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Agrément Certificate
06/4388
Product Sheet 1

KEMPER SYSTEM SOLVENT-FREE COLD LIQUID-APPLIED WATERPROOFING SYSTEMS

KEMPEROL 2K-PUR ROOF WATERPROOFING SYSTEM

This Agrément Certificate Product Sheet(1) relates to the Kemperol 2K-PUR Roof Waterproofing System, a solvent-free, cold liquid-applied polyurethane roof waterproofing membrane reinforced with polyester fleece, for use as a waterproofing layer on flat, pitched or zero fall roofs, including green roofs and roof gardens, with limited access, and for waterproofing balconies, terraces and podiums.

(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 can enable a roof to be unrestricted under the national Building Regulations (see section 7).

Resistance to wind uplift — the adhesion of the system is sufficient to resist the effects of any likely wind suction acting on the roof and the effects of thermal or other minor movements likely to occur in practice (see section 8).

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

Resistance to root penetration — the system will adequately resist plant root penetration in green roof and roof garden systems (see section 10).

Durability — under normal service conditions, the system will provided 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 Third issue: 2 August 2019

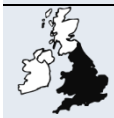
Originally certificated on 27 November 2006

John Albon
Chief Scientific Officer

Claire Curtis-Thomas
Chief Executive

Regulations

In the opinion of the BBA, the Kemperol 2K-PUR 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 sections 7.1 to 7.3 of this Certificate.
Requirement:	**C2(b)**	**Resistance to moisture**
Comment:		The system can satisfy this Requirement. See section 6.1 of this Certificate.
Regulation:	**7**	**Materials and workmanship (applicable in Wales only)**
Regulation:	**7(1)**	**Materials and workmanship (applicable in 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:		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:	2.8	Spread from neighbouring buildings
Comment:		The system, when applied to a non-combustible substrate, 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 use of 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)(b)(i)**	**Fitness of materials and workmanship**
Comment:		The system is acceptable. See section 12 and the *Installation* part of this Certificate.

Regulation:	**28(b)**	**Resistance to moisture and weather**
Comment:		The use of the system can 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 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* of this Certificate.

Additional Information

NHBC Standards 2019

In the opinion of the BBA, the Kemperol 2K-PUR Roof 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-03/0044 and ETAG 005 : 2005. 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 Kemperol 2K-PUR Roof Waterproofing System is a cold liquid-applied polyurethane coating reinforced with an embedded polyester fleece to provide a waterproofing membrane with a minimum dry film thickness of 2 mm.

1.2 The system components are:

- Kemperol 2K-PUR Resin — a two-component, solvent-free liquid-applied resin that cures to form a flexible waterproofing membrane
- Kemperol 165 Fleece — a polyester fleece for embedding into Kemperol 2K-PUR Resin to act as reinforcement. The fleece has the nominal characteristics of:
  - weight per unit area ($g \cdot m^{-2}$) 165 ± 10%
  - tensile strength ($N \cdot 50\ mm^{-1}$) ≥ 250
  - elongation at break (%) ≥ 40
  - roll length (m) 50
  - roll width (mm) 105, 210, 262.5, 350, 525, 700 and 1050.

1.3 The system is the subject of ETA-03/0044, issued by Deutsches Institut für Bautechnik (DIBt), in accordance with ETAG 005 : 2005. The levels of Use Categories are:

- categorisation by working life W3 (25 years)*
- categorisation by climatic zone M (moderate) and S (severe)
- categorisation by imposed loads P4
- categorisation by roof slope S1 to S4 (<5% to >30% of roof slope)
- categorisation by surface temperature (ºC):

- lowest temperature TL4 (-30)
- highest temperature TH4 (+90)

- reaction to fire class E
- resistance to roots satisfactory.

