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Agrément Certificate

93/2967

Product Sheet 1

SEAMLESS ROOFING SYSTEMS

PERMADECK 20 ROOF WATERPROOFING SYSTEM

This Agrément Certificate Product Sheet⁽¹⁾ relates to the Permadeck 20 Roof Waterproofing System, a cold-applied, glassfibre-reinforced polyester resin for use as a waterproofing system on flat or pitched roofs with limited access. A non-slip version is available for use on verandas and terraces or for walkways on flat roofs.

(1) Hereinafter referred to as 'Certificate'.

CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.



KEY FACTORS ASSESSED

Weathertightness — the system will resist the passage of moisture into the building (see section 6).

Properties in relation to fire — the system will enable a roof to be unrestricted under Building Regulations (see section 7).

Resistance to wind uplift — the system will resist the effects of any wind suction likely to occur in practice (see section 8).

Resistance to foot traffic — the system will accept the limited foot traffic and loads associated with installation and maintenance (see section 9).

Durability — the system will have a durability in excess of 15 years. (see section 11).

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 Second issue: 5 May 2016

John Albon – Head of Approvals
Construction Products

Claire Curtis-Thomas
Chief Executive

Originally certificated on 30 November 1993

The BBA is a UKAS accredited certification body – Number 113.

The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

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Regulations

In the opinion of the BBA, the Permadeck 20 Roof Waterproofing 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 presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



The Building Regulations 2010 (England and Wales) (as amended)

Requirement:	B4(2)	External fire spread
Comment:		On a suitable substructure, the use of the system can enable a roof to be unrestricted under this Requirement. See section 7 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		The system, including joints, will enable a roof to meet this Requirement. See section 6.1 of this Certificate.
Regulation:	7	Materials and workmanship
Comment:		The system is acceptable. See section 11 and the <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Durability, workmanship and fitness of materials
Comment:		The use of the system satisfies the requirements of this Regulation. See sections 10 and 11 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	2.8	Spread from neighbouring buildings
Comment:		The system, when applied to a suitable substructure, can be regarded as having low vulnerability under clause 2.8.1 ⁽¹⁾⁽²⁾ of this Standard. See section 7 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The use of the system, including joints, will enable a roof to meet the requirements of this Standard, with reference to clauses 3.10.1 ⁽¹⁾⁽²⁾ and 3.10.7 ⁽¹⁾⁽²⁾ . See section 6.1 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The system can contribute to meeting 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 applicable to conversions
Comment:		All comments given for 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(a)(i) (iii)(b)(i)	Fitness of materials and workmanship
Comment:		The system is acceptable. See section 11 and the <i>Installation</i> part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		The system, including joints, will enable a roof to meet the requirements of this Regulation. See section 6.1 of this Certificate.

Regulation:	36(b)	External fire spread
Comment:	On a suitable substructure, the use of the system can enable a roof to be unrestricted under the requirements of this Regulation. See section 7 of this Certificate.	

Construction (Design and Management) Regulations 2015 Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, Principal Designer/CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See sections: 3 *Delivery and site handling* (3.2 and 3.6) and 13 *Precautions* of this Certificate.

Additional Information

NHBC Standards 2016

NHBC accepts the use of the Permadeck 20 Roof Waterproofing System, provided it is installed, used and maintained in accordance with this Certificate, in relation to *NHBC Standards*, Chapters 7.1 *Flat roofs and balconies* and 7.2 *Pitched roofs*.

Technical Specification

1 Description

1.1 The Permadeck 20 Roof Waterproofing System consists of a glassfibre-reinforced polyester resin, cold applied on site by the hand lay-up process. Permadeck grit can be added to the topcoat resin to provide a non-slip surface.

