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Agrément Certificate

22/5990

Product Sheet 1

LIQUASIL FLAT ROOF WATERPROOFING SYSTEM

LIQUASIL DILAPIDATIONS GRADE (DG) RAPID

This Agrément Certificate Product Sheet⁽¹⁾ relates to Liquasil Dilapidations Grade (DG) Rapid, a liquid-applied roof waterproofing system for use on limited access and, where appropriate, pedestrian access roofs, in warm and cold exposed roofs (flat and pitched), on green roofs (flat, zero fall and pitched), protected warm/cold 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 25 years when exposed (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

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

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

Readers MUST check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.

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

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Regulations

In the opinion of the BBA, Liquasil Dilapidations Grade (DG) Rapid, 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 <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Durability, workmanship and fitness of materials
Comment:		The system satisfies the requirements of this Regulation. See sections 11.1, 11.2 and 12.1 and the <i>Installation</i> 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 structure, may 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 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)	Fitness of materials and workmanship
Comment:	(b)(i)	The system is acceptable. See section 12.1 and the <i>Installation</i> part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		The system will enable a roof to 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 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 2022

In the opinion of the BBA, Liquasil Dilapidations Grade (DG) Rapid, 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 Dilapidations Grade (DG) Rapid is a liquid-applied, glass-reinforced flexible modified polyester system.

1.2 The system consists of:

- Liquasil DG Resin — a pigmented, flexible modified polyester resin
- Liquasil DG Rapid Powder Hardener — a 50% dibenzoyl powder
- 225 g·m⁻² Chopped strand glass fibre mat — a 225 g·m⁻² glass reinforcement
- Liquasil Universal Primer — a primer for preparing bituminous, wood, concrete, and other substrates, as approved by the Certificate holder
- Liquasil Twin-Pack Metal Epoxy Primer — a two-part primer for preparing metal substrates and other selected substrates as approved by the certificate holder
- Anti-slip Additive — an optional surface finish to provide an anti-slip surface if required.

1.3 Ancillary items for use with the system are:

- Liquasil Winter Accelerator — an additive for the resin to allow application at lower temperatures
- Liquasil Summer Inhibitor — an additive to enable longer pot-life and working time in high temperatures
- Liquasil Universal Primer Accelerator — an additive to allow application at lower temperatures
- Taping Mat — a reinforcing tape for use at points of weakness such as detailing, protrusions and over cracks
- Mordant solution — a pre-treatment for new galvanized steel or zinc substrates
- GRP Trimming Details — 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 Sealer— a hard finishing wear coat for walkways and balconies
- Liquasil Detailer— a flexible, fibre-reinforced resin for detailing, inaccessible areas, levelling and minor repairs
- SP Primer — A primer for preparing selected single ply substrates
- Metal Detailing Primer — single pack very fast drying primer for minor detail work.

2 Manufacture

2.1 The Liquasil DG Resin and primer 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 The Liquasil DG Resin is 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 type and sizes are given in Table 1.

Table 1 Packaging

Component/item	Package type	Weight/Quality
Liquasil DG Resin	Tins	10 kg
Liquasil DG Rapid Powder Hardener	Packs	2.35 kg (for 15 kg resin tin)
225 g·m ⁻² Chopped strand glass fibre mat	Rolls	17, 30 and 100 m ²
Liquasil Universal Primer	Tins	5 kg
Liquasil Twin-Pack Metal Epoxy Primer	Packs	4 ℓ
Acetone	Cans	5 ℓ

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 Dilapidations Grade (DG) Rapid.

4 General

4.1 Liquasil Dilapidations Grade (DG) Rapid is satisfactory for use as a liquid-applied roof waterproofing system on new or existing roofs with limited or pedestrian access 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⁾.

(1) Limited access.

(2) Pedestrian access.

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

- concrete
- concrete screeds
- asphalt
- OSB 3 TG4⁽¹⁾
- reinforced bitumen membranes (including sanded and mineral surfaced felts)
- 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 consulted 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 wildflower 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 Structural decks to which the systems are to be applied must be suitable to transmit the dead and imposed loads experienced in service. Allowance needs to be made for loading deflections to ensure that the free drainage of water is maintained.

