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**Agrément Certificate**

**25/7425**

Product Sheet 1 Issue 1

## GARLAND LIQUID-APPLIED WATERPROOFING SYSTEMS

### LIQUI-ZERO

This Agrément Certificate Product Sheet<sup>(1)</sup> relates to Liqui-Zero, 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), protected warm and cold roofs (flat and zero fall), inverted roofs (flat and zero fall), blue roofs in combination with a storm water attenuation system<sup>(2)</sup>, terraces, balconies and walkways across roof areas.

(1) Hereinafter referred to as 'Certificate'.

(2) The storm water attenuation system is outside the scope of this Certificate.

#### The assessment includes

##### Product factors:

- compliance with Building Regulations
- compliance with additional regulatory or non-regulatory information where applicable
- evaluation against technical specifications
- assessment criteria and technical investigations
- uses and design considerations

##### Process factors:

- compliance with Scheme requirements
- installation, delivery, handling and storage
- production and quality controls
- maintenance and repair

##### Ongoing contractual Scheme elements†:

- regular assessment of production
- formal 3-yearly review

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 issue: 4 August 2025



#### KEY FACTORS ASSESSED

- Section 1. Mechanical resistance and stability
- Section 2. Safety in case of fire
- Section 3. Hygiene, health and the environment
- Section 4. Safety and accessibility in use
- Section 5. Protection against noise
- Section 6. Energy economy and heat retention
- Section 7. Sustainable use of natural resources
- Section 8. Durability

Hardy Giesler  
Chief Executive Officer

*This BBA Agrément Certificate is issued under the BBA's Inspection Body accreditation to ISO/IEC 17020. Sections marked with † are not issued under accreditation.*

*The BBA is a UKAS accredited Inspection Body (No. 4345), Certification Body (No. 0113) and Testing Laboratory (No. 0357).*

*Readers MUST check that this is the latest issue of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.*

*The Certificate should be read in full as it may be misleading to read clauses in isolation.*

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

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## SUMMARY OF ASSESSMENT AND COMPLIANCE

This section provides a summary of the assessment conclusions; readers should refer to the later sections of this Certificate for information about the assessments carried out.

### Compliance with Regulations

Having assessed the key factors, the opinion of the BBA is that Liqui-Zero, 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 Building Regulations 2010 (England and Wales) (as amended)

|                     |              |   |
|---------------------|--------------|---|
| <b>Requirement:</b> | <b>B4(1)</b> | <b>External fire spread</b>   |
| Comment:            |              | The system is restricted by this Requirement in some circumstances. See section 2 of this Certificate.                              |
| <b>Requirement:</b> | <b>B4(2)</b> | <b>External fire spread</b>   |
| Comment:            |              | On a suitable substructure, the system may enable a roof to be unrestricted by this Requirement. See section 2 of this Certificate. |
| <b>Requirement:</b> | <b>C2(b)</b> | <b>Resistance to moisture</b>   |
| Comment:            |              | The system will enable a roof to satisfy this Requirement. See section 3 of this Certificate.                                       |
| <b>Regulation:</b>  | <b>7(1)</b>  | <b>Materials and workmanship</b>  |
| Comment:            |              | The system is acceptable. See sections 8 and 9 of this Certificate.   |



#### The Building (Scotland) Regulations 2004 (as amended)

|                    |                |  |
|--------------------|----------------|--|
| <b>Regulation:</b> | <b>8(1)(2)</b> | <b>Fitness and durability of materials and workmanship</b>   |
| Comment:           |                | The use of the system satisfies the requirements of this Regulation. See sections 8 and 9 of this Certificate.   |
| <b>Regulation:</b> | <b>8(3)</b>    | <b>Fitness and durability of materials and workmanship</b>   |
| Comment:           |                | The system on balconies is restricted by this Regulation in some circumstances. See section 2 of this Certificate.   |
| <b>Regulation:</b> | <b>9</b>       | <b>Building standards – construction</b>   |
| Standard:          | 2.2            | Separation   |
| Standard:          | 2.7            | Spread on external walls   |
| Comment:           |                | Use of the system on balconies is restricted under clauses 2.2.7 <sup>(1)</sup> and 2.7.2 <sup>(1)(2)</sup> of these Standards. See section 2 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 by this Standard, with reference to clause 2.8.1 <sup>(1)(2)</sup> . See section 2 of this Certificate. |
| Standard:          | 3.10           | Precipitation  |
| Comment:           |                | The system will enable a roof to satisfy this Standard, with reference to clauses 3.10.1 <sup>(1)(2)</sup> and 3.10.7 <sup>(1)(2)</sup> . See section 3 of this Certificate.                     |

|                    |        |  |
|--------------------|--------|--|
| <b>Standard:</b>   | 7.1(a) | Statement of sustainability  |
| <b>Comment:</b>    |        | 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. |
| <b>Regulation:</b> | 12     | <b>Building standards – conversion</b>   |
| <b>Comment:</b>    |        | All comments given for the system under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 <sup>(1)(2)</sup> and Schedule 6 <sup>(1)(2)</sup> .                                |
|                    |        | (1) Technical Handbook (Domestic).   |
|                    |        | (2) Technical Handbook (Non-Domestic).   |



