Liquasil Ltd
Unit 8 Radway Industrial Estate,
Radway Road, Solihull,
West Midlands,
B90 4NR

Tel: 0121 709 5352
e-mail: info@liquasil.com
website: www.liquasil.com

Agrément Certificate
22/5989
Product Sheet 1

LIQUASIL FLAT ROOF WATERPROOFING SYSTEM

LIQUASIL ULTRA RAPID PEMA

This Agrément Certificate Product Sheet(1) relates to Liquasil Ultra Rapid PeMA, a liquid-applied roof waterproofing system for use on limited access and, where appropriate, pedestrian access roofs, on warm and cold exposed roofs (flat and pitched), green roofs (flat, zero fall and pitched), warm and cold protected roofs and inverted roofs (flat and zero fall).

(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 to the interior of a building (see section 6).

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

Adhesion — the adhesion of the system is sufficient to 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, maintenance and pedestrian traffic on defined walkways (see section 9).

Resistance to root penetration — the system will resist penetration by plant roots and can be used as a waterproofing layer in green roof specifications (see section 10).

Durability — under normal service conditions, the system will provide a durable waterproof covering with a service life of at least 30 years (see section 12).

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

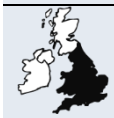
On behalf of the British Board of Agrément

Date of First issue: 21 February 2022

Hardy Giesler
Chief Executive Officer

Regulations

In the opinion of the BBA, Liquasil Ultra Rapid PeMA, 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 is restricted by this Requirement in some circumstances. See section 7.4 of this Certificate.
Requirement:	**B4(2)**	**External fire spread**
Comment:		On suitable substructures, the system may 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 12.1 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 system satisfies the requirements of this Regulation. See sections 11.1, 11.2 and 12.1 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:		When applied to a suitable substructure the system may enable a roof to be unrestricted 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 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The system can contribute to meeting the relevant requirements of Regulation 9, Standards 1 to 6 and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.
Regulation:	**12**	**Building standards applicable to conversions**
Comment:		Comments in relation to the system under Regulation 9, Standards 1 to 6 also apply to this Regulation, with reference to clause 0.12.1(1)(2) and Schedule 6(1)(2).

(1) Technical Handbook (Domestic).
(2) Technical Handbook (Non-Domestic).

The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation:	**23(a)(i)**	**Fitness of materials and workmanship**
Comment:	**(iii)(b)(i)**	The system is acceptable. See section 12.1 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 system may enable a roof to be unrestricted by 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 2022

In the opinion of the BBA, Liquasil Ultra Rapid PeMA, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Chapter 7.1 *Flat roofs, terraces and balconies*.

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

Technical Specification

1 Description

1.1 Liquasil Ultra Rapid PeMA is a liquid-applied, glass-reinforced, low odour, flexible modified polyester system, available in unpigmented or pre-pigmented versions.

1.2 The system consists of:

- Liquasil Ultra Rapid PeMA Base Coat resin — a flexible, low odour, modified polyester resin
- Liquasil Ultra Rapid PeMA Top Coat resin — a flexible, low odour, modified polyester resin
- Liquasil Ultra Rapid PeMA Pigment — a pigment dispersed in polyester resin
- Liquasil PeMA Catalyst — a 40% dibenzoyl peroxide suspension in a solvent mixture
- 450gsm Chopped Strand Glass Fibre Mat — a 450 $g \cdot m^{-2}$ glassfibre mat for reinforcing the system
- Liquasil Aggregate — an optional surface finish to provide an anti-slip surface if required.