4.11 Dead loads, wind loading and imposed loads are 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 only 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 the following systems achieved a classification under BS EN 13501-5 : 2005 of B_{ROOF}(t4)⁽¹⁾:

- a flat roof system consisting of primed 9 mm thick calcium silicate board, a layer of Liquasil Universal Primer applied at 0.22 kg·m⁻², one coat of Liquasil DG Resin at 1.22 kg·m⁻², a layer of 225 g·m⁻² chopped strand glass fibre mat reinforcement and one coat of Liquasil DG Resin at 0.71 kg·m⁻²⁽¹⁾
- a flat roof system consisting of a primed 18 mm thick OSB3 board, a layer of polymeric adhesive primer applied at 0.15 ℓ·m⁻², a 0.6 mm self-adhesive air and vapour control layer (AVCL), a 150 mm thick tissue faced polyisocyanurate (PIR) insulation board adhesively bonded, layer of polymeric adhesive primer applied at 0.15 ℓ·m⁻², a 0.6 mm self-adhesive carrier membrane, one coat of Liquasil DG Resin at 1 ℓ·m⁻², a layer of 225 g·m⁻² chopped strand glass fibre mat reinforcement and one coat of Liquasil DG Resin at 0.5 ℓ·m⁻²⁽²⁾
- a flat roof system consisting of a primed 18 mm thick OSB3 board, a 300 µm polyethylene AVCL, a 150 mm thick aluminium foil faced PIR insulation board mechanically fastened, an 18 mm thick OSB3 board, one coat of Liquasil DG Resin at 1 ℓ·m⁻², a layer of 225 g·m⁻² chopped strand glass fibre mat reinforcement and one coat of Liquasil DG Resin at 0.5 ℓ·m⁻²⁽³⁾.

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:

- 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 in Scotland 11 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 In Scotland, the system, when used in pitches of greater than 70°, excluding upstands, should not be used on buildings 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 I₄ for hard substrate and I₂ for soft substrate with respect to dynamic indentation and L₄ for a hard substrate and L₂ for a soft substrate 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 should 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 25 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 BS 8000-0 : 2014, BS 8000-4 : 1989, 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 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 5°C stable (1°C with the use of Liquasil Winter Accelerator), 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 and when measured have a maximum moisture content of 20% wood moisture equivalent (WME), be 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 an 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 bitumen roofing felt) 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 GRP Trimming Details are prefabricated and installed where required in accordance with the Certificate holder's instructions.

14.9 Small areas of new galvanized steel and zinc substrates are treated with a mordant solution at the recommended coverage rate. 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.

14.10 Metal substrates are primed using Liquasil Twin-Pack Metal Epoxy Primer at a coverage rate of 5 m² per litre; rough or porous surfaces will significantly reduce coverage rate. The primer should be left to dry for a minimum of 8 hours to maximize adhesion. The maximum overcoating period is 28 days; after this period, it will be necessary to rub down and/or re-prime the surface.

14.11 Other substrates may be primed, using Liquasil Universal Primer at a coverage rate of 4 to 6 m² per litre, depending on surface roughness, in dry conditions between 5°C (1°C when accelerator used) and 30°C ambient air temperature. Porous surfaces should be visually checked to ensure an adequate seal and any suspect areas re-primed as necessary.

14.12 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 and may require re-priming prior to the installation of the waterproofing. Advice on the necessity of re-priming should be sought from the Certificate holder.

14.13 The Liquasil DG Rapid Powder Hardener proportion for Liquasil Universal Primer is given in Table 3 in respect of the surface/air temperature.

Temperature (°C)	Catalyst addition (level scoops per litre of primer) ⁽¹⁾
5–10	4
11–17	3
18–30	2

(1) Scoop provided with the catalyst.

14.14 All upstands, internal outlets, protrusions, cracks/splits and other points of weakness are locally reinforced using Liquasil DG Resin reinforced with Taping Mat prior to the application of the main system.

15 Application

15.1 The system is mixed on site by adding the catalyst, and if required accelerator, to the resin in the correct proportions. The catalyst is added in the proportions given in Table 4, depending on the surface/air temperature, and stirred in accordance with the mixing instructions.

