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Agrément Certificate

22/6033

Product Sheet 3 Issue 1

PROTEUS BITUMINOUS ROOF WATERPROOFING MEMBRANES

PROTEUS PRO-FELT ENDURA ANTI ROOT SYSTEM

This Agrément Certificate Product Sheet⁽¹⁾ relates to the Proteus Pro-Felt⁽²⁾ Endura Anti Root System, for use in exposed flat and pitched roofs with limited access, inverted systems and roof gardens on flat roofs, and in green roofs on flat and pitched roofs not greater than 70°.

(1) Hereinafter referred to as 'Certificate'.

(2) Proteus Pro-Felt is a registered trademark.

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 system described herein. This system 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: 24 January 2024

A handwritten signature in black ink, appearing to read 'Hardy Giesler'.

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 the Proteus Pro-Felt Endura Anti Root System, 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: | B4(2) | External fire spread |
| Comment: | | On a suitable substructure, the system may enable a roof to be unrestricted by this Requirement. See section 2 of this Certificate. |
| Requirement: | C2(b) | Resistance to moisture |
| Comment: | | The system, including joints, will enable a roof to satisfy this Requirement. See section 3 of this Certificate. |
| Requirement: | C2(c) | Resistance to moisture |
| Comment: | | The system can contribute to enabling a roof to satisfy this Requirement. See section 3 of this Certificate. |
| Regulation: | 7(1) | Materials and workmanship |
| Comment: | | The system is acceptable. See sections 8 and 9 of this Certificate. |



The Building (Scotland) Regulations 2004 (as amended)

| | | |
|--------------------|----------------|--|
| Regulation: | 8(1)(2) | Fitness and durability of materials and workmanship |
| Comment: | | The use of the system satisfies the requirements of this Regulation. See sections 8 and 9 of this Certificate. |
| Regulation: | 9 | Building standards - construction |
| Standard: | 2.8 | Spread from neighbouring buildings |
| Comment: | | The system, when applied to a suitable substructure, may enable a roof to be unrestricted under clause 2.8.1 ⁽¹⁾⁽²⁾ of this Standard. See section 2 of this Certificate. |
| Standard: | 3.10 | Precipitation |
| Comment: | | The use of the system, including joints, will enable a roof to satisfy the requirements of this Standard, with reference to clauses 3.10.1 and 3.10.7 ⁽¹⁾ . See section 3 of this Certificate. |
| Standard: | 3.15 | Condensation |
| Comment: | | The system will enable a roof to satisfy this Standard, with reference to clauses 3.15.1 ⁽¹⁾⁽²⁾ , 3.15.3 ⁽¹⁾⁽²⁾ , 3.15.5 ⁽¹⁾⁽²⁾ and 3.15.6 ⁽¹⁾⁽²⁾ . See section 3 of this Certificate. |
| Standard: | 7.1(a) | Statement of sustainability |
| Comment: | | The system can contribute to satisfying the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard. |

| | | |
|--------------------|-----------|--|
| Regulation: | 12 | Building standards - conversions |
| Comment: | | Comments in relation to the system 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) | The system is acceptable. See sections 8 and 9 of this Certificate. |
| Regulation: | 28(b) | Resistance to moisture and weather |
| Comment: | | The system, including joints, can satisfy the requirements of this Regulation. See section 3 of this Certificate. |
| Regulation: | 29 | Condensation |
| Comment: | | The system can contribute to a roof satisfying this Regulation. See section 3 of this Certificate. |
| Regulation: | 36(b) | External fire spread |
| Comment: | | On a suitable substructure, the use of the system may enable a roof to be unrestricted by this Regulation. See section 2 of this Certificate. |

Additional Information

NHBC Standards 2024

In the opinion of the BBA, the Proteus Pro-Felt Endura Anti Root System, 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*.

In addition, in the opinion of the BBA, the system when installed and used in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards for Conversions and Renovations*, taking account of other relevant guidance within the chapter and the suitability of the substrate to receive the system.

The NHBC Standards do not cover the refurbishment of existing roofs.