1.3 Ancillary items for use with the system are:

- Liquasil Universal Primer — a primer for preparing bituminous, wood, concrete, and other substrates, as approved by the Certificate holder
- Liquasil Ultra Rapid Epoxy Primer — a two-part primer for preparing metal substrates and other selected substrates as approved by the Certificate holder
- Liquasil Powder Catalyst — 50% dibenzoyl peroxide powder
- Mordant Solution — a pre-treatment for new galvanized steel or zinc substrates
- Proprietary anti-fungicidal solution — an HSE approved fungicide for the removal of algae and moss prior to application

- Taping Mat — a reinforcing tape for use at points of weakness such as detailing, protrusions and over cracks
- Liquasil MMA resin — a liquid-applied methyl methacrylate resin that may be used over excessive movement joints and other special case applications
- Liquasil Ultra Rapid PeMA Accelerator — an additive to allow application at lower temperatures
- Liquasil Universal Primer DP Accelerator — an additive to allow application at lower temperatures
- preformed trims — a range of factory-manufactured GRP trims, including upstand fixing trim, drip trim, fillet trim and flat trim
- acetone — for use in cleaning tools.

1.4 Ancillary items that can be used in conjunction with the system, but which are outside the scope of this Certificate, are:

- quartz sand — an alternative grit for walkways and balconies
- mineral slate — an alternative grit for walkways and balconies
- Liquasil Balcony & Walkway Sealer — a wear coat for walkways and balconies
- Single Ply Primer— a primer for preparing selected single ply substrates
- Metal Detailing Primer — a single pack very fast drying primer for minor detail work.

2 Manufacture

2.1 Liquasil Ultra Rapid PeMA resins and Liquasil Universal Primer and DP accelerators are manufactured via a batch-blending process using conventional methods.

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 Liquasil Ultra Rapid PeMA resins are delivered to site in tins bearing the Certificate holder's name, logo, product name, batch number, health and safety data and the BBA logo incorporating the number of this Certificate.

3.2 The system components and ancillary items packaging types and sizes are given in Table 1.

Table 1 Packaging

Component/item	Package type	Weight/Volume
Liquasil Ultra Rapid PeMA resins	Tins	15 litre
Liquasil PeMA Catalyst	Dispensing bottles	2 litre
Liquasil Ultra Rapid PeMA Pigment	Packs	various(1)
450gsm Chopped Strand Glass Fibre Mat	Rolls	17, 30 and 100 m^2
Liquasil Powder Catalyst	Packs	0.5 or 1 kg
Liquasil Aggregate	Packs	2.25 or 25 kg
Liquasil Universal Primer	Tins	5 litre
Liquasil Ultra Rapid Epoxy Primer	Tins	4 litre
Liquasil MMA resin	Tins	10 litre
Mordant Solution	Tins	5 litre
Liquasil Ultra Rapid PeMA Accelerator	Tins	0.479 kg
Liquasil Universal Primer DP Accelerator	Tins	0.5 litre

(1) Weight depended on pigment colour.

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 Liquasil Ultra Rapid PeMA.

Design Considerations

4 General

4.1 Liquasil Ultra Rapid PeMA is satisfactory for use as a liquid-applied roof waterproofing system on new or existing roofs with limited(1) or pedestrian access(2) in the following specifications:

- exposed warm and cold flat and pitched roofs(1)
- protected warm and cold flat and zero fall roofs (ie covered by pavers or other suitable protection)(1)(2)
- green (extensive) flat, zero fall and pitched roofs(1)(2)
- inverted flat and zero fall roofs(1)(2).

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

- concrete
- asphalt
- plywood(1)
- OSB 3(1)
- reinforced bitumen membranes (including sanded and mineral surfaced reinforced bitumen membranes)
- insulation(1)
- GRP
- single-ply membranes(2)
- previously-coated surfaces(2)
- small areas of metal incidental to the roof, eg pipe upstands
- small areas of plastic-coated metal incidental to the roof(1).

(1) Grades approved by the Certificate holder.
(2) The advice of the Certificate holder should be sought on compatibility with the system.

4.3 Decks to which the system is to be applied must comply with the relevant requirements of BS 6229 : 2018, BS 8217 : 2005 and, where appropriate, *NHBC Standards* 2022, Chapter 7.1.

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

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

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

(1) NHBC Standards 2022 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 which can vary between 0 and 1:80(1). Reference should also be made to the appropriate clauses in Liquid Roofing and Waterproofing Association (LRWA) Note 7 – *Specifier Guidance for Flat Roof Falls*.

(1) NHBC Standards 2022 require a minimum fall of 1:60 for green roofs and roof gardens.

