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BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
16/5322
Product Sheet 1 Issue 4

AXTER COLD LIQUID WATERPROOFING AND SURFACING SYSTEMS

STARCOAT PMMA ROOF WATERPROOFING SYSTEM

This Agrément Certificate Product Sheet(1) relates to Starcoat PMMA Roof Waterproofing System, a polymethyl methacrylate liquid-applied roof waterproofing system for use on inverted roofs, exposed flat and pitched roofs with limited access, green roofs on flat, zero fall and pitched roofs, and roof garden specifications on flat and zero fall roofs.

(1) Hereinafter referred to as '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

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

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

On behalf of the British Board of Agrément

Date of Fourth issue: 30 January 2024

Originally certificated on 6 June 2016

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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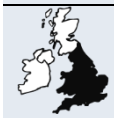
SUMMARY OF ASSESSMENT AND COMPLIANCE

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 Starcoat PMMA Roof Waterproofing System, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations:



The 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 2 of this Certificate.
Requirement:	**B4(2)**	**External fire spread**
Comment:		On a suitable substructure, the system may contribute to satisfying this Requirement. See section 2 of this Certificate.
Requirement:	**C2(b)**	**Resistance to moisture**
Comment:		The system will enable a roof to satisfy this Requirement. See section 3 of this Certificate.
Regulation:	**7(1)**	**Materials and workmanship**
Comment:		The system is acceptable. See sections 8 and 9 of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	**8(1)(2)**	**Fitness and durability of materials and workmanship**
Comment:		The use of the system satisfies the requirements of this Regulation. See sections 8 and 9 of this Certificate.
Regulation:	**9**	**Building standards – construction**
Standard:	2.6	Spread to neighbouring buildings
Standard:	2.7	Spread on external walls
Comment:		The system is restricted under clauses 2.6.4(1)(2) and 2.7.2(1)(2) of these Standards in some circumstances. See section 2 of this Certificate.
Standard:	2.8	Spread from neighbouring buildings
Comment:		When applied to a suitable substructure, the system may contribute to satisfying this Standard, with reference to clause 2.8.1(1)(2). See section 2 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 3 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The system can contribute to satisfying the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.

Regulation:	**12**	**Building standards – 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(1)(a)(i) (iii)(b)(i)**	**Fitness of materials and workmanship**
Comment:		The system is acceptable. See sections 8 and 9 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 3 of this Certificate.
Regulation:	**36(a)**	**External fire spread**
Comment:		The system is restricted by this Regulation in some circumstances. See section 2 of this Certificate.
Regulation:	**36(b)**	**External fire spread**
Comment:		On a suitable substructure, the use of the system may contribute to satisfying this Regulation. See section 2 of this Certificate.

Additional Information

NHBC Standards 2024

In the opinion of the BBA, Starcoat PMMA Roof Waterproofing System, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Chapter 7.1 *Flat roofs, terraces and balconies.*

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 Standard 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.

Fulfilment of Requirements

The BBA has judged Starcoat PMMA Roof Waterproofing System to be satisfactory for use as described in this Certificate. The system has been assessed as a waterproofing system on exposed flat and pitched roofs with limited access, in green roof applications on flat, zero fall and pitched roofs, and roof gardens specifications on flat and zero fall roofs.

ASSESSMENT

System description and intended use

The Certificate holder provided the following description for the system under assessment. Starcoat PMMA Roof Waterproofing System consists of:

- Starcoat PMMA — a polymethyl methacrylate-based waterproofing resin available in Pebble Grey (RAL 7032) and Traffic Grey (RAL 7043). Other RAL colours are available on request

- Starcoat PMMA Thix — a thixotropic version of the standard resin. For use in detailing at upstands, corners, connections and other details, available in Pebble Grey (RAL 7032) and Traffic Grey (RAL 7043). Other RAL colours are available on request
- Starcoat PMMA TT — a low-temperature installation version of the standard resin, with a modified cure system. For use to allow application between +25 and -15°C. Available in Pebble Grey (RAL 7032). Other RAL colours are available on request
- Starcoat PMMA Catalyst — a polymethyl methacrylate-based catalyst, used with all three resin versions as a two-component system
- Starcoat PMMA Fleece — a 110 $g \cdot m^{-2}$ polyester fleece for use as a reinforcement
- Starcoat PMMA A (Asphalt) Primer — a pigmented or non-pigmented primer based on a two-component fast-reactive polymethyl methacrylate resin, for the preparation of asphaltic and bituminous substrates
- Starcoat PMMA P (Porous) Primer — a pigmented or non-pigmented primer based on a two-component fast-reactive and fast-curing polymethyl methacrylate resin, for the preparation of absorbent substrates such as concrete, screeds and timber.