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

|                    |                 |  |
|--------------------|-----------------|--|
| <b>Regulation:</b> | 23(1)(a)(i)(ii) | <b>Fitness of materials and workmanship</b>  |
| <b>Comment:</b>    | (iii)(iv)(b)(i) | The system is acceptable. See sections 8 and 9 of this Certificate.  |
| <b>Regulation:</b> | 28(b)           | <b>Resistance to moisture and weather</b>  |
| <b>Comment:</b>    |                 | The system will enable a roof to satisfy this Regulation. See section 3 of this Certificate.                                       |
| <b>Regulation:</b> | 36(a)           | <b>External fire spread</b>  |
| <b>Comment:</b>    |                 | The system is restricted by this Regulation in some circumstances. See section 2 of this Certificate.                              |
| <b>Regulation:</b> | 36(b)           | <b>External fire spread</b>  |
| <b>Comment:</b>    |                 | On a suitable substructure, the system may enable a roof to be unrestricted by this Regulation. See section 2 of this Certificate. |

## Additional Information

### NHBC Standards 2025

In the opinion of the BBA, Liqui-Zero, 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*.

In addition, in the opinion of the BBA, the system, when installed and used in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards for Conversions and Renovations*, taking account of other relevant guidance within the chapter and the suitability of the substrate to receive the system.

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

However, the opinion of the BBA does not amount to any endorsement or approval by NHBC and does not in any way guarantee that NHBC will approve such product / system as compliant with the NHBC Technical Requirements and Standards.

## Fulfilment of Requirements

The BBA has judged Liqui-Zero to be satisfactory for use as described in this Certificate. The system has been assessed as 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), protected warm and cold roofs (flat and zero fall), inverted roofs (flat and zero fall), blue roofs in combination with a storm water attenuation system<sup>(1)</sup>, terraces, balconies and walkways across roof areas.

(1) The storm water attenuation system is outside the scope of this Certificate.

### Product description and intended use

The Certificate holder provided the following description for the system under assessment. Liqui-Zero is a liquid-applied, glass-reinforced, flexible modified polyester system, available in unpigmented or pre-pigmented versions.

Liqui-Zero consists of:

- Liqui-Zero — a flexible, modified polyester resin
- Liqui-Zero Catalyst — a 40% dibenzoyl peroxide suspension in a solvent mixture
- GarMat 450 — a 450 g·m<sup>-2</sup> glass fibre mat for reinforcing the system
- Liqui-Zero Seal Coat — sealer/wear coat for pedestrian access specification, available in clear and pigmented versions
- Natural Quartz (0.4 to 0.8 mm) — a grit for walkways and balconies
- Loose Mineral — an optional surface finish to provide an anti-slip surface if required
- Liqui-Zero ABS Primer — an alternative primer for preparing bituminous, wood and concrete
- Liqui-Zero TS2 Primer — a two-part primer for preparing metal, concrete, plywood, OSB3 and bituminous membrane substrates
- Liqui-Zero MT1 Primer — a single part, low viscosity, moisture curing primer for metal details.

#### Ancillary Items

The following ancillary items are essential to use with the system and have been assessed with the system:

- GV5 Solution — a pre-treatment for new galvanized steel or zinc substrates
- GarMat Joint Tape — a reinforcing tape for use at points of weakness such as detailing, protrusions and over cracks
- Liqui-Zero Cold Weather Additive — an additive to allow application at lower temperatures
- Liqui-Zero ABS Primer Cold Weather Additive — an additive to allow application at lower temperatures
- Preformed trims — a range of factory-manufactured glass reinforced plastic (GRP) trims, including upstand fixing trim, drip trim, fillet trim and flat trim
- Acetone — for use in cleaning tools.

The Certificate holder recommends the following ancillary items for use with the system, but these materials have not been assessed by the BBA and are outside the scope of this Certificate:

- Mineral slate — an alternative grit for walkways and balconies
- Liqui-Zero SH7 Primer — a primer for preparing selected single-ply substrates
- Proprietary anti-fungicidal solution — for the removal of algae and moss prior to application.

#### Applications

The system is intended for use on the following substrates:

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

(1) The advice of the Certificate holder must be sought on compatibility with the system, but such advice is outside the scope of this Certificate.

The system is intended for use in the following situations:

- 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<sup>(1)</sup>
  - protected warm and cold flat and zero fall roofs (ie covered by pavers or other suitable protection)<sup>(1)(2)</sup>
  - green (extensive) flat, zero fall and pitched roofs<sup>(1)(2)</sup>
  - inverted flat and zero fall roofs<sup>(1)(2)</sup>
  - blue roofs<sup>(1)(2)</sup>
  - terraces with anti-slip layer<sup>(2)</sup>
  - walkways across roof areas with anti-slip layer<sup>(2)</sup>
  - balconies<sup>(2)</sup>.

(1) Limited access.

(2) Pedestrian access.