4.9 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.

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

4.11 Dead loads, wind loading and imposed loads 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.

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

4.13 The drainage systems for inverted roofs, zero fall roofs or green 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 can increase if the drains become partially or completely blocked causing waterlogging of the drainage layer
- additional guidance for inverted roof specifications is given in BBA Information Bulletin No 4 *Inverted roofs – Drainage and U value corrections.*

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

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

4.15 The NHBC requires that the roof membranes, once installed, be inspected in accordance with NHBC Standards 2022, Chapter 7.1, Clause 7.1.12, and undergo an appropriate integrity test, where required. Any damage to the membrane is repaired in accordance with section 16 of this Certificate and reinspected.

5 Practicability of installation

The system is only installed by specialist roofing contractors who have been trained and approved by the Certificate holder.

6 Weathertightness

The system will adequately resist the passage of moisture into the interior of a building and so satisfies the requirements of the national Building Regulations.

7 Properties in relation to fire

7.1 When tested to DD CEN/TS 1187 : 2012, Test 4, and classified under BS EN 13501-5 : 2016 the following system achieved a classification of B_{ROOF}(t4) and so is unrestricted by the documents supporting the national Building Regulations with respect to distance from a boundary:

- a flat roof system consisting of primed 18 mm thick orientated strand board, a 0.6 mm thick self-adhesive vapour control layer, a 120 mm thick, foil-faced polyisocyanurate insulation board bonded with a polyurethane adhesive, one coat of Liquasil Ultra Rapid PeMA resin at 1.5 $l \cdot m^{-2}$, a layer of 450gsm Chopped Strand Glass Fibre Mat reinforcement and one coat of Liquasil Ultra Rapid PeMA resin at 0.5 $l \cdot m^{-2}$(1)
- a flat roof system consisting of primed 18 mm thick orientated strand board, a 0.6 mm thick self-adhesive vapour barrier layer, a 150 mm thick, tissue-faced polyisocyanurate insulation board bonded with a polyurethane adhesive, a 2.0 mm thick self-adhesive carrier membrane, one coat of Liquasil Ultra Rapid PeMA resin at 1.5 $l \cdot m^{-2}$,

a layer of 450gsm Chopped Strand Glass Fibre Mat reinforcement and one coat of Liquasil Ultra Rapid PeMA resin at 0.5 $l \cdot m^{-2}$ (2)

(1) Fire Test and Classification reports, reference Q100928-1000 and Q100928-1001 respectively, conducted by BRE Global. Report available from the Certificate holder.
(2) Fire Test and Classification reports, references 20410B and 20410B respectively, conducted by Warrington fire. Report available from the Certificate holder.

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

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

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

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

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

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

8 Adhesion

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

9 Resistance to mechanical damage

9.1 The system can accept, without damage, the limited foot traffic and light concentrated loads associated with installation, maintenance and pedestrian traffic on defined walkways. However, care must be taken to avoid puncture by sharp objects or concentrated loads.

9.2 The system can achieve a result of I_3 with respect to dynamic indentation and L_4 with respect to static indentation when tested in accordance with EOTA TR006 and EOTA TR007, respectively.

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

10 Resistance to root penetration

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

11 Maintenance

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

11.2 Green roofs must be the subject of regular inspections, particularly in autumn after leaf fall and in spring, to ensure unwanted vegetation and other debris are cleared from the roof and drainage outlets (see section 4.13). Guidance is available within the latest edition of The GRO Green Roof Code - *Green Roof Code of Best Practice for the UK.*

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

12 Durability

12.1 The system will achieve an initial life expectancy of at least 30 years. When fully protected, and subjected to normal service conditions in an inverted roof specification with an open covering (eg aggregate pavers), the system can provide an effective barrier to the transmission of liquid water and water vapour for the design life of the roof in which it is incorporated.

12.2 In situations where maintenance or repair of any of the components in the roof structure are necessary (eg protection layer or insulation), the durability of the membrane may be reduced. In these circumstances the Certificate holder should be consulted.

12.3 An estimation cannot be given for the life of green roof specifications owing to the nature of use; however, under normal circumstances, it should be significantly greater than for exposed waterproof coverings.

