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Agrément Certificate
90/2431
Product Sheet 3

HYDROTECH MONOLITHIC MEMBRANES

BLUROOF MONOLITHIC MEMBRANE 6125

This Agrément Certificate Product Sheet[1] relates to the BluRoof Monolithic Membrane 6125, an inverted roof system for use in blue roof specifications on zero falls in combination with a storm water attenuation system[2].

(1) Hereinafter referred to as 'Certificate'.
(2) The attenuation system is outside the scope of this 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).
Thermal performance — the system can be used to improve the thermal performance of a roof (see section 7).
Condensation risk — roofs incorporating the system will adequately limit the risk of interstitial and surface condensation (see section 8).
Properties in relation to fire — use of the system can enable a roof to be unrestricted under the national Building Regulations (see section 9).
Resistance to wind uplift — the system will resist the effects of any likely wind suction acting on the roof (see section 10).
Resistance to mechanical damage — the system will accept the limited foot traffic and loads associated with installation and maintenance, and the effects of thermal or other minor movement likely to occur in service (see section 11).
Resistance to penetration of roots — the system will resist the penetration of roots (see section 12).
Durability — under normal service conditions and when fully protected, the system will provide a durable roof waterproofing for the service life of the roof in which it is incorporated (see section 14).

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

On behalf of the British Board of Agrément

Date of First issue: 24 October 2018

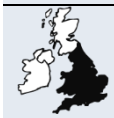
John Albon – Head of Approvals
Construction Products

Claire Curtis-Thomas
Chief Executive

Certificate amended on 29 March 2019 to include additional substrate and update section 7.1.
Certificate amended on 11 October 2019 to update company and component names, and sections 4 and 7.

Regulations

In the opinion of the BBA, BluRoof Monolithic Membrane 6125, 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:		The system, when used with a suitable surface protection, can enable a roof to be unrestricted under this Requirement. See sections 9.1 to 9.3 of this Certificate.
Requirement:	**C2(b)**	**Resistance to moisture**
Comment:		The system will enable a structure to satisfy this Requirement. See section 6.1 of this Certificate.
Requirement:	**C2(c)**	**Resistance to moisture**
Comment:		The system will contribute to a structure satisfying this Requirement. See section 8.4 of this Certificate.
Requirement:	**L1(a)(i)**	**Conservation of fuel and power**
Comment:		The system can contribute to satisfying this Requirement. See sections 7.1 and 7.3 of this Certificate.
Regulation:	**7**	**Materials and workmanship**
Comment:		The system is acceptable. See section 14.1 to 14.4 and the *Installation* part of this Certificate.
Regulation:	**26**	**CO_2 emission rates for new buildings**
Regulation:	**26A**	**Fabric energy efficiency rates for new dwellings (applicable to England only)**
Regulation:	**26A**	**Primary energy consumption rates for new buildings (applicable to Wales only)**
Regulation:	**26B**	**Fabric performance values for new dwellings (applicable to Wales only)**
Comment:		The system can contribute to satisfying these Regulations. See sections 7.1 and 7.3 of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	**8(1)(2)**	**Durability, workmanship and fitness of materials**
Comment:		The use of the system satisfies the requirements of this Regulation. See sections 13.1 and 14.1 to 14.4 and the *Installation* part of this Certificate.
Regulation:	**9**	**Building standards applicable to construction**
Standard:	2.8	Spread from neighbouring buildings
Comment:		The system, when used with suitable protection, can be regarded as having low vulnerability and can enable a roof to be unrestricted, with reference to clause 2.8.1$^{(1)(2)}$ of this Standard. See sections 9.1 to 9.3 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The system will enable a roof to satisfy the requirements of this Standard, with reference to clauses 3.10.1$^{(1)(2)}$ and 3.10.7$^{(1)(2)}$. See section 6.1 of this Certificate.
Standard:	3.15	Condensation
Comment:		The system can contribute to satisfying this Standard, with reference to clauses 3.15.1$^{(1)(2)}$, 3.15.3$^{(1)(2)}$, 3.15.4$^{(1)(2)}$, 3.15.5$^{(1)(2)}$ and 3.15.6$^{(1)(2)}$. See sections 8.4 to 8.6 of this Certificate.

