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Agrément Certificate

90/2431

Product Sheet 1

HYDROTECH MONOLITHIC MEMBRANES

HYDROTECH MONOLITHIC MEMBRANE 6125 ROOF WATERPROOFING SYSTEM

This Agrément Certificate Product Sheet⁽¹⁾ relates to the Hydrotech Monolithic Membrane 6125 Roof Waterproofing System, a total inverted roof system for use on flat and zero fall roofs, podiums, green roofs and roof gardens.

(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).

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 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 Third issue: 29 August 2018

John Albon – Head of Approvals
Construction Products

Originally certificated on 13 March 1990

Claire Curtis-Thomas
Chief Executive

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.*

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

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Regulations

In the opinion of the BBA, the Hydrotech Monolithic Membrane 6125 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 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 <i>Installation</i> part of this Certificate.
Regulation:	26	CO₂ 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 <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 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.
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)(i)	Fitness of materials and workmanship
Comment:	(iii)(b)(i)	The system is acceptable. See section 14.1 to 14.4 and the <i>Installation</i> part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		The system will enable a roof to satisfy the requirements of this Regulation. See section 6.1 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
		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: 1 *Description* (1.3 and 1.4), 3 *Delivery and site handling* (3.1, 3.6 and 3.9) and 15 *General* (15.9) of this Certificate.

Additional Information

NHBC Standards 2018

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

CE marking

The Certificate holder has taken the responsibility of CE marking the system, in accordance with European Technical Assessment 05/0152 issued by the BBA under ETAG 005 : 2005, Parts 1 and 5 for the waterproofing component and in accordance with harmonised European Standard BS EN 13164 : 2012 for the insulation component. 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 The Hydrotech Monolithic Membrane 6125 Roof Waterproofing System comprises of:

- 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 from 8 m² per litre to 16 m² per litre
- SB Primer — alternative fast curing primer
- Hydrotech Monolithic Membrane 6125 — a hot-applied, polymer-modified, rubberised bitumen-based membrane, including 30% recycled material content. The system is applied in two layers to provide a coating with a nominal thickness of 6 mm
- 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 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 Separator Sheet — a water flow-reducing layer for use above thermal insulation in inverted roof specifications.

1.2 The levels of Use Categories for the waterproofing component of the system in accordance with ETAG 005 : 2004, Parts 1 and 5 are given below:

water vapour permeability	0.18 g·m ⁻² ·day ⁻¹
nominal thickness of waterproofing membrane	6 mm
in accordance with ETAG 005 are:	
Categorisation by working life*	W3
Categorisation by climatic zones*	M
Categorisation by imposed loads *	P1
Categorisation by roof slope*	S1
Categorisation by surface temperature	
lowest	TL1
highest	TH1

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 Separator Sheet has the nominal properties are shown in Table 2.

Table 2 Nominal characteristics of the Alumasc Separator Sheet

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·s·g ⁻¹)	0.17
Head of water test (1.0 m)	No penetration
Mass per unit area (g·m ⁻²)	60
Lap joints (mm) – unsealed	300

1.5 Ancillary items used in conjunction with the system, 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 (HD-PE) studded membrane core
- Derbigum/HiTen Universal/PIR or mineral wool insulation overlay for hybrid systems
- Alumasc Extruded Polystyrene Upstand Board — self-faced insulation board for use at upstands
- Alumasc VTherm Vacuum Insulated Panel
- 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) 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 waterproofing 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 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 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 Sheets.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the Hydrotech Monolithic Membrane 6125 Roof Waterproofing System.

Design Considerations

4 Use

4.1 The Hydrotech Monolithic Membrane 6125 Roof Waterproofing System is satisfactory for use as a protected waterproofing layer on zero fall roofs, flat roofs and podiums with limited access in:

- inverted roof specifications
- protected roof specifications, eg covered by pavers or other suitable protection, or
- green roof and roof garden specifications.

4.2 The system is suitable for use on precast concrete, concrete block and timber substrates. The substrates must comply with the relevant requirements of BS 6229 : 2003 and, where appropriate, *NHBC Standards 2018*, Chapter 7.1.

4.3 Limited access roofs are defined for the purpose 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.

4.4 For the purposes of this Certificate, flat roofs are defined as those having a minimum finished fall of 1:80 and pitched roofs as those having falls in excess of 1:6. 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. Zero fall roofs are defined for the purpose of this Certificate 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 Roof Falls*.

4.5 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.

4.6 The system is not suitable for direct application to metal decking, which must be overlaid with a suitable flat deck of exterior grade plywood or calcium silicate board.

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

4.8 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*.

