

Alumasc Exterior Building Products Ltd

White House Works
Bold Road
Sutton
St Helens
Merseyside WA9 4JG
Tel: 01744 648 400
e-mail: roofing@alumasc-exteriors.co.uk
website: www.alumascroofing.co.uk



Agrément Certificate
17/5392
Product Sheet 1

EUROROOF CALTECH LIQUID APPLIED WATERPROOFING AND SURFACING SYSTEMS

CALTECH QC

This Agrément Certificate Product Sheet⁽¹⁾ relates to Caltech QC, for use on flat and pitched roofs with limited access, including green roof and roof garden specifications.

(1) Hereinafter referred to as 'Certificate'.

CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.



KEY FACTORS ASSESSED

Weathertightness — the system will resist the passage of moisture into a building (see section 6).

Properties in relation to fire — the system can contribute to a roof being unrestricted under the Building Regulations (see section 7).

Adhesion — the system will resist the effects of any likely wind suction acting on the roof (see section 8).

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

Resistance to penetration by roots — the system will resist penetration by plant roots and rhizomes (see section 10).

Durability — under normal service conditions the system will provide a durable roof waterproofing with a service life in excess of 25 years (see section 12).



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

On behalf of the British Board of Agrément

John Albon — Head of Approvals
Construction Products

Claire Curtis-Thomas
Chief Executive

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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 are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

British Board of Agrément
Bucknalls Lane
Watford
Herts WD25 9BA

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tel: 01923 665300
fax: 01923 665301
clientservices@bba.star.co.uk
www.bbacerts.co.uk

Regulations

In the opinion of the BBA, Caltech QC, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



The Building Regulations 2010 (England and Wales) (as amended)

Requirement: B4(2)	External fire spread
Comment:	On a suitable substructure on flat roofs, the system can contribute to a roof being unrestricted under this Requirement. See sections 7.1 to 7.4 of this Certificate.
Requirement: C2(b)	Resistance to moisture
Comment:	The system will enable a roof to meet this Requirement. See section 6.1 of this Certificate.
Regulation: 7	Materials and workmanship
Comment:	The system comprises acceptable materials and satisfies the requirements of this Regulation. See section 12 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 comprises acceptable materials and satisfies the requirements of this Regulation. See sections 11.1 to 11.3 and 12 and the <i>Installation</i> part of this Certificate.
Regulation: 9	Building standards applicable to construction
Standard: 2.8	Spread from neighbouring buildings
Comment:	The system, when applied to a suitable substructure on flat roofs, is regarded as having a low vulnerability and can contribute to a roof being unrestricted under this Standard, with reference to clause 2.8.1 ⁽¹⁾⁽²⁾ . See sections 7.1 to 7.4 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 6.1 of this Certificate.
Standard: 7.1(a)	Statement of sustainability
Comment:	The system can contribute to meeting the relevant requirements of Regulation 9, Standards 1 to 6 and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.
Regulation: 12	Building standards applicable to conversions
Comment:	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 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ . (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



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

Regulation: 23(a)(b)(i)	Fitness of materials and workmanship
Comment:	The system comprises acceptable materials and satisfies the requirements of this Regulation. See section 12 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 meet the requirements of this Regulation. See section 6.1 of this Certificate.
Regulation: 36(b)	External fire spread
Comment:	On a suitable substructure on flat roofs, the system can contribute to a roof being unrestricted under the requirements of this Regulation. On sloping roofs, boundary restrictions will apply. See sections 7.1 to 7.4 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 2017

NHBC accepts the use of Caltech QC, provided it is installed, used and maintained in accordance with this Certificate, in relation to *NHBC Standards, Part 7 Roofs, Chapters 7.1 Flat roofs and balconies and 7.2 Pitched roofs.*

CE marking

The Certificate holder has taken the responsibility of CE marking the system in accordance with ETA 03/0020 and ETAG 005. An asterisk (*) appearing in this Certificate indicates that data shown are given in the manufacturer's Declaration of Performance.

Technical Specification

1 Description

1.1 Caltech QC is based on a two-component, liquid-applied polymethylmethacrylate membrane, reinforced with an embedded polyester fleece with a nominal mass per unit area of $110 \text{ g}\cdot\text{m}^{-2}$.

1.2 The system is available in winter and summer grades, for use where application temperatures are between 0°C and 20°C , and 10°C and 35°C respectively.

