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Agrément Certificate

24/7232

Product Sheet 2 Issue 1

POWERDECK

POWERDECK U (UK)

This Agrément Certificate Product Sheet⁽¹⁾ relates to Powerdeck U (UK), a rigid polyisocyanurate (PIR) foam board with a composite bitumen/glass fibre tissue facing on both sides. The product is for use as a thermal insulation layer on limited access concrete, timber or metal flat roof decks, in domestic and non-domestic buildings. The product is 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 product described herein. This product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of issue: 19 August 2024

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 Powerdeck U (UK), 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 product can contribute to satisfying this Requirement. See section 1 of this Certificate. |
| Requirement: | B3(2) | Internal fire spread (structure) |
| Comment: | | The product may be restricted by this Requirement in some circumstances. See section 2 of this Certificate. |
| Requirement: | B4(2) | External fire spread |
| Comment: | | The product may be restricted by this Requirement. See section 2 of this Certificate. |
| Requirement: | C2(c) | Resistance to moisture |
| Comment: | | The product can contribute to satisfying this Requirement. See section 3 of this Certificate. |
| Requirement: | L1(a)(i) | Conservation of fuel and power |
| Comment: | | The product can contribute to satisfying this Requirement. See section 6 of this Certificate. |
| Regulation: | 7(1) | Materials and workmanship |
| Comment: | | The product is 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 product 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 product is acceptable. See sections 8 and 9 of this Certificate. |
| Regulation: | 9 | Building standards – construction |
| Standard: | 1.1 | Structure |
| Comment: | | The product 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 product 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 product 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 product can contribute to satisfying this Standard, with reference to clauses 3.15.1 ⁽¹⁾⁽²⁾ , 3.15.3 ⁽¹⁾⁽²⁾ , 3.15.4 ⁽¹⁾⁽²⁾ , 3.15.5 ⁽¹⁾⁽²⁾ and 3.15.6 ⁽¹⁾⁽²⁾ . See section 3 of this Certificate. |
| Standard: | 6.1(b)(c) | Energy demand |
| Comment: | | The product 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 product 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 product 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 product can contribute to a construction meeting a higher level of sustainability as defined in this Standard, with reference to clauses 7.1.4 ⁽¹⁾ , 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: | | Comments in relation to the product under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 ⁽¹⁾ and Schedule 6 ⁽¹⁾ . |
| | | (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 product is acceptable. See sections 8 and 9 of this Certificate. |
| Regulation: | 29 | Condensation |
| Comment: | | The product can contribute to satisfying this Regulation. See section 3 of this Certificate. |
| Regulation: | 30 | Stability |
| Comment: | | The product can contribute to satisfying this Regulation. See section 1 of this Certificate. |
| Regulation: | 35(2) | Internal fire spread – structure |
| Comment: | | The product may be restricted by this Regulation in some circumstances. See section 2 of this Certificate. |
| Regulation: | 36(b) | External fire spread |
| Comment: | | The product may be restricted by this Regulation. See section 2 of this Certificate. |

| | | |
|--------------------|-----------------|--|
| Regulation: | 39(a)(i) | Conservation measures |
| Comment: | | The product 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: | 43(b) | Nearly zero-energy requirements for new buildings |
| Comment: | | The product can contribute to satisfying these Regulations. See section 6 of this Certificate. |

Additional Information

NHBC Standards 2024

In the opinion of the BBA, Powerdeck U (UK), 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 and balconies*.

Fulfilment of Requirements

The BBA has judged Powerdeck U (UK) to be satisfactory for use as described in this Certificate. The product is for use as a thermal insulation layer on limited access concrete, timber or metal flat roof decks, in domestic and non-domestic buildings. The product is for use in conjunction with an AVCL and adhesively bonded or mechanically fixed roof waterproofing systems.

ASSESSMENT

Product description and intended use

The Certificate holder provided the following description for the product under assessment. Powerdeck U (UK) consists of rigid PIR foam boards, with a composite bitumen/glass fibre tissue facing on both sides.

The product has the nominal characteristics given in Table 1.