Standard:	6.1	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		The system can contribute to satisfying these Standards, with reference to clauses, or parts of, 6.1.1[(1)], 6.1.2[(1)(2)], 6.1.4[(1)(2)], 6.1.5[(1)], 6.1.6[(1)(2)], 6.1.7[(2)], 6.1.8[(2)] to 6.1.10[(2)], 6.2.1[(1)(2)], 6.2.2[(1)], 6.2.3[(1)(2)], 6.2.4[(1)(2)], 6.2.5[(2)], 6.2.6[(1)(2)] to 6.2.11[(1)(2)], 6.2.12[(2)] and 6.2.13[(1)(2)]. See sections 7.1 and 7.3 of this Certificate.
Standard:	7.1(a)(b)	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. In addition, the system can contribute to a construction meeting a higher level of sustainability as defined in this Standard, with reference to clauses 7.1.4[(1)(2)] [Aspects 1[(1)(2)] and 2[(1)]], 7.1.6[(1)(2)] [Aspects 1[(1)(2)] and 2[(1)]] and 7.1.7[(1)(2)] [Aspect 1[(1)(2)]]. See section 6.1 of this Certificate.
Regulation:	**12**	**Building standards applicable to conversions**
Comment:		Comments in relation to the system under Regulation 9, Standards 1 to 6 also apply to this Regulation, with reference to clause 0.12.1[(1)(2)] and Schedule 6[(1)(2)].

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

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

Regulation:	**23(a)**	**Fitness of materials and workmanship**
Comment:	**(b)(i)**	The system is acceptable. See section 14.1 to 14.4 and the *Installation* part of this Certificate.
Regulation:	**28(b)**	**Resistance to moisture and weather**
Comment:		The system will enable a roof to satisfy the requirements of this Regulation. See section 6.1 of this Certificate.
Regulation:	**29**	**Condensation**
Comment:		The system can contribute to satisfying this Regulation. See sections 8.4 and 8.5 of this Certificate.
Regulation:	**36(b)**	**External fire spread**
Comment:		The system, when used with a suitable surface protection, can enable a roof to be unrestricted under this Requirement. See sections 9.1 to 9.3 of this Certificate.
Regulation:	**39(a)(i)**	**Conservation measures**
Regulation:	**40(2)**	**Target carbon dioxide emissions rate**
Comment:		The system can contribute to satisfying this Regulation. See sections 7.1 and 7.3 of this Certificate.

Construction (Design and Management) Regulations 2015
Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See section: 3 *Delivery and site handling* (3.1, 3.6 and 3.9) of this Certificate.

Additional Information

NHBC Standards 2018

In the opinion of the BBA, BluRoof Monolithic Membrane 6125, 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 and balconies*.

Technical Specification

1 Description

1.1 BluRoof Monolithic Membrane 6125 is a hot-applied, polymer-modified, rubberised bitumen-based membrane, including 30% recycled material content. The membrane is applied in two layers to provide a coating with a nominal thickness of 6 mm and is used in conjunction with a range of reinforcement membranes and protection sheets.