Ancillary Items

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:

- Starcoat PMMA M (Metal) Primer — one component, acrylate-based primers for metal substrates, available in grey
- Starcoat PMMA Self-Levelling Mortar — for use in levelling rough substrates of less than 10 mm depth, levelling of gradients, and as additional protection in trafficked areas such as roof terraces, communal walkways and balconies
- Starcoat PMMA Mortar — for use in levelling rough substrates of greater than 10 mm depth and levelling of gradients
- Starcoat PMMA Coloured Sealer — a pigmented surface sealant, based on polymethyl methacrylate, available in Stone grey (RAL 7030), Pebble Grey (RAL 7032), Traffic Grey (RAL 7043) and Beige (RAL 1001). Other RAL colours are available on request
- Starcoat PMMA Decorative Chips — an acrylate-based topping available in black, grey and white, for use on a surface sealant coat as decorative medium
- Starcoat PMMA Vehicular Coat — a surface finish based on polymethyl methacrylate, available in Stone Grey (RAL 7030), Pebble Grey (RAL 7032) and Traffic Grey (RAL 7043)
- Starcoat PMMA Filler — for use in filling small cracks and joints in the substrate
- Starcoat PMMA Cleaner — for use in cleaning the substrate prior to the installation of the system
- Starcoat PMMA R (Refurb) Primer — a combination primer for interface details and upstands with changing substrate materials
- Starcoat PMMA W (Wet) Primer — a primer for mineral substrates
- Starcoat PMMA FPO/TPO Primer — a one-component primer used as a bonding agent between FPO and TPO
- Starcoat PMMA Spray (A+B) Primer — a polymethyl methacrylate-based waterproofing resin for waterproofing main areas, developed specifically for spray application
- Starcoat PMMA Roller-Applied Surfacing — for use as a wearing layer for Starcoat PMMA Roof Waterproofing System
- Starcoat PMMA Clear Sealer — a colourless, clear sealer for surfaces with topping
- Starcoat PMMA Reinforced Filler — a fibre-filled waterproofing product for sealing minor penetrations, eg screws
- Starcoat PMMA Vapour Release Mesh – a prefabricated, compression-resistant mesh for use on cementitious substrates
- Starcoat PMMA De-Bonding Tape – for use in providing a bond breaker at expansion/construction joints.

Applications

The system is intended for use on inverted roofs, exposed flat and pitched roofs with limited access, on the following substrates:

- concrete
- bituminous
- timber
- metal
- plastic.

The system is also satisfactory for use in green roof applications on flat, zero fall and pitched roofs and roof gardens on flat and zero fall roofs on concrete substrates.

Definitions for products and applications inspected

The following terms are 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
- zero fall roof — a roof having a finished fall which can vary between 0 and 1:80(1)
- flat roof — a roof having a minimum finished fall of 1:80(1)
- pitched roof — a roof having a fall in excess of 1:6
- roof garden (intensive) — a roof with a substantial layer of growing medium with planting that can include shrubs and trees generally accessible to pedestrians
- green roof (extensive) — a roof with a shallow layer of growing medium planted with low-maintenance plants such as mosses, sedums, grasses and some wild flower species.

(1) *NHBC Standards* 2024 require a minimum fall of 1:60 for green roofs and roof gardens.

System 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 unless otherwise stated.

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 CEN/TS 1187 : 2012 Test 4 and classified to BS EN 13501-5 : 2016, the systems given in Table 1 of this Certificate achieved B_{ROOF}(t4) for slopes below 10°.