Fulfilment of Requirements

The BBA has judged the Proteus Pro-Felt Endura Anti Root System to be satisfactory for use as a torch-on system as described in this Certificate. The system has been assessed for use in exposed flat and pitched roofs with limited access, inverted systems and roof gardens on flat roofs, and in green roofs on flat and pitched roofs not greater than 70°.

ASSESSMENT

Product description and intended use

The Certificate holder provided the following description for the system under assessment. The Proteus Pro-Felt Endura Anti Root System consists of the following:

- Proteus Pro-Felt Endura TO Underlay — a torch-on, elastomeric modified bitumen membrane, reinforced with polyester. The membrane has a slate finish on the upper surface with a thermofusible polyethylene film on the lower surface
- Proteus Pro-Felt Endura Mineral — a torch on, elastomeric modified bitumen capsheet, reinforced with polyester, with a slate finish on the upper surface and a thermofusible polyethylene film on the lower surface
- Proteus Pro-Felt Endura Plus Mineral — a torch on, elastomeric modified bitumen capsheet, reinforced with polyester, with a slate finish on the upper surface and a thermofusible polyethylene film on the lower surface
- Proteus Pro-Felt Endura Anti Root Mineral — a torch-on, elastomeric modified bitumen root resistant membrane, reinforced with a polyester fleece. The membrane has a slate finish on the upper surface and a thermofusible polyethylene film on the lower surface
- Proteus Pro-Felt Endura AVCL Sanded — a torch-on, elastomeric modified bitumen AVCL with a glass fleece/aluminium composite acting as reinforcement. The membrane has a sand finish on the upper surface and a thermofusible polyethylene film on the lower surface.

The system components have the nominal characteristics given in Table 1.

Table 1 Nominal characteristics of the Proteus Pro-Felt Endura Anti Root System

| Characteristic (unit) | Proteus Pro-Felt Endura TO Underlay | Proteus Pro-Felt Endura Anti Root Mineral | |
|-----------------------|--|--|--|
| Thickness (mm) | 4.0 | 5.2 | |
| Roll width (m) | 1.0 | 1.0 | |
| Roll length (m) | 10.0 | 5.0 | |
| Roll weight (kg) | 52 | 36 | |
| | Proteus Pro-Felt Endura Mineral | Proteus Pro-Felt Endura Plus Mineral | Proteus Pro-Felt Endura AVCL Sanded |
| Thickness (mm) | 4.2 | 5.2 | 3.5 |
| Roll width (m) | 1.0 | 1.0 | 1.0 |
| Roll length (m) | 7.5 | 5.0 | 7.5 |
| Roll weight (kg) | 42 | 37.5 | 39 |

Ancillary Items

The following ancillary items are essential to use with the system and have been assessed with the system:

- air and vapour control layers (AVCL)

Proteus Pro-Felt Endura SA AVCL Sanded — a self-adhesive AVCL

- underlays
 - Proteus Pro-Felt Endura SA Underlay Sanded — a self-adhesive underlay
 - Proteus Pro-Felt Endura SA Underlay Film — a self-adhesive underlay
- capsheets — for detailing work
 - Proteus Pro-Felt Endura SA Mineral — a cold applied, self-adhesive bituminous capsheet.

Applications

The system is intended for use in exposed flat and pitched roofs with limited access, inverted systems and roof gardens on flat roofs, and in green roofs on flat and pitched roof specifications as follows:

- exposed flat and pitched roofs with limited access (using Proteus Pro-Felt Endura Mineral or Proteus Pro-Felt Endura Plus Mineral as capsheet)
- in inverted roofs on flat roofs
- in roof gardens on flat roofs (using Proteus Pro-Felt Endura Anti Root Mineral as capsheet)
- in green roofs on flat and pitched roofs (using Proteus Pro-Felt Endura Anti Root Mineral as capsheet).

Definitions for products and applications inspected

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

- limited access roof — a roof subjected only to pedestrian traffic for maintenance of the roof covering, cleaning of gutters, etc
- flat roof — a roof having a minimum finished fall of 1:80⁽¹⁾
- pitched roof — a roof having a fall in excess of 1:6
- roof garden — a roof with a substantial layer of growing medium with intensive planting that can include shrubs and trees, generally accessible to pedestrians
- green roof — a roof with a shallow layer of growing medium with extensive planting of low-maintenance plants such as mosses, sedums, grasses and some wild flower species
- invasive plant species — vegetation species having vigorous and/or invasive root systems likely to cause damage to components of the inverted roof insulation system and roof waterproofing.