1.4 Ancillary items necessary for installation of the system and included in this assessment are:

- Kempertec EP Primer — a two-component, solvent-free epoxy primer for use as a surface pre-treatment on concrete and other substrates prior to the application of Kemperol 2K-PUR Resin
- Kempertec D Primer — a two-component, solvent-free polyurethane primer for use on mastic asphalt, GRP, PVC, bituminous sheet, steel and plywood prior to the application of Kemperol 2K-PUR Resin
- Kempertec R Primer — a rapid-cure two-component solvent-free polyurethane primer for use on mastic asphalt, GRP, PVC, bituminous sheet, steel and plywood substrates prior to the application of Kemperol 2K-PUR Resin
- Kempertec AC Primer — a rapid-cure, two-component, methyl methacrylate primer used in conjunction with Kemco NQ0408 Natural Quartz for use on mastic asphalt and concrete substrates prior to the application of Kemperol 2K-PUR Resin
- Kempertec FPO Primer — a single-component primer for use on polyolefin plastic substrates prior to the application of Kemperol 2K-PUR Resin.

1.5 Other materials which are available for use with the system, but which are outside the scope of this Certificate, include(1):

- Kempertec KR Quartz Sand Mixture — a lightweight graded sand mixture that is used in combination with either Kempertec EP, EP5 or AC Primers to provide a trowel-applied levelling and/or repair mortar, prior to the application of Kemperol 2K-PUR resin
- Kempertec EP5 Primer — a faster-curing version of Kempertec EP Primer which can be used at temperatures down to 5°C prior to the application of Kemperol 2K-PUR Resin
- Kemperol 2K-PUR Speedshot — accelerator added to Kemperol 2K-PUR Resin to shorten the curing time, for use at lower temperatures (5 – 10°C)
- Kemco NQ 0408 (0.4 – 0.8 mm) Natural Quartz —sprinkled in to wet Kempertec EP Primer, Kempertec EP5 Primer and Kempertec A/C Primer to produce a mechanical bond key for Kemperol 2K-PUR Resin
- Kemco NQ 0712 (0.7 – 1.2 mm) Natural Quartz — kiln-dried natural quartz, sprinkled in to wet Kempertec EP Primer, Kempertec EP5 Primer and Kempertec AC Primer to produce a mechanical bond key for bedding mortar or screed when being used as an alkaline protection layer above Kemperol 2K-PUR Resin
- Kemperdur Coloured Quartz (0.4 – 0.8 mm) — kiln-dried quartz sand, available in a range of colours, for scattering into the surface of Kemperol 2K-PUR Resin or Kemperdur Solvent-Free TC Surfacing on balconies where increased resistance to foot traffic is required and to provide a non-slip surface
- Kemperdur Solvent-Free TC Surfacing — a hard-wearing surfacing for application over 2K-PUR membrane to provide additional protection and offer colour options when used with a quartz or aggregate finish
- Kemperol Topcoat — UV-stable, transparent coating for sealing quartz aggregate
- Kemperdur Eco-Finish — a two-component, solvent-free, wear-resistant, transparent silk finish coating, for sealing Kemperdur Solvent-Free TC Surfacing and Kemperol waterproofing incorporating Kemperdur coloured quartz, Kempertec natural quartz and Kemperdur granite finishes
- Kemperol Reinforcement Strip — used to reinforce joints in fleece reinforcement when a flush joint detail is required
- Kemco MEK Cleaner — to clean substrates, remove fat or oil from metals, clean Kemperol surfaces after a working break of more than 6 hours, clean existing membranes prior to re-treatment and clean tools post-work
- Kemperol Reinforcement Fleece – applied during priming at board joints, perimeters and penetrations to prevent the loss of resin during priming and offers additional reinforcement at these areas.

(1) Details of the specifications may be obtained from the Certificate holder.

1.6 The system is available in anthracite, RAL approximation 7016, as standard; yellow-grey and green-grey are available to order. Other colours can be manufactured to order subject to minimum quantities and availability of pigment.

