Kemper System Ltd
Kemper House
30 Kingsland Grange
Warrington
Cheshire WA1 4RW

Tel: 01925 445532 Fax: 01925 575096
e-mail: enquiries@kempersystem.co.uk
website: www.kempersystem.co.uk

Agrément Certificate
95/3139
Product Sheet 1

KEMPER SYSTEM COLD LIQUID-APPLIED WATERPROOFING SYSTEM

KEMPEROL V210 ROOF WATERPROOFING SYSTEM

This Agrément Certificate Product Sheet(1) relates to the Kemperol V210 Roof Waterproofing System, a cold liquid-applied, unsaturated polyester roof waterproofing membrane reinforced with polyester fleece, for use as a waterproofing layer on flat, pitched or protected 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 products may contribute to a roof being unrestricted under the national Building Regulations (see section 7).
Resistance to wind uplift — the system will resist the effects of any likely wind suction and the effects of thermal or other minor movement 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 penetration of roots — 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 have 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

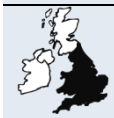
Date of Fourth issue: 18 June 2021

Originally certificated on 18 May 1995

Hardy Giesler
Chief Executive Officer

Regulations

In the opinion of the BBA, the Kemperol V210 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(1)**	**External fire spread**
Comment:		The system, in some circumstances, is 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 of this Certificate.
Regulation:	**7(1)**	**Materials and workmanship**
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:		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, is regarded as having a low vulnerability and can enable a roof to be unrestricted under this Standard, with reference to clause 2.8.1(1)(2). 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 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The system can contribute to satisfying 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 *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 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 sections: 3 *Delivery and site handling* (3.1, 3.2, 3.3 and 3.6) of this Certificate.

Additional Information

NHBC Standards 2021

In the opinion of the BBA, Kemperol V210 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, terraces and balconies*.

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

CE marking

The Certificate holder has taken the responsibility of CE marking the product in accordance with ETA 03/0025 and ETAG 005 : 2004.

Technical Specification

1 Description

1.1 The Kemperol V210 Roof Waterproofing System is a cold liquid-applied, unsaturated polyester coating, reinforced with a 165 g·m^{-2} embedded polyester fleece, to provide a waterproofing membrane with a minimum dry film thickness of 2 mm and typical cured mass of 3.165 kg·m^{-2}.

1.2 The system components are:

- Kemperol V210 — available in two packaging options: a three-part V210 system, or a two-part V210(M) system

  Kemperol V210
  - Component A — Kemperol V210 Basic Resin
  - Component B — Kemperol V210 Accelerated Resin, containing the required proportion of accelerant
  - Component C — CP Catalyst Powder

  Kemperol V210(M)
  - Component M — Kemperol V210 Basic Resin plus Kemperol V210 Accelerated Resin, containing the required proportion of accelerant
  - Component C — CP Catalyst Powder

- Kemperol 165 Fleece — polyester fleece for embedding into Kemperol V210 resin, to act as reinforcement. The fleece has 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 03/0025, issued by Deutsches Institut für Bautechnik (DIBt). In accordance with ETAG 005 : 2004, 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 (°C)	
lowest temperature	TL4 (–30)
highest temperature	TH4 (+90)
reaction to fire Class	E
resistance to roots	satisfactory.

1.4 Ancillary items necessary for the 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 V210 resin
- Kempertec D Primer — a 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 V210 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 V210 resin
- Kempertec AC Primer — a rapid-cure, two-component methyl methacrylate primer for use on bitumen roof sheets, mastic asphalt, fibre cement screeds, sand and cement screed and concrete substrates prior to the application of Kemperol V210 resin.

