Enke-Werk, Johannes Enke GmbH & Co KG
Hamburger Straße 16
D-40221 Düsseldorf
Germany

Tel: 01245 707449
e-mail: info@moymaterials.co.uk
website: www.moymaterials.co.uk

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(2) 1K Polyurethane Waterproofing System, a single-component, cold liquid-applied polyurethane-based roof waterproofing membrane with a polyester fleece reinforcement, for use on pitched, flat and zero fall 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 can 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 upon the roof (see section 8).

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

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 Third issue: 16 August 2019

Originally certificated on 30 June 2015

John Albon
Chief Scientific Officer

Claire Curtis-Thomas
Chief Executive

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

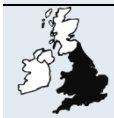
The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

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.

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

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 system can enable a roof to be unrestricted under this Requirement. See section 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**	**Materials and workmanship (applicable to Wales only)**
Regulation:	**7(1)**	**Materials and workmanship (applicable to England only)**
Comment:		The system is acceptable. See section 12 and the *Installation* part of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	**8(1)(2)**	**Durability, workmanship and fitness of materials**
Comment:		On a suitable substructure, the use of the system can enable a roof to be unrestricted under this Requirement. See sections 11.1 and 12 and the *Installation* part of this Certificate.
Regulation:	**9**	**Building standards applicable to construction**
Standard:	2.8	Spread from neighbouring buildings
Comment:		On suitable non-combustible substructures, the use of the system can be unrestricted by the requirements of 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)(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:		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)**	**Fitness of materials and workmanship**
Comment:	**(b)(i)**	The system is acceptable. See section 12 and the *Installation* part of this Certificate.
Regulation:	**28(b)**	**Resistance to moisture and weather**
Comment:		The system will enable a roof to satisfy the requirements of this Regulation. See section 6.1 of this Certificate.

Regulation:	**36(b)**	**External fire spread**
Comment:		On suitable non-combustible substructures, 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 section: 3 *Delivery and site handling* (3.1 to 3.3 and 3.5) of this Certificate.

Additional Information

NHBC Standards 2019

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 in relation to *NHBC Standards*, Chapter 7.1 *Flat roofs and balconies.*

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 a reinforcement
- Enke Universal 933 Primer — a transparent, solvent-based, fast-drying synthetic resin solution, slightly yellowish in colour, for use on concrete, bitumen sheets, extruded polystyrene foam and steel
- Enke P-O Primer — a solvent based yellow primer for use on thermoplastic polyolefin membranes
- Enke Primer 2K — a two-part polyurethane-based primer for use on plasticised PVC membranes
- Enke Glass Primer — a silane-based primer for use on glass and glazed tiles.

1.2 Enkopur 1K is available in silver-grey and black. 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 DIBt, in accordance with ETAG 005 : 200, Revision March 2004. The level of Use Categories* are:

Working life	W3 (25 years)
Climatic zone	M (Moderate) and 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
- PIR Insulation Board (for warm roof applications).

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, 12.5 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, 8 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 Fleece 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)
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 and 50°C. If unopened and stored correctly, the resins will have a minimum shelf-life of 6 months.

3.5 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 Enkopur 1K Polyurethane Waterproofing System.

Design Considerations

4 General

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

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

- concrete
- XPS/PIR
- polymer modified bitumen sheets
- metal
- TPO roofing membranes
- PVC roofing membranes
- glass.

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

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

- roof garden (intensive) — a roof with a substantial layer of growing medium with planting that can include shrubs and trees, generally accessible to pedestrians
- green roof (extensive) — a roof with a shallow layer of growing medium planted with low-maintenance plants such as mosses, sedums, grasses and some wild flower species.

4.4 Limited access roofs are defined for the purpose of this Certificate as those subjected only to pedestrian traffic for maintenance of the roof covering and cleaning of gutters, etc. Where traffic in excess of this is envisaged, additional protection to the membrane must be provided.

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

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

4.7 Zero fall roofs are defined for the purpose of this Certificate as those having a finished fall which can vary between 0 and 1:80(1). Reference should also be made to the appropriate clauses of Liquid Roofing and Waterproofing Association (LRWA) Note 7 — *Specifier Guidance for Flat Roof Falls*.

(1) *NHBC Standards* 2019 require a minimum fall of 1:60 for green roofs and roof gardens.

4.8 Decks to which the system is to be applied must comply with the relevant requirements of BS 6229 : 2018, BS 8217 : 2005 (Sections 5.1.2 and 6.7) and, where appropriate, *NHBC Standards* 2019, Chapter 7.1.

4.9 For green roofs and roof gardens, 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 Imposed loads, dead loading and wind loads 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 UK National Annexes.

4.11 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.