1.7 Application rates and nominal weights of the system are subject to individual site surveys and are dependent on the porosity and surface finish of the substrate.

2 Manufacture

2.1 The system components 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.

2.3 The management system of the manufacturer, Kemper System GmbH & Co KG, has been assessed and registered as meeting the requirements of EN ISO 9001 : 2015 and EN ISO 14001 : 2015 by TÜV Rheinland (Certificates 01/100 6588 and 01/104/9322 respectively).

3 Delivery and site handling

3.1 The system components are delivered to site packaged as given in Table 1.

Table 1 Details of packaging

Component	Packaging	Weight (kg)
Kemperol 2K-PUR Components A and B composite packs	Outer plastic with 2 foil sachets containing Component A and B in easy-mix bags	5 (2 x 2.5)
Kemperol 2K-PUR Components A and B composite packs	Outer plastic 2-part container with Component B in additional foil sachet	12.5
Kemperol 2K-PUR Speedshot	Plastic bottle	0.9
Kemperol 165 Fleece (50 m rolls in various widths)	Roll	0.866 to 8.66
Kempertec D Primer Components A and B composite packs	Outer plastic with 2 foil sachets containing Component A and B in easy-mix bags	2 (2 x 1) and 5 (2 x 2.5)
Kempertec D Primer Components A and B composite packs	Metal can	5
Kempertec EP Primer Components A and B composite packs	Foil sachet	1
Kempertec EP Primer Components A and B composite packs	Metal can	10
Kempertec EP5 Primer Components A and B composite packs	Foil sachet	1
Kempertec EP5 Primer Components A and B composite packs	Metal can	10
Kempertec FPO Primer Components A and B composite packs	Metal can	0.75 and 4
Kempertec R Primer Components A and B composite packs	Outer plastic with 2 foil sachets containing Component A and B in easy-mix bags	2 (2 x 1)
Kempertec AC Primer Component A	Metal can	1 and 5
CP Catalyst Powder (Kempertec AC Primer Component B)	Sealed plastic bag	0.1 and 0.02
Kemco NQ0408 Natural Quartz	Bag	25
Kemco NQ0712 Natural Quartz	Bag	25
Kempertec KR Quartz Sand Mixture	Bag	25
Kemperdur ECO-Finish Components A and B composite packs	Outer plastic with 2 foil sachets containing Component A and B in easy-mix bags	5 (2 x 2.5)
Kemco MEK Cleaning Agent	Metal can	3 L and 10 L

3.2 All containers must be stored under cover in a cool, dry, ventilated location away from other chemicals and any source of ignition. Storage temperatures should preferably be below 20°C with all materials protected from sub-zero temperatures and direct sunlight. Each container carries a label bearing the manufacturer's name, product name and health and safety information. Rolls of Kemperol 165 Fleece should be stored flat in a dry, clean environment protected from moisture. When correctly stored in accordance with the Certificate holder's instructions, Kemperol 2K-PUR Resin will have a storage life of up to 12 months. The Certificate holder's product data sheets should be consulted for details.

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 the Kemperol 2K-PUR Roof Waterproofing System.

Design Considerations

4 General

4.1 The Kemperol 2K-PUR Roof Waterproofing System is satisfactory for use as a built-up system on pitched, flat and zero fall roofs with limited access. The system is also satisfactory for use as a built-up system on roofs with limited or pedestrian access in:

- roof gardens (intensive) on flat roofs
- green roofs (extensive) on flat and pitched roofs
- biodiverse roofs
- brown roofs
- protected terraces/balconies with pedestrian access.