Table 1 Nominal characteristics of Powerdeck U (UK)

| Characteristic (unit) | Value |
|-------------------------------|--------------------------------------|
| Length (mm) | 1200 |
| Width (mm) | 600 |
| Thickness (mm) ⁽¹⁾ | 30 to 150 (in 5 mm increments) |
| Edge detail | Square |
| Facing | Composite bitumen/glass fibre tissue |

(1) Thicknesses greater than 150 mm can be achieved by combining two boards.

Ancillary Items

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

- waterproofing membrane/system
- AVCL
- adhesives and/or mechanical fixings.

Application

The product is for use as a thermal insulation layer on flat roofs with concrete, timber, and profiled metal roof decks, in conjunction with a suitable roof waterproofing membrane system, with limited access only.

The product is intended for use with one of the following torch-on waterproofing specifications:

- built-up reinforced bitumen membranes to BS 8747 : 2007 laid in accordance with BS 8217 : 2005 (torch-on application only)
- other bitumen waterproofing systems which are the subject of a current BBA Certificate, laid in accordance with, and within the limitations imposed by that Certificate (torch-on application only)
- single-ply waterproof membranes, such as PVC, CSM, CPE, FPO (including TPO), VET, PIB or EPDM, 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 product was 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 product is given in Table 2.

Table 2 Wind uplift resistance

| Product assessed | Assessment method | Requirement | Result |
|--|--|--|-----------|
| Powerdeck U (UK) insulation adhesively fixed with torch-on waterproofing | Large scale wind uplift test to MOAT 50 : 1992 | Peak load for completed wind uplift cycle without damage | - 7.0 kPa |

1.1.2 On the basis of data assessed, the 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.

Table 3 Behaviour under loading

| Product assessed | Assessment method | Requirement | Result |
|------------------|---|---|----------------------------|
| Powerdeck U (UK) | Compressive strength to BS EN 826 : 1996 | Value achieved | |
| | | Control | 180 kPa |
| | | Soaked | 170 kPa |
| | Dimensional changes due to variations in temperature to MOAT 50 : 1992 | Value achieved | $\delta L_s < 0.3\%$ |
| | Deformation under distributed load and increased temperature to MOAT 50 : 1992 | Value achieved | $\delta t < 1.5\%$ |
| | Concentrated load on cantilevered parts to MOAT 50 : 1992 | Declared value | No residual deformation |
| | Concentrated load in the centre of a free span to MOAT 50 : 1992 | Declared value | No residual deformation |
| | Tensile strength perpendicular to faces to BS EN 1607 : 2013 | Value achieved | |
| | | Control | 31.5 kPa |
| | | Soaked | 26.2 kPa |
| | Resistance to peel (mineral coated glass fleece facing) to MOAT 27 : 1983 | Average peel load achieved | |
| | | Control | 32.42 N |
| | | Soaked | 25.26 N |
| | Pour and Roll to BS 4841-3 : 2006 | Average mean total percentage dimensional change | 0.049% |

1.2.2 The product was 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.

Table 4 Clear spans for insulation thicknesses

| 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 product must not exceed the maximum permissible spans given in Table 4.

1.2.4 The product has 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. The product is not suitable when permanent roof access is required.

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 product was 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 ⁽¹⁾ |
|------------------|----------------------|----------------|-----------------------|
| Powerdeck U (UK) | BS EN 13501-1 : 2007 | Value achieved | F |

(1) Warringtonfire Gent, report references 17876H (8 September 2016) and 18060B (29 November 2016). Copies of the reports 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

The product was 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 | $\geq 300 \text{ MN}\cdot\text{s}\cdot\text{g}^{-1}\cdot\text{m}^{-1}$ |
| Composite bitumen/glass fibre tissue facing | BS EN 12086 : 2013 | Value achieved | $6.6 \text{ MN}\cdot\text{s}\cdot\text{g}^{-1}$ |

3.2 Condensation

3.2.1 The BBA has assessed the product 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 with sealed and lapped joints, turned up around the insulation and bonded to the waterproofing finish. In the case of single ply membranes, the recommendations of the SPRA Design Guide should be followed.

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

The product was tested for thermal conductivity and the results are given in Table 7.

