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Agrément Certificate

21/5859

Product Sheet 1

TOPSEAL LIQUID APPLIED ROOF WATERPROOFING SYSTEMS

TOPSEAL PU

This Agrément Certificate Product Sheet⁽¹⁾ relates to the Topseal PU, a moisture-triggered, glassfibre-reinforced aliphatic polyurethane, for use as a roof waterproofing membrane on new and existing flat and pitched roofs with limited and pedestrian access, inverted roofs and green (extensive) 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 a building (see section 6).

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

Resistance to wind uplift — the system will resist the effects of any likely wind suction acting on the roof (see section 8).

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

Resistance to root penetration — the system will adequately resist non-intrusive plant root penetration in green (extensive) roof specifications (see section 10).

Durability — under normal service conditions, the system will provide a durable waterproof covering with a service life of at least 25 years (see section 12).

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 First issue: 19 February 2021

Hardy Giesler
Chief Executive Officer



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

Readers MUST check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.

Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.

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Regulations

In the opinion of the BBA, Topseal PU, 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(1)	External fire spread
Comment:		The system, in some circumstances, are restricted by this Requirement. See section 7.4 of this Certificate.
Requirement:	B4(2)	External fire spread
Comment:		On a suitable substructure, the system can enable a roof to be unrestricted under this Requirement. See sections 7.1 to 7.3 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		The system will enable a roof to satisfy this Requirement. See section 6.1 of this Certificate.
Regulation:	7(1)	Materials and workmanship
Comment:		The system is acceptable. See section 12 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 11.1 and 12 and the Installation part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	2.6	Spread to neighbouring buildings
Comment:		The system is restricted under clause 2.6.4 ⁽¹⁾⁽²⁾ of this Standard in some circumstances. See section 7.5 of this Certificate.
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 sections 7.1 to 7.3 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The system will enable a roof to satisfy the requirements of this Standard, with reference to clauses 3.10.1 ⁽¹⁾ and 3.10.7 ⁽¹⁾ . 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:		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(a)(i)	Fitness of materials and workmanship
Comment:	(iii)(b)(i)	The system is acceptable. See section 12 and the <i>Installation</i> part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		The system can satisfy 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 sections 7.1 to 7.3 of this 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.

See sections: 3 *Delivery and site handling* (3.1 and 3.3) of this Certificate.

Additional Information

NHBC Standards 2021

In the opinion of the BBA, Topseal PU, 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*.

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

Technical Specification

1 Description

1.1 The Topseal PU system consists of:

- Topseal PU Basecoat — a polyurethane base coat with a matt finish, available in grey
- Topseal PU Topcoat — a polyurethane, UV-resistant top coat with a matt finish, available in a range of colours
- Topseal PU Primer — a moisture-curing urethane primer for use on concrete, steel and GRP substrates
- Topseal PU 225gm CSM Reinforcement — a 225 g·m⁻² glassfibre chopped strand reinforcing mat for reinforcement of the basecoat
- Topseal PU Bandage — a 225 g·m⁻² glassfibre chopped strand reinforcing mat for use as reinforcement at details.

1.2 The liquid-applied components have the nominal characteristics given in Table 1.

Table 1 Nominal characteristics of liquid-applied components

Characteristic (unit)	Components		
	Topseal PU Basecoat	Topseal PU Topcoat	Topseal PU Primer
Colour	grey	dark grey, mid grey, light grey, terracotta, copper green, white	light brown
Percentage solids	89	84	70
Viscosity at 23°C (mPa·s)	thixotropic	thixotropic	140
Specific gravity (g·cm ⁻³)	1.37	1.38	1.00

1.3 Bridging tape is an ancillary item for use as additional reinforcement in areas of potential weakness such as upstands, cracks and expansion joints.

2 Manufacture

2.1 The liquid components of the system are manufactured by a batch-blending process.

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 operated by the manufacturer are being maintained.

3 Delivery and site handling

3.1 The liquid components are delivered to site in packaging bearing the product name, company name, batch number, health and safety information and weight of contents in kilograms. The type of packaging for the liquid components is given in Table 2.