Installation

13 General

13.1 Installation of the system must be carried out in accordance with the relevant clauses of Liquid Roofing and Waterproofing Association (LRWA) Note 7 – *Specifier Guidance for Flat Roof Falls* and the Certificate holder's instructions and this Certificate only by specialist roofing contractors trained and approved by the Certificate holder in accordance with their Installation Manual.

13.2 Application of the system is carried out at a minimum substrate temperature and air temperature of 8°C stable (2°C with the use of accelerators), rising to a maximum air temperature of 30°C and substrate temperature of 40°C. The system must not be installed in rain, snow, fog or misty conditions, or when the relative humidity is above 95%.

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

13.4 Growing medium or other bulk material must not be stored on one area of the roof prior to installation, to ensure that localised overloading does not occur.

14 Site and surface preparation

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

14.2 Adhesion to substrates depends on the condition and cleanliness of the substrate. Substrates must be visibly dry, sound and free from loose materials or contamination (eg moss or algae). In cases of doubt the advice of the Certificate holder's Technical Department should be sought.

14.3 Any areas of fungal growth or moss must be treated with a HSE approved, proprietary anti-fungal solution to ensure that all spores are destroyed.

14.4 High pressure sand-blasting or water-jetting may be used to remove loose or flaking materials and residues following treatment with the anti-fungal wash, but the substrate must be visibly dry before application of the system.

14.5 Damaged areas of the substrate (eg broken fibre-cement sheets or blistered reinforced bitumen membranes) must be removed, replaced or repaired.

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

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

14.8 New galvanized steel and zinc substrates are treated with Mordant Solution at a coverage rate of 15 m^2 per litre. The wash is allowed to react, the surface conversion is indicated by a black deposit. The surface residue is washed off with water and dried prior to the application of the primer.

14.9 Metal substrates are primed using Liquasil Ultra Rapid Epoxy Primer at a coverage rate of 10 to 15 m^2 per litre; rough or porous surfaces will significantly reduce coverage rate. The primer should be left to dry for a minimum of 2 to 4 hours to maximize adhesion. The maximum overcoating period is 14 days; after this period, it may be necessary to rub down and/or re-prime the surface.

14.10 Other substrates may be primed, using catalysed Polyroof Liquasil Universal Primer at a coverage rate of 4 to 6 m^2 per litre. Porous surfaces should be visually checked to ensure an adequate seal and any suspect areas re-primed as necessary. The primer is allowed to dry for at least one hour before overcoating. If the primed surface is left for longer than seven days before application of the system, it is necessary to solvent wipe the surface with acetone prior to the installation of the waterproofing. The catalyst proportion for Liquasil Universal Primer is given in Table 2 in respect of the surface/air temperature.

Table 2 Catalyst proportion for Liquasil Universal Primer

Temperature (°C)	Catalyst addition (%)
	DP
3–10	3–4
10–20	2–3
20–35	2

15 Application

15.1 The system is mixed on site by adding the pigment (if required) and then the catalyst to the resin in the correct proportions. The catalyst is added in the proportions given in Table 3, depending on the surface/air temperature, and stirred in accordance with the mixing instructions.

Table 3 Accelerator and Catalyst addition

Air temperature range	cold (2 to 7°C)	warm (8 to 17°C)	hot (18 to 30°C)
Liquasil Ultra Rapid PeMA Accelerator	must be used	optional	do not use
PeMA resin volume in litres		Number of catalyst pumps(1)	
10	16	12	8
7.5	12	9	6
5	8	6	4
2.5	4	3	2

(1) One pump is equivalent to 30 mℓ of catalyst.

15.2 One coat of Liquasil Ultra Rapid PeMA is applied to all upstands, detailing, protrusions, cracks, joints, and stepped joints with adjoining dissimilar substrates, and reinforced with Taping Mat or pre-cut strips of 450gsm Chopped Strand Glass Fibre Mat prior to the application of the main waterproofing. Liquasil Ultra Rapid PeMA is allowed to dry before overcoating with the main waterproofing.