1.2 The system comprises:

- Permadeck B resin — an unsaturated polyester resin in styrene monomer, modified to allow curing with methyl ethyl ketone peroxide (MEKP), for use as the basecoat resin. A dye is included in the resin, which produces a colour change on curing. The basecoat contains additives to suppress the emission of the styrene monomer and protect the basecoat from dirt, moisture and excessive monomer loss prior to the application of the topcoat. A pre-accelerated winter grade is available
- Permadeck T resin — an unsaturated polyester resin in styrene monomer, modified to allow curing with MEKP, for use as the topcoat resin. The coating is supplied clear (translucent white) for use in conjunction with the pigmented paste. A pre-accelerated winter grade is available. The resin can have a slight lightening effect on the colouring
- Permadeck glass mat — 600 g·m⁻² emulsion-bound, chopped strand glassfibre mat conforming to BS 3496 : 1989, used as reinforcement for the B resin
- Permadeck glass mat — 450 g·m⁻² emulsion-bound, chopped strand glassfibre mat conforming to BS 3496 : 1989, used as reinforcement for the B resin and additional reinforcement over areas of potential weakness
- Permadeck catalysts — di-benzoyl peroxide 50 FT powder and MEKP
- Permadeck pigment — thixotropic colouring paste for Permadeck T resin
- Permadeck grit — 16/24 EMO1 abrasive grit
- Permadeck accelerator — cobalt-ethylhexanoate for converting summer grade resin to winter grade. The accelerator is pre-mixed off-site with the resin so that catalyst and accelerator cannot come into contact
- Permadeck trims — preformed GRP detail sections:
 - Section A (Drip Fascia)
 - Section A (Deep Drip Fascia)
 - Section B (Raised Edge)
 - Section B (Raised Edge) Deep fascia
 - Section C (Simulated Lead Wall Cover Flashing)
 - Section D (Fillet)
 - Section E (Flat trim).

2 Manufacture

2.1 The components of the system are manufactured by a batch blending process using conventional methods.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control being operated by the manufacturer are being maintained.

3 Delivery and site handling

3.1 The components of the system are available to registered applicators only through nominated distributors, a list of whom is available from the Certificate holder.

3.2 Permadeck B resin and Permadeck T resin are supplied in 20 kg batch coded drums. The catalyst is supplied in 0.5 litre plastic containers and the pigment in 5 kg metal containers.

3.3 Each container bears the Certificate holder's product name and the BBA logo incorporating the number of this Certificate.

3.4 The glassfibre reinforcement is supplied in rolls polythene-wrapped in cardboard boxes, and must be kept dry.

3.5 The catalyst and colouring paste should be stored in sealed containers, under dry conditions, in temperatures of between 5°C and 25°C and away from direct sunlight, until ready for application.

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

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the Permadeck 20 Roof Waterproofing System.

Design Considerations

4 Use

4.1 The Permadeck 20 Roof Waterproofing System is satisfactory for use as a waterproofing layer on flat or pitched limited access roofs. The non-slip additive is used for verandas, terraces or for walkways on flat roofs.

4.2 Installation is carried out only by applicators registered by the Certificate holder, who provide the necessary technical advice and support. It is the responsibility of registered applicators to ensure that all materials used comply with the Certificate holder's specifications and that all site practices are in full accord with the instructions of the Certificate holder.

4.3 Limited access roofs are defined for the purpose of this Certificate as those subjected only to pedestrian traffic for maintenance of the roof covering, cleaning of gutters, etc. Where traffic in excess of this is envisaged, either the non-slip additive must be used or special precautions such as additional protection to Permadeck 20 must be taken.

4.4 Flat roofs are defined for the purpose of this Certificate as those having a minimum finished fall of 1:80. Pitched roofs are defined as those having falls in excess of 1:6.

4.5 When designing flat roofs, twice the minimum finished fall should be assumed, unless a detailed analysis of the roof is available including, for example, overall and local deflection and direction of falls. When upgrading existing flat roofs, care should be taken to eliminate ponding water.

4.6 Permadeck 20 should only be applied to plywood substrates 18 mm thick, bond class WBP, or oriented strand board (OSB) with tongue-and-groove edges, of the correct durability class for the situation of use (as described in BRE Digest 323 *Selecting wood-based panel products* and the relevant requirements of BS 6229 : 2003 or, where appropriate, complying with *NHBC Standards*, Chapter 7.1). As an alternative, Sterling floor tongue-and-groove boards 8 m by 2 m, 15 mm or 18 mm thick (or, when fully supported, 12 mm thick boards) can be used.

4.7 Imposed loads, dead loads and wind loading are calculated in accordance with BS EN 1991-1-1 : 2002, BS EN 1991-1-3 : 2003 and BS EN 1991-1-4 : 2005 and their respective National Annexes.