Table 1 External fire spread tests

	System 1	System 2	System 3
Substrate	12.5 mm cement board	12.5 mm cement board	≥ 18 mm OSB/3
Primer	1 mm Starcoat PMMA P (Porous) Primer	—	SBS adhesive primer(1)
VCL	—	0.6 mm self-adhesive bituminous membrane foil faced(1)	0.6 mm self-adhesive bituminous membrane foil faced(1)
Adhesive	—	—	PU insulation adhesive(1)
Insulation	—	130 mm PIR tissue faced insulation(1)	25 mm up to any thickness PIR tissue faced insulation (single or double layered)(1)
Primer	—	—	SBS adhesive primer(1)
Carrier membrane	—	0.6 mm self-adhesive bituminous membrane foil faced(1)	0.6 mm self-adhesive bituminous membrane foil faced(1)
Waterproofing	3 mm Starcoat PMMA	3 mm Starcoat PMMA	3 mm Starcoat PMMA

(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 boundary.

2.1.3 A roof incorporating the system will also be unrestricted under the national Building Regulations with respect to a boundary in the following circumstances:

- when protected by an inorganic covering (eg gravel or paving slabs) listed in the Annex of Commission Decision 2000/553/EC
- a roof garden covered with a drainage layer of gravel 100 mm thick and a soil layer 300 mm thick
- irrigated roof gardens and green roofs.

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

2.1.5 If allowed to dry, plants used in a roof garden may allow flame spread across the roof. This should 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.

2.2 Reaction to fire

2.2.1 The Certificate holder has declared a reaction to fire classification of Class E to BS EN 13501-1 : 2018 for the system.

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

2.2.3 In England, the system, when used in pitches greater than 70°, excluding upstands, should not be used less than 1 m from a relevant boundary, or 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 should also be included in calculations of unprotected area.

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

2.2.5 In Scotland, when used in pitches greater than 70°, excluding upstands, the system should not be used on buildings less than 1 m from a relevant boundary nor with a storey 11 m or more above the ground level or on some entertainment, assembly, hospital and residential care buildings. These constructions should also be included in calculations of unprotected area.

3 Hygiene, health and the environment

Data were assessed for the following characteristics.

3.1 Weathertightness

Data were assessed for the following characteristics.

3.1.1 Results of weathertightness tests are given in Table 2.

Table 2 Weathertightness tests

Product assessed	Assessment method	Requirement	Result
Starcoat PMMA reinforced with Starcoat PMMA Fleece	Watertightness to EOTA TR 003 : 1999	No evidence of water leakage	Pass
Starcoat PMMA reinforced with Starcoat PMMA Fleece primed with Starcoat PMMA P (Porous) Primer	Effects of day joints to EOTA TR 004 : 2004 concrete substrate	≥ 50 kPa	Pass
Starcoat PMMA reinforced with Starcoat PMMA Fleece primed with Starcoat PMMA P (Porous) Primer	Resistance to wind loads to EOTA TR 004 : 2004 concrete substrate steel substrate pine wood substrate plastic substrate	≥ 50 kPa	Pass
Starcoat PMMA reinforced with Starcoat PMMA Fleece primed with Starcoat PMMA A (Asphalt) Primer	Resistance to wind loads to EOTA TR 004 : 2004 bitumen substrate	≥ 50 kPa	Pass
Starcoat PMMA reinforced with Starcoat PMMA Fleece	Water vapour transmission to BS EN 1931 : 2000	Declared value $\mu \geq 4330$	Pass

3.1.2 On the basis of data assessed, Starcoat PMMA Roof Waterproofing System, including joints, when completely sealed and consolidated, will adequately resist the passage of moisture into the interior of a building and so satisfy the requirements of the national Building Regulations.

3.1.3 On the basis of data assessed, 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 Results of resistance to mechanical damage tests are given in Table 3.