#### Definitions for system and applications inspected

The following terms have been defined for the purpose of this Certificate as:

- limited access roof — a roof subjected only to pedestrian traffic for maintenance of the roof covering, cleaning of gutters, etc
- pedestrian access roof — a roof subject only to foot traffic and gathering of people greater than required for maintenance
- flat roof — a roof having a minimum finished fall of 1:80<sup>(1)</sup>
- zero fall roof — a roof having a minimum finished fall between 0 and 1:80<sup>(1)</sup>
- pitched roof — a roof having a fall in excess of 1:6
- green roof — a roof with a shallow layer of growing medium planted with low-maintenance plants such as mosses, sedums, grasses and some wild flower species
- invasive plant species — vegetation species having vigorous and/or invasive root systems likely to cause damage to components of the inverted roof insulation system and roof waterproofing
- blue roof — a flat roof designed to allow controlled attenuation of rain fall during storm events as part of a SUDS good practice policy<sup>(2)</sup>.

(1) *NHBC Standards 2025* require a minimum fall of 1:60 for green roofs.

(2) The storm water attenuation system is outside the scope of this Certificate.

## Product assessment – key factors

The system was assessed for the following key factors, and the outcome of the assessments is shown below. Conclusions relating to the Building Regulations apply to the whole of the UK.

### 1 Mechanical resistance and stability

Not applicable.

### 2 Safety in case of fire

Data were assessed for the following characteristics.

#### 2.1 External fire spread

2.1.1 When tested to DD CEN/TS 1187 : 2012, Test 4 and classified to BS EN 13501-5 : 2016, the constructions given in Table 1 of this Certificate achieved a classification of B<sub>ROOF</sub>(t4) for slopes below 10°.

**Table 1 External fire exposure classification**

| Layer            | System 1   | System 2  | System 3                                    |
|------------------|--|---|---|
| Substrate        | 18 mm orientated strand board <sup>(1)</sup>   |   | 9 mm calcium silicate board <sup>(1)</sup>  |
| Primer           | Garland SA Contact Primer <sup>(1)</sup> applied at a rate of 0.15 l·m <sup>-2</sup> |   | 0.2 mm Liqui-Zero ABS Primer <sup>(1)</sup> |
| AVCL             | Garland SA Flex Vapour Barrier <sup>(1)</sup>  |   | —   |
| Adhesive         | Garland Twin Pack Insulation adhesive <sup>(1)</sup>                                 |   | —   |
| Insulation       | 150 mm tissue-faced PIR Insulation board <sup>(1)</sup>                              | 123 mm PIR Insulation board with 3.2 bituminous facing <sup>(1)</sup> | —   |
| Primer           | Garland SA Contact Primer <sup>(1)</sup> applied at a rate of 0.15 l·m <sup>-2</sup> | Liqui-Zero TS2 Primer <sup>(1)</sup> at 0.10 l·m <sup>-2</sup>        | —   |
| Carrier membrane | Garland SA Flex Carrier Membrane <sup>(1)</sup>                                      | —   | —   |
| First coat       | Liqui-Zero Resin at 1.5 l·m <sup>-2</sup>  |   |   |
| Reinforcement    | GarMat 450   |   |   |
| Second coat      | Liqui-Zero resin at 0.50 l·m <sup>-2</sup>   |   |   |
| Third coat       | —  | Liqui-Zero resin at 0.50 l·m <sup>-2</sup>                            | —   |
| Anti-slip        | —  | 0.4-0.8 mm Natural Quartz broadcast at 1.6 kg·m <sup>-2</sup>         | —   |
| Sealer coat      | —  | Liqui-Zero Seal Coat at 0.20 l·m <sup>-2</sup>                        | —   |

(1) These components are outside the scope of this Certificate.

2.1.2 On the basis of data assessed, the constructions listed in Table 1 will be unrestricted by the documents supporting the national Building Regulations with respect to proximity to a relevant boundary. Restrictions may apply at junctions with compartment walls.

2.1.3 A roof incorporating the system will also be unrestricted under the national Building Regulations with respect to proximity to a relevant boundary 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.

2.1.4 The designation and permissible areas of use of other specifications must be confirmed by reference to the requirements of the documents supporting the national Building Regulations.

2.1.5 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 must be applied to ensure the overall fire-rating of the roof is not compromised.

## 2.2 Reaction to fire

2.2.1 The Certificate holder has not declared a reaction to fire classification for the system.

2.2.2 On the basis of the data assessed, the system will be restricted in use under the documents supporting the national Building Regulations.

2.2.3 In England, the system, when used in pitches greater than 70°, excluding upstands, must not be used less than 1 m from a relevant boundary, on residential buildings more than 11 m in height or on other buildings more than 18 m in height. Restrictions apply on assembly and recreation buildings. These constructions must also be included in calculations of unprotected area.

2.2.4 In Wales, the system, when used in roof pitches greater than 70°, excluding upstands, must not be used less than 1 m from a relevant boundary, on buildings more than 18 m in height or, in some cases, on assembly and recreation buildings. These constructions must also be included in calculations of unprotected area.