1.2 The other components of the system are:

- Flex Flash F — a spunbond polyester fabric reinforcement sheet
- Flex Flash UN — an uncured neoprene rubber reinforcement sheet
- Hydrogard 10 — a lightweight oxidised-bitumen glassfibre-reinforced protection sheet
- Hydrogard 20 — a polyester-reinforced modified-bitumen protection sheet
- Hydrogard 20 AR — a root-resistant polyester-reinforced modified-bitumen protection sheet, incorporating root repellent
- Hydrogard 30 — a heavy-duty dual-reinforced modified-bitumen protection sheet
- Hydrogard 40-AR — a root-resistant polyester-reinforced modified-bitumen protection sheet, incorporating root repellent
- Hydrogard 50 — a dual glass/polyester-reinforced, APP-modified bitumen heavy-duty protection sheet
- Alumasc Bitumen Primer — a cold, spray-applied bituminous primer for use on horizontal, vertical and sloping surfaces. The coating can also be applied by brush or roller at a rate of 8 to 16 m^2 per litre
- SB Primer — alternative fast curing primer
- Alumasc Extruded Polystyrene — an extruded polystyrene (XPS) foam board, available in two standard sizes and rebated for lap jointing for use in inverted roof specifications
- Alumasc LO-k WFRL — a water flow-reducing layer for use above thermal insulation in inverted roof specifications.

1.3 The Alumasc Extruded Polystyrene has the nominal characteristics shown in Table 1.

Table 1 Nominal characteristics of Alumasc Extruded Polystyrene

Nominal characteristic (unit)	Value
Minimum compressive strength at 10% compression* (kPa)	300
Minimum density (kg·m^{-3})	34
Work size – length x width (mm)	1250 x 600
Overall size – length x width (mm)	1265 x 615
Available thicknesses (mm)	80, 100, 120, 140, 160, 180
Work size – length x width (mm)	2500 x 600
Overall size – length x width (mm)	2515 x 615
Available thickness (mm)	200, 205
Edge detail	Rebated (15 mm x half board thickness)
Colour	Grey

1.4 Alumasc LO-k WFRL has the nominal properties shown in Table 2.

Table 2 Nominal characteristics of the Alumasc LO-k WFRL

Nominal characteristic (unit)	Value
Material type (vapour permeable membrane)	Non-woven spunbonded polyethylene
Roll sizes (m)	100 x 3
	50 x 1.5
Water vapour resistance ($MN \cdot s \cdot g^{-1}$)	0.17
Head of water test (1.0 m)	No penetration
Mass per unit area ($g \cdot m^{-2}$)	60
Lap joints (mm) — unsealed	300

1.5 Ancillary items used in conjunction with the product, but outside the scope of this Certificate, are:

- Monoscreed — for use in repairing concrete decks, screeding and levelling of deflections and backfalls
- Harmer AV(1) — high capacity aluminium roof drainage outlets
- FC6 Drainage layer — a geo-composite unit, comprising a non-woven geotextile filtration layer that is bonded to a High-Density Polyethylene (HDPE) studded membrane core
- Derbigum/HiTen Universal/PIR or mineral wool insulation insulation overlay for hybrid systems
- Alumasc Extruded Polystyrene Upstand Board — self-faced insulation board for use at upstands
- Bluroof patented flow restrictor using Harmer AV400 outlet
- VF void former
- Overflow outlets
- ProEXP — expansion joint for structural decks
- Skyline — polyester powder coated aluminium coping, soffit and fascia systems
- Modulock — a fully engineered raised adjustable pedestal system for paving and decking
- Blackdown Green Roofs — extensive, biodiverse and intensive green roof systems.

(1) Harmer AV is a registered trademark of The Alumasc Group PLC.

2 Manufacture

2.1 The membrane is manufactured by heating and blending bitumen, process oils, fillers (including inert clay) and other additives in a temperature-controlled cycle. After blending, the mix is held in a temperature-controlled tank until it is packaged. The reinforcement sheets are purchased to a specification.

2.2 The insulation is manufactured by a continuous extrusion process allowing a skin to form on the surfaces. Boards are then cut to size and rebates formed.

2.3 The water flow-reducing layer is manufactured by spinning strands of HDPE and bonding them together with heat and pressure to form a flexible sheet.

2.4 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.

2.5 The membrane is manufactured in Canada by the Hydrotech Membrane Corporation and marketed in the UK by the Certificate holder.

3 Delivery and site handling

3.1 The membrane is supplied in the form of solid 18 kg blocks, wrapped in polythene film and in cardboard boxes bearing the product description, the BBA logo and the production batch number. The membrane must be stored under cover, away from heat sources.

