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Agrément Certificate No 90/2431
*Third issue**

BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

Designated by Government to issue European Technical Approvals

HYDROTECH MONOLITHIC MEMBRANE 6125 ROOFING SYSTEM

Revêtement d'étanchéité
Dachabdichtungen

Product

Hydrotech Monolithic Membrane used at Guildhall Yard East, London

• *THIS CERTIFICATE RELATES TO THE HYDROTECH MONOLITHIC MEMBRANE 6125 ROOFING SYSTEM, A ONE-PART, HOT-APPLIED, RUBBERISED BITUMINOUS MEMBRANE FOR USE IN A PROTECTED ROOFING SYSTEM.*

• *The system is for use on flat roofs with limited access in either:*

(1) an inverted roof specification

(2) a protected roof specification (eg covered by pavers or other suitable protection).

• *Hydrotech is manufactured by Hydrotech Membrane Corporation, Canada and marketed in the UK by Alumasc Exterior Building Products Ltd. The system is installed by trained contractors using specialist equipment and approved by Alumasc Exterior Building Products Ltd.*

Regulations

1 The Building Regulations 1991 (as amended) (England and Wales)

The Secretary of State has agreed with the British Board of Agrément the aspects of performance to be used by the BBA in assessing the compliance of roof waterproofing systems with the Building Regulations. In the opinion of the BBA, the Hydrotech Monolithic Membrane 6125 Roofing System, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements.

Requirement:	B4(2)	External fire spread
Comment:		On flat roofs the system, when used in an inverted roof specification including a minimum surface finish of 50 mm of aggregate, the roof may be deemed to be of designation AA. See sections 12.1 and 12.2 of this Certificate.
Requirement:	C4	Resistance to weather and ground moisture
Comment:		Tests for water resistance on the membrane indicate that the material meets this Requirement. See section 9.1 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The system comprises acceptable materials. See sections 15.1 and 15.2 of this Certificate.

2 The Building Standards (Scotland) Regulations 1990 (as amended)

In the opinion of the BBA, the Hydrotech Monolithic Membrane 6125 Roofing System, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Regulations and related Technical Standards as listed below.

Regulation:	10	Fitness of materials
Standard:	B2.1	Selection and use of materials and components
Comment:		The system complies with this Standard. See sections 15.1 and 15.2 of this Certificate.
Regulation:	12	Structural fire precautions
Standard:	D6.7	Distance of sides of buildings from boundaries — Roofs and rooflights
Comment:		On flat roofs, the system, when used in an inverted roof specification including a minimum surface protection of 50 mm of aggregate, may be considered of designation AA. See sections 12.1, 12.3 and 12.4 of this Certificate.
Regulation:	17	Preparation of sites and resistance to moisture
Standard:	G3.1	Resistance to precipitation
Comment:		Tests for water resistance on the membrane indicate that the use of the system can enable a roof to satisfy the requirements of this Regulation. See section 9.1 of this Certificate.

3 The Building Regulations (Northern Ireland) 1994 (as amended)

In the opinion of the BBA, the Hydrotech Monolithic Membrane 6125 Roofing System, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Building Regulations as listed below.

Regulation:	B2	Fitness of materials and workmanship
Comment:		The system comprises acceptable materials. See sections 15.1 and 15.2 of this Certificate.
Regulation:	C5	Resistance to ground moisture and weather
Comment:		Tests for water resistance of the membrane indicate that the use of the system can enable a roof to satisfy the requirements of this Regulation. See section 9.1 of this Certificate.
Regulation:	E8	External fire spread
Comment:		On flat roofs, the system, when used in an inverted roof specification including a minimum surface protection of 50 mm of aggregate, may be considered of designation AA. See sections 12.1, 12.3 and 12.4 of this Certificate.

4 Construction (Design and Management) Regulations 1994

Information in this Certificate may assist the client, planning supervisor, designer and contractors to address their obligations under these Regulations.

See sections: 6 *Delivery and site handling* (6.1 and 6.2) 17 *Procedure* (17.2).

Technical Specification

5 Description

5.1 The Hydrotech Monolithic Membrane 6125 Roofing System is manufactured by heating and blending together bitumen, processing oils, fillers and other additives.

5.2 Flex-Flash F is a 50 gm^{-2} spunbond polyester fabric used to reinforce the membrane.

5.3 Ancillary products used with Hydrotech include:

Flex-Flash UN — a 1.5 mm thick uncured Neoprene membrane, used to reinforce the membrane at joints where movement is likely to occur, and for details and upstands. Flex-Flash UN may be replaced by similar material approved by the Certificate holder.

0.25 mm polythene sheet — for use as a separating layer (only as part of an insulated roof membrane assembly, and only light foot traffic to be allowed over area).

Bitumen composite protection board.

Hydrogard 10 — lightweight protection sheet.

Hydrogard 20 — standard protection sheet.

Hydrogard 30 — heavy duty protection sheet.

Hydrogard 40 — root repellent protection sheet.