2.2.5 In Northern Ireland, for roofs incorporating the system in pitches greater than 70°, excluding upstands, that do not achieve the minimum Class E reaction to fire classification to BS EN 13501-1 : 2018, designers must seek guidance on the proposed use of the system from the relevant Building Control Body.

2.2.6 In Scotland, the use of the system is unrestricted with respect to building height and proximity to a relevant boundary. However, restrictions on the overall construction may apply, depending on the reaction to fire classification achieved by the build-up, which must be established on a case-by-case basis.

2.2.7 In England, unless covered with a protection with a reaction to fire of class A1 or A2-s1, d0 (for example, 40 mm thick cast stone slabs), the system must not be used on balconies of residential buildings with a storey 11 m or more in height or balconies of buildings 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, student accommodation, care homes, sheltered housing, hospitals, dormitories in boarding schools, hotels, hostels or boarding houses.

2.2.8 In Wales, unless covered with a protection with a reaction to fire of class A1 or A2-s1, d0 (for example, 40 mm thick cast stone slabs), the system must not be used on balconies of buildings 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, student accommodation, care homes, sheltered housing, hospitals, dormitories or boarding schools.

2.2.9 In Northern Ireland, unless covered with a protection with a reaction to fire of class A1 or A2-s1, d0 (for example, 40 mm thick cast stone slabs), the system must not be used on balconies of buildings 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, dormitories in boarding schools, nursing homes and places of lawful detention.

2.2.10 In Scotland, the system must not be used on balconies of buildings with a storey at a height of 11 m or more above the ground.

## 3 **Hygiene, health and the environment**

Data were assessed for the following characteristics.

### 3.1 Weathertightness

3.1.1 The results of weathertightness tests are given in Table 2.

| Product assessed      | Assessment method                             | Requirement | Result |
|-----------------------|---|-------------|--------|
| Liqui-Zero            | Watertightness to BS EN 1928 : 2000 at 60 kPa | No leakage  | Pass   |
| Liqui-Zero on Asphalt | Delamination strength to EOTA TR-004 : 2004   | 50 kPa      | Pass   |

3.1.2 The delamination strength from steel and concrete substrates of the system were assessed using test data from a representative related system.

3.1.3 On the basis of data assessed, the system will adequately resist the passage of moisture to the inside of a building and so satisfy the requirements of the national Building Regulations.

3.1.4 The adhesion of the bonded system is sufficient to resist the effects of wind suction, elevated temperature and thermal shock conditions likely to occur in practice and remain weathertight.

### 3.2 Resistance to mechanical damage

3.2.1 The results of resistance to mechanical damage tests are given in Table 3.

| <i>Table 3 Resistance to mechanical damage</i>   |  |                |                              |
|--|--|----------------|------------------------------|
| Product assessed                                 | Assessment method                                    | Requirement    | Result                       |
| Liqui-Zero on steel                              | Dynamic indentation to EOTA TR-006 : 2004            | Value achieved |                              |
|  | tested at 23°C                                       |                | L <sub>4</sub>               |
|  | tested at -20°C                                      |                | L <sub>4</sub>               |
| Liqui-Zero on PIR Insulation                     | tested at 23°C                                       |                | L <sub>3</sub>               |
| -Liqui-Zero on steel                             | Static indentation to EOTA TR-007 : 2004             | Value achieved |                              |
|  | tested at 23°C                                       |                | L <sub>4</sub>               |
|  | tested at 90°C                                       |                | L <sub>3</sub>               |
| Liqui-Zero on carrier membrane on PIR insulation | tested at 23°C                                       |                | L <sub>4</sub>               |
| Liqui-Zero                                       | Tensile strength to BS EN ISO 527-3 : 2003           | Value achieved | 3703 N·(50 mm) <sup>-1</sup> |
| Liqui-Zero                                       | Elongation at maximum load to BS EN ISO 527-3 : 2003 | Value achieved | 3.1%                         |

3.2.2 The resistance to mechanical damage of the system was assessed using test data from a representative related system.

3.2.3 On the basis of data assessed, the system can accept, without damage, the foot traffic and light concentrated loads associated with installation, maintenance and the effects of minor movement likely to occur in practice while remaining weathertight.

3.2.4 Where traffic in excess of the examples given in section 3.2.3 is envisaged, such as pedestrian access roofs or for maintenance of lift equipment, either the pedestrian access specifications must be used or other suitable protection must be provided (for example, using concrete slabs supported on bearing pads). Reasonable care must be taken to avoid puncture by sharp objects or concentrated loads.

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

### 3.3 Resistance to root penetration

In green roofs using plants with non-invasive roots, the roof waterproofing layer will adequately resist roof penetration, subject to routine maintenance being carried out in accordance with this Certificate and as recommended by the *Green Roof Organisation* (GRO) Code of Best Practice.

## 4 Safety and accessibility in use

Data were assessed for the following characteristic.

### 4.1 Skid resistance

4.1.1 The results of skid resistance tests are given in Table 4.

*Table 4 Skid resistance results*

| Product assessed                             | Assessment method   | Requirement   | Result       |
|--|---|---|--------------|
| Liqui-Zero- with Natural Quartz (0.4-0.8 mm) | Slip resistance using a pendulum tester to BS 7976-2 : 2002<br>dry<br>wet | Greater than or equal to a PTV <sup>(1)</sup> of 36 | Pass<br>Pass |

(1) Mean pendulum test value.