1.5 Other materials 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 Kempertec EP, EP5 or AC Primers to provide a trowel-applied levelling and/or repair mortar, prior to the application of Kemperol V210 resin
- Kempertec EP5 Primer — a faster-curing version of Kempertec EP which can be used at temperatures down to 5°C prior to the application of Kemperol V210 resin
- Kemperol UP-A Cold Activator — accelerator added to Kemperol V210 resin at temperatures between 5 and 10°C inclusive
- Kemperol UP-1 Inhibitor — retardant added to delay the reaction time of Kemperol V210 resin at temperatures above 25°C
- Kemperdur CQ 0408 (0.4-0.8 mm) Coloured Quartz — kiln-dried quartz sand, available in a range of colours, for scattering into the surface of Kemperol V210 where increased resistance to foot traffic on balconies is required, and to provide a slip resistant finish
- Kemco NQ 0712 (0.7-1.2 mm) Natural Quartz — a larger grained, kiln-dried natural quartz, scattered into wet Kempertec EP, EP5 and AC Primers when providing an alkaline protection and bonding layer prior to overlaying with bedding mortars and/or screeds
- Kemco NQ 0408 (0.4-0.8 mm) Natural Quartz — kiln-dried natural quartz, scattered into wet Kempertec EP and EP5 Primers to produce a mechanical bond for Kemperol V210 and V210M resin
- Kemperdur AC Surfacing — surfacing that can be applied over Kemperol V210 membrane to provide additional protection and offer colour options when used with a quartz or aggregate finish
- Kempedur Topcoat — UV-stable, transparent coating for sealing quartz aggregate
- Kemperdur ECO-Finish — a two-component, solvent-free, transparent silk finish coating, for sealing Kemperol waterproofing incorporating Kemperdur Coloured Quartz, Kempertec natural quartz

- Kemperol Reinforcement Fleece — used to reinforce joints in fleece reinforcement when a flush detail is required, or to reinforce joints and perimeters in sheet-type substrates prior to the application of Kemperol V210 resin
- Kemperol Reinforcement Circles — pre-cut circles of Kemperol 165 Fleece reinforcement, used to reinforce internal and external corners during application of the system
- Kemco MEK Cleaning Agent — 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.

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

1.6 The system is available in RAL approximations grey (7030) and anthracite (7016) colours. Other colours are available on request, subject to minimum manufacturing quantities.

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 issued 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 type	Weight (kg)
Kemperol V210 Components A and B composite packs	Metal can	9.4 and 10.0
Kemperol V210 Components A and B composite packs	Metal can	23.4 and 25.0
Kemperol V210 M Component M	Metal can	9.7 or 24.25
Kemperol CP Catalyst Powder — Hardener Component C	Plastic bag	0.3, 0.6, 0.75 or 1.6
Kemperol UP-A Cold Activator	Metal can	0.2
Kemperol UP-1 Inhibitor	Metal can	0.3
Kemperol 165 Fleece	Roll	0.866 to 8.66
Kempertec D Primer Components A and B composite packs	Foil sachet	1.0 and 2.5
Kempertec D Primer Components A and B composite packs	Metal can	5.0
Kempertec EP Primer Components A and B composite packs	Foil sachet	1.0
Kempertec EP Primer Components A and B composite packs	Metal can	10.0
Kempertec EP5 Primer Components A and B composite packs	Foil sachet	1.0
Kempertec EP5 Primer Components A and B composite packs	Metal can	10.0
Kempertec R Primer Components A and B composite packs	Foil sachet	1.0
Kempertec R Primer Components A and B composite packs	Metal can	3.0
Kempertec AC Primer Component A	Metal can	1.0, 3.0 or 5.0
CP Catalyst Powder (Kempertec AC Primer Component B)	Bag	0.02 or 0.1
Kemco NQ 0408 Natural Quartz	Bag	25.0
Kemco NQ 0712 Natural Quartz	Bag	25.0
Kempertec KR Quartz Sand Mixture	Bag	25.0
Kemco MEK Cleaning Agent	Metal can	2.7 or 10.0

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 be below 20°C, with all materials protected from sub-zero temperatures and direct sunlight.

3.3 Each container carries a label bearing the Certificate holder's name, product name and health and safety information.

3.4 Rolls of Kemperol 165 Fleece should be stored flat in a dry, clean environment protected from moisture.

3.5 When correctly stored in accordance with the Certificate holder's instructions, Kemperol V210 resin will have a storage life of up to 12 months.

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

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the Kemperol V210 Roof Waterproofing System.