3.2 Reinforcement and protection sheets are packaged in rolls with labels bearing the product trade name. They should be stored under cover and kept dry.

3.3 The insulation boards are shrink wrapped in polythene and delivered to site on pallets or bearers. Each pack shows the manufacturer's name, grade, type marking and the BBA logo incorporating the number of this Certificate.

3.4 The boards must be protected from prolonged exposure to sunlight and should be stored under cover or protected with light-coloured opaque polythene sheets.

3.5 Care must be taken to avoid contact of the boards with solvents and materials containing organic components.

3.6 The boards must be stored flat, off the ground on a clean, level surface and under cover to protect them from high winds. They must not be exposed to open flame or other ignition sources.

3.7 The water flow-reducing layer is delivered to site in rolls wrapped in polythene bearing the Certificate holder's name, the product name and the BBA logo incorporating the number of this Certificate.

3.8 The water flow-reducing layer should be stored on its side, on a smooth, clean surface, under cover and protected from sunlight.

3.9 The Certificate holder has taken the responsibility of classifying and labelling the products 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 BluRoof Monolithic Membrane 6125.

Design Considerations

4 Use

4.1 BluRoof Monolithic Membrane 6125 is satisfactory for use as a waterproofing layer in blue roofs on zero falls, in combination with a storm water attenuation system(1), with the following specifications:

- inverted roofs ballasted with paving slabs on supports with limited or pedestrian access
- inverted green roofs with limited access
- roof gardens.

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

4.2 Full details of the storm water attenuation system are given in the Certificate holder's publication *Bluroof Stormwater Management Systems*, and detailed specifications are available from the Certificate holder. The BBA has not assessed the storm water attenuation system and all aspects of the performance of this system are outside the scope of this Certificate.

4.3 The system is suitable for use on in-situ concrete, precast concrete, concrete block and timber substrates. The substrates must comply with the relevant requirements of BS 6229 : 2018 and, where appropriate, *NHBC Standards* 2018, Chapter 7.1.

4.4 Blue roofs are defined for the purpose of this Certificate as zero fall roofs designed to allow controlled attenuation of rainfall during heavy storm events, as part of Sustainable Urban Drainage Systems (SuDS).

4.5 Limited access roofs are defined for the purposes of this Certificate as those subjected only to pedestrian traffic for such duties as maintenance of the roof covering and cleaning of gutters. Where traffic in excess of this is envisaged, special precautions such as additional protection to the membrane must be taken. Pedestrian access roofs are defined for the purposes of this Certificate as those not subjected to vehicular traffic.

4.6 For the purposes of this Certificate, zero fall roofs are defined as those having a finished fall which can vary between 0 and 0.7°. Reference should also be made to the appropriate clauses in *Liquid Roofing and Waterproofing Association* (LRWA) Note 7 – *Specifier Guidance for Flat Roofs Falls*.

4.7 For the purposes of this Certificate, a green roof is defined as a shallow layer of growing medium, planted with low-maintenance plants such as mosses, sedums, grasses (extensive) and some wild flower species (biodiverse) placed over the insulation and waterproofing components of the roof. For the purpose of this Certificate, a roof garden is defined as a deeper layer of growing medium planted with lawns, bushes, shrubs and small trees (intensive), placed over the insulation and waterproofing components of the roof.

4.8 Structural decks to which the system is to be applied must be suitable to transmit the dead and imposed loads experienced in service. Dead loads, wind loading and imposed loads are calculated in accordance with BS EN 1991-1-1 : 2002, BS EN 1991-1-3 : 2003 and BS EN 1991-1-4 : 2005, and their UK National Annexes.

4.9 The attenuation system and drainage should be designed by a suitably competent and experienced individual to allow the short term storage and discharge at a set flow rate of storm water to alleviate the risk of localised flooding.