4.9 The drainage system for zero fall green roofs or roof gardens must be correctly designed, and provision made for access for maintenance purposes. Dead loads for green roofs and roof gardens can increase if the drains become partially or completely blocked causing waterlogging of the drainage layer.

4.10 Dual level roof drainage should be provided in accordance with BS 6229 : 2003 and BS EN 12056-3 : 2000 to drain water off at the level of the water flow-reducing layer and also at the level of the roof waterproofing.

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

4.12 A paving finish ballast comprising a minimum 40 mm of standard pressed concrete paving slabs is suitable in sheltered regions and in buildings up to 15 storeys. For other exposure conditions or tall buildings, specialist advice should be sought. Paving should be supported using proprietary spacer pads in accordance with the Certificate holder's recommendations.

4.13 Alumasc Extruded Polystyrene must always be overlaid with the Alumasc Separator Sheet, 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 system 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 : 2007 and BRE Report BR 443 : 2006, using the design thermal conductivity (λU) (including moisture correction factor), and the f_x drainage factor for the system as given below. See also BBA Information Bulletin No 4:

- $0.032 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ — design thermal conductivity (λU) (which is the declared lambda λD with addition of moisture correction) for 80 mm thickness of insulation
- $0.033 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ — design thermal conductivity (λU) (which is the declared lambda λD with addition of moisture correction) for 100 mm to 205 mm thickness of insulation
- $f_x = 0.001$ — 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 product 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 ($\text{W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$)	Insulation thickness required ⁽²⁾ (mm)	
	$p^{(3)} \leq 3$	$p^{(3)} = 8$
0.13	120 +120	140 + 120
0.15	205	120 +100
0.16	200	205
0.18	180	180
0.20	160	160
0.25	140	140

(1) 200 mm dense concrete deck.

(2) Thickest board as bottom layer, when double layer 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 (ΔU_r) to the calculated roof U value in accordance with Annex D.4 of BS EN ISO 6946 : 2007, as follows:

$\Delta U_r = p f_x (R1/RT)^2$ where:

ΔU_r = correction to the calculated thermal transmittance of the roof element ($\text{W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$)

$p^{(1)}$ = average rate of precipitation during the heating season ($\text{mm}\cdot\text{day}^{-1}$)

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 ($\text{W}\cdot\text{day}\cdot\text{m}^{-2}\cdot\text{K}^{-1}\cdot\text{mm}^{-1}$)

$R1$ = thermal resistance of the layer of the insulation above the waterproofing membrane ($\text{m}^2\cdot\text{K}\cdot\text{W}^{-1}$)

RT = total thermal resistance of the construction before application of the correction ($\text{m}^2\cdot\text{K}\cdot\text{W}^{-1}$)

$f_x = 0.001$ for the system incorporating the XENERGY MK water-control membrane.

(1) Values for average rainfall during the heating season for different UK locations can be found at

www.metoffice.gov.uk/climate/uk/averages/19611990/images/RainOctMar6190.gif and divided by 182 days to obtain 'p' in $\text{mm}\cdot\text{day}^{-1}$.

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 $0.35 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ at any point and the junctions with walls are designed in accordance with section 7.3 of this Certificate.



8.6 Roofs will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed $1.2 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ at any point. Guidance may be 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 system 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, will resist penetration by plant roots and can be used as a waterproofing system 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 : 2003, Annex B1-B5, 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 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 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 waterproofing component 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 waterproofing membrane component is resistant to 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 The Hydrotech Monolithic Membrane 6125 Roof Waterproofing System 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 system.

15.4 Prior to application of the system, 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 system 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 Soil or other bulk material must not be stored on one area of the roof prior to installation, to ensure that localised overloading does not occur.

15.8 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. Insulation boards can be cut to fit around projections through the roof, using either a sharp knife or a fine-toothed saw.

15.9 The insulation is light and may be installed in any weather but, due to their size, care will be needed in high winds. Installers must not carry them near to parapets or apertures in the deck and, once placed, they must be restrained immediately.

15.10 The flashing upstand must be a minimum of 150 mm above the top of the ballast/protection layer.

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 temperature.

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 in the protection sheets 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 on samples of the system components 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 : 2003 *Flat roofs with continuously supported 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*

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BS EN 12056-3 : 2000 *Gravity drainage systems inside buildings. Roof drainage, layout and calculation*

BS EN 13164 : 2012 *Thermal insulation products for buildings. Factory made extruded polystyrene foam (XPS) products. Specification*

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

BS EN ISO 6946 : 2007 *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*

ETAG 005 : 2000 Part 1 *Liquid applied roof waterproofing kits — General*

ETAG 005 : 2000 Part 5 *Liquid applied roof waterproofing kits — Specific stipulations for Kits based on Hot Applied Polymer Modified Bitumen*

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 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.