Table 7 Thermal conductivity

| Product assessed | Insulation thickness | Assessment method | Requirement | Result |
|------------------|----------------------|--------------------|-----------------------------------|--|
| Powerdeck U (UK) | < 80 mm | BS EN 13165 : 2012 | Declared value (λ_0) | 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 Conservation of fuel and power

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 8 and 9.

Table 8 Example U values for fully adhered system

| Target U value (W·m ⁻² ·K ⁻¹) | Insulation thickness ⁽¹⁾ (mm) | | |
|---|---|----------------------------|---------------------------|
| | Concrete deck ⁽²⁾ | Timber deck ⁽³⁾ | Metal deck ⁽⁴⁾ |
| 0.09 | 125 + 125 ⁽⁵⁾ | 120 + 120 ⁽⁵⁾ | 125 + 125 ⁽⁵⁾ |
| 0.11 | 105 + 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 | 80 + 80 ⁽⁵⁾ |
| 0.16 | 140 | 135 | 145 |
| 0.18 | 125 | 120 | 125 |
| 0.20 | 115 | 110 | 120 |

(1) Nearest available thickness.

(2) 150 mm concrete deck ($\lambda = 1.33 \text{ W·m}^{-1}\cdot\text{K}^{-1}$), AVCL, insulation, 3 mm waterproofing membrane.

(3) 12.5 mm plasterboard ($\lambda = 0.25 \text{ W·m}^{-1}\cdot\text{K}^{-1}$), 150 mm timber joists (12.5%)/air cavity (87.5%), 18 mm plywood deck ($\lambda = 0.17 \text{ W·m}^{-1}\cdot\text{K}^{-1}$), AVCL, insulation, 3 mm waterproofing membrane.

(4) Metal deck ($\lambda = 50 \text{ W·m}^{-1}\cdot\text{K}^{-1}$), AVCL, insulation, 3 mm waterproofing membrane.

(5) Two layers of insulation boards used.

Table 9 Example U values for constructions with galvanized steel fixings

| Target U value (W·m ⁻² ·K ⁻¹) | Insulation thickness ⁽¹⁾ (mm) | | |
|---|---|-------------------------------|------------------------------|
| | Concrete deck ⁽²⁾⁽³⁾ | Timber deck ⁽²⁾⁽⁴⁾ | Metal deck ⁽²⁾⁽⁵⁾ |
| 0.09 | 145 + 145 ⁽⁶⁾ | 140 + 140 ⁽⁶⁾ | 145 + 145 ⁽⁶⁾ |
| 0.11 | 120 + 120 ⁽⁶⁾ | 120 + 115 ⁽⁶⁾ | 120 + 120 ⁽⁶⁾ |
| 0.12 | 115 + 110 ⁽⁶⁾ | 110 + 110 ⁽⁶⁾ | 115 + 115 ⁽⁶⁾ |
| 0.13 | 105 + 105 ⁽⁶⁾ | 100 + 100 ⁽⁶⁾ | 105 + 105 ⁽⁶⁾ |
| 0.15 | 90 + 90 ⁽⁶⁾ | 90 + 85 ⁽⁶⁾ | 95 + 90 ⁽⁶⁾ |
| 0.16 | 85 + 85 ⁽⁶⁾ | 80 + 80 ⁽⁶⁾ | 90 + 85 ⁽⁶⁾ |
| 0.18 | 145 | 140 | 150 |
| 0.20 | 130 | 125 | 135 |

(1) Nearest available thickness.

(2) Includes 5.55 galvanized steel insulation fixings per m² with a 4.8 mm cross sectional diameter.

(3) 150 mm concrete deck ($\lambda = 1.33 \text{ W·m}^{-1}\cdot\text{K}^{-1}$), AVCL, insulation, 3 mm waterproofing membrane.

(4) 12.5 mm plasterboard ($\lambda = 0.25 \text{ W·m}^{-1}\cdot\text{K}^{-1}$), 150 mm timber joists (12.5%)/air cavity (87.5%), 18 mm plywood deck ($\lambda = 0.17 \text{ W·m}^{-1}\cdot\text{K}^{-1}$), AVCL, insulation, 3 mm waterproofing membrane.