5 Practicability of installation

The system should only be installed by installers who have been trained and approved by the Certificate holder.

6 Weathertightness

6.1 To achieve weathertightness, it is essential that the coating is correctly applied and the coverage rate used complies with that stated in the Certificate holder's literature.



6.2 The system will adequately resist the passage of moisture into the building and enable a roof to comply with the relevant requirements of the national Building Regulations.

6.3 The system is impervious to water and will give a weathertight roof covering capable of accepting minor structural movements without damage.

7 Properties in relation to fire



7.1 A system comprising Permadeck 20 applied to an 18 mm thick OSB substrate, when tested to BS 476-3 : 1958, was designated EXT.F.AA.

7.2 The designation of other specifications, eg when used on combustible substrates, should be confirmed by:

England and Wales — test of assessment in accordance with Approved Document B, Appendix A, clause 1

Scotland — test to conform to Mandatory Standard 2.8, clause 2.8.1⁽¹⁾⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — test or assessment by a UKAS-accredited laboratory, or an independent consultant with appropriate experience.

8 Resistance to wind uplift

The system has adequate resistance to the effects of wind suction likely to occur in practice, provided the substrate is adequately fixed to the roof structure.

9 Resistance to foot traffic

The system can accept, without damage, the limited foot traffic and light concentrated loads associated with installation and maintenance. However, reasonable care is required to avoid damage by sharp objects or concentrated loads. When used on verandas, terraces and walkways on flat roofs, the non-slip additive must be used.

10 Maintenance



The system should be the subject of annual inspections, and roof drains kept clear, as is good practice with all roofing membranes.

11 Durability



The results of accelerated ageing tests and the system's performance in use confirm that satisfactory retention of physical properties is achieved. All available evidence indicates that a Permadeck 20 Roof Waterproofing System, when constructed in accordance with this Certificate, will have a life expectancy in excess of 15 years, provided there is no abnormal movement of the structure and the roof is subjected to regular inspections and maintenance.

Installation

12 General

12.1 Application of the Permadeck 20 Roof Waterproofing System is carried out only by applicators registered by the Certificate holder. Application must be carried out in strict accordance with the relevant clauses of the Certificate holder's instructions and this Certificate.

12.2 Registration of applicators by the Certificate holder require that on completion of every project a Quality Statement is completed, confirming that materials and installation comply with the Certificate holder's specification. This will contain site details including weather conditions, humidity, shape and size of area to which the system is to be applied, resin batch numbers and specification details on the quality of the other components. These should be verified as far as possible by the contractor's client.

12.3 The plywood/OSB substrate to which the product is to be applied must be properly prepared in accordance with the Certificate holder's instructions.

12.4 Adhesion to the plywood/OSB will depend on its condition and cleanliness. The board should be dry, sound, and free from loose material or contamination.

12.5 The Permadeck 20 Roof Waterproofing System is a two-coat application of a basecoat, into which is embedded a glassfibre mat, and a pigmented topcoat.

12.6 Catalyst and pigment are added on site to the resin as detailed in Table 1. The amount of catalyst may be reduced slightly when laying in higher than normal temperatures (see section 14.1).

Table 1 Proportions by weight (%)

Component	Basecoat	Topcoat
Catalyst	1–2	1–2
Pigment	—	5
Accelerator	0.2–0.5	0.2–0.5

12.7 All points of potential weakness, such as board joints and changes of direction (eg at upstands, gutters and protrusions) should be reinforced using a 75 mm wide strip of 450 g·m⁻² glassfibre reinforcement and the basecoat.

12.8 All roofs greater than 50 m² or with a linear dimension greater than 12 m must have provision for the expansion and contraction met in service. The Certificate holder's advice should be sought in these instances.

12.9 On completion of any project, a copy of the Quality Statement must be passed to the client for retention. This document would be used as evidence of use of the correct materials and site procedures in the event of any future discussions, negotiations or complaints relating to the roof in question.

13 Precautions

13.1 Vapours from the individual components of the system, some of which contain styrene monomer, may cause sensitisation and irritation to the respiratory system, eyes and skin. The system should be used only in areas with sufficient ventilation to prevent the build-up of vapour. Contact with the skin, eyes and clothes must be avoided. The Certificate holder's instructions and the relevant safety regulations for working procedures must be adhered to at all times.