Design Considerations

4 Use

4.1 The Kemperol V210 Roof Waterproofing system is satisfactory for use as a waterproofing layer on roofs with limited or pedestrian access in:

- exposed systems on flat and pitched roofs(1)
- roof gardens (intensive) on flat and zero fall roofs(1)(2)
- green roofs (extensive) on flat and pitched roofs(1)(2)
- biodiverse roofs on flat and zero fall roofs(1)(2)
- brown roofs on flat and zero fall roofs(1)(2)
- protected terraces/balconies with pedestrian access

- podium decks[1][2].

(1) Limited access.
(2) Pedestrian access.

4.2 When treated with the appropriate primer in accordance with the Certificate holder's instructions, the system is suitable for use on substrates of:

- acrylic glazing
- aluminium
- bituminous felts including polymer-modified hot- and cold-applied bitumens and bitumen emulsions
- liquid bituminous roof coatings
- 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 plywood and orientated strand board (OSB)
- zinc
- brickwork, blockwork
- PVC single-ply membranes
- TPO single-ply membranes
- EPDM membranes.

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

4.3 Decks for green roofs, roof gardens, biodiverse roofs and brown roofs to which the membranes are to be applied must comply with the relevant requirements of BS 6229 : 2018 and, where appropriate, *NHBC Standards* 2021, Chapter 7.1.

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, 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.

4.5 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.

4.6 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.

(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 Zero fall roofs are defined for the purpose of this Certificate as those having a finished fall between 0 and 1:80[(1)] degrees. Recommendations for the design of roof falls are available in the Liquid Roofing and Waterproofing Association (LRWA) Note 7 — *Specifier Guidance for Flat Roof Falls*.

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

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

4.10 Imposed loads, dead loads and wind loadings must be 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 Terraces and balconies should be designed in accordance with BS 8579 : 2020.

4.12 Recommendations for the design of green roof, roof garden, biodiverse roof and brown roof specifications are available within the latest edition of *The GRO Green Roof Code — Green Roof Code of Practice for the UK.*

4.13 The drainage system for green roofs, roof gardens, biodiverse roofs, brown roofs and zero fall roofs 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, roof gardens, biodiverse roofs and brown roofs can increase if the drains become partially or completely blocked, causing waterlogging of the drainage layer.

4.14 Insulation materials used in conjunction with the membranes must be in accordance with the Certificate holder's instructions and either:

- as described in the relevant clause of BS 8217 : 2005, or
- the subject of a current BBA Certificate and used in accordance with, and within the scope of, that Certificate.

4.15 The NHBC requires that the roof membrane, once installed, is visually inspected and electronically tested for its waterproofing integrity prior to the installation of the green roof, roof garden, biodiverse or brown roof systems, in accordance with *NHBC Standards* 2021, Chapter 7.1, Clause 7.1.9. Any damage to the membrane must be repaired in accordance with section 17 of this Certificate.

6 Practicability of installation

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

6 Weathertightness

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.

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7 Properties in relation to fire

7.1 When tested to DD CEN/TS 1187 : 2012, the following systems were classified to BS EN 13501-5 : 2016 as B_{ROOF}(t4):

- an 18 mm plywood deck, primed with Kempertec D primer (500 g.m^{-2} application rate) and a layer of Kemperol V210M (3000 g.m^{-2} application rate) reinforced with Kemperol 165 reinforcement fleece embedded in the Kemperol V210M, tested flat[(1)]

- an 18 mm OSB deck primed, a self-adhesive air and vapour control layer (AVCL), a 123 mm PIR insulation board with a compressed bitumen and fibre facing on one face and a glass tissue facing on the other bonded to the AVCL with a two-part polyurethane adhesive, a coat of Kempertec D primer (500 $g.m^{-2}$ application rate) and a layer of Kemperol V210M (3000 $g.m^{-2}$ application rate) reinforced with Kemperol 165 reinforcement fleece embedded in the Kemperol V210M.

(1) Classification report reference 20028M, conducted by Warringtonfire Gent. Report available from the Certificate holder.
(2) Classification report reference 19537B, conducted by Warringtonfire Gent. Report available from the Certificate holder.