4.1.2 The skid resistance properties of the system were also assessed using test data from a representative related system including Natural Quartz.

4.1.3 On the basis of data assessed, the system, when installed with the anti-slip surface, has a satisfactory skid resistance in dry and wet conditions to allow it to be used in areas of pedestrian access.

## 5 Protection against noise

Not applicable.

## 6 Energy economy and heat retention

Not applicable.

## 7 Sustainable use of natural resources

Not applicable.

## 8 Durability

8.1 The potential mechanisms for degradation and the known performance characteristics of the materials in the system were assessed.

8.2 Specific test data were assessed as given in Table 5.

*Table 5 Durability*

| Product assessed             | Assessment method  | Requirement    | Result                       |
|------------------------------|--|----------------|------------------------------|
| Liqui-Zero on Mastic asphalt | Delamination strength to EOTA TR-004 : 2004 after 90 days at 60°C water exposure to EOTA TR-012 : 2004                 | 50 kPa         | Pass                         |
| Liqui-Zero on steel          | Dynamic indentation to EOTA TR-006 : 2004 after heat ageing for 120 days at 80°C to EOTA TR-011 : 2004 tested at -20°C | Value achieved | I <sub>4</sub>               |
| Liqui-Zero on steel          | after UV ageing 1200 MJ·m <sup>2</sup> at 50°C to EOTA TR-010 : 2004 tested at -10°C                                   |                | I <sub>4</sub>               |
| Liqui-Zero on steel          | Static indentation to EOTA TR-007 : 2004 after 180 days at 60°C water exposure to EOTA TR-012 : 2004 tested at 90°C    | Value achieved | L <sub>4</sub>               |
| Liqui-Zero                   | Tensile strength to BS EN ISO 527-3 : 2003 after heat ageing for 120 days at 80°C to EOTA TR-011 : 2004                | Value achieved | 5420 N·(50 mm) <sup>-1</sup> |
| Liqui-Zero                   | Elongation at maximum load to BS EN ISO 527-3 : 2003 after heat ageing for 120 days at 80°C to EOTA TR-011 : 2004      | Value achieved | 3.1.%                        |

8.2.1 The fatigue cycling after heat ageing and delamination after water exposure of the system were assessed using test data from a representative related system.

### 8.3 Service life

8.3.1 Under normal service conditions, the system will have a life in excess of 30 years, provided it is designed, installed and maintained in accordance with this Certificate and the Certificate holder's instructions.

8.3.2 When fully protected, under normal service conditions, the system will have a life at least equivalent to the roof in which it is incorporated, provided it is designed, installed and maintained in accordance with this Certificate and the Certificate holder's instructions.

8.3.3 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 system may be reduced. In these circumstances, the Certificate holder must be consulted, but such advice is outside the scope of this Certificate.

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

## PROCESS ASSESSMENT

Information provided by the Certificate holder was assessed for the following factors:

### 9 Design, installation, workmanship and maintenance

#### 9.1 Design

9.1.1 The design process was assessed by the BBA, and the following requirements apply in order to satisfy the performance assessed in this Certificate.

9.1.2 Decks to which the system is to be applied must comply with the relevant requirements of BS 6229 : 2018 and, where appropriate, *NHBC Standards 2025*, Chapter 7.1.

9.1.3 For design purposes of flat roofs, twice the minimum finished fall must be assumed, unless a detailed structural analysis of the roof is available, including overall and local deflection, direction of falls etc.

9.1.4 Terraces and balconies to which the system is to be applied, must be designed in accordance with BS 8579 : 2020.

9.1.5 Structural decks to which the system is 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.

9.1.6 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.

9.1.7 The ballast on protected roofs or growing medium used in green roofs must not be of a type that will be removed or become delocalised owing to wind scour experienced on the roof.

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

9.1.9 For green roofs, invasive non-native alien plant species as defined by UK Government guidance must not be used.

9.1.10 For green roof finishes, in order to protect the roof waterproofing and any system components above the waterproofing, such as insulation or water flow reducing layer, invasive plant species must not be used. In particular, the following species must be excluded:

- invasive weeds including buddleia
- plants and grasses with aggressive rhizomes such as bamboo
- self-setting woody weeds such as sycamore and ash seedlings – must be removed at early germination stage
- other woody plants which spread aggressively including rhododendron.

9.1.11 The Green Roof Organisation (GRO) can provide guidance on species not included in section 9.1.10 but such advice is outside the scope of this Certificate.

9.1.12 The drainage systems for inverted roofs, protected zero fall roofs or green roofs must be correctly designed, and the following points must be addressed:

- provision made for access for maintenance purposes
- for protected 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*.

9.1.13 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, and within the scope of, that Certificate.

## 9.2 Installation

9.2.1 Installation instructions provided by the Certificate holder were assessed and judged to be appropriate and adequate.

9.2.2 Installation of Liqui-Zero must be carried out in accordance with this Certificate and the Certificate holder's instructions. A summary of instructions and guidance is provided in Annex A of this Certificate.