Air temperature range	1°C to 4°C	5°C to 10°C	11°C to 17°C	18°C to 30°C
Liquasil Winter Accelerator	must be used	not required		
Resin volume in litres	Number of catalyst level scoops ⁽¹⁾			
1	4	4	3	2
2	8	8	6	4
3	12	12	9	6
4	16	16	12	8
5	20	20	15	10
6	24	24	18	12
7	28	28	21	14

(1) Scoop provided with the catalyst.

15.2 The application is normally in two coats. Depending on the substrate, the first coat of resin is applied at the rates given in Table 5, and 225 g·m⁻² chopped strand glass fibre mat rolled out and laid with 50 mm side and end laps and ensuring the mat is correctly oriented so the cut edge is overlapped by the feathered edge of the next strip of reinforcement. Extra resin is immediately applied to achieve a closed, pinhole-free surface.

Table 5 First coat coverage rate⁽¹⁾

Substrate	Coverage rate ($\ell \cdot \text{m}^{-2}$)
Concrete screed	1.0
OSB 3 TG4	0.85
Asphalt	
– smooth	0.85
– medium	1.0
– rough	1.4
Sanded felt	0.85
Mineral felt	1.15
Single ply	0.85
GRP	0.85

(1) The rates given in this Table are minimum values and it is the contractor's responsibility to ascertain the rate used on the specific site.

15.3 The second coat of resin can be applied as soon as it is practical to do so at a coverage rate of $0.5 \ell \cdot \text{m}^{-2}$. However, the maximum period between coats is seven days, after which it is necessary to clean the surface with acetone that will allow a further seven days' application time. If left longer than 14 days, the Certificate holder's advice should be sought.

15.4 Where required an anti-slip finish can be achieved by broadcasting the Anti-slip Additive onto a further coat of Liquasil DG Resin applied, in accordance with the Certificate holder's instructions, at a coverage rate of $0.5 \ell \cdot \text{m}^{-2}$. Alternatively, quartz sand or mineral slate can be used instead of the Anti-slip Additive.

16 Repair

Should minor damage occur, it can be rectified by cleaning back to unweathered material, reactivating the surface in accordance with the Certificate holder's advice and applying the Liquasil Dilapidations Grade (DG) Rapid system to the damaged area at the total application rate stated in sections 14 and 15.

Technical Investigations

17 Tests

17.1 Tests were carried out and the results assessed to determine:

- dynamic indentation on hard and soft substrates
- static indentation on hard and soft substrates
- dynamic indentation after heat ageing for 100 days at 80°C
- static indentation after 180 days surface water exposure at 60°C .

17.2 Tests on related products were used to assess the following:

- tensile strength and elongation on control, heat aged⁽¹⁾ and UV aged⁽²⁾ samples
- delamination on control and after water exposure⁽³⁾
- resistance to fatigue on control and after heat ageing⁽¹⁾
- slip resistance.

(1) Heat aged for 200 days at 70°C .

(2) UV aged at $1000 \text{ MJ} \cdot \text{m}^{-2}$ UV-A.

(3) 180 days surface water exposure at 60°C .

18 Investigations

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

18.2 Data on fire performance was evaluated.

18.3 An assessment was made of the installation instructions and contractor training scheme.

Bibliography

- BS 6229 : 2018 *Flat roofs with continuously supported flexible waterproof coverings — Code of practice*
- BS 8000-0 : 2014 *Workmanship on construction sites — Introduction and general principles*
BS 8000-4 : 1989 *Workmanship on building sites — Code of practice for waterproofing*
- BS 8217 : 2005 *Reinforced bitumen membranes for roofing — Code of practice*
- BS EN 1991-1-1 : 2002 *Eurocode 1 : Actions on structures — General actions— 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 *Eurocode 1 : Actions on structures — General actions — Snow loads*
NA to BS EN 1991-1-3 : 2003 UK National Annex to *Eurocode 1 : Actions on structures — General actions — Snow loads*
- BS EN 1991-1-4 : 2005 *Eurocode 1 : Actions on structures — General actions — Wind actions*
NA to BS EN 1991-1-4 : 2005 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*
- EOTA TR 006 : 2004 *Determination of the resistance to dynamic indentation*
- EOTA TR 007 : 2003 *Determination of the resistance to static indentation*

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.