1.3 The system is applied to provide a waterproofing membrane with a minimum dry film thickness of 1.8 mm.

1.4 The system is the subject of ETA 03/0020, issued by Deutsches Institut für Bautechnik (DIBt). In accordance with ETAG 005, Part 1 and Part 4, the levels of use categories(*) are:

- working life W3 (25 years)
- climatic zones M (moderate) and S (Severe)
- imposed loads P1 to P4 [for most compressible (PUR insulation) and least compressible (steel/concrete)]
- roof slope S1 to S4 (<5% to >30%)
- lowest surface temperature in use TL4 (-30°C)
- highest surface temperature in use TH4 (90°C).

1.5 Ancillary items which may be necessary for installation of the system and which are included in this assessment are:

- Caltech QC Primer C — a two-component, polymethylmethacrylate primer for use on porous substrates such as concrete, cementitious screeds and timber
- Caltech QC Primer B — a two-component, polymethylmethacrylate primer for use on asphalt and other bituminous substrates
- Caltech QC RF110 Reinforcement — a polyester reinforcement fleece with a nominal mass per unit area of $110 \text{ g}\cdot\text{m}^{-2}$
- Caltech QC Detail — for use at details and for repairs, and the subject of Product Sheet 3 of this Certificate
- Caltech QC Finish — a two-component polymethylmethacrylate-based decorative finish available in a range of colours
- Caltech QC Cleaner — cleaner used for cleaning tools, cleaning substrates and the reactivation of the cured Caltech QC Roof prior to overcoating when work is interrupted for periods in excess of 12 hours.

1.6 Other items or components which may be used with the system, but which are outside the scope of this Certificate, are:

- primers and pre-treatments for open textured and porous cementitious substrates, glass, metals, render, insulation, hot melt membranes, solar reflective coatings, coated metals, plastics and timber/ply
- primers and pre-treatments for single ply membranes based on PVC, PVC-P, FPO, TPE, CPE, EPDM, PIB, VET, EVA and rubber
- primers and pre-treatments for membranes and coatings based on polyurethane, polymethylmethacrylate, unsaturated polyester, epoxy and acrylic
- anti-corrosion and etch primers for metals
- compounds for small and large scale filling, levelling and repair
- fibre reinforced detailing resin for complex, less critical and difficult-to-access details
- coloured smooth and anti-skid finishes.

Details of suitable products/specifications may be obtained from the Certificate holder.

2 Manufacture

2.1 The system components are manufactured by batch processes.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

2.3 The management system of the manufacturer has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by DEKRA (Certificates 90207207/1 and 80408283/2).

3 Delivery and site handling

3.1 The components of the system are delivered to site in packs consisting of liquid base resin and powder catalyst components. The packs bear a label that includes the component's name, health and safety information, and batch number. The components are available in the pack sizes detailed in Table 1.

Table 1 Pack sizes

Component	Pack sizes
Caltech QC	20 kg, 999 kg
Caltech QC Detail	5 kg, 10 kg, 15 kg
Caltech QC Catalyst	100 g, 1 kg (bags), 25 kg (box)
Caltech QC Primer C	10 kg, 910 kg
Caltech QC Primer B	10 kg, 910 kg
Caltech QC Cleaner	9 litre, 27 litre
Caltech QC Finish	10 kg, 980 kg
Caltech QC RF110 Reinforcement	50 m (length) x 15, 20, 26.25, 35, 52.5, 70 or 105 cm (widths) rolls

3.2 The system components must be stored in a cool, dry location and protected from freezing temperatures and direct sunlight. When stored in accordance with the manufacturer's instructions they will have a shelf-life of at least six months. Rolls of Caltech QC RF110 Reinforcement must be stored flat in a dry, clean environment and protected from moisture. Caltech QC Catalyst must be stored at a temperature below 30°C in closed containers, away from sources of ignition and protected from direct sunlight. Contamination and heat can cause the catalyst to decompose rapidly and create a hazard.

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 Caltech QC.

Design Considerations

4 Use

4.1 Caltech QC is satisfactory for use as a fully adhered waterproofing layer on new and existing:

- exposed flat (including zero pitch) and pitched roofs with limited access
- protected and inverted roofs with limited access
- green roofs and roof gardens.

4.2 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.

4.3 Flat roofs are defined for the purpose of this Certificate as those having a minimum finished fall of 1:80. For design purposes, twice the minimum finished fall should be assumed, unless a detailed analysis of the roof is available, including overall and local deflection, direction of falls, etc. Pitched roofs are defined for the purpose of this Certificate as those having a fall greater than 1:6. Zero pitched roofs (also known as completely flat) are defined for the purpose of this Certificate as those having a finished fall which can vary between 0 and 1:80.