4.10 In the event of contamination of the product by chemicals, oils or grease, the advice of the Certificate holder must be sought.

4.11 Recommendations for the design of green roof 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*.

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

4.13 Alumasc Extruded Polystyrene must always be overlaid with the Alumasc LO-k WFRL, which acts as a filter layer preventing fines and other debris from passing through and also as a water-control layer minimising cold rainwater flowing between the insulation and the roof waterproofing with consequent heat loss. This membrane may be covered with either a gravel ballast or paving finish.

5 Practicability of installation

The system should only be installed by contractors who have been trained and approved by the Certificate holder, from whom details can be obtained.

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 product is impervious to water and will act as a waterproof layer capable of accepting minor structural movement without damage.

7 Thermal performance

7.1 Calculations of the thermal transmittance (U value) of a specific roof construction should be carried out in accordance with BS EN ISO 6946 : 2017 and BRE Report BR 443 : 2006, using the design thermal conductivity (λU) (including moisture correction factor), and the fx drainage factor for the system as given below. See also BBA Information Bulletin No 4:

- 0.031 $W \cdot m^{-1} \cdot K^{-1}$ — design thermal conductivity (λU) (which is the declared lambda λD with addition of moisture correction) for 50 mm thickness of insulation
- 0.032 $W \cdot m^{-1} \cdot K^{-1}$ — design thermal conductivity (λU) (which is the declared lambda λD with addition of moisture correction) for 80 mm thickness of insulation

- 0.033 $W \cdot m^{-1} \cdot K^{-1}$ — design thermal conductivity (λU) (which is the declared lambda λD with addition of moisture correction) for 100 mm to 205 mm thickness of insulation
- fx = 0.03 — drainage factor (incorporating the water flow-reducing layer).

The value of a completed roof will depend on the insulation thickness, and type of substrate and internal finish. When considering insulation requirements, designers should refer to the detailed guidance contained in the documents supporting the national Building Regulations. The U values shown in Table 3 indicate that the system can contribute to a roof achieving typical U values referred to in those supporting documents.

Table 3 Example U(1) values for flat roof and zero pitch applications (incorporating the water flow-reducing layer)

Required U Value	**Insulation thickness required(2) (mm)**	
($W \cdot m^{-2} \cdot K^{-1}$)	**$p^{(3)} \leq 3$**	**$p^{(3)} = 8$**
0.13	—	—
0.15	-160 + 160 + 160	—
0.16	205 + 205	—
0.18	180 + 160	—
0.20	140 + 140	—
0.25	100 + 100	—

(1) 50 mm gravel, water flow-reducing layer, insulation, water proofing layer & 200 mm dense concrete deck.
(2) Thickest insulation board as bottom layer, when layering is used.
(3) Values for *p* taken as examples of best to worst case for all UK locations.

7.2 Rainfall reaching the roof waterproofing membrane will temporarily affect the rate of heat loss from the roof and should be accounted for by adding a correction (ΔUr) to the calculated roof U value in accordance with Annex D.4 of BS EN ISO 6946 : 2017, as follows:

$\Delta U\text{r} = pfx\,(R1/R\text{T})^2$

where:

ΔUr = correction to the calculated thermal transmittance of the roof element ($W \cdot m^{-2} \cdot K^{-1}$)
$p^{(1)}$ = average rate of precipitation during the heating season ($mm \cdot day^{-1}$)
f = drainage factor giving the fraction of *p* reaching the waterproof membrane
x = factor for increased heat loss caused by rainwater flowing on the membrane ($W \cdot day \cdot m^{-2} \cdot K^{-1} \cdot mm^{-1}$)
*R*1 = thermal resistance of the layer of the insulation above the waterproofing membrane ($m^2 \cdot K \cdot W^{-1}$)
*R*T = total thermal resistance of the construction before application of the correction ($m^2 \cdot K \cdot W^{-1}$)
fx = 0.03 for the system incorporating the Alumasc LO-k WFRL

(1) Values for average rainfall during the heating season for different UK locations can be found at www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages

Junctions

7.3 Care must be taken in the overall design and construction of junctions with other elements and openings to minimise thermal bridges and air infiltration. Detailed guidance can be found in the documents supporting the national Building Regulations.