9.2.3 Application of the system must be 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%.

9.2.4 Detailing (eg upstands) must be carried out in accordance with the Certificate holder's instructions. Metal details are primed using Liqui-Zero MT1 Primer applied by brush at an application rate of 50 to 150 ml·m<sup>-2</sup>.

9.2.5 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.

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

9.2.7 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 must be sought, but such advice is outside the scope of this Certificate.

9.2.8 Any areas of fungal growth or moss must be treated with a proprietary anti-fungal solution to ensure that all spores are destroyed. The Certificate holder can advise on suitable materials for this purpose, but such advice and products are outside the scope of this Certificate.

9.2.9 High pressure sand-blasting or water-jetting must 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.

9.2.10 Damaged areas of the substrate, for example, blistered reinforced bitumen membranes, must be removed, replaced or repaired.

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

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

9.2.13 New galvanized steel and zinc substrates must be treated with GV5 Solution at a coverage rate of 15 m<sup>2</sup>·l<sup>-1</sup>. 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.

9.2.14 Metal substrates must be primed using Liqui-Zero TS2 Primer at a coverage rate of 10 to 15 m<sup>2</sup>·l<sup>-1</sup>, rough or porous surfaces will significantly reduce coverage rate. The primer must be left to dry for a minimum of 2 hours, and ideally between 8 and 24 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.

9.2.15 Metal details, such as penetrating pipes, must be primed using Liqui-Zero MT1 Primer at a coverage rate of 50 to 150 ml·m<sup>-2</sup>; the surface type could affect the coverage rate. The primer must be left to dry for a minimum of 15 to 30 minutes and a maximum of 24 hours; the curing time will be affected by temperature.

9.2.16 Other substrates must be primed, using catalysed Liqui-Zero ABS Primer at a coverage rate of 4 to 6 m<sup>2</sup>·l<sup>-1</sup>. Porous surfaces must be visually checked to ensure an adequate seal and any suspect areas re-primed as necessary. The primer must be 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 Liqui-Zero ABS Primer is given in Table 6 for a range of surface/air temperatures.

*Table 6 Catalyst proportion for Liqui-Zero ABS Primer*

| Temperature (°C) | Catalyst addition (%)<br>Liqui-Zero ABS Primer |
|------------------|--|
| 3 – 10           | 3 – 4  |
| 10 – 20          | 2 – 3  |
| 20 – 35          | 2  |

9.2.17 Liqui-Zero 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 7, depending on the surface/air temperature, and stirred in accordance with the mixing instructions.

*Table 7 Accelerator and Catalyst addition*

| Air temperature range             | Cold (2 to 7°C)                         | Warm (8 to 17°C) | Hot (18 to 30°C) |
|-----------------------------------|---|------------------|------------------|
| Liqui-Zero Cold weather Additive  | Must be used                            | Optional         | Do not use       |
| Liqui-Zero resin volume in litres | Number of catalyst shots <sup>(1)</sup> |                  |                  |
| 10                                | 16                                      | 12               | 8                |
| 7.5                               | 12                                      | 9                | 6                |
| 5                                 | 8                                       | 6                | 4                |
| 2.5                               | 4                                       | 3                | 2                |

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

9.2.18 One coat of Liqui-Zero is applied to all upstands, detailing, protrusions, cracks, joints, and stepped joints with adjoining dissimilar substrates, and reinforced with GarMat Joint Tape or pre-cut strips of GarMat 450 prior to the application of the main waterproofing. This layer of Liqui-Zero must be allowed to dry before overcoating with the main waterproofing layers of the same material.

9.2.19 The application is normally in two coats. Depending on the substrate, the first coat of resin is applied at the rates given in Table 8, and GarMat 450 rolled out and laid with 50 mm side and end laps. Extra resin is immediately applied to achieve a closed, pinhole-free surface.

*Table 8 First coat coverage rate<sup>(1)</sup>*

| Substrate                  | Coverage rate (l·m <sup>-2</sup> ) |
|----------------------------|------------------------------------|
| Smooth concrete            | 1.25 – 1.50 <sup>(2)</sup>         |
| OSB 3                      | 1.25 – 1.50                        |
| Plywood                    | 1.25 – 1.50                        |
| Asphalt                    | 1.25 – 1.50                        |
| Sanded bitumen             | 1.25 – 1.50                        |
| Mineral bitumen            | 1.50 – 2.00 <sup>(2)</sup>         |
| De-chipped bitumen/asphalt | 1.50 – 2.00 <sup>(2)</sup>         |
| 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 must be taken into account when estimating material usage.

9.2.20 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 l·m<sup>-2</sup>.

9.2.21 Joints subjected to excessive movement may require the use of an alternative bridging material; the Certificate holder must be consulted for advice, but such advice is outside the scope of this Certificate.

9.2.22 When an anti-skid finish is required, an additional third coat of Liqui-Zero is applied at a coverage rate of 0.5 l·m<sup>-2</sup> to the waterproofing system Natural Quartz (0.4 – 0.8 mm) is broadcast in excess, approximately 2.6 kg·m<sup>-2</sup>, into the wet resin. The loose excess quartz sand is removed to leave a coverage of approximately 1.6 kg·m<sup>-2</sup>.