4.2 When treated with the appropriate primer in accordance with the Certificate holder's instructions, the Kemperol 2K-PUR Roof Waterproofing System is suitable for use on substrates of:

- acrylic glazing
- aluminium
- bituminous felts including polymer-modified hot- and cold-applied bitumens and bitumen emulsions
- concrete and concrete screeds cured sufficiently to achieve the required bond strength
- copper
- fibre-reinforced cement sheeting
- glass
- GRP
- lead
- lightweight concrete
- mastic asphalt to BS 8218 : 1998
- polyisocyanurate insulation board (PIR)(1)
- PVC
- stainless steel V2A
- steel to CP 143-10 : 1973
- tiles (glazed and unglazed)
- timber, including appropriate grade plywood (minimum EN 636-2 : 1997) and oriented strand board (OSB3) (EN 300 : 2006)
- zinc.

(1) The Certificate holder should be consulted for specific advice on board facing compatibility.

4.3 The substrate list represents a guide to the user; adhesion should be confirmed by test if necessary.

4.4 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, and 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 wildflower species
- biodiverse roof — a roof planted with the aim either to recreate the habitat that was lost when the building was erected or to enhance it
- brown roof — a roof with a growing medium selected to allow indigenous plant species to inhabit the roof over time; no deliberate planting is undertaken.

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 pedestrian access is envisaged additional protection to the membrane must be provided (see section 9).

4.6 Pedestrian access roofs are defined for the purpose of this Certificate as those allowing unrestricted foot traffic but not subject to vehicular traffic.

4.7 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 such features as overall and local deflection and direction of falls.

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

4.8 Pitched roofs are defined as those having a fall greater than 1:6.

4.9 Decks to which the membranes are to be applied must comply with the relevant requirements of either BS 6229 : 2018 or BS 8217 : 2005 and, where appropriate, *NHBC Standards* 2019, Chapter 7.1.

4.10 The structural deck to which the system is to be applied must be suitable to transmit the dead and imposed loads experienced in service.

4.11 Imposed loads, dead loading and wind load specifications 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.

4.12 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 Additional products are available for use on substrates such as metalwork. The advice of the Certificate holder for the specification and use of these products should be sought.

4.14 The drainage system for green roofs, roof gardens, biodiverse roofs and brown roofs must be correctly designed, and the following points should be addressed:

- provision made for access for maintenance purposes
- dead loads for green roofs and roof gardens can increase if the drains become partially or completely blocked causing waterlogging of the drainage layer.

4.15 Insulation systems or materials used in conjunction with the membranes must be 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 scope of, that Certificate.

5 Practicability of installation

Installation of the system must only be carried out by installers 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 The system is impervious to water and will achieve a weathertight roof capable of accepting minor structural movement (see section 8.1).

7 Properties in relation to fire

7.1 A system comprising 12 mm thick Superlux board primed with a coat of Kempertec D-Primer, a coat of Kemperol 2K-PUR Resin embedded with a single layer of polyester fleece covered with a further coat of Kemperol 2K-PUR Resin and a layer of kiln dried quartz sand is unrestricted under the national Building Regulations(1).

(1) Warrington Fire Research, fire report reference 138673, 02/04/2004. Report available upon request 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
- in irrigated green roofs, roof gardens, biodiverse roofs or brown roofs.

7.3 The designation of other specifications should be confirmed by:

England and Wales — test or assessment in accordance with Approved Document B (Volumes 1 and 2), Appendix A, clause A1
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 may allow the spread of flame across the roof. This must be taken into consideration when selecting suitable plants. Appropriate planting, irrigation and/or protection must be applied to ensure the overall fire-rating of the roof is not compromised.

8 Resist to wind uplift

8.1 The adhesion of the system to the materials listed in section 4.2 is sufficient to resist the effects of wind suction, elevated temperatures, thermal shock or minor movement likely to occur in practice. Acceptable adhesion to other substrates should be confirmed by test.

8.2 When the system is bonded to insulation boards, the resistance to wind uplift will be dependent on the cohesive strength of the insulation and the method by which it is secured to the roof deck. This must be taken in to account when selecting a suitable insulation material.

8.3 The growing medium used in roof gardens must not be of a type that will be removed or become delocalised due to wind scour.