8 Condensation risk

8.1 Warm water trapped under the boards is likely to be replaced by colder water during rainfall. Therefore, during heavy or continuous rainfall the roof waterproofing and the deck will be cooled. If condensation does occur it will be short-term, disappearing when the rain stops.

8.2 Risk of interstitial condensation will be minimal with concrete decks but metal and timber decks will be subjected to short periods of moisture; therefore timber must be treated with a suitable preservative in accordance with BS 8417 : 2011.

8.3 For systems using paving, a condensation risk analysis may be necessary using dynamic software in accordance with BS EN 15026 : 2007, depending on the climatic conditions existing in the location where it is installed.

Interstitial condensation

8.4 Roofs will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2011 Section 4 and Annexes D and H. Further guidance may be obtained from BRE Report BR 262 : 2002.

Surface condensation

8.5 Roofs will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 0.35 $W \cdot m^{-2} \cdot K^{-1}$ at any point and the junctions with walls are designed in accordance with section 7.3.

8.6 Roofs will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 1.2 $W \cdot m^{-2} \cdot K^{-1}$ at any point. Guidance may by obtained from BS 5250 : 2011, Annex H. Further guidance may be obtained from BRE Report BR 262 : 2002 and section 7.3 of this Certificate.

9 Properties in relation to fire

9.1 The system, when used in protected specifications including an inorganic covering listed in the Annex of Commission Decision 2000/553/EC, can be considered to be unrestricted under the national Building Regulations.

9.2 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.

9.3 In the opinion of the BBA, irrigated green roofs and roof gardens will also be unrestricted under the national Building Regulations.

9.4 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.

10 Resistance to wind uplift

10.1 The ballast requirements for the system should be calculated by a suitably competent and experienced individual in accordance with the relevant parts of BS EN 1991-1-4 : 2005 and its UK National Annex. The system should always be ballasted with a minimum depth of 50 mm of aggregate. In areas of high wind exposure, the Certificate holder's advice should be sought. Alternatively, concrete slabs on suitable supports can be used.

10.2 The growing medium used in intensive plantings must not be of the type that will be removed, or become delocalised, owing to wind scour experienced on site.

11 Resistance to mechanical damage

11.1 The system can accept the foot traffic and light concentrated loads associated with installation and maintenance. Reasonable care must 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, a walkway should be provided, for example using concrete slabs supported on bearing pads.

11.2 When used over construction and expansion joints, the product can accommodate the minor structural movement likely to occur in service.

12 Resistance to root penetration

The system, when used with one of the Hydrogard AR root-resistant polyester-reinforced modified-bitumen protection sheets incorporating root repellent listed in section 1.2, will resist penetration by plant roots and can be used as a waterproofing layer in green roof and roof garden specifications.

13 Maintenance

13.1 The system must be the subject of annual inspections and maintenance in accordance with BS 6229 : 2018, to ensure continued performance. Maintenance should include checks and operations to ensure that, where applicable:

- adequate ballast is in place and evenly distributed over the membrane
- protection layers are in good condition
- any exposed membrane is free from the build-up of silt, and other debris and unwanted vegetation is cleared.

13.2 Green roofs must be the subject of regular inspections, particularly in autumn after leaf fall and in spring, to ensure unwanted vegetation and other debris are cleared from the roof and drainage outlets (see section 4.12). Guidance is available within the latest edition of *The GRO Green Roof Code - Green Roof Code of Best Practice for the UK*.

13.3 Should a leak occur in the roof waterproofing it must be repaired following removal of the protection/ballast layer, water flow-reducing layer and the insulation boards. Correct reinstatement of these layers must be carried out with particular care and the advice of the Certificate holder should be sought.