9.2.23 The Natural Quartz is sealed with a coat of Liqui-Zero Seal Coat at a coverage rate of 0.2 l·m<sup>-2</sup> in accordance with the Certificate holder's instructions.

9.2.24 The NHBC requires that the system, once installed, is inspected in accordance with NHBC Standards 2025, Chapter 7, Clause 7.1.11, and undergoes an appropriate integrity test where required. Any damage to the system assessed in this Certificate must be repaired in accordance with section 9.4 of this Certificate and reinspected, in order to maintain system performance.

### 9.3 Workmanship

Practicability of installation was assessed by the BBA on the basis of the Certificate holder's information. To achieve the performance described in this Certificate, the system must only be installed by contractors who have been trained and approved by the Certificate holder

### 9.4 Maintenance and repair

9.4.1 Ongoing satisfactory performance of the system in use requires that it is suitably maintained. The guidance provided by the Certificate holder was assessed by the BBA and found to be appropriate and adequate.

9.4.2 The following requirements apply in order to satisfy the performance assessed in this Certificate:

9.4.2.1 The system must be the subject visual six-monthly inspections and maintenance in accordance with the recommendations in BS 6229 : 2018, Chapter 7, and the Certificate holder's own maintenance requirements. For green roof drainage systems, these six-monthly inspections must be carried out by a suitably experienced and competent individual (with horticultural knowledge) to ensure continued satisfactory performance. This must include an

examination of the overall condition of the roof, ensure that drain outlets and gutters are kept clear and unblocked and, for green roofs, the removal of any self-propagated plants and invasive plant species found. See section 9.1.10 of this Certificate.

9.4.2.2 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 is cleared from the roof and drainage outlets. Guidance is available within the latest edition of *The GRO Green Roof Code – Green Roof Code of Best Practice for the UK*.

9.4.2.3 For green roofs, to protect the roof waterproofing and any system components above the waterproofing, such as insulation or water flow reducing layer, invasive plant species (see sections 9.1.10 and 9.1.11 of this Certificate) must be eliminated through maintenance.

9.4.2.4 The control and removal of invasive plant species is carried out by hand. Where this is not possible, any chemicals used must be checked for compatibility with the roof waterproofing layer. The Certificate holder can advise on the suitability of a particular product, but such advice is outside the scope of this Certificate. Note, if using chemicals on a green roof, rainwater outlets may need to be disconnected from the main drainage system to prevent contamination of the local water system and/or harm to flora and fauna.

9.4.2.5 The chemical fertiliser used on green roofs must be checked for compatibility with the roof waterproofing layer and any system components above the waterproofing. The Certificate holder can advise on the suitability of a particular product, but such advice is outside the scope of this Certificate.

9.4.2.6 If a leak occurs in the roof waterproof membrane in a protected specification, it must be repaired following removal of any system components above the waterproofing.

9.4.2.7 If minor damage occurs, it can be rectified by cleaning back to unweathered material, reactivating the surface and applying the system to the damaged area at the total application rate stated in section 9.2.19 of this Certificate.

9.4.2.8 The anti-slip layer may require maintenance and repair for either cosmetic or anti-slip performance. In most situations a visual inspection will reveal if the seal coat has worn away. A further application of the seal coat is then required, at the coverage rate given in sections 9.2.22 and 9.2.23. Preparation before coating includes a thorough clean and, if any of the original seal coat remains, a solvent wipe. A small quantity of extra Natural Quartz may be required to be broadcast onto the wet seal coat and rolled in to maintain anti-slip properties.

9.4.2.9 If more severe wear of the anti-slip layer has occurred, with a significant loss of the Natural Quartz the full anti-slip layer specification must be applied (see sections 9.2.21 and 9.2.22) following appropriate surface preparation in accordance with the Certificate holder's instructions.

9.4.2.10 In the event of the system being contaminated by oil, grease or other chemicals, the advice of the Certificate holder must be sought, but such advice is outside the scope of this Certificate.

## **10 Manufacture**

10.1 The production processes for the system have been assessed, and provide assurance that the quality controls are satisfactory according to the following factors:

10.1.1 The manufacturer has provided documented information on the materials, processes, testing and control factors.

10.1.2 The quality control operated over batches of incoming materials has been assessed and deemed appropriate and adequate.

10.1.3 The quality control procedures and product testing to be undertaken have been assessed and deemed appropriate and adequate.

10.1.4 The process for management of non-conformities has been assessed and deemed appropriate and adequate.

10.1.5 An audit of each production location was undertaken, and it was confirmed that the production process was in accordance with the documented process, and that equipment has been properly tested and calibrated.

† 10.2 The BBA has undertaken to review 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.

## 11 Delivery and site handling

11.1 The Certificate holder stated that the system components are delivered to site in packaging bearing the Certificate holder's name, BBA logo, product name, batch number and health and safety data.

