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Agrément Certificate
15/5223
Product Sheet 1

ENKOPUR COLD APPLIED LIQUID ROOF WATERPROOFING SYSTEM

ENKOPUR 1K POLYURETHANE WATERPROOFING SYSTEM

This Agrément Certificate Product Sheet⁽¹⁾ relates to the Enkopur 1K Polyurethane Waterproofing System⁽²⁾, a single-component, cold liquid-applied polyurethane-based roof waterproofing membrane with a polyester fleece reinforcement, for use on flat and pitched roofs with limited access, including green roof and roof garden specifications and podia.

(1) Hereinafter referred to as 'Certificate'.

(2) Enkopur is a registered trademark.

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 — use of the system will enable a roof to be unrestricted under the Building Regulations (see section 7).

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

Resistance to foot traffic — the system will accept, without damage, the foot traffic and loads associated with installation and maintenance (see section 9).

Resistance to penetration by roots — the system will resist penetration by plant roots and rhizomes (see section 10).

Durability — under normal service conditions the system will provide a durable roof waterproofing with a service life in excess of 25 years (see section 12).



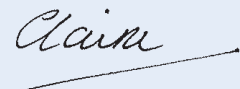
The BBA has awarded this Certificate to the company named above for the system described herein. This system has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément



Date of First issue: 30 June 2015

John Albon — Head of Approvals
Construction Products



Claire Curtis-Thomas
Chief Executive

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 are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

Regulations

In the opinion of the BBA, the Enkopur 1K Polyurethane 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 suitable substructures the use of the system will enable a roof to be unrestricted under this Requirement. See section 7 of this Certificate.
Requirement: C2(b)	Resistance to moisture
Comment:	The system 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 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 system comprises acceptable materials and satisfies the requirements of this Regulation. See sections 11 and 12 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 on flat roofs, is regarded as having a low vulnerability and will enable a roof to be unrestricted under this Standard, with reference to clause 2.8.1 ⁽¹⁾⁽²⁾ . See section 7 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⁾⁽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 this 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)(b)(i)	Fitness of materials and workmanship
Comment:	The system comprises acceptable materials and satisfies the requirements of this Regulation. See section 12 and the <i>Installation</i> part of this Certificate.
Regulation: 28(b)	Resistance to moisture and weather
Comment:	The system 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 suitable substructures, the use of the system will 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* and 14 *Precautions* of this Certificate.

Additional Information

NHBC Standards 2014

NHBC accepts the use of the Enkopur 1K Polyurethane Waterproofing System, provided it is installed, used and maintained in accordance with this Certificate, in relation to *NHBC Standards, Part 7 Roofs, Chapters 7.1 Flat roofs and balconies and 7.2 Pitched roofs.*

CE marking

The Certificate holder has taken the responsibility of CE marking the system, in accordance with ETA-04/0020 and ETAG 005 : 2000, Revision March 2004, Parts 1 and 6. An asterisk (*) appearing in this Certificate indicates that data shown are given in the manufacturer's Declaration of Performance.

Technical Specification

1 Description

1.1 The Enkopur 1K Polyurethane Waterproofing System comprises:

- Enkopur 1K — a one-component, liquid-applied, moisture-reactive polyurethane prepolymer-based membrane
- Enke Polyflex fleece — a 1.10 kg·m⁻² polyester fleece for use as a reinforcement
- Enke Universal VA 933 Primer — a transparent, solvent-based, fast-drying synthetic resin solution, slightly yellowish in colour, to be applied on concrete, bitumen sheets, extruded polystyrene foam and steel.

1.2 The membrane is available in silver-grey and black colours. Other colours are available on request.

1.3 The membrane is applied by rolling or brushing in multiple layers to provide a waterproofing membrane with a minimum dry film thickness of 2.1 mm.

1.4 The system is the subject of ETA-04/0020 issued by the DIBt in accordance with ETAG 005 : 2000, Revision March 2004. The level of use categories are:

Working life	W3* (25 years)
Climatic zone	S* (Severe)
Imposed loads	P1* to P4* (non-compressible substrate, eg concrete, steel)
Roof slope	S1* (<5%) to S4* (>30%)
Lowest surface temperature	TL4* (-30°C)
Highest surface temperature	TH4* (90°C)
Resistance to wind loads	≥ 50* kPa.

1.5 Other items or components which may be used with the system, but which are outside the scope of this Certificate, are:

- Bitumen Vapour Control Layer — available in polyester and foil core
- PIR Insulation board (for warm roof applications) — suitable for direct application of the Enkopur 1K Polyurethane Waterproofing System and available in thicknesses from 50 mm to 140 mm.

2 Manufacture

2.1 The system components are manufactured by batch-blending processes.

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 Enkopur 1K is delivered to site in 4 kg, 12.5 kg or 25 kg disposable containers bearing the product's name, safety data and batch number, and the BBA logo incorporating the number of this Certificate.