14 Durability

14.1 The ballasted product will provide an effective barrier to the transmission of moisture for the service life of the roof in which it is incorporated.

14.2 The insulation board is rot resistant and, as long as the water flow-reducing layer remains undamaged, will have a life of at least 25 years under normal circumstances.

14.3 Under normal service conditions, the water flow-reducing layer will have a service life equivalent to that of the insulation in the inverted roof.

14.4 Care must be taken to ensure that the protection/ballast layer provides complete cover to the water flow-reducing layer during the membrane service life to avoid UV degradation.

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

14.6 An estimate cannot be given for the life of green roof and roof garden specifications owing to the nature of use. However, under normal circumstances, it should be significantly greater than for open coverings.

14.7 The membrane is resistant to the acidic and alkali conditions it is likely to encounter during its service life, as well as chemicals, such as liquid fertiliser, it may come into contact with.

Installation

15 General

15.1 BluRoof Monolithic Membrane 6125 must be installed in accordance with the Certificate holder's instructions and this Certificate, on a dry and frost-free substrate. After rain or snow, the substrate must be allowed to dry before installation can commence. The installer can aid drying by any suitable means approved by the Certificate holder. Once applied, the membrane is not affected by rain, snow or frost.
15.2 To assess the suitability of a substrate to receive the membrane, bond tests must be carried out to ensure adequate adhesion can be achieved. If bonding problems occur, advice must be sought from the Certificate holder.

15.3 The substrate should be conditioned with Alumasc Bitumen Primer or SB Primer and allowed to dry before application of the product.

15.4 Prior to application of the product, defects in the substrate such as cracks, irregularities and other areas of potential weakness must be repaired using an approved repair mortar, and the substrate cleaned in accordance with the Certificate holder's instructions. Additional membrane may be used to fill minor depressions in the substrate.

15.5 The product must be covered by a protective layer immediately after installation, in accordance with the Certificate holder's instructions.

15.6 Detailing (eg upstands) is carried out in accordance with the Certificate holder's instructions.

15.7 Bulk materials must not be stored on one area of the roof prior to installation, to ensure that localised overloading does not occur.

16 Procedure

Waterproofing layer

16.1 Blocks of the membrane are heated in a mechanically agitated air-jacketed melter fitted with thermometers to measure the melt and/or oil temperatures.

16.2 The nominal temperature range for the molten membrane is from 180 to 190°C. The temperature of the melt must never exceed 205°C.

16.3 The molten membrane is discharged from the melter into a suitable container and applied to the surface using three passes of a long-handled squeegee for horizontal surfaces and a suitable spreader for vertical surfaces.

16.4 When used over construction joints or other minor cracks, the membrane must be reinforced with Flex-Flash UN. The Certificate holder must be consulted for suitable details at expansion joints.

16.5 The first layer of molten membrane should have a nominal thickness of 3 mm.

16.6 Flex-Flash F polyester reinforcing sheet is embedded by lightly brushing it into the first layer of the membrane while still warm and tacky. The reinforcement overlaps must be at least 75 mm and fully sealed by the membrane.

16.7 The second layer of the membrane, applied over the top of the reinforcement, must have a nominal thickness of 3 mm.

16.8 The membrane must be protected immediately with the specified protection sheet in accordance with the Certificate holder's instructions. The overlaps must be at least 75 mm and sealed with membrane, except for anti-root protection sheets which require torch-sealed overlaps.

16.9 The completed membrane must be electronically tested for damage (and repaired where necessary) prior to the application of the covering layers.

Insulation and water flow-reducing layer

16.10 The roof waterproofing must be clean and free from any extraneous matter.

16.11 The insulation product is laid in accordance with the Certificate holder's instructions.

16.12 Boards are laid in a brick bond pattern, and it is essential that all joints between the boards are tight and no gaps exist where they meet rooflights, edge details and other services which perforate the roof deck.