Table 3 Resistance to mechanical damage tests

Product assessed	Assessment method	Requirement	Result
Starcoat PMMA reinforced with Starcoat PMMA Fleece	Resistance to static indentation to EOTA TR 007 : 2004 23°C, concrete substrate	Value achieved	L3
Starcoat PMMA reinforced with Starcoat PMMA Fleece primed with Starcoat PMMA P (Porous) Primer	Resistance to static indentation to EOTA TR 007 : 1999 23°C, steel substrate	Value achieved	L4
Starcoat PMMA reinforced with Starcoat PMMA Fleece primed with Starcoat PMMA M (Metal) Primer	Resistance to static indentation to EOTA TR 007 : 2004 23°C, steel substrate	Value achieved	L4
Starcoat PMMA reinforced with Starcoat PMMA Fleece	Resistance to static indentation to EOTA TR 007 : 2004 23°C, mineral wool substrate	Value achieved	L3
Starcoat PMMA reinforced with Starcoat PMMA Fleece	Resistance to dynamic indentation to EOTA TR 006 : 1999 23°C, concrete substrate	Value achieved	I3
Starcoat PMMA reinforced with Starcoat PMMA Fleece	Resistance to dynamic indentation to EOTA TR 006 : 1999 –20°C, concrete substrate	Value achieved	I4
Starcoat PMMA reinforced with Starcoat PMMA Fleece primed with Starcoat PMMA M (Metal) Primer	Resistance to dynamic indentation to EOTA TR 006 : 1999 –20°C, steel substrate	Value achieved	I4
Starcoat PMMA reinforced with Starcoat PMMA Fleece	Resistance to dynamic indentation to EOTA TR 006 : 1999 23°C, mineral wool substrate	Value achieved	I4
Starcoat PMMA reinforced with Starcoat PMMA Fleece	Tensile strength to BS EN ISO 527-1 : 2019 longitudinal direction	Value achieved	6.0 MPa
	Tensile strength to BS EN ISO 527-1 : 2019 transversal direction	Value achieved	6.7 MPa
Starcoat PMMA reinforced with Starcoat PMMA Fleece	Elongation at break to BS EN ISO 527-1 : 2019 longitudinal direction	Value achieved	40.1%
	Elongation at break to BS EN ISO 527-1 : 2019 transversal direction	Value achieved	32.6%

3.2.2 On the basis of data assessed, Starcoat PMMA Roof Waterproofing System can accept, without damage, the limited foot traffic and light concentrated loads associated with installation and maintenance and the effects of minor structural movement while remaining weathertight.

3.2.3 Where traffic in excess of the examples given in section 3.2.2 is envisaged, such as for maintenance of lift equipment, a walkway must be provided (for example, using concrete slabs supported on bearing pads or the Certificate holder's walkway sheets). Reasonable care must be taken to avoid puncture of the membranes by sharp objects or concentrated loads.

3.2.4 Once the green roof or roof garden is installed, it can be regarded as a suitable protection for the system in use.

3.3 Resistance to root penetration

3.3.1 Results of resistance to root penetration tests are given in Table 4.

Table 4 Resistance to root penetration tests

Product assessed	Assessment method	Requirement	Result
Starcoat PMMA reinforced with Starcoat PMMA Fleece	Resistance to root penetration to BS EN 13948 : 2007	No root penetration after 2 years	Pass

3.3.2 On the basis of data assessed, the system will resist penetration by plant roots and remain weathertight.

3.3.3 Starcoat PMMA Roof Waterproofing System can be used as a layer in the waterproofing system in green roof and roof garden specifications acting as the root protection layer.

4 Safety and accessibility in use

Not applicable.

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 this system were assessed.