3.2 Enke Universal VA 933 Primer is delivered to site in 2.5 kg, 8 kg or 20 kg disposable containers bearing the product's name, safety data and batch number, and the BBA logo incorporating the number of this Certificate.

3.3 Enke Polyflex reinforcing fabric is delivered to site in 50 m rolls with the widths and weights shown in Table 1. Other widths are available on request.

Table 1 Enke Polyflex reinforcing fabric —roll widths and weights

Roll width (cm)	Roll weight (kg)
10.5	0.750
15.0	0.825
20.0	1.100
30.0	1.650
50.0	2.750
100.0	5.500

3.4 Resins must be stored in ventilated, dry locations, away from heat and oxidising agents and out of direct sunlight, and at a temperature between 0°C and 50°C. If unopened and stored correctly, the resins will have a minimum shelf-life of 6 months.

3.5 The polyurethane adhesives and bitumen primer are classified under the *Classification, Labelling and Packaging of Substances and Mixtures (CLP Regulation) 2009* and bear the appropriate hazard warning label. The flashpoints and hazard warning classifications are given in Table 2.

Table 2 Flashpoints and hazard classifications

Component	Flashpoint (°C)	Classification
Enkopur 1K ⁽¹⁾	48	Flammable, Irritant, Dangerous for the environment
Enke Universal VA 933 Primer	11	Highly flammable, Irritant, Harmful

(1) This component must be stored in accordance with *The Dangerous Substances and Explosive Atmospheres Regulations 2002*.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the Enkopur 1K Polyurethane Waterproofing System.

Design Considerations

4 Use

4.1 The Enkopur 1K Polyurethane Waterproofing System is satisfactory for use as a fully-adhered waterproofing membrane on new and existing flat and pitched roofs with limited access, including green roof and roof garden specifications.

4.2 Pedestrian access roofs are defined for the purpose of this Certificate as those not subjected to vehicular traffic.

4.3 Flat roofs are defined for the purpose of this Certificate as those having a minimum finished fall of 1:80. 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. Pitched roofs are defined for the purpose of this Certificate as those having a fall greater than 1:6.

4.4 Decks to which the membranes are to be applied must comply with the relevant requirements of BS 6229 : 2003 and, where appropriate, *NHBC Standards 2014*, Chapters 7.1 *Flat roofs and balconies* and 7.2 *Pitched roofs*.

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

- as described in the relevant clauses of BS 6229 : 2003, or
- the subject of a current BBA Certificate and used in accordance with that Certificate.

4.6 Structural decks to which the system is to be applied must be suitable to transmit the dead and imposed loads experienced in service. Imposed loads, dead loading and wind loads are calculated in accordance with BS EN 1991-1-1 : 2002, BS EN 1991-1-3 : 2003, BS EN 1991-1-4 : 2005 and their respective UK National Annexes.

4.7 Where applicable, the Certificate holder must be consulted for advice on suitable protection (eg pavers), depending on the use of the roof. The system can be used on balconies as a protected waterproofing layer in conjunction with pavers for pedestrian access.

4.8 The system has been assessed for use on the following primed substrates:

- concrete
- XPS/PIR

- polymer bitumen sheets
- metal.

For use with other substrates, the Certificate holder's technical advice must be sought. The adhesion to and compatibility with other substrates must be confirmed by test (see also section 13.4).

5 Practicability of installation

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

6 Weathertightness



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

6.2 The system is impervious to water and will achieve a weathertight roof capable of accepting minor structural movement.

6.3 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 in accordance with EN 1187 : 2002 test 4, a system comprising 1 kg per m² Enkopur 1K (grey) with an embedded 110 g·m⁻² polyester reinforcing fabric and overcoated with 2 kg per m² Enkopur 1K, applied to a substrate of 19 mm plywood board with 2.4 mm bitumen membrane under 40 mm PIR insulation with hard top composite board and primed with 0.2 kg per m² Universal 933 primer, was classified as B_{ROOF} (t4) in accordance with Table 1 of EN 13501-5 : 2005.

7.2 The designation of other specifications should be confirmed by:

England and Wales — test or 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 Adhesion

The adhesion of the system to the substrates given in section 4.8 is sufficient to resist the effects of wind suction, thermal cycling or other minor structural movements likely to occur in service. Acceptable adhesion to other substrates must be confirmed by test.

9 Resistance to foot traffic

The system can accept the 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.

10 Resistance to penetration of roots

The system will resist penetration by plant roots and rhizomes and can be used as a waterproofing system in green roof and roof garden specifications.

11 Maintenance



Roofs waterproofed with the system must be the subject of bi-annual inspections, in autumn after leaf fall and in spring, to ensure that vegetation and other debris are cleared from the roof and that drains remain clear and functional.

12 Durability



The system will function effectively as a waterproofing membrane for a period in excess of 25 years.