7.2 In the opinion of the BBA, a roof incorporating the system will be unrestricted in terms of proximity to a boundary 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
- a roof garden covered with a drainage layer of gravel 100 mm thick and a soil layer 300 mm thick
- irrigated roof gardens, green roofs, biodiverse and brown 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 system, when used in pitches 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 which 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, plants used in a green roofs, roof gardens, biodiverse roofs and brown roofs may allow flame spread across the roof. This must be taken into consideration when selecting suitable plants for the roof. Appropriate planting irrigation and/or protection should be applied 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 materials listed 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.

8.2 When bonding 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 into account when selecting a suitable insulation material.

8.3 The growing medium used in roof gardens, biodiverse roofs and brown roofs 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

9.1 The system can accept, without damage, the limited foot traffic and light concentrated loads associated with installation and maintenance. Reasonable care is required to avoid puncture 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.

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

10 Resistance to penetration of roots

Results of tests on the system and its joints indicate that it is resistant to root penetration and can be used in a roof waterproofing system for green roofs, roof gardens, biodiverse roofs and brown 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 satisfactory performance.

11.2 Green roofs roof gardens, biodiverse roofs and brown roofs must be the subject of regular inspections, particularly in autumn after leaf fall and in spring, to ensure that unwanted vegetation and other debris are cleared from the roof and drainage outlets (see section 4.9). 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 the system be contaminated by oil, grease or other chemicals, the advice of the Certificate holder must be sought.

11.4 Damage to the system must be repaired at the earliest opportunity (see section 15).

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 Kemperol V210 Roof Waterproofing System must be carried out in accordance with the relevant requirements of the Certificate holder's instructions, the LRWA Guidance Note 7 and this Certificate.

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 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.

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), and 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, 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 2021,* 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 cleaned with Kemco MEK Cleaning Agent.

13.8 Adhesion checks must be carried out to ensure that the system is compatible with 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 When applying the system by hand, only as much resin as can be applied in 20 minutes at 25°C should be mixed.

13.11 The reaction time, and hence the pot life, of the mixed resin is reduced at increased temperatures.

13.12 At temperatures above 25°C, the resin reaction time can be retarded using Kemperol UP-1 Inhibitor in accordance with the Certificate holder's instructions.

13.13 At temperatures of less than 10°C, the resin reaction time can be accelerated by using Kemperol UP-A Cold Activator in accordance with the Certificate holder's instructions.

13.14 If work is interrupted for periods in excess of 6 hours, surfaces must be cleaned with Kemco MEK Cleaning Agent prior to resumption of work.

13.15 All tools should be 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 the fleece saturated with Kemperol V210 resin mixed to ensure homogeneity in accordance with the Certificate holder's instructions for standard details.

Mixing of Kemperol V210

14.2 The system is made up on site by mixing the basic resin Component A, the pre-accelerated resin Component B and the catalyst hardener Component C, in the proportions given in Table 2.

Table 2 Resin mix proportions

Component	20 kg kit	50 kg kit
Kemperol V210 Component A	9.4	23.4
Kemperol V210 Component B	10.0	25.0
Kemperol CP Catalyst Powder Component C	0.6	1.6

14.3 The basic resin, Component A (black formulation), is mixed with an agitator using a slow-speed drill until the liquid is a uniform black colour.

14.4 CP Catalyst Powder Component C is added to resin Component A, mixing with the same agitator until the powder is completely absorbed, with no white specks remaining. Depending on the ambient temperature, this takes between 20 minutes and 2 hours.

14.5 The basic resin/catalyst mix may be stored for up to 24 hours prior to mixing with the pre-accelerated resin Component B, providing the storage temperature does not exceed 20°C.

14.6 The resin Component B is mixed with a different agitator using a slow-speed drill until a uniform white colour. If the ambient temperature is 10°C or below, or 25°C or above, the appropriate additive should be mixed into Component B (see sections 14.7 and 14.8 respectively).

14.7 At temperatures between 5 and 10°C inclusive, Kemperol UP-A Cold Activator should be added to resin Component B in the proportion advised by the Certificate holder. The activator is mixed with the agitator for 5 minutes or until both liquids are fully blended.

14.8 At temperatures at or above 25°C, Kemperol UP-1 Inhibitor should be added to resin Component B in the proportion advised by the Certificate holder. Mixing instructions are the same as those for Kemperol UP-A Cold Activator.