15.3 The application is normally in two coats. Depending on the substrate, the first coat of resin is applied at the rates given in Table 4, and 450gsm Chopped Strand Glass Fibre Mat rolled out and laid with 50 mm side and end laps. Extra resin is immediately applied to achieve a closed, pinhole-free surface.

Table 4 First coat coverage rate[1]

Substrate	Coverage rate (litres per m^2)
Smooth concrete	1.25–1.50[2]
Plywood	1.25–1.50
Asphalt	1.25–1.50
Sanded felt	1.25–1.50
Mineral felt	1.50–2.00[2]
De-chipped felt/asphalt	1.50–2.00[2]
Single ply	1.25–1.50
GRP	1.25–1.50
Metal	1.25–1.50
Insulation	1.25–1.50

(1) The rates given in this Table are indicative only and it is the contractor's responsibility to ascertain the rate used on the specific site.
(2) When applying to very rough, uneven or heavily mineralised surfaces, the coverage rate may be significantly reduced. This should be taken into account when estimating material usage.

15.4 The second coat of resin can be applied as soon as it is practical to do so. However, the maximum period between coats is seven days, after which it is necessary to clean the surface with acetone allowing a further seven days' application time. The coverage rate for the second coat is 0.5 litres per m^2.

15.5 Joints subjected to excessive movement may require the use of Liquasil MMA resin as an alternative bridging material; the Certificate holder should be consulted for advice.

16 Repair

Should minor damage occur, it can be rectified by cleaning back to unweathered material, reactivating the surface and applying the Ultra Rapid PeMA System to the damaged area at the total application rate stated in sections 14 and 15.

Technical Investigations

17 Tests

17.1 Tests were conducted on samples of the system and the results assessed to determine:

- tensile strength and elongation on control and heat aged[1] samples
- resistance to dynamic impact on control, hard and soft substrates and on a hard substrate on a control at -20°C, after heat ageing[1] at -10°C and UV ageing[2] at -20°C
- resistance to static indent on control hard and soft substrates and on a hard substrate at 90°C on a control and after water exposure[3].

(1) Heat aged for 120 days at 80°C.
(2) UV aged using UVA lamps at an exposure of 1200 $MJ \cdot m^{-2}$ at 60°C.
(3) Water exposure for 200 days at 60°C.

17.2 Existing test data on the related Ultra Rapid PeMA System and ancillary items were used to assess the system:

- tensile strength and elongation on control and UV aged samples
- tensile adhesion on control, heat aged and after water exposed samples
- resistance to fatigue on control and after heat ageing.

18 Investigations

18.1 The manufacturing process was evaluated, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

18.2 Visits were made to a site in progress to assess the practicability of installation.

18.3 Data on fire performance were evaluated.

18.4 The results for tensile strength, dynamic indentation and static indentation for Liquasil Ultra Rapid PeMA and the Protec system were compared.

Bibliography

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

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

BS EN 1991-1-1 : 2002 Eurocode 1 : *Actions on structures — General actions— Densities, self-weight, imposed loads for buildings*
NA to BS EN 1991-1-1 : 2002 UK National Annex to Eurocode 1 *: Actions on structures — General actions— Densities, self-weight, imposed loads for buildings*
BS EN 1991-1-3 : 2003 + A1 : 2015 Eurocode 1 : *Actions on structures — General actions — Snow loads*
NA to BS EN 1991-1-3 : 2003 + A1 : 2015 : UK National Annex to Eurocode 1 : *Actions on structures — General actions — Snow loads*
BS EN 1991-1-4 : 2005 + A1 : 2010 Eurocode 1 : *Actions on structures — General actions — Wind actions*
NA to BS EN 1991-1-4 : 2005 + A1 : 2010 UK National Annex to Eurocode 1 : *Actions on structures — General actions — Wind actions*

BS EN 13501-5 : 2016 *Fire classification of construction products and building elements — Classification using data from external fire exposure to roof tests*

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

19 Conditions

19.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page – no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- is valid only within the UK
- has to be read, considered and used as a whole document – it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

19.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

19.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

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

19.5 In issuing this Certificate the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

19.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.