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

Table 5 Durability tests

Product assessed	Assessment method	Requirement	Result
Starcoat PMMA reinforced with Starcoat PMMA Fleece	Resistance to static indentation to EOTA TR 007 : 2004 80°C, concrete substrate Surface water ageing 60 days at 60°C	Value achieved	L3
Starcoat PMMA reinforced with Starcoat PMMA Fleece primed with Starcoat PMMA P (Porous) Primer	Resistance to static indentation to EOTA TR 007 : 2004 23°C, steel substrate Surface water ageing 180 days at 60°C	Value achieved	L4
Starcoat PMMA reinforced with Starcoat PMMA Fleece primed with Starcoat PMMA M (Metal) Primer	Resistance to static indentation to EOTA TR 007 : 2004 80°C, steel substrate Surface water ageing 216 days at 60°C	Value achieved	L4
Starcoat PMMA reinforced with Starcoat PMMA Fleece	Resistance to dynamic indentation to EOTA TR 006 : 1999 –20°C, concrete substrate Heat ageing 200 days at 80°C	Value achieved	I4
Starcoat PMMA reinforced with Starcoat PMMA Fleece	Resistance to dynamic indentation to EOTA TR 006 : 1999 –10°C, concrete substrate UV ageing 1000 MJ·m^{-2} Xenon Arc at 50°C	Value achieved	I4
Starcoat PMMA reinforced with Starcoat PMMA Fleece	Resistance to dynamic indentation to EOTA TR 006 : 1999 –10°C, concrete substrate UV ageing 1000 MJ·m^{-2} Xenon Arc at 60°C	Value achieved	I4
Starcoat PMMA reinforced with Starcoat PMMA Fleece primed with Starcoat PMMA M (Metal) Primer	Resistance to dynamic indentation to EOTA TR 006 : 1999 –10°C, steel substrate UV ageing 1200 MJ·m^{-2} Xenon Arc at 50°C	Value achieved	I4
Starcoat PMMA reinforced with Starcoat PMMA Fleece primed with Starcoat PMMA P (Porous) Primer	Resistance to fatigue movement to EOTA TR 008 : 2004 –10°C, 1000 cycles, concrete substrate	No leakage after 24-hour exposure to 100 mm head of water.	Pass
	Resistance to fatigue movement to EOTA TR 008 : 2004 –10°C, 50 cycles, concrete substrate Heat ageing 200 days at 80°C	No debonding, or if any not exceeding 75 mm in total or 50 mm on one side of the gap	Pass

Table 5 Durability tests (continued)

Starcoat PMMA reinforced with Starcoat PMMA Fleece	Tensile strength to BS EN ISO 527-1 : 2019 Heat ageing 200 days at 80°C	Value achieved	5.9 MPa
	Tensile strength to BS EN ISO 527-1 : 2019 longitudinal direction UV ageing 1000 MJ·m^{-2} Xenon Arc at 50°C	Value achieved	5.2 MPa
	Tensile strength to BS EN ISO 527-1 : 2019 transversal direction UV ageing 1000 MJ·m^{-2} Xenon Arc at 50°C	Value achieved	6.4 MPa
	Tensile strength to BS EN ISO 527-1 : 2019 longitudinal direction UV ageing 1000 MJ·m^{-2} Xenon Arc at 60°C	Value achieved	5.6 MPa
	Tensile strength to BS EN ISO 527-1 : 2019 transversal direction UV ageing 1000 MJ·m^{-2} Xenon Arc at 60°C	Value achieved	6.7 MPa
	Tensile strength to BS EN ISO 527-4 : 2021 UV ageing 1200 MJ·m^{-2} Xenon Arc at 50°C	Value achieved	5.6 MPa
Starcoat PMMA reinforced with Starcoat PMMA Fleece	Elongation at break to BS EN ISO 527-1 : 2019 Heat ageing 200 days at 80°C	Value achieved	28.7%
	Elongation at break to BS EN ISO 527-1 : 2019 longitudinal direction UV ageing 1000 MJ·m^{-2} Xenon Arc at 50°C	Value achieved	40.1%
	Elongation at break to BS EN ISO 527-1 : 2019 transversal direction UV ageing 1000 MJ·m^{-2} Xenon Arc at 50°C	Value achieved	32.8%
	Elongation at break to BS EN ISO 527-1 : 2019 longitudinal direction UV ageing 1000 MJ·m^{-2} Xenon Arc at 60°C	Value achieved	43.6%
	Elongation at break to BS EN ISO 527-1 : 2019 transversal direction UV ageing 1000 MJ·m^{-2} Xenon Arc at 60°C	Value achieved	34.4%
	Elongation at break to BS EN ISO 527-4 : 2021 UV ageing 1200 MJ·m^{-2} Xenon Arc at 50°C	Value achieved	55.8%

Table 5 Durability tests (continued)

Starcoat PMMA reinforced with Starcoat PMMA Fleece primed with Starcoat PMMA P (Porous) Primer	Resistance to delamination to EOTA TR 004 : 2004 concrete substrate Surface water ageing 60 days at 60°C	≥ 50 kPa	Pass
	Resistance to delamination to EOTA TR 004 : 2004 concrete substrate Surface water ageing 180 days at 60°C	≥ 50 kPa	Pass

8.3 Service life

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

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 meet the performance assessed in this Certificate:

9.1.1.1 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* 2024, Chapter 7.1.