4.12 Recommendations for the design of green roofs 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*.

4.13 The drainage systems for zero fall roofs, green roofs or roof gardens must be correctly designed, and the following points should be addressed:

- provision made for access for maintenance purposes
- for zero fall roofs, it is particularly important to identify the correct drainage points, to ensure that drainage is sufficient and effective
- dead loads for green roofs and roof gardens can increase if the drains become partially or completely blocked causing waterlogging of the drainage layer.

4.14 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 : 2018 and BS 8217 : 2005, or
- the subject of a current BBA Certificate and used in accordance with, and within the limitations of, that Certificate.

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 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(1) in accordance with DD CEN/TS 1187 : 2012, Test 4, a system comprising 1 $kg \cdot m^{-2}$ Enkopur 1K (grey) with an embedded 110 $g \cdot m^{-2}$ polyester reinforcing fabric and overcoated with 2 $kg \cdot m^{-2}$ 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 $kg \cdot m^{-2}$ Enke Universal 933 Primer, was classified(1) as $B_{ROOF}(t4)$ in accordance with EN 13501-5 : 2005, Table 1.

(1) Test Report Reference 351720, issued by Exova Warringtonfire. The Report is available from the Certificate holder.

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:

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

7.3 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
Northern Ireland – test or assessment by a UKAS-accredited laboratory or an independent consultant with appropriate experience.

7.4 If allowed to dry, plants used in a roof garden may allow flame spread across the roof. This should be taken into consideration when selecting suitable plants for the roof. Appropriate planting and irrigation should be used to ensure 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 given in section 4.2 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.

8.2 The system, when used with a suitable roof garden or green roof specification, will adequately resist the effects of wind uplift likely to occur in practice.

8.3 The growing medium used in intensive plantings must not be of the type that will be removed, or become delocalised, owing to wind scour experienced on site.

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 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.

9.2 Once the green roof or roof garden has been installed, it can be regarded as protection for the system in use.

10 Resistance to root penetration

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. Advice on suitable planting specifications can be obtained by the Certificate holder.

11 Maintenance

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

11.2 Guidance is available within the latest edition of The GRO Green Roof Code – *Green Roof Code of Best Practice for the UK.*

11.3 Should a leak occur in the waterproofing layer in green or inverted roof specifications, access to it is achieved by removing the layers above the waterproofing and replacing them once the repair has been carried out.

12 Durability

Under normal service conditions, the system will have a service life in excess of 25 years.

Installation

13 General

13.1 Installation of the system must be carried out only in accordance with the relevant requirements of BS 8000-4 : 1989, BS 6229 : 2018, 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 projection 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 must be taken. The substrate and ambient air temperature for the application of the system is between 5 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 to the application of the main waterproofing layer, in accordance with the Certificate holder's instructions.

14 Application

14.1 The substrate is primed with Enke Universal VA 933 Primer at a minimum rate of 0.1 $kg \cdot m^{-2}$. Once joint treatments have cured, Enkopur 1K is applied at a minimum application rate of 2.0 $kg \cdot m^{-2}$.

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

14.3 A top layer of Enkopur 1K is applied to the substrate at a minimum application rate of 1.0 $kg \cdot m^{-2}$, ensuring that the fleece is saturated.

14.4 In the event of uneven, undulating or heavily structured substrates, or at low temperatures, the total application of Enkopur 1K may exceed 3.0 $kg \cdot m^{-2}$. Recommended application rates for various substrates are given in Table 2. For further recommended application rates in various situations, the Certificate holder's technical application instructions must be followed.

Table 2 Application rates

Substrate	Application rate ($kg \cdot m^{-2}$)
Smooth	3.0
Fine-grained	3.2
Rough	3.5

15 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 in section 14.

Technical Investigations

16 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 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 $MJ \cdot m^{-2}$
- resistance to water exposure at 60°C for 180 days
- the effect of application temperatures
- the effect of day joints
- root resistance
- external fire performance to ENV 1187 : 2002, Test 1
- reaction to fire.

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

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

Bibliography

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

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

BS 8217 : 2005 *Reinforced bitumen membranes for roofing — Code of practice*

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 + A1 : 2015 *Eurocode 1 : Actions on structures — General actions*
NA to BS EN 1991-1-3 : 2003 + A1 : 2015 UK National Annex to *Eurocode 1 : Actions on structures — General actions*
BS EN 1991-1-4 : 2005 + A1 : 2015 *Eurocode 1 : Actions on structures — General actions*
NA to BS EN 1991-1-4 : 2005 + A1 : 2015 UK National Annex to *Eurocode 1 : Actions on structures — General actions*

BS EN 13501-5 : 2005 + A1 : 2009 *Fire classification of construction products and building elements — Classification using data from external fire exposure to roofs test*

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

ENV 1187 : 2002 *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*

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 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.

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.