(1) NHBC Standards 2024 require a minimum fall of 1:60 for green roofs and roof gardens.

Product assessment – key factors

The system 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

Not applicable.

2 Safety in case of fire

Data were assessed for the following characteristics.

2.1 External fire spread

2.1.1 When tested to CEN/TS 1187 : 2012, Test 4, and classified to BS EN 13501-5 : 2016, the constructions given in Table 2 of this Certificate achieved B_{ROOF}(t4) for slopes below 10°.

Table 2 Tested system

| Substrate | AVCL | Insulation | Underlay | Capsheet |
|------------------------------|--|--|-------------------------------------|--|
| 18 mm plywood ⁽¹⁾ | Proteus Pro-Felt Endura AVCL Sanded or Proteus Pro-Felt Endura AVCL Sanded | glass faced polyisocyanurate (PIR) boards ⁽¹⁾ bonded with polyurethane adhesive ⁽¹⁾ one layer 50 to 120 mm <u>two layers 120 mm or greater</u> bitumen faced mineral wool boards greater than 60 mm | Proteus Pro-Felt Endura TO Underlay | Proteus Pro-Felt Endura Anti Root Mineral, Proteus Pro-Felt Endura Mineral or Proteus Pro-Felt Endura Plus Mineral |

(1) These components are outside the scope of this Certificate.

2.1.2 On the basis of data assessed, the constructions given in Table 2 are unrestricted by the documents supporting the national Building Regulations with respect to proximity to a boundary. Restrictions may apply at junctions with compartment walls.

2.1.3 A roof incorporating the system will also be unrestricted under the national Building Regulations with respect to a boundary in the following circumstances:

- when protected by an inorganic covering (eg gravel or paving slabs) listed in the Annex of commission Decision 2000/553/EC
- a roof garden covered with a drainage layer of gravel 100 mm thick and a soil layer 300 mm thick
- irrigated roof gardens and green roofs.

2.1.4 In Wales and Northern Ireland, when used on flat roofs using a substrate designated in the documents supporting the national Building Regulations with the surface finishes listed below, the roof is also deemed to be unrestricted with respect to a boundary:

- bitumen-bedded stone chippings covering the whole surface to a depth of not less than 12.5 mm
- bitumen-bedded tiles of a non-combustible material
- sand and cement screed
- macadam.

2.1.5 The designation and permissible areas of use of other specifications must be established by reference to the requirements of the documents supporting the national Building Regulations.

2.1.6 If allowed to dry, plants used may allow the spread of flame across the roof. This must be taken into consideration when selecting suitable plants for the roof. Appropriate planting, irrigation and/or protection must be applied to ensure the overall fire-rating of the roof is not compromised.

2.2 Reaction to fire

2.2.1 When tested to BS EN 13501-1 : 2018, Proteus Pro-Felt Endura Anti Root Mineral, Proteus Pro-Felt Endura Mineral, and Proteus Pro-Felt Endura AVCL Sanded had a reaction to fire classification of Class E. The Certificate holder has not declared a fire classification for Proteus Pro-Felt Endura TO Underlay and Proteus Pro-Felt Endura Plus Mineral.

3 Hygiene, health and the environment

Data were assessed for the following characteristics.

3.1 Weathertightness

3.1.1 Results of weathertightness tests are given in Table 3.

Table 3 Weathertightness

| Product assessed | Assessment method | Requirement | Result |
|--|--|---|--------|
| Proteus Pro-Felt Endura TO Underlay | Watertightness BS EN 1928 : 2000 | No leakage after 24 hours exposure to a 1 m head of water | Pass |
| Proteus Pro-Felt Endura Anti Root Mineral | | | Pass |
| Proteus Pro-Felt Endura TO Underlay | Peel resistance of joints to BS EN 12316-1 : 2000 | ≥ 100 N | Pass |
| Proteus Pro-Felt Endura Anti Root Mineral | | | Pass |

3.1.2 On the basis of data assessed, the system, including joints, when completely sealed and consolidated, will adequately resist the passage of moisture to the inside of a building and so satisfy the requirements of the national Building Regulations.