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

9.1.1.3 Structural decks to which the system is to be applied must be suitable to transmit the dead and imposed loads experienced in service. Allowance must be made for loading deflections to ensure that the free drainage of water is maintained.

9.1.1.4 Imposed loads, dead loading and wind loads must be calculated by a suitably experienced and competent individual in accordance with the principles of BS EN 1991-1-1 : 2002, BS EN 1991-1-3 : 2003 and BS EN 1991-1-4 : 2005, and their UK National Annexes.

9.1.1.5 The drainage systems for zero fall roofs, green roofs or roof gardens must be correctly designed, and the following points must 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 in accordance with the relevant clauses of BS 6229 : 2018
- dead loads for green roofs and roof gardens can increase if the drains become partially or completely blocked causing waterlogging of the drainage layer.

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

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

9.1.1.7 The soil used in intensive planting must not be of a type that will be removed, or become localised, owing to wind scour on the site.

9.1.1.8 It must be recognised that the type of plants used could significantly affect the wind loads experienced in service.

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 must be carried out in accordance with this Certificate, the Certificate holder's instructions and the relevant clauses of BS 6229 : 2018, BS 8000-0 : 2014, BS 8000-4 : 1989 and Liquid Roofing and Waterproofing Association (LRWA) Note 7 – *Specifier Guidance for Flat Roof Falls*. A summary of instructions and guidance are provided in Annex A.

9.2.3 Substrates to which the system is to be applied must be sound, clean, dry, free from laitance and adhesion-reducing particles, and free from ice and frost.

9.2.4 The substrate must also be free from sharp projections such as nail heads and concrete nibs. Power-floated concrete, cement slurry, dirt and grease must be shot blasted or mechanically abraded to help ensure the primer can penetrate into the surface. The Certificate holder's advice must be sought as to the suitability of the substrate to receive the system and for suitable cleaning procedures, including the use of a proprietary surface cleaner/HSE approved fungicidal wash where required.

9.2.5 Rough substrates must be made good using the appropriate levelling compound in accordance with the Certificate holder's instructions.

9.2.6 Defects such as large cracks must be repaired prior to application of the system in accordance with the Certificate holder's instructions.

9.2.7 Installation must not be carried out during inclement weather (eg rain, fog or snow) or when the substrate or air or material temperature is outside of the range specified in Table 6. The substrate temperature must be at least 3°C above the dew-point during application and curing. The relativity humidity must be ≤ 90%.

Table 6 Usage temperature ranges

Product	Temperature range (°C)		
	Air ambient	Substrate	Material
Starcoat PMMA A (Asphalt) Primer	+3 to +35	+3 to +50	+3 to +30
Starcoat PMMA P (Porous) Primer	+3 to +35	+3 to +50	+3 to +30
Starcoat PMMA M (Metal) Primer	+3 to +35	+3 to +50	+3 to +30
Starcoat PMMA	-5 to +35	+3 to +50	+3 to +30
Starcoat PMMA Thix	-5 to +35	+3 to +50	+3 to +30
Starcoat PMMA TT	-15 to +25	-10 to +30	+3 to +20
Starcoat PMMA Self-Levelling Mortar	-5 to +25	-5 to +30	+3 to +20
Starcoat PMMA Coloured Sealer	-5 to +35	+3 to +40	+3 to +30

9.2.8 Previously coated areas must be checked for integrity and adequate adhesion to the substrate. Adhesion checks must be carried out to ensure that the system is compatible with the existing surface. The Certificate holder must be consulted for details of suitable test methods and requirements before use. If the substrate requires preparing after bond testing, the appropriate methods (such as high pressure washing, captive shot blasting or other mechanical abrasive methods) can be used. Advice must be sought from the Certificate holder.