(5) Metal deck ($\lambda = 50 \text{ W·m}^{-1}\cdot\text{K}^{-1}$), AVCL, insulation, 3 mm waterproofing membrane.

(6) Two layers of insulation boards used.

6.2.2 On the basis of data assessed, the product 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 this product were assessed.

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

Table 10 Durability

| Product assessed | Assessment method | Requirement | Result |
|------------------|--|--|--------|
| Powerdeck U (UK) | Dimensional stability to BS 4841-3 : 2006 (70°C and 90-100% RH for 48 hours) | Length and width $\leq 5\%$ change Thickness $\leq 10\%$ change | Pass |
| | Thermal conductivity to BS EN 13165 : 2012, Clause C.4.4 | Change of less than $0.0005 \text{ W}\cdot\text{m}\cdot\text{K}^{-1}$ | Pass |
| | Acceleration test | | |
| | Bowing under the effect of a thermal gradient to MOAT 50 : 1992 | $< 10 \text{ mm}$ | Pass |

8.3 Service life

Under normal service conditions, the product will have a life at least equivalent to the structure in which it is incorporated, provided it is 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 product is 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 flat 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 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 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.

9.1.10 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, but such advice is outside the scope of this Certificate. 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 the principles of 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.

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 should 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.

Interstitial condensation

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.

Surface condensation

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 are provided in Annex A of this Certificate.

9.2.3 Care must be taken to ensure the 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 The suitability of the substrate deck to accept an adhesive bond or mechanical fixings must be checked prior to the work commencing.

9.2.5 The deck to which the AVCL is to be applied must be even, dry, sound and free from dust, grease and any defects which may impair the bond. All deck joints should be taped. For adhered products, all deck joints should 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 product is either adhesively bonded to the AVCL or mechanically fixed to the roof deck and is for use in conjunction with a suitable roof waterproofing system (as defined in *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 The boards must be protected from the elements and never installed in exposed situations such as inverted flat roofs or in direct contact with the ground. Boards must be kept dry during installation and covered at the end of each day work on site. Boards that have been allowed to get wet must not be used.

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

9.2.12 The product 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 product must be carried out by a competent general builder, or a contractor, experienced with this type of product.

9.4 Maintenance and repair

9.4.1 The product, once installed, does not require any regular maintenance and has 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 product have been assessed, and provide assurance that the quality controls are satisfactory according to the following factors:

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

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

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

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

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

† 10.2 The BBA has undertaken to review the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

11 Delivery and site handling

11.1 The Certificate holder stated that the product is delivered to site in packaging bearing the product name, Certificate holder name, product description and characteristics, 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 product 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 should be stacked flat, covered with sheeting, and raised above ground level and not in contact with ground moisture.

11.2.3 Care must be exercised when handling individual items to avoid crushing the edges or corners.

11.2.4 The product 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

ANNEX A – SUPPLEMENTARY INFORMATION †

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

Construction (Design and Management) Regulations 2015

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

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

CE marking

The Certificate holder has taken the responsibility of CE marking the product, 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 ISO 9001 : 2015 and ISO 14001 : 2015 by Lloyd's Register Quality Assurance (Certificates 00008940 and 00005756 respectively).

Additional Information

This Certificate holder has at least one staff member who has been deemed competent by the BBA under the BBA/TIMSA Scheme for Calculation Competency (U value and Condensation Risk Analysis). Competent persons should be contacted for accurate, quality-assured U value and condensation risk analysis. The Certificate of Competency can be found on the BBA website (<http://www.bbacerts.co.uk>) as Certificate number CS/6864.

Additional information on installation

Installation must be in accordance with the Certificate holder's instructions and this Certificate. A summary of the procedure is provided below:

Procedure

Bonded builds-up

A.1 The AVCL is torch-applied or adhered. Where necessary, a primer needs to be used in accordance with manufacturer's instructions to ensure an adequate bond between the deck and the AVCL.

A.2 The AVCL should be turned up at the edge of the roof and well-sealed, ensuring that all laps are minimum 150 mm.