3.1.3 The adhesion of Proteus Pro-Felt Endura Mineral and Proteus Pro-Felt Endura Plus Mineral, when bonded, is sufficient to resist the effects of wind suction, elevated temperature and thermal shock conditions likely to occur in practice and remain weathertight.

3.2 Condensation

On the basis of data assessed, Proteus Pro-Felt Endura AVCL Sanded provides an effective control to the passage of liquid water and water vapour.

3.3 Resistance to mechanical damage

3.3.1 Results of resistance to mechanical damage tests are given in Table 4.

Table 4 Mechanical damage results

| Product assessed | Assessment method | Requirement | Result |
|--|---|-------------------|--|
| Proteus Pro-Felt Endura TO Underlay | Dynamic indentation to EOTA TR 006 : May 1999 concrete substrate | Value achieved | l ₄ |
| Proteus Pro-Felt Endura Mineral | concrete substrate Expanded polystyrene (EPS) substrate | | l ₃ l ₃ |
| Proteus Pro-Felt Endura Anti Root Mineral | concrete substrate | | l ₄ |
| Proteus Pro-Felt Endura Mineral | Static indentation to BS EN 12730 : 2015 Method A EPS substrate concrete substrate | Value achieved | 20 kg 20 kg |
| Proteus Pro-Felt Endura TO Underlay | concrete substrate | | 20 kg |
| Proteus Pro-Felt Endura Anti Root Mineral | concrete substrate | | 20 kg |
| Proteus Pro-Felt Endura Mineral | Tensile strength to BS EN 12311-1 : 2000 longitudinal direction transverse direction | Value achieved | 999 N·(50 mm) ⁻¹ 522 N·(50 mm) ⁻¹ |
| Proteus Pro-Felt Endura Mineral | Elongation to BS EN 12311-1 : 2000 longitudinal direction transverse direction | Value achieved | 36% 50% |
| Proteus Pro-Felt Endura Mineral SA AVCL Sanded | Tear strength to BS EN 12310-1 : 2000 longitudinal direction transverse direction | ≥ 50 N ≥ 50 N | Pass Pass |
| Proteus Pro-Felt Endura Mineral | longitudinal direction transverse direction | ≥ 50 N ≥ 50 N | Pass Pass |

3.3.2 On the basis of data assessed, the Proteus Pro-Felt Endura Anti Root System can accept, without damage, the foot traffic and light concentrated loads associated with installation and maintenance and the effects of minor movement likely to occur in practice while remaining weathertight.

3.3.3 Where traffic in excess of the examples given in section 3.3.2 is envisaged, such as for maintenance of lift equipment, a walkway must be provided (for example, using concrete slabs supported on bearing pads). Reasonable care must be taken to avoid puncture by sharp objects or concentrated loads.

3.4 Resistance to root penetration tests

3.4.1 Results of resistance to root penetration tests are given in Table 5.

| Products assessed | Assessment method | Requirement | Result |
|--|-------------------|--|--------|
| Proteus Pro-Felt Endura Anti Root Mineral | EN 13948 : 2007 | No root penetration after two years | Pass |

3.4.2 On the basis of data assessed, Proteus Pro-Felt Endura Anti Root Mineral will resist penetration by plant roots and remain weathertight.

3.4.3 Proteus Pro-Felt Endura Anti Root Mineral can be used as a layer in the waterproofing system in green roof and roof garden specifications acting as the root protection layer.

4 Safety and accessibility in use

Not applicable.

5 Protection against noise

Not applicable.

6 Energy economy and heat retention

Not applicable.

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 the system were assessed.

8.2 Specific test data were assessed as given in Table 6.

| Products assessed | Assessment method | Requirement | Result |
|--|--|------------------------|--------------|
| Proteus Pro-Felt Endura Plus Mineral | Heat Resistance to BS EN 1110 : 2010 – control heat aged at 70°C for 240 days | ≥ 100°C ≥ 90°C | Pass Pass |
| Proteus Pro-Felt Endura Anti Root Mineral | Resistance to fatigue to MOAT 64 : 4.3.5 2001 longitudinal direction transverse direction | No damage No damage | Pass Pass |

8.3 Low temperature flexibility on control and heat aged samples was assessed using test data from representative related products.