Installation

13 General

13.1 Installation of the system must be carried out only in accordance with the relevant clauses of BS 8000-4 : 1989, BS 6229 : 2003, the Certificate holder's instructions and this Certificate.

13.2 Substrates to which the system is to be applied must be sound, dry, clean and free from sharp projections such as nail heads and concrete nibs. Rough substrates must be made good using the appropriate levelling compound in accordance with the Certificate holder's instructions.

13.3 Where necessary, substrate priming must be carried out using a brush or roller in accordance with the Certificate holder's instructions.

13.4 Adhesion checks may be carried out to ensure that the system is compatible with the existing surfaces. The Certificate holder must be consulted for details of suitable test methods and requirements before use.

13.5 Installation should not be carried out during inclement weather (eg rain, fog or snow). When the temperature is below 5°C suitable precautions against surface condensation on the substrate must be taken. The substrate and ambient air temperature for the application of Enkopur 1K Polyurethane Waterproofing System is between 5°C and 30°C.

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

13.7 Expansion or construction joints must be additionally reinforced prior the application of the main waterproofing layer, in accordance with the Certificate holder's instructions.

14 Precautions

14.1 Vapours from the system may cause sensitisation and irritation to the respiratory system, eyes and skin. The system must only be used in areas with sufficient ventilation to prevent the build-up of vapours. Contact with the skin, eyes and clothing must be avoided. The Certificate holder's instructions and relevant material safety data sheets must be consulted and a COSHH assessment for the works carried out before use.

14.2 The system must not be allowed to enter the waste drainage system.

15 Procedure

15.1 The substrate is primed with Enke Universal VA 933 Primer at a minimum application rate of 0.1 kg·m⁻². Once joint treatments have cured, Enkopur 1K is applied at a minimum application rate of 2.0 kg·m⁻².

15.2 Enke Polyflex fleece is applied into the wet resin and embedded using a brush or roller, ensuring that any trapped air pockets are removed.

15.3 A top layer of Enkopur 1K is applied to the substrate at a minimum application rate of 1.0 kg·m⁻² ensuring that the fleece is saturated.

15.4 In the event of uneven, undulated or heavily-structured substrates, or at low temperatures, the total application of Enkopur 1K may exceed 3.0 kg·m⁻². Recommended application rates for various substrates are given in Table 3.

Table 3 Application rates

Substrate	Application rate (kg·m ⁻²)
Smooth	3
Fine-grained	3.2
Rough	3.5

For further recommended application rates in various situations, the Certificate holder's technical application instructions must be consulted.

16 Repair

Minor damage can be repaired by cleaning back to the unweathered material and recoating the damaged area with the membrane at the appropriate application rate stated in section 15.

Technical Investigations

17 Tests

Tests were carried out in accordance with ETAG 005 : 2000, Revision March 2004, Parts 1 and 6, leading to the issue of European Technical Approval ETA - 04/0020. The results were assessed by the BBA to determine:

- tensile strength and elongation
- water vapour diffusion resistance coefficient μ
- watertightness
- tensile bond strength on concrete, steel and bitumen sheet
- dynamic indentation
- static indentation
- resistance to fatigue cycling
- resistance to low temperatures
- resistance to high temperatures

- heat ageing at 80°C for 200 days
- resistance to UV ageing at 1000 MJ·m⁻²
- resistance to water exposure at 60°C for 180 days
- the effect of application temperatures
- the effect of day joints
- external fire performance to ENV 1187 : 2002, Test 1
- reaction to fire.

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 Data on fire performance to DD CEN/TS 1187 : 2012 Test 4 were assessed.

18.3 Visits were made to sites in progress to assess the practicability of installation.

Bibliography

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

BS 8000-4 : 1989 *Workmanship on building sites — Code of practice for waterproofing*

BS EN 1991-1-1 : 2002 *Eurocode 1 : Actions on structures — General actions*

NA to BS EN 1991-1-1 : 2002 UK National Annex to *Eurocode 1 : Actions on structures — General actions*

BS EN 1991-1-3 : 2003 *Eurocode 1 : Actions on structures — General actions*

NA to BS EN 1991-1-3 : 2003 UK National Annex to *Eurocode 1 : Actions on structures — General actions*

BS EN 1991-1-4 : 2005 *Eurocode 1 : Actions on structures — General actions*

NA to BS EN 1991-1-4 : 2005 UK National Annex to *Eurocode 1 : Actions on structures — General actions*

BS EN 13501-5 : 2005 *Fire classification of construction products and building elements — Classification using data from external fire exposure to roofs tests*

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

ETAG 005 : 2000, Revision 2004, Part 1 *Liquid applied roof waterproofing kits — General*

ETAG 005 : 2000, Revision 2004, Part 6 *Liquid applied roof waterproofing kits — Specific stipulations*

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.