS 8000-4 : 1989 *Workmanship on building sites — Code of practice for waterproofing*
- 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 826 : 1996 *Thermal insulation products for building applications — Determination of compression behaviour*
- BS EN 1604 : 1997 *Thermal insulating products for building applications — Determination of dimensional stability under specified temperature and humidity conditions*
- BS EN 1607 : 1997 *Thermal insulating products for building applications — Determination of tensile strength perpendicular to faces*
- BS EN 1991-1-1 : 2002 *Eurocode 1 — Actions on structures — General actions — Densities, self-weight, imposed loads for buildings*
- NA to BS EN 1991-1-1 : 2002 *UK National Annex to Eurocode 1 — Actions on structures — General actions — Densities, self-weight, imposed loads for buildings*
- BS EN 1991-1-3 : 2003 + A1 : 2015 *Eurocode 1 — Actions on structures — General actions — Snow loads*
- NA + A2 : 18 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 12086 : 1997 *Thermal insulating products for building applications — Determination of water vapour transmission properties*
- BS EN 13165 : 2012 + A2 : 2016 *Thermal insulation products for buildings — Factory made rigid polyurethane foam (PU) products — Specification*
- BS EN 13501-1 : 2007 + A1 : 2009 *Fire classification of construction products and building elements — Classification using data from external fire exposure to roofs tests*
- BS EN 13956 : 2012 *Flexible sheets for waterproofing — Plastic and rubber sheets for roof waterproofing — Definitions and characteristics*
- BS EN ISO 140-6 : 1998 *Acoustics — Measurement of sound insulation in buildings and of building elements — Laboratory measurements of impact sound insulation of floors*
- BS EN ISO 140-3 : 1995 *Acoustics — Measurement of sound insulation in buildings and of building elements — Laboratory measurement of airborne sound insulation of building elements*
- BS EN ISO 140-18 : 2006 *Acoustics — Measurement of sound insulation in buildings and of building elements — Laboratory measurement of sound generated by rainfall on building elements*
- BS EN ISO 717-1 : 1997 *Acoustics — Rating of sound insulation in buildings and of building elements — Airborne sound insulation*
- 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 10456 : 2007 *Building materials and products — Hygrothermal properties — Tabulated design values and procedures for determining declared and design thermal values*

BS EN ISO 14001 : 2015 *Environmental management systems — Requirements with guidance for use*

EOTA TR005 : 2003 *Determination of the resistance to wind loads of partially bonded roof waterproofing membranes*

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

Single Ply Roofing Association (SPRA) — Single Ply: Design Guide — 2020 Edition

Conditions

1 This Certificate:

- relates only to the products that are 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 products or any other product
- the right of the Certificate holder to manufacture, supply, install, maintain or market the products
- actual installations of the products, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the products are installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the products, including their 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 these products which is contained or referred to in this Certificate is the minimum required to be met when the products are 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.