9.2.9 Starcoat PMMA Catalyst must be mixed with the resin for 2 minutes in accordance with the Certificate holder's instructions using a mixing tool with twin-paddle stirrer at slow-speed setting, in the weight ratio specified in Table 7.

Table 7 Substrate temperature to percentage catalyst

Resin	Substrate temperature to percentage catalyst				
	–10 to +2°C	+3 to +14°C	+15 to +34°C	+35 to +39°C	+40 to +50°C
Starcoat PMMA / Starcoat PMMA Thix	—	4%	2%	2%	1%
Starcoat PMMA TT	6%	4%	2%	—	—

9.2.10 The primer coat must be allowed to dry prior to overcoating with Starcoat PMMA/-Thix/-TT waterproofing membrane, ensuring that any minimum/maximum drying times are observed in accordance with the Certificate holder's instructions.

9.2.11 Starcoat PMMA/-Thix/-TT resin must be applied at a minimum application rate of 1.5 $kg \cdot m^{-2}$ for the waterproofing of details, such as penetrations and expansion joints.

9.2.12 Starcoat PMMA Fleece must be immediately applied into the wet resin, ensuring that any trapped air pockets are removed.

9.2.13 A second layer of Starcoat PMMA/-Thix/-TT resin must be applied (wet in wet) at a minimum application rate of 1 $kg \cdot m^{-2}$, ensuring that the fleece is saturated. Typical application rates for various situations are:

- smooth substrates 2.5 $kg \cdot m^{-2}$
- fine-grained substrates 3 $kg \cdot m^{-2}$
- rough substrates 3.5 $kg \cdot m^{-2}$
- below Starcoat PMMA Coloured Sealer/Starcoat PMMA Self-Levelling Mortar 2.5 $kg \cdot m^{-2}$.

9.2.14 Fleece overlaps must be at least 5 cm wide.

9.2.15 Expansion or construction joints must be additionally reinforced prior to the application of the main waterproofing layer, in accordance with the Certificate holder's instructions.

9.2.16 If work is interrupted or when it is completed, the tools must be cleaned thoroughly with Starcoat PMMA Cleaner within the pot life of the material (approximately 10 minutes), using a brush.

9.2.17 Following installation, the treated surface must be tested using a non-destructive test, eg holiday test, where required. Damaged areas must be repaired in accordance with section 9.4.

9.2.18 The NHBC requires that Starcoat PMMA Roof Waterproofing System, once installed, be inspected in accordance with *NHBC Standards* 2024, Chapter 7.1, Clause 7.1.11, including the use of 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

9.3.1 Practicability of installation was assessed on the basis of the Certificate holder's information and the relevant clauses of BS 6229 : 2018, BS 8000-0 : 2014 and BS 8000-4 : 1989. To achieve the performance described in this Certificate, the system must only be installed by installers 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.

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

9.4.2 The system must be the subject of six-monthly inspections and maintenance in accordance with the recommendations in BS 6229 : 2018, Chapter 7, and the manufacturer's own maintenance requirements, where relevant, to ensure continued satisfactory performance.

9.4.3 Green roofs and roof gardens 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 9.1).

9.4.4 Minor damage can be repaired by cleaning back to the unweathered material and recoating the damaged area with the membrane at the appropriate application rate as described in the Certificate holder's instructions.

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 system 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 components of the system are delivered to site in packs consisting of liquid resin and power catalyst component. The packs bear the product name, batch number and health and safety information. The components are available in the pack sizes specified in Table 8.

Table 8 Packaging of the system components

Component	Packaging type	Packaging size
Starcoat PMMA	Tub + catalyst bag	10 and 25 kg
Starcoat PMMA Thix	Tub + catalyst bag	10 and 25 kg
Starcoat PMMA TT	Tub + catalyst bag	10 and 25 kg
Starcoat PMMA Fleece	Roll	50 m x 1.05 m, 50 m x 0.7 m 50 m x 0.52 m, 50 m x 0.35 m 50 m x 0.26 m, 50 m x 0.20 m 50 m x 0.15 m, 50 m x 0.10 m
Starcoat PMMA A (Asphalt) Primer	Tub	5 and 10 kg
Starcoat PMMA P (Porous) Primer	Tub	5 and 10 kg

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

11.2.1 Resins must be stored in a ventilated, dry location, away from heat and oxidising agents and out of direct sunlight, and at a temperature between 0 and 25°C.