Table 2 Liquid component packaging and size

Component	Packaging	Packaging size (kg)
Topseal PU Basecoat	clamp top tin	6.85, 20.85
Topseal PU Topcoat	clamp top tin	6.9, 20.7
Topseal PU Primer	metal can	5

3.2 The components must be stored in a dry, well-ventilated area, under cover, within the temperature range recommended by the Certificate holder and away from heat sources.

3.3 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 Topseal PU.

4 General

4.1 Topseal PU is satisfactory for use as a waterproofing layer on new and existing flat and pitched roofs with limited and pedestrian access, inverted roofs and green (extensive) roofs.

4.2 The system is suitable for use on the following substrates:

- concrete
- mastic asphalt
- bituminous roofing membranes
- steel
- wood
- GRP.

4.3 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 2021*, Chapter 7.1.

4.4 Green roof (extensive) is defined for the purpose of this Certificate as a roof with a shallow layer of growing medium planted with low-maintenance plants such as mosses, sedums, grasses and some wild flower species.

4.5 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, additional protection to the membrane must be provided as specified by the Certificate holder.

4.6 Flat roofs are defined for the purpose of this Certificate as those having a minimum finished fall of 1:80⁽¹⁾.

(1) NHBC Standards 2021 require a minimum fall of 1:60 for green roofs and roof gardens.

4.7 Pitched roofs are defined for the purpose of this Certificate as those having a fall greater than 1:6.

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

4.9 For green and inverted roofs, structural decks to which the system is to be applied must be capable of transmitting the dead and imposed loads experienced in service.

4.10 Dead loads, wind loading and imposed loads are 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.

4.11 Recommendations for the design of green roof specifications are available within the latest edition of *The GRO Green Roof Code - Green Roof Code of Best Practice for the UK*.

4.12 The drainage systems for inverted roofs or green roofs must be correctly designed, and the following points should be addressed:

- provision made for access for maintenance purposes
- dead loads for green roofs 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 BBA Information Bulletin No 4 *Inverted roofs – Drainage and U value corrections*.

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

- as described in the relevant clauses of BS 6229 : 2018, or
- the subject of a current BBA Certificate and used in accordance with the scope of that Certificate.

4.14 The NHBC requires that the roof membranes, once installed, be inspected in accordance with of *NHBC Standards 2021*, Chapter 7.1, Clause 7.1.12, including the use of an appropriate integrity test, where required. Any damage to the membrane is repaired in accordance with section 15 of this Certificate and reinspected.

5 Practicability of installation

Installation of the system must only be carried out by specialist roofing contractors trained and approved by the Certificate holder.

6 Weathertightness



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

6.2 To achieve a weathertight coating it is essential that the application rate is as quoted in the Certificate holder's literature for the relevant system.

7 Properties in relation to fire



7.1 When tested to DD CEN/TS 1187 : 2012, Test 4, a system comprising 12 mm calcium silicate board, a coat of Topseal PU Basecoat at a coating rate of $1 \text{ l}\cdot\text{m}^{-2}$, a layer of Topseal PU 225gm CSM Reinforcement embedded in the base coat, and a coat of Topseal PU Topcoat at a coating rate of $1.75 \text{ l}\cdot\text{m}^{-2}$, when classified to BS EN 13501-5 : 2005, achieved $B_{\text{ROOF}}(t4)$.

7.2 In the opinion of the BBA, a roof incorporating the system will be unrestricted under the national Building Regulations in the following circumstances:

- Protected or inverted roof specifications, including an inorganic covering listed in the Annex of Commission Decision 2000/553/EC,
- irrigated green roofs.

7.3 The designation of other specifications should be confirmed by reference to the requirements of the documents supporting the national Building Regulations.



7.4 The products, when used in pitches of greater than 70° , excluding upstands, should not be used on buildings in England and Wales that have a storey at least 18 m above ground level and contain: one or more dwellings, an institution, a room for residential purposes (excluding any room in a hostel, hotel or boarding house), student accommodation, care homes, sheltered housing, hospitals or dormitories in boarding schools.