8.4 Service life

8.4.1 Under normal service conditions, the system will have a life of at least 35 years, provided it is designed, installed and maintained in accordance with this Certificate and the Certificate holder's instructions.

8.4.2 When fully protected and subject to normal service conditions, Proteus Pro-Felt Endura AVCL Sanded will provide an effective barrier to the transmission of liquid water and water vapour for the design life of the roof in which it is incorporated.

8.4.3 Localised loss of the mineral surfacing may occur after some years in areas where complex detailing of the roof design is incorporated.

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

9.1.4 Once a green roof or roof garden is installed, it can be regarded as a suitable protection for the membrane in use.

9.1.5 Structural decks to which the system is to be applied must be suitable to transmit the dead and imposed loads experienced in service. Allowance must be made for loading deflections to ensure that the free drainage of water is maintained.

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

9.1.7 The drainage systems for inverted roofs, green roofs or roof gardens must be correctly designed, and the following points must be addressed:

- provision made for access for maintenance purposes
- dead loads for green roofs and roof gardens can increase if the drains become partially or completely blocked, causing waterlogging of the drainage layer
- additional guidance for inverted roof specifications is given in the BBA information Bulletin No 4 *Inverted roofs – Drainage and U value corrections*.

9.1.8 The resistance to wind uplift for warm roofs will be dependent on the cohesive strength of the insulation and the method by which it is secured to the roof deck. This must be taken into account when selecting a suitable insulation material.

9.1.9 Proteus Pro-Felt Endura Anti Root Mineral, when used with a suitable roof garden or green-roof specification, will adequately resist the effects of wind uplift likely to occur in practice.

9.1.10 The ballast requirements for inverted roof systems must be calculated by a suitable competent and experienced individual in accordance with the relevant parts of BS EN 1991-1-4 : 2005 and its UK National Annex. When using gravel ballast, the system must always be loaded with a minimum depth of 50 mm of aggregate. In areas of high-wind exposure concrete slabs on suitable supports can be used (also see Annex A, section A.1).

9.1.11 The ballast on protected roofs or growing media used in roof gardens and ballast on inverted/protected roofs must not be of a type that will be removed or become delocalised owing to wind scour experienced on the roof.

9.1.12 It must be recognised that the type of plants used in green roofs and roof gardens could significantly affect the expected wind loads experienced in service. Appropriate mitigation measures must be taken (see Annex A).

9.1.13 For green roofs and roof gardens, invasive non-native alien plant species as defined by UK Government guidance must not be used.

9.1.14 For roof garden (intensive) finishes over inverted roof specifications, in order to protect the water-flow-reducing-layer (WFRL), inverted roof insulation invasive plant species must not be used, or alternatively if utilised in the planting, they must be confined within either a proprietary root resistant planter box or a planter box lined with an impervious root barrier or a tree pit lined with an impervious root barrier. In particular, the following species must be excluded or managed:

- invasive weeds including Buddleia
- plants and grasses with aggressive rhizomes such as Bamboo
- self-setting woody weeds such as Sycamore and Ash seedlings must be removed at early germination stage
- other woody plants which spread aggressively including Rhododendron.

9.1.15 The Green Roof Organisation (GRO) can provide guidance on species not included in section 9.1.14 but such advice is outside the scope of this Certificate.

9.1.16 Where a root resistant planter box is installed over the inverted roof insulation and water-flow-reducing-layer (WFRL) a suitable drainage board must be installed beneath the planter box to allow the inverted roof system to function correctly, the planter box to drain and to enable rainwater to reach drainage outlets without impediment.

9.1.17 Soil or other bulk material must not be stored on one area of the roof prior to installation, to ensure that localised overloading does not occur.