ANNEX A – SUPPLEMENTARY INFORMATION †

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 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

General

A.1 Where necessary, substrate priming should be carried out using a sheepskin roller in accordance with the Certificate holder's instructions.

A.2 To assess the suitability of a substrate to receive the system, bond tests should be carried out generally in accordance with BS EN 1542 : 1999, in consultation with the Certificate holder. If bonding problems occur, advice should be sought from the Certificate holder.

A.3 Detailing should be carried out in accordance with the Certificate holder's instructions.

A.4 All equipment should be cleaned after use with Starcoat PMMA Cleaner.

A.5 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*.

A.6 Additional guidance for inverted roof specifications is given in BBA Information Bulletin No 4 *Inverted roofs – Drainage and U value corrections.*

Procedure

A.7 The primer is applied to the prepared substrate using a sheepskin roller, smoothing trowel or finish roller.

A.8 Once the coating has cured, a second coat of primer should be applied to cover any defects, ensuring that a continuous pore free primer film is achieved.

A.9 Starcoat PMMA/-Thix/-TT resin is applied using a sheepskin roller or brush.

A.10 Starcoat PMMA Fleece is immediately applied into the wet resin and embedded using a sheepskin roller.

A.11 A second layer of Starcoat PMMA/-Thix/-TT resin is applied (wet in wet), ensuring that the fleece is saturated.

A.12 If existing expansion joints have to be waterproofed, a joint tape and two layers of waterproofing with fleece reinforcement are applied along the centre of the joint.

A.13 The main area is waterproofed in the same way as the details, and these are integrated with a minimum fleece overlap of 5 cm.

Maintenance

A.14 Additional guidance on maintenance for green roofs and roof gardens is available within the latest edition of *The GRO Green Roof Code – Green Roof Code of Best Practice for the UK*.

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 1542 : 1999 *Products and systems for the protection and repair of concrete structures — Test methods — Measurement of bond strength by pull-off*

BS EN 1931 : 2000 *Flexible sheets for waterproofing — Bitumen, plastic and rubber sheets for roof waterproofing — Determination of water vapour transmission properties*

BS EN 1991-1-1 : 2002 *Eurocode 1 — Actions on structures — General actions — Densities, self-weight, imposed loads for buildings*
NA to BS EN 1991-1-1 : 2002 UK National Annex to *Eurocode 1 — Actions on structures — General actions — Densities, self-weight, imposed loads for buildings*
BS EN 1991-1-3 : 2003 + A1 : 2015 *Eurocode 1 — Actions on structures — General actions — Snow loads*
NA + A2 : 18 to BS EN 1991-1-3 : 2003 + A1 : 2015 UK National Annex to *Eurocode 1 — Actions on structures — General actions — Snow loads*
BS EN 1991-1-4 : 2005 + A1 : 2010 *Eurocode 1 — Actions on structures — General actions — Wind actions*
NA to BS EN 1991-1-4 : 2005 + A1 : 2010 *UK National Annex to Eurocode 1 — Actions on structures — General actions — Wind actions*

BS EN 13501-1: 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 roof tests*

BS EN 13948 : 2007 *Flexible sheets for waterproofing — Bitumen, plastic and rubber sheets for roof waterproofing — Determination of resistance to root penetration*

BS EN ISO 527-1 : 2019 *Plastics — Determination of tensile properties — General principles*
BS EN ISO 527-4 : 2021 *Plastics — Determination of tensile properties — Test conditions for isotropic and orthotropic fibre-reinforced plastic composites*

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

EOTA TR 003 : 1999 *Determination of the watertightness*

EOTA TR 004 : 2004 *Determination of the resistance to delamination*

EOTA TR 006 : 1999 *Determination of the resistance to dynamic indentation*

EOTA TR 007 : 2004 *Determination of the resistance to static indentation*

EOTA TR 008 : 2004 *Determination of the resistance to fatigue movement*

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
- 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.

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.