13.2 The individual components must not be allowed to enter the drainage system.

14 Procedure

14.1 The curing time of the resin is dependent upon temperature and may be modified by adjusting the quantity of catalyst. If the following conditions apply, application should not take place:

- the air or substrate temperature is outside the range of 6°C to 25°C
- conditions could cause surface condensation
- there is a risk of rain
- during frost.

14.2 The Permadeck 20 basecoat is prepared on site by mixing Permadeck B resin with the catalyst in the correct proportions immediately prior to application. On adequate mixing, the resin will be opaque throughout and will have a slight pink hue. The catalysed resin has a working time of approximately 15 minutes depending on temperature. The thoroughly-mixed basecoat is applied to the prepared substrate at a coverage rate of 1 kg·m⁻² using a synthetic lambswool roller, to obtain a uniform coating sufficient to fully bond the glassfibre reinforcement to the substrate.

14.3 The glassfibre reinforcement is embedded into the freshly-applied basecoat by rolling with a paddle wheel roller until the reinforcement is thoroughly soaked. More of the catalysed basecoat is applied with the synthetic lambswool roller, at a coverage rate of 0.50 kg·m⁻².

14.4 During application the glassfibre should be lapped 50 mm along the length as well as along the width.

14.5 The roof is ready to accept the topcoat when it is sufficiently dry to walk on without disturbing the strands of glassfibre.

14.6 Prior to topcoating the laminate should be checked to ensure uniformity of resin distribution and that no pin-holes exist. All irregularities, eg glassfibre strands not lying flat, ends of trim jointing strips, etc, must be removed with coarse sandpaper. Suspect areas in the laminate should receive a further coat of resin.

14.7 The Permadeck topcoat is prepared on site by fully mixing into the Permadeck T resin the correct proportion of the colour pigmented paste and, immediately prior to application, the required amount of catalyst. It must be ensured during mixing that the catalyst is uniformly distributed throughout the resin. The catalysed topcoat resin has a working time of 15 to 30 minutes depending on temperature. When thoroughly mixed, the topcoat is applied at a coverage rate of 0.50 kg·m⁻² using a fresh synthetic mohair (short pile) roller.

14.8 When the non-slip finish is required, it is added to the Permadeck T resin after the pigment paste and immediately prior to the addition of the catalyst. The grit should be added at a rate of 100 g per kilogram of topcoat resin, and stirred well. The topcoat resin with grit added requires constant stirring during application to ensure that the grit is evenly dispersed. The grit can also be broadcast onto areas that require additional roughness.

14.9 The Permadeck topcoat should be checked for uniformity of colour and any signs of pin-holing. Sub-standard areas should receive a further thin application of Permadeck topcoat.

15 Repair

Any damage must be repaired in accordance with the Certificate holder's instructions. Repairs are made by cutting out the damaged section and grinding the surrounding area to a roughened, feathered surface extending 100 mm in each direction from the damaged area. The area to be covered is thoroughly cleaned with a stiff brush. Glass mat

and Permadeck B resin are used to make good the repair and left to harden and, subsequently, colour-matched pigmented Permadeck T resin is applied. Care must be taken not to coat existing areas of Permadeck T resin.

Technical Investigations

16 Tests

Tests were conducted on samples of the Permadeck 20 Roof Waterproofing System and the results assessed to determine:

- tensile strength
- density
- thickness
- glass to resin ratio
- Barcol hardness
- cross-break strength
- water vapour transmission
- resistance to water pressure
- resistance to thermal shock
- static loading
- dynamic loading
- tensile bond strength
- water exposure
- heat ageing
- UV ageing
- slip resistance.

17 Investigations

17.1 The manufacturing process was evaluated, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

17.2 A visit was made to a site in progress to assess the practicability of the installation procedures.

Bibliography

BS 476-3 : 1958 *Fire tests on building materials and structures — External fire exposure roof test*

BS 6229 : 2003 *Flat roofs with continuously supported coverings — Code of practice*

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 *Eurocode 1— Actions on structures — General actions — Snow loads*

NA to BS EN 1991-1-3 : 2003 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*

18 Conditions

18.1 This Certificate:

- relates only to the product/system 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 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.

18.2 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.

18.3 This Certificate will remain valid for an unlimited period provided that the product/system 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.

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

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

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