4.4 Decks to which the system is to be applied must comply with the relevant requirements of BS 6229 : 2003 and, where appropriate, *NHBC Standards 2017*, Chapters 7.1 *Flat roofs and balconies* and 7.2 *Pitched roofs*.

4.5 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 : 2003, or
- the subject of a current BBA Certificate and used in accordance with the scope of that Certificate.

4.6 For green roofs, roof gardens and inverted roofs, the structural decks to which the system is to be applied must be suitable to transmit the dead and imposed loads experienced in service. Imposed loads, dead loading and wind loads are calculated in accordance with BS EN 1991-1-1: 2002, BS EN 1991-1-3: 2003, BS EN 1991-1-4 : 2005 and their respective UK National Annexes.

4.7 The drainage systems for green roofs and roof gardens must be correctly designed and accessible for maintenance purposes. Dead loads can increase significantly if the drains become blocked causing waterlogging of the drainage layers.

4.8 Recommendations for the design of green roofs and roof garden specifications are available within the latest edition of the GRO *Green Roof code – Green Roof Code of Best Practice for the UK*.

4.9 In inverted roof specifications, the ballast requirements must be calculated in accordance with the relevant parts of BS EN 1991-1-4: 2005 and its UK National Annex. Additional guidance is given in BBA Information Bulletin No. 4 *Inverted Roofs – Drainage and U value corrections*.

4.10 The system has been assessed for use on concrete primed with Caltech QC Primer C, asphalt primed with Caltech QC Primer B, and unprimed steel. The adhesion to and compatibility with other substrates must be confirmed by test (see also section 13.5 of this Certificate).

5 Practicability of installation

The system should only be installed by installers who have been trained and approved by the Certificate holder.

6 Weathertightness



6.1 The system will adequately resist the passage of moisture into the building and enable a roof to comply with the requirements of the national Building Regulations.

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

7 Properties in relation to fire



7.1 A composite build-up comprising:

- Caltech QC (pebble grey) applied at a rate of 3.1 kg·m⁻², including Caltech QC RF110 Reinforcement
- a 0.6 mm thick bitumen carrier membrane
- 120 mm thick PIR Insulation board bonded to a vapour control membrane with a two-component PUR adhesive
- 19 mm thick plywood primed with a synthetic rubber resin, when tested in accordance with DD CEN/TS 1187 : 2012 (test 4) was classified in accordance with EN 13501-5 : 2005 as European Class B_{ROOF(t4)}, and when tested in the flat position in accordance with BS 476-3 : 2004 achieved an EXT.F.AA rating. The system can contribute to a roof being unrestricted under the national Building Regulations.

7.2 Protected or inverted roof specifications, including an inorganic covering listed in the Annex of Commission Decision 2000/553/EC, can be considered to be unrestricted under the national Requirements.

7.3 The designation of other specifications should be confirmed by:

England and Wales — test or assessment in accordance with Approved Document B (Volumes 1 and 2), Appendix A, clause A1

Scotland — test to conform to Mandatory Standard 2.8, clause 2.8.1

Northern Ireland — test or assessment by a UKAS accredited laboratory, or an independent consultant with appropriate experience.

7.4 In the opinion of the BBA, irrigated green roofs and roof gardens will be unrestricted under the national Requirements.

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

8 Adhesion

The adhesion of the system to the substrates given in section 4.10 of this Certificate, including day joints, is sufficient to resist the effects of wind suction, thermal cycling or other minor structural movements likely to occur in service. Acceptable adhesion to other substrates should be confirmed by test.

9 Resistance to foot traffic

The system can accept the limited foot traffic and light concentrated loads associated with installation and maintenance. Reasonable care should be taken to avoid puncture by sharp objects or concentrated loads. Where traffic in excess of this is envisaged, such as for maintenance of lift equipment, additional protection to the membrane must be provided as specified by the Certificate holder. In areas of heavy foot traffic, an additional coat of Caltech QC filled with aggregate can be applied and sealed with Caltech QC Finish. The Certificate holder must be consulted for details.

10 Resistance to penetration by roots

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

11 Maintenance



11.1 The system must be the subject of annual inspections and maintenance to ensure continued performance.

11.2 Maintenance should include checks and operations to ensure that the membrane and drainage outlets are free from the build-up of silt and other debris, and that protection layers, eg walkways (where applicable), are in good condition.