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

9 Resistance to mechanical damage

The system can accept, without damage, the limited foot traffic and light concentrated loads associated with installation and maintenance. However, reasonable care should be taken to avoid puncture of the system by sharp objects or concentrated loads. Where traffic in excess of this is envisaged, such as for maintenance of lift equipment or in pedestrian areas, additional protection must be used.

10 Resistance to root penetration

The system, including joints, is resistant to root penetration and can be used in a roof waterproofing system for roof gardens and green roofs.

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 Where damage has occurred, it should be repaired in accordance with section 15 and the Certificate holder's instructions.

11.4 In the event of the system being contaminated by oil, grease or other chemicals, the advice of the Certificate holder must be sought.

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 Site checks include:

- prior to application — suitability of substrate and application conditions
- during application — evenness and exclusion of bubbles
- on completion — inspection to ensure that coating has fully cured and is fully adhered.

13.2 The system must be applied in accordance with the Certificate holder's instructions. Work must not be carried out if rain is imminent. The ambient temperature at the time of laying must be between 5 and 35°C and the relative humidity below 85%.

13.3 The temperature of the substrate should be at least 3°C above the dew point and rising.

13.4 Substrates to which the coating is to be applied must be dry (residual moisture content of less than 5% in the upper 20 mm), clean and free from loose particles, paint, grease and oil or other contaminants which may affect the adhesion of the system.

13.5 Defects in the substrate should be suitably prepared prior to application of the system, in accordance with the Certificate holder's instructions.

13.6 It is recommended that membranes installed for green roof installations are visually inspected and tested electronically for waterproofing integrity prior to the green roof system being installed, in accordance with *NHBC Standards* 2019, Chapter 7.1, Clause 7.1.9.

13.7 Previously coated areas must be checked for integrity and adequate adhesion to the substrate. Defects such as cracks and blisters must be repaired prior to application of the system in accordance with the Certificate holder's instructions and should be cleaned with Kempertec MEK Cleaning Agent.

13.8 Adhesion checks must 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.

13.9 The substrate must be primed with the appropriate primer in accordance with the Certificate holder's instructions.

13.10 If work is interrupted for periods in excess of 6 hours, surfaces should be cleaned with Kempertec MEK Cleaning Agent prior to resumption of work.

13.11 All tools and spraying equipment are cleaned with Kemco MEK Cleaning Agent on completion of work.

14 Procedure

14.1 Prior to application to the main roof area, any protrusions and upstands must be treated with Kemperol 165 Fleece saturated with Kemperol 2K-PUR Resin which has been mixed to ensure homogeneity in accordance with the Certificate holder's instructions for standard details.

14.2 The 2.5 kg foil-packed material incorporates both components separated from each other by a rubber cord. The material is mixed by thoroughly kneading component A. The rubber cord is removed, and the foil sachet kneaded together quickly for at least one minute or until a streak-free homogeneous mixture is obtained.

14.3 Materials packaged in tins must be thoroughly stirred. Component B is decanted into Component A and thoroughly mixed using a slow-speed drill until streaks are not visible. The mixture is transferred into another clean container and stirred again for approximately one minute.

14.4 If accelerated curing reaction time is required, Kemperol 2K-PUR Speedshot is added in accordance with the volumes given in the Certificate holder's technical data sheet. The accelerator is added to the blended Kemperol 2K-PUR Resin and mixed until streaks are not visible. If the ambient temperature is +10°C or lower, components should be stored and mixed at room temperature.

14.5 Approximately two-thirds of the mixed pack is applied to the substrate at a minimum coverage rate of 2 $kg \cdot m^{-2}$ using a roller. Kemperol 165 Fleece is rolled into the wet resin and pressed free of trapped air.

14.6 The remaining resin is immediately applied to the treated surface, wet-on-wet, until complete saturation of the fleece is achieved. The minimum total coverage rate for Kemperol 2K-PUR Resin application will be 3 $kg \cdot m^{-2}$. The minimum coating thickness is 2 mm.