14.9 Components A and B should be poured into a clean container at a 1:1 (equal parts) ratio in accordance with Table 2 and thoroughly mixed together using a clean agitator and slow-speed drill until a streak-free homogeneous mixture is obtained.

14.10 The system is made up on site by mixing Component M (blended resin consisting of Components A and B) with the catalyst hardener Component C, in the proportions given in Table 3.

Table 3 Resin mix proportions

Component	10 kg kit	25 kg kit
Kemperol V210 M Component M	9.7	24.25
Kemperol CP Catalyst Powder Component C	0.3	0.75

14.11 The Kemperol CP Catalyst Powder Component C is added to resin Component M, mixing with an agitator until the powder is completely dissolved, with no white specks remaining. Depending on ambient temperature, this takes between 2 and 15 minutes. Once mixed it should be used immediately.

14.12 At temperatures between 5 and 10°C inclusive, Kemperol UP-A Cold Activator should be added to Kemperol V210 M Component M in the proportion advised by the Certificate holder. The activator is mixed with the agitator for 5 minutes or until both liquids are fully blended. The activator must be added and mixed prior to the addition and mixing of the Kemperol CP Catalyst Powder.

14.13 At temperatures at or above 25°C, Kemperol UP-1 Inhibitor should be added to Kemperol V210 M Component M in the proportion advised by the Certificate holder. Mixing instructions are the same as those for Kemperol UP-A Cold Activator.

Preparation

14.14 The quantity of mixture prepared should be limited to the amount that can be applied within 15 minutes.

14.15 The first coat of the mixture is applied to the substrate at a minimum coverage rate of 2 $kg \cdot m^{-2}$, using a roller or brush. Kemperol 165 Fleece is rolled and embedded into the wet resin, avoiding folds and wrinkles, and pressed free of trapped air.

14.16 The second coat is immediately applied to the treated surface, wet-on-wet, until complete saturation of the fleece is achieved. The total coverage rate of resin is typically 3.0 $kg \cdot m^{-2}$ with Kemperol 165 Fleece reinforcement.

14.17 The fleece reinforcement 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.

14.18 Exposed applications to 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 AC Surfacing — can be applied over Kemperol V210 membrane to provide additional protection and offer colour options.

14.19 Other materials can be used for hard landscaping applications, including:

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

14.20 Kemperol V210 may be overlaid with hot-rolled asphalt after a period of curing.

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

14.22 The NHBC requires that the waterproofing layer, once installed, be inspected in accordance with 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.

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 V210 lightly abraded and wiped with Kempertec MEK Cleaner, ensuring the removal of any contamination that may inhibit adhesion of the repair.

Overlapped repair

15.3 The substrate only is primed using the appropriate compatible primer, and Kemperol V210 resin is reapplied using the correct fleece grade, ensuring a 100 mm minimum overlap with the existing membrane.

Hidden repair

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

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

15.6 Kemperol Reinforcement Fleece is laid over the butt joint in the repair, ensuring that the strip is fully saturated with Kemperol V210 resin.

Technical Investigations

16 Tests

16.1 Tests were conducted and the results assessed to determine:

- tensile strength and elongation
- water vapour permeability
- water adsorption
- watertightness
- tensile bond strength on concrete, bituminous roofing felt, copper sheet, steel sheet, aluminium sheet, galvanized steel sheet, PVC sheet
- 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 28 and 56 days
- heat ageing at 70°C for 188 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 performance of the system components when tested for external fire exposure.

17.3 The results of tests used in the assessment leading to the issue of ETA 03/0025 *Roof waterproofing "Kemperol V210"* were evaluated.

17.4 Data relating to bond strength to substrates were assessed.

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

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

17.7 User surveys were conducted to evaluate the performance in use.

17.8 Data relating to root resistance were assessed.

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 8579 : 2020 *Guide to the design of balconies and terraces*

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 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 + A2 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*

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

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

EN ISO 9001 : 2015 *Quality management systems — Requirements*
EN ISO 14001 : 2015 *Environmental management systems — Requirements with guidance for use*

ETAG 005 : 2004 *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.