7.5 The system, when used in pitches greater than 70° , excluding upstands, should not be used on buildings in Scotland that have a storey more than 11 m above ground level.

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

8 Resistance to wind uplift

8.1 The adhesion of the system to the substrates listed in section 4.2 is sufficient to resist the effects of any wind suction, elevated temperatures, thermal shock or minor movement likely to occur in practice.

8.2 Where the system is installed over insulation, the resistance to wind uplift is dependent on the cohesive strength of the insulation.

8.3 The ballast requirements for inverted specifications should be calculated by a suitably competent and experienced individual in accordance with the relevant parts of BS EN 1991-1-4 : 2005 and its UK National Annex. The system should always be ballasted with a minimum depth of 50 mm of aggregate. In areas of high wind exposure, the Certificate holder’s advice should be sought. Alternatively, concrete slabs on suitable supports can be used.

8.4 It should be recognised that the type of plants used in roof gardens could significantly affect the expected wind loads experienced in service.

9 Resistance to mechanical damage

9.1 The system can accept the limited foot traffic and light concentrated loads associated with installation and maintenance. Reasonable care should be taken to avoid puncture by sharp objects or concentrated loads. Where traffic in excess of this is envisaged, such as maintenance of lift equipment, a walkway should be provided.

9.2 Results of dynamic and static indentation tests are given in Table 3.

Table 3 Dynamic and static indentation

Test	Result	Method
Dynamic indentation control:		EOTA TR-006
steel substrate		
– tested at 23°C	I4	
– tested at –20°C	I4	
PU insulation substrate		
– tested at 23°C	I3	
heat aged ⁽¹⁾ :		
– tested at –20°C on steel	I4	
UV aged ⁽²⁾ :		
– tested at –10°C on steel	I4	
Static indentation control tested at 23°C:		EOTA TR-007
steel substrate	L3	
PU insulation substrate	L3	
water exposure ⁽³⁾ :		
– tested at 23°C on steel	L4	
– tested at 90°C on steel	L2	

(1) Heat aged for 200 days at 80°C.

(2) UV aged 1000 MJ·m⁻² at 50°C.

(3) Water exposure at 60°C for 60 days.

9.3 In pedestrian access areas, suitable protection, such as pavers, is used.

9.4 The system is capable of accepting minor structural movement while remaining weathertight.

10 Resistance to root penetration

The system will resist non-intrusive root penetration, such as mosses, sedums and some wild flower species, and can be used in a roof waterproofing system for green roofs (extensive).

11 Maintenance



11.1 The system should be the subject of six monthly inspections and maintenance in accordance with BS 6229 : 2018, Chapter 7, to ensure continued satisfactory performance.

11.2 Green roofs must be the subject of regular inspections, particularly in autumn after leaf fall and in spring, to ensure unwanted vegetation and other debris are cleared from the roof and drainage outlets (see section 4.12). Guidance is available within the latest edition of The GRO Green Roof Code - Green Roof Code of Best Practice for the UK.

11.3 Any damage should be repaired in accordance with section 16 of this Certificate and the Certificate holder's instructions.

12 Durability



Under normal service conditions, the system will provide a durable waterproof covering with a service life of at least 25 years.

Installation

13 General

13.1 Installation of the system is carried out in accordance with the relevant clauses of Liquid Roofing and Waterproofing Association (LRWA) Note 7 – *Specifier Guidance for Flat Roof Falls*, the Certificate holder's instructions and this Certificate.

13.2 The system must be applied when the air and substrate temperatures are greater than 5°C. Special precautions may be necessary when temperatures exceed 30°C, as shown in the Certificate holder's Technical Data Sheets.

13.3 Detailing (eg upstands) must be carried out in accordance with the Certificate holder's instructions.

13.4 Growing medium 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.

14 Site and surface preparation

14.1 Substrates on which the system is to be applied must be properly prepared in accordance with the Certificate holder's instructions.