14.7 The fleece sheets should have end and side overlaps of at least 50 mm, and sufficient resin must remain beneath the fleece to maintain the physical properties of the system.

14.8 Exposed applications on balconies, terraces and podiums subject to pedestrian traffic should be protected with other finishes, including:

- Kemperdur Coloured Quartz (0.4 – 0.8 mm) — to provide a non-slip surface
- Kemperdur Solvent-Free TC Surfacing — a hard-wearing surfacing for application over Kemperol 2K-PUR membrane to provide additional protection and offer colour options.

14.9 Other materials can be used for hard landscaping applications. These include:

- paving slabs on spacers
- paving tiles fully bedded
- timber decking on bearers.

14.10 The system may be overlaid with hot-rolled asphalt after a period of curing.

14.11 The Certificate holder must be consulted for wear course and surface finishing procedures.

15 Repair

15.1 Any damage to the system must be repaired as soon as possible to ensure that the integrity of the waterproofing is maintained.

15.2 The damaged waterproofing membrane is cut back to bonded material. The exposed substrate and adjacent bonded waterproofing (at least 100 mm) is cleaned and the existing Kemperol 2K-PUR resin lightly abraded with 40 grit media and wiped with Kempertec MEK Cleaner.

Overlapped repair

15.3 The substrate is primed using the appropriate compatible primer and Kemperol 2K-PUR Resin is reinstated with the correct fleece grade, ensuring a 100 mm minimum overlap with the existing membrane.

Hidden repair

15.4 Kemperol 165 Fleece reinforcement is laid over the repair area, the shape of the repair is traced and the fleece is cut to ensure that it butts with the existing sound material.

15.5 The substrate is primed with the correct compatible primer and the system is reinstated, ensuring a butt joint with the existing membrane.

15.6 Kemperol Reinforcement Strip is laid over the butt-joint in the repair ensuring that the strip is fully saturated with Kemperol 2K-PUR Resin.

Technical Investigations

16 Tests

16.1 Tests were conducted on samples of the Kemperol 2K-PUR Roof Waterproofing System and the results were assessed to determine:

- tensile strength and elongation
- water vapour permeability
- water absorption
- watertightness
- tensile bond strength on concrete, glass-faced PU insulation, GRP, mastic asphalt, plywood, PVC membrane, steel
- dynamic indentation
- static indentation
- resistance to fatigue cycling
- resistance to crack-bridging
- resistance to low temperatures
- resistance to high temperatures
- heat ageing at 80°C for 200 days
- resistance to UV ageing
- resistance to water exposure
- the effect of application temperatures
- wind uplift resistance before and after thermal shock.

16.2 Additional characterisation tests were carried out on the system and its component parts.

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 An evaluation was made of data relating to the fire performance of the system

17.3 The results of tests used in the assessment leading to the issue of ETA-03/0044 *Roof waterproofing "Kemperol 2K-PUR"* were evaluated.

17.4 Data relating to the bond strength of the system to concrete, mastic asphalt, plywood, steel, glass-faced PU Insulation, GRP and PVC substrates were assessed.

17.5 Data relating to resistance to wear and slip resistance were assessed.

17.6 Data relating to root resistance were assessed.

17.7 Visits were made to sites in progress and established sites to assess the practicability of installation and performance in use.

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 8218 : 1998 *Code of practice for mastic asphalt roofing*

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 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*

CP 143-10 : 1973 *Code of practice for sheet roof and wall coverings — Galvanized corrugated steel — Metric units*

EN 300 : 2006 *Oriented strand boards (OSB) — Definitions, classification and specifications*

EN 636-2 : 1997 *Plywood — Specifications — Requirements for plywood for use in humid conditions*

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

EN ISO 14001 : 2015 *Environmental management systems — Requirements with guidance for use*

ETAG 005 : 2005 *Liquid Applied Roof Waterproofing Kits*

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.

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