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

11.4 Damage to the system must be repaired at the earliest opportunity. See sections 13.14 to 13.16 of this Certificate.

12 Durability



Accelerated weathering tests and evidence from existing installations confirm that satisfactory retention of physical properties is achieved. All available evidence indicates that, under normal conditions, the system will have a service life in excess of 25 years.

Installation

13 General

13.1 Installation of Caltech QC must be in accordance with the relevant clauses of BS 8000-4 : 1989, BS 6229 : 2003, the Certificate holder's instructions and this Certificate.

13.2 Installation should not be carried out during inclement weather, eg rain, fog or snow, and the ambient temperature at the time of laying must be between 0°C and 35°C.

13.3 Substrates to which the system is to be applied must be sound, clean, frost-free, dry and free from sharp projections. The Certificate holder's advice must be sought with regard to the suitability of the substrate to receive the system, suitable cleaning procedures and the use of a proprietary surface cleaner/fungicidal wash where required.

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

13.5 Adhesion checks must be carried out to ensure that the system is compatible with the existing surfaces. The Certificate holder must be consulted for details of suitable test methods and requirements before use.

13.6 Detailing, such as at upstands, penetrations and joints, must be carried out using Caltech QC Detail in accordance with the Certificate holder's instructions. Where use of Caltech QC Detail is not practicable owing to the complexity of detail, the Certificate holder must be consulted for an alternative solution.

13.7 All equipment must be cleaned with Caltech QC Cleaner.

Procedure

13.8 Caltech QC base component is mixed thoroughly using a slow speed agitator fitted with a suitable mixing paddle. The required quantity of catalyst is added, and stirring is continued until the mixture is lump-free, and in any event for at least two minutes. The amount of catalyst required will depend on the ambient temperature, and the manufacturer's technical data sheet/product label must be consulted for the required amount.

13.9 A layer of the mixed Caltech QC resin is applied with a lambswool roller to the clean, prepared and, if required, primed substrate at a minimum application rate of 2.0 kg·m⁻².

13.10 Caltech QC RF110 Reinforcement is rolled and embedded into the wet coating, avoiding creasing and trapped air. Adjacent lengths of the reinforcement must overlap by a minimum of 50 mm (100 mm if left over 12 hours), ensuring that there is sufficient coating to fully encapsulate it. Additional coating is applied if required.

13.11 A second coat of mixed Caltech QC resin is applied, wet on wet, by roller at a minimum application rate of 1.0 kg·m⁻².

13.12 At each stage the system should be checked to ensure that it has been applied to achieve the minimum consumption. If a localised area has been applied below the minimum consumption, the affected area must be removed and reinstated to specification.

13.13 If work is interrupted for periods in excess of 12 hours, the cured membrane must be reactivated by wiping with Caltech QC Cleaner. Overcoating must proceed within 60 minutes, otherwise the process must be repeated.

Repair

13.14 Areas of damaged system must be cut back to sound, well-adhering material and cleaned with Caltech QC Cleaner.

13.15 After the cleaner has evaporated, the system is installed as described in sections 13.8 to 13.13, ensuring that there is at least a 100 mm overlap over the existing sound material.

13.16 A check for adequate adhesion must be carried out once the system has cured.

Technical Investigations

14 Tests

Tests were conducted by independent laboratories on samples of Caltech QC to determine:

- water vapour permeability/water vapour diffusion resistance coefficient (μ)
- tensile strength and elongation
- watertightness
- tensile bond strength
- resistance to fatigue
- crack bridging capability
- resistance to dynamic indentation
- resistance to static indentation
- resistance to low temperatures
- resistance to high temperatures
- effect of heat ageing
- effect of exposure to surface water
- effect of exposure to UV-A radiation
- resistance to penetration by roots/rhizomes.

15 Investigations

15.1 Independent reports relating to roof fire exposure tests to BS 476-3 : 2004 and DD CEN/TS 1187: 2012 (test 4) were assessed.

15.2 Existing installations were visited to provide additional evidence of the system's in-service durability.

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

Bibliography

BS 476-3 : 2004 *Fire tests on building materials and structures — Classification and method of test for external fire exposure to roofs*

BS 6229 : 2003 *Flat roofs with continuously supported coverings — Code of practice*

BS 8000-4 : 1989 *Workmanship on building sites — Code of practice for waterproofing*

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 : 2002 UK National Annex to *Eurocode 1 — Actions on structures — General actions — Snow loads*

Conditions of Certification

16 Conditions

16.1 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.

16.2 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.

16.3 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.

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

16.5 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.

16.6 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.