A.3 Hot bitumen or a suitable proprietary adhesive is applied over the AVCL in accordance with manufacturer's instructions and the insulation boards are fully embedded into it in a tightly-butted brick bond pattern, with the long edges at right angles to the edge of the roof, or laid diagonally across the deck. On a metal deck, the long edges should be at right angles to the troughs to ensure the short ends are fully supported, or laid diagonally across the deck corrugations.

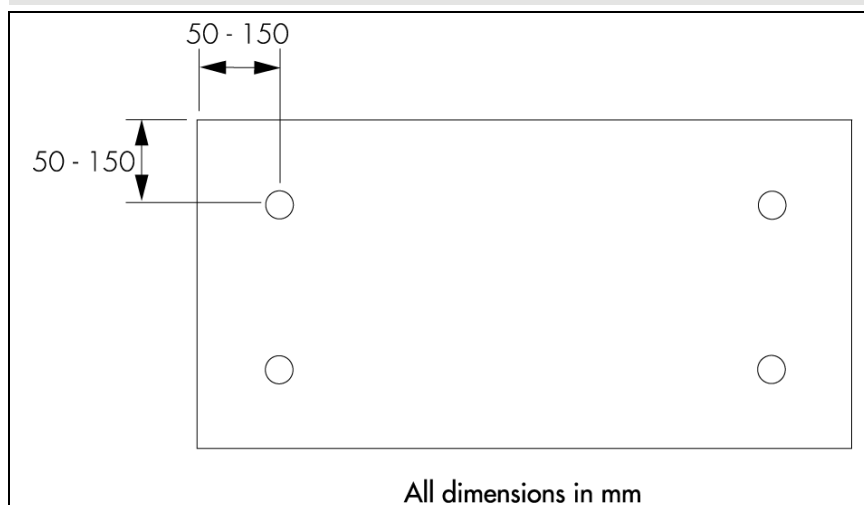
Mechanical fixings

A.4 The product can also be secured to the deck substrate by means of mechanical fixings.

A.5 A 0.25 mm thick polythene AVCL is loose laid, and installed in the same manner as described in section A.2.

A.6 The insulation boards are laid over the AVCL in a brick-bonded pattern and secured to the deck with a minimum of four mechanical fixings, each incorporating a 50 mm square or circular washer and positioned within 50 to 150 mm of board edges and corners, as shown in Figure 1.

Figure 1 Minimum fixing pattern for 1200 by 600 mm board



A.7 The requirement for additional fixings above those specified in section A.6 is assessed in accordance with BS 6399-2 : 1997 or BS EN 1991-1-4 : 2005.

Double layers (when required)

A.8 If the desired insulation thickness comprises two layers, board joints should be staggered and the thicker layer positioned outermost. Where mechanically fixing, one or two fixings can be used to secure the first layer of boards, prior to securing the top layer with the required number of fixings.

Waterproofing

A.9 The chosen waterproofing is installed in accordance with the manufacturer's instructions and/or relevant British Standards.

Bibliography

- BRE Report BR 262 : 2002 *Thermal insulation: avoiding risks*
- BRE Report BR 443 : 2019 *Conventions for U-value calculations*
- BS 3416 : 1991 *Specification for bitumen-based coatings for cold application, suitable for use in contact with potable water*
- BS 4841-3 : 2006 *Rigid polyisocyanurate (PIR) and polyurethane (PUR) products for building end-use applications — Specification for laminated boards (roofboards) with auto-adhesively or separately bonded facings for use as roofboard thermal insulation under built up bituminous roofing membranes*
- 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 8218 : 1998 *Code of practice for mastic asphalt roofing*
- 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 1607 : 2013 *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 : 2013 *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 6946 : 2017 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*
- BS EN ISO 10456 : 2007 *Building materials and products — Hygrothermal properties — Tabulated design values and procedures for determining declared and design thermal values*
- ISO 9001 : 2015 *Quality management systems — Requirements*
- ISO 14001 : 2015 *Environmental management systems — Requirements with guidance for use*
- MOAT 27 : 1983 *General directive for the assessment of roof waterproofing systems*
- 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 of Certificate

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.

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