9.1.18 Insulation materials to be used in conjunction with the system must be in accordance with the Certificate holder's instructions and be either:

- as described in the relevant clauses of BS 6229 : 2018, or
- the subject of a current BBA Certificate and be used in accordance with, and within the limitations of, that 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 Certificate holder's instructions and the relevant clauses of BS 8000-0 : 2014, BS 8000-4 : 1989 and BS 8217 : 2005.

9.2.3 Deck surfaces must be dry, clean and free from sharp projections such as nail heads and concrete nibs. If required, the substrate must be prepared using a suitable bitumen primer at the recommended rate.

9.2.4 The system is laid in conditions normal to roofing work and must not be laid in rain, snow or heavy fog. If the temperature is below 5°C, suitable precautions must be taken against the formation of condensation on the substrate.

9.2.5 The waterproofing layers must always be installed with staggered overlaps and in such a manner that no counter-seams in the direction of the outlets are made, where reasonably practical.

9.2.6 For warm roof specifications, the AVCL is rolled out onto the primed substrate, positioned and cut to length and applied to the substrate. The membrane must be completed at the edges at least 100 mm higher than the insulation boards.

9.2.7 At falls in excess of 5° (1:11), precautions against slippage, and requirements for mechanical fixing as required by BS 8217 : 2005, must be observed. For slopes above 10° (1:5.7), the Certificate holder's Technical Service Department must be contacted for advice, but such advice is outside the scope of this Certificate.

9.2.8 Installation of the insulation boards must be carried out in accordance with the insulation manufacturer's instructions.

9.2.9 Where thermal break insulation is installed, the AVCL must extend up all upstands by a sufficient height to ensure that the insulation is encapsulated.

9.2.10 Proteus Pro-Felt Endura AVCL Sanded is installed by torch-bonding.

9.2.11 The overlaps must be a minimum of 80 to 100 mm wide. The laps are sealed together using a gas torch in accordance with the Certificate holder's instructions.

9.2.12 Insulation boards are bonded to the AVCL using a suitable polyurethane adhesive.

9.2.13 Bonding of the waterproofing layers is achieved by melting the lower surface of the membranes using a standard roofer's torch. The membranes must be heated carefully, ensuring that the thermofusible film is completely removed as work proceeds, and the membrane pressed down onto the prepared substrate.

9.2.14 End laps and side laps for the Proteus Pro-Felt Endura TO Underlay must be a minimum of 80 mm wide and fully bonded, ensuring that a continuous bead of bitumen exudes from the lap.

9.2.15 The underlay must be taken a sufficient distance up all upstands and protrusions and must be a minimum height of 150 mm above the roof surface.

9.2.16 Laps between the underlay and the capsheet must be offset by a minimum of 300 mm.

9.2.17 The capsheet is fully bonded to the underlayer (see 9.2.14). End laps and side laps must be a minimum of 80 mm wide and fully bonded, ensuring that a continuous bead of bitumen exudes from the lap.

9.2.18 Detailing must be carried out in accordance with the Certificate holder's instructions and following the guidelines specified in the NFRC *Safe2Torch Guidance - For the safe installation of torch-on reinforced bitumen membranes and use of gas torches in the workplace*.

9.2.19 The NHBC requires that Proteus Pro-Felt Endura Anti Root Mineral, once installed, is inspected in accordance with *NHBC Standards 2024* Chapter 7.1, Clause 7.1.11, and undergo an appropriate integrity test, where required. Any damage must be repaired in accordance with section 9.4 of this Certificate and reinspected, in order to maintain system performance.

9.3 Workmanship

Practicability of installation was assessed on the basis of the Certificate holder's information and relevant clauses of BS 8000-0 : 2014, BS 8000-4 : 1989 and BS 8217 : 2005. To achieve the performance described in this Certificate, the system must only be installed by contractors/installers who have been trained and approved by the Certificate holder.

9.4 Maintenance and repair

9.4.1 Ongoing satisfactory performance of the system in use requires that it is suitably maintained. The guidance provided by the Certificate holder was assessed by the BBA and found to be appropriate and adequate.

9.4.2 The following requirements apply in order to satisfy the performance assessed in this Certificate:

9.4.2.1 The system must be the subject of six-monthly inspections and maintenance in accordance with the recommendations of BS 6229 : 2018, Chapter 7, and the Certificate holder's own maintenance requirements, where

relevant. These six-monthly inspections must be carried out by a suitably experienced individual to ensure continued satisfactory performance. This must include an examination of the condition of the roof finishes, and ensure that drain outlets and gutters are kept clear and unblocked (see clause 9.1.7).