16.13 The water flow-reducing layer should be loose laid over the insulation, at right angles to the slope, with 300 mm wide unsealed lap joints running down the slope. At upstands and penetrations, the water flow-reducing layer should be turned up to finish above the surface of the ballast later and turned down at drainage outlets.

16.14 The ballast loading layer must be applied as work progresses to protect the insulation and the water flow-reducing layer from the effects of wind uplift and solar degradation. The ballast must not be stacked in one place on the roof unless the roof is strong enough to support it.

17 Repair

17.1 Any damage to the waterproofing membrane must be repaired as soon as possible and before being confined within the structure. The membrane is repaired by removing the damaged area and reinstating to the original specification. The advice of the Certificate holder should be sought.

17.2 When damaged the insulation boards should be replaced.

17.3 Repair of the water flow-reducing layer is carried out by replacement of the damaged length of the membrane.

Technical Investigations

18 Tests

Tests were carried out and the results assessed to determine:

Unreinforced membrane

- fines content
- elastic recovery (aged and unaged)
- oil loss
- water absorption
- static indentation
- dynamic indentation
- flow
- imposed load resistance
- ring and ball softening point
- viscosity (unaged and heat aged)

Reinforcement

- thickness
- mass per unit area
- tensile strength and elongation

Reinforced membrane

- mass per unit area
- dimensional stability
- low temperature flexibility
- water vapour permeability

- water vapour resistance
- resistance to cracking
- resistance to cyclic movement (aged and unaged)
- static indentation
- dynamic indentation
- peel strength
- slide resistance

Insulation

- thermal conductivity
- compressive strength
- water vapour permeability
- long-term water absorption by diffusion
- water absorption by total immersion
- resistance to freeze/thaw of the thermal insulation
- water flow through an inverted roof kit
- deformation under specified compressive load and temperature
- dimensional stability.

19 Investigations

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

19.2 Visits were made to sites to assess the practicability of installation.

19.3 Third party test data for the following properties were examined:

- resistance to chemicals to BS EN ISO 2812-3 : 2012
- dynamic crack bridging to EN 1062-7 : 2004
- liquid water permeability to EN 1062-3 : 2008
- water vapour properties to BS EN ISO 7783 : 2011.

19.4 A series of U value calculations on the insulation were carried out.

19.5 A calculation was undertaken to confirm the declared and design thermal conductivity for the insulation.

19.6 Data for reaction to fire classification for the insulation were examined.

Bibliography

BRE Report BR 262 : 2002 *Thermal insulation avoiding risks*

BRE Report BR 443 : 2006 *Conventions for U-value calculations*

BS 5250 : 2011 *Code of practice for control of condensation in buildings*

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

BS 8417 : 2011 + A1 : 2014 *Preservation of wood — Code of practice*

BS EN 1991-1-1 : 2002 *Eurocode 1: Actions on structures — General actions — Densities, self-weight, imposed loads for buildings*
NA to BS EN 1991-1-1 : 2002 UK National Annex to *Eurocode 1: Actions on structures — General actions — Densities, self-weight, imposed loads for buildings*
BS EN 1991-1-3 : 2003 + A1 : 2015 *Eurocode 1: Actions on structures — General actions — Snow loads*
NA + A1 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 15026 : 2007 *Hygrothermal performance of building components and building elements — Assessment of moisture transfer by numerical simulation*

BS EN ISO 2812-3 : 2012 *Paints and varnishes — Determination of resistance to liquids — Method using an absorbent medium*

BS EN ISO 6946 : 2017 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*

BS EN ISO 7783 : 2011 *Paints and varnishes. Determination of water-vapour transmission properties — Cup method*

EN 1062-3 : 2008 *Paints and varnishes — Coating materials and coating systems for exterior masonry and concrete. Determination of liquid water permeability*
EN 1062-7 : 2004 *Paints and varnishes — Coating materials and coating systems for exterior masonry and concrete — Determination of crack bridging properties*

20 Conditions

20.1 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.

20.2 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.

20.3 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.

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

20.5 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.

20.6 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.