11.2 Delivery and site handling must be performed in accordance with the Certificate holder's instructions and this Certificate, including:

11.2.1 The liquid components must be stored unopened.

11.2.2 All components must be stored undercover and in dry conditions, at the recommended storage temperatures.

11.3 The system components and ancillary items' packaging types and sizes are given in Table 9.

*Table 9 Packaging*

| Component/item                              | Package type       | Size                                      |
|---|--------------------|---|
| Liqui-Zero Resin                            | Tins               | 10 litres                                 |
| Liqui-Zero Catalyst                         | Dispensing bottles | 2 litres                                  |
| GarMat 450                                  | Rolls              | 17, 30 and 100 m <sup>2</sup>             |
| Liqui-Zero Seal Coat                        | containers         | 2 litres                                  |
| Loose Mineral                               | Packs              | 15kg                                      |
| Liqui-Zero ABS Primer                       | Tins               | 5 litres                                  |
| Liqui-Zero TS2 Primer                       | Tins               | 4 litres total volume of the two-pack kit |
| Liqui-Zero MT1 Primer                       | Tins, six to a box | 250 millilitres                           |
| GarMat Joint Tape 75 mm/300 mm              | Rolls              | 110 m/18 m                                |
| Natural Quartz                              | Packs              | 25 kg                                     |
| GV5 Solution                                | Tins               | 5 litres                                  |
| Liqui-Zero Cold Weather Additive            | Tins               | 0.5 litres                                |
| Liqui-Zero ABS Primer Cold Weather Additive | Tins               | 0.5 litres                                |

Supporting information in this Annex is relevant to the system but has not formed part of the material assessed for the 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.

### CLP Regulations

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

### Additional information on installation

#### Design

A.1 For zero fall roofs, reference must be made to the appropriate clauses in *Liquid Roofing and Waterproofing Association (LRWA) Note 7 – Specifier Guidance for Flat Roof Falls*.

A.2 Recommendations for the design of green roofs specifications are available within the latest edition of *The GRO Green Roof Code – Green Roof Code of Best Practice for the UK*.

A.3 Additional guidance for inverted roof specifications is given in *BBA Information Bulletin No 4 Inverted roofs – Drainage and U value corrections*.

#### Installation

A.4 Installation must also be in accordance with the relevant clauses of *Liquid Roofing and Waterproofing Association (LRWA) Note 7 – Specifier Guidance for Flat Roof Falls*.

## Bibliography

- BS 6229 : 2018 *Flat roofs with continuously supported flexible waterproof coverings — Code of practice*
- BS 7976-2 : 2002 + A1 : 2013 *Pendulum testers — Part 2: Method of operation*
- BS 8579 : 2020 *Guide to the design of balconies and terraces*
- BS EN 1991-1-1 : 2002 *Eurocode 1 : Actions on structures — General actions*  
NA to BS EN 1991-1-1 : 2002 UK National Annex to *Eurocode 1 : Actions on structures — General actions*
- BS EN 1991-1-3 : 2003 + A1 : 2015 *Eurocode 1 : Actions on structures — General actions*  
NA to BS EN 1991-1-3 : 2003 + A1 : 2015 UK National Annex to *Eurocode 1 : Actions on structures — General actions*
- BS EN 1991-1-4 : 2005 + A1 : 2015 *Eurocode 1 : Actions on structures — General actions*  
NA to BS EN 1991-1-4 : 2005 + A1 : 2015 UK National Annex to *Eurocode 1 : Actions on structures — General actions*
- BS EN 1928 : 2000 *Flexible sheets for waterproofing – Bitumen, plastic and rubber sheets for roof waterproofing – Determination of watertightness*
- BS EN 13501-1 : 2018 *Fire classification of construction products and building elements — Classification using data from reaction to fire tests*
- BS EN 13501-5 : 2016 *Fire classification of construction products and building elements — Classification using data from external fire exposure to roofs test*
- BS EN ISO 527-3 : 2003 *Plastics — Determination of tensile properties - Part 3: Test conditions for films and sheets*
- DD CEN/TS 1187 : 2012 *Test methods for external fire exposure to roofs*
- EOTA TR-004 : May 2004 *Determination of the resistance to delamination*
- EOTA TR-006 : May 2004 *Determination of the resistance to dynamic indentation*
- EOTA TR-007: May 2004 *Determination of the resistance to static indentation*
- EOTA TR-010 : May 2004 *Exposure procedure for artificial weathering*
- EOTA TR-011 : May 2004 *Exposure procedure for accelerated ageing by heat*
- EOTA TR-012 : May 2004 *Exposure procedure for accelerated ageing by hot water*

## Conditions of Certificate

### Conditions

1 This Certificate:

- relates only to the product 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
- 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
- and any matter arising out of or in connection with it or its subject matter (including non-contractual disputes or claims) is governed by and construed in accordance with the law of England and Wales.
- the courts of England and Wales shall have exclusive jurisdiction to settle any matter arising out of or in connection with this Certificate or its subject matter (including non-contractual disputes or claims).

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.

3 This Certificate will be displayed on the BBA website, and the Certificate Holder is entitled to use the Certificate and Certificate logo, provided that the product 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.

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

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

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

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