14.2 Adhesion to substrates will depend on the condition and cleanliness of the substrate. Substrates must be visibly dry, sound and free from loose materials or contamination (eg moss or algae).

14.3 Substrates are high-pressure washed and rinsed to remove loose or flaking materials, but the substrate must be visibly dry before application of the system. Areas contaminated with moss and lichen are treated with a proprietary fungicidal wash and allowed to dry.

14.4 Damaged areas of the substrate (eg blistered bitumen roofing felt or degraded mastic asphalt) must be removed, replaced or repaired. The adhesion of existing liquid-applied coatings is checked and any defective area removed back to a firm edge. Substrate defects (eg shallow-bottomed cracks and indentations) are filled using a cementitious mortar.

14.5 Deck surfaces must be free from sharp projections, such as protruding fixing bolts and concrete nibs.

14.6 Gutters and outlets must be checked to ensure that they are, and remain, clear of all debris.

14.7 All points of potential weakness such as splits, cracks, joints and crazed surfaces must be reinforced in accordance with the Certificate holder's instructions prior to the application of the system.

14.8 Where required, the substrates are primed using Topseal PU Primer at the recommended coverage rate in accordance with the Certificate holder's instructions.

15 Application

15.1 Topseal PU Basecoat is applied to the substrate using a medium pile roller at a coverage rate of $1.0 \ell \cdot m^{-2}$ (flat roof) or $0.5 \ell \cdot m^{-2}$ (pitched roof). The application rate may need to be increased on uneven or porous substrates and the advice of the Certificate holder should be sought.

15.2 The reinforcement is laid out and rolled into the wet base coat. Adjacent widths of reinforcement are overlapped by a minimum of 50 mm.

15.3 The base coat is cured for a minimum of 16 hours at $20^{\circ}C$ prior to application of the top coat. At lower temperatures this time should be increased in line with the recommendations of the Certificate holder. Providing the base coat surface is clean, there is no maximum over-coating time.

15.4 Prior to the application of Topseal PU Topcoat, the base coat surface must be dry and free of contamination.

15.5 The top coat is applied at a coverage rate of $1.75 \ell \cdot m^{-2}$ on smooth surfaces, ensuring the embedment coat is totally covered. The top coat is cured for a minimum of 6 hours at $20^{\circ}C$ (longer at lower temperatures) prior to trafficking.

16 Repair

The repair of minor damage to the system can be achieved effectively by cleaning back to the unweathered material and recoating the damaged area with the membrane at the application rates stated in section 15.

Technical Investigations

17 Tests

Tests were carried out and the results assessed to determine:

- watertightness
- water vapour transmission
- tensile properties
- delamination strength from concrete, primed concrete, primed steel, bitumen roofing membrane, primed wood, liquid-applied acrylic roof waterproofing, primed GRP and primed aluminium paint
- dynamic indentation
- static indentation
- fatigue cycling
- extremes of installation temperature (tensile strength and dynamic indentation repeated)
- UV ageing for $1000 MJ \cdot m^{-2}$ at $50^{\circ}C$ (tensile strength and dynamic indentation)
- heat ageing at $80^{\circ}C$ for 200 days (tensile strength, dynamic indentation and fatigue cycling repeated)
- water exposure at $60^{\circ}C$ for 60 days (delamination strength and static indentation repeated).

18 Investigations

18.1 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.

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

18.3 A visit was made to an existing site to assess the system in use.

18.4 Data on fire performance were evaluated.

Bibliography

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

BS 8217 : 2005 *Reinforced bitumen membranes for roofing — 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 + 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 13501-5 : 2016 *Fire classification of construction products and building elements — Classification using data from external fire exposure to roofs tests*

BS EN ISO 9001 : 2015 *Quality management systems — Requirements*

DD CEN/TS 1187 : 2012 *Test methods for external fire exposure to roofs*

EOTA TR-006 May 2004 *Determination of the resistance to dynamic indentation*

EOTA TR-007 May 2004 *Determination of the resistance to static indentation*

19 Conditions

19.1 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 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.

19.2 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.

19.3 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.

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

19.5 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.

19.6 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.