9.4.2.2 For inverted roofs with green roof finishes, in order to protect the water-flow-reducing-layer (WFRL), inverted roof insulation and the roof waterproofing, invasive plant species must be eliminated through maintenance. In particular, the following species must be removed/excluded:

- invasive weeds including Buddleia
- plants and grasses with aggressive rhizomes such as Bamboo
- self-setting woody weeds such as Sycamore and Ash seedlings must be removed at early germination stage
- other woody plants which spread aggressively including Rhododendron.

9.4.2.3 In the event of damage, the capsheet can be effectively repaired, after cleaning the surrounding areas, with a patch of the appropriate capsheet over the damaged area in accordance with the Certificate holder's instructions.

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 system is delivered to site in rolls with either paper wrappers or tape bands bearing the component name and dimensions. The rolls are packed on pallets and shrink wrapped in polythene; the pallets bear a label with the component number, name, dimensions and batch number.

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

11.2.1 Rolls must be stored upright on a clean, level surface, away from excessive heat and kept under cover.

11.2.2 The self-adhesive components must be stored out of direct sunlight.

Supporting information in this Annex is relevant to the system 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.

CLP Regulations

The Certificate holder has taken the responsibility of classifying and labelling the system components under the *GB CLP Regulation* and *CLP Regulation (EC) No 1272/2008 – classification, labelling and packaging of substances and mixtures*. Users must refer to the relevant Safety Data Sheet(s).

CE marking

The Certificate holder has taken the responsibility of CE marking the system components in accordance with harmonised European Standards EN 13707 : 2013 and EN 13970 : 2004.

Additional information on installation

A.1 Recommendations for the design and maintenance of green roof and roof garden specifications are available within the latest edition of the *GRO Green Roof code – Green Roof Code of Best Practice for the UK*.

Bibliography

- BS 6229 : 2018 *Flat roofs with continuously supported flexible waterproof coverings — Code of practice*
- BS 8000-0 : 2014 *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 EN 1110 : 2010 *Flexible sheets for waterproofing. Bitumen sheets for roof waterproofing. Determination of flow resistance at elevated temperature*
- BS EN 1928 : 2000 *Flexible sheets for waterproofing — Bitumen, plastic and rubber sheets for roof waterproofing — Determination of watertightness*
- 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 12310 -1 : 2000 *Flexible sheets for waterproofing — Determination of resistance to tearing (nail shank) — Part 1 : Bitumen sheets for roof waterproofing*
- BS EN 12311-1 : 2000 *Flexible sheets for waterproofing — Determination of tensile properties — Part 1 : Bitumen sheets for roof waterproofing*
- BS EN 12316-1 : 2000 *Flexible sheets for waterproofing — Determination of peel resistance of joints — Part 1 : Bitumen sheets for roof waterproofing*
- BS EN 12730 : 2015 *Flexible sheets for waterproofing — Bitumen, plastic and rubber sheets for roof waterproofing — Determination of resistance to static loading*
- CEN/TS 1187 : 2012 *Test methods for external fire exposure to roofs*
- EN 13501-1 : 2018 *Fire classification of construction products and building elements — Classification using data from reaction to fire tests*
- EN 13501-5 : 2016 *Fire classification of construction products and building elements — Classification using data from external fire exposure to roof tests*
- EN 13707 : 2013 *Flexible sheets for waterproofing — Reinforced bitumen sheets for roof waterproofing — Definitions and characteristics*
- EN 13948 : 2007 *Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roof waterproofing - Determination of resistance to root penetration*
- EN 13970 : 2004 *Flexible sheets for waterproofing — Bitumen water vapour control layers — Definitions and characteristics*
- EOTA TR 006 *Determination of the resistance to dynamic indentation 1999*
- MOAT 64 : 2001 *UEAtc Technical Guide for the Assessment of Roof Waterproofing Systems made of Reinforced APP or SBS Polymer Modified Bitumen Sheets*

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.