Hydrotech surface conditioner primer or other bitumen conditioner approved by the Certificate holder — for surface conditioning of concrete and brickwork.

5.4 Quality control checks are performed on incoming raw materials, during production, and on the finished product. Checks include:

penetration
viscosity
flow
flexibility, and
toughness.

6 Delivery and site handling

6.1 Hydrotech is delivered to site in 226 kg drums bearing the product name, the manufacturer's name and the BBA identification mark incorporating the number of this Certificate.

6.2 Each drum contains 10 cakes of Hydrotech individually double-wrapped in disposable polythene film. Each cake has a nominal weight of 22.6 kg.

6.3 Unused cakes should be stored in the sealed drums. The material is not affected by the temperatures likely to occur during storage.

6.4 Reinforcing materials should be stored under cover and kept dry.

Design Data

7 General

7.1 The Hydrotech Monolithic Membrane 6125 Roofing System is satisfactory for use on flat, limited-access roofs as:

(1) A waterproofing layer in an inverted roof specification.

(2) A waterproofing layer protected by pavers or other suitable protection.

7.2 Limited access roofs are defined for the purpose of this Certificate as those roofs subjected only to pedestrian traffic for maintenance of the roof covering and cleaning of gutters, etc. Where traffic in excess of this is envisaged, special precautions such as additional protection to the membrane must be taken.

7.3 Flat roofs are defined for the purpose of this Certificate as those roofs having a minimum finished fall of 1:80. Pitched roofs are defined as those having falls in excess of 1:6.

7.4 When designing flat roofs, 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.

7.5 Insulation systems or materials to be used in conjunction with Hydrotech must be the subject of a current BBA Certificate, and be used in accordance with, and within the limitations of, that Certificate.

8 Substrates

8.1 The system can be applied to concrete deck substrates complying with the relevant requirements of BS 6229 : 1982, BS 8217 : 1994 and, where appropriate, NHBC Standards, Chapter 8.1 or the Zurich Building Guarantees Technical Standards, section 5, clause 5.9.3.19.

8.2 The concrete surface should be conditioned with Hydrotech surface conditioner (or equivalent bitumen conditioner approved by the Certificate holder).

8.3 To assess the suitability of a substrate to receive the system, initial adhesion tests must be carried out. If bonding problems occur, advice should be sought from the Certificate holder.

8.4 Any gaps, irregularities and areas of potential weakness may be filled with latex modified repair mortar. Where faults are not critical, additional Hydrotech membrane may be used to fill in.

8.5 The system will adhere to metal, plywood and timber details. Metal should be free of oil, rust, paint or other coatings liable to affect the bond.

9 Weathertightness

9.1 It is confirmed from test data that the membrane will adequately resist the passage of moisture to the inside of the building and so comply with the relevant requirements of the national Building Regulations thus:

England and Wales

Approved Document C, Requirement C4, Section 5.1

Scotland

Regulation 17, Standard G3.1

Northern Ireland

Regulation C5.

9.2 The membrane is impervious to water and, when used in accordance with this Certificate, will give a waterproofing layer capable of accepting minor structural movements without damage.

10 Adhesion

10.1 Tests indicate that the adhesion of the membrane to substrates is satisfactory.

10.2 When used over construction or bridging joints, the membrane can accommodate the minor structural movement likely to occur under normal service conditions. The methods described in sections 17.4 and 17.5 should be followed.

11 Resistance to foot traffic

11.1 Tests indicate that provided there are no sharp objects present on the surface of the membrane prior to and during installation of the protective layer above, it will not be damaged by normal foot traffic.

11.2 Tests indicate that the membrane can accept, without damage, distributed loads. Concentrated point loads can cause damage and should be avoided.

12 Properties in relation to fire

12.1 The system, when used in an inverted roof specification including a minimum surface finish of 50 mm of aggregate, shall

be deemed to meet BS 476 : Part 3 : 1958, designation EXT.F.AA.

12.2 The designation of other specifications should be confirmed by test or assessment:

England and Wales

In accordance with Approved Document B, Clause A1, Appendix A

12.3 When used in an appropriate roof structure, the system is unrestricted under the following national Building Regulations:

Scotland

Regulation 12, Standard D6.7

Northern Ireland

Regulation E8.

12.4 The designation for other specifications should be confirmed by test or assessment.

13 Effects of temperature

Providing the substrate is dry and frost free, the membrane can be installed down to the lowest possible site working temperatures found in the United Kingdom.

14 Maintenance

Damage to the membrane can be adequately repaired by patching in accordance with the manufacturer's instructions.

15 Durability

15.1 The Hydrotech Monolithic Membrane 6125 Roofing System, when fully protected and subjected to normal service conditions, will provide an effective barrier to the transmission of liquid water and water vapour for the design life of the roof in which it is incorporated.

15.2 However, in situations where maintenance or repair of any of the components in the roof structure are necessary (eg protection layer, insulation, or deck), the durability of the membrane may be reduced. In these circumstances Alumasc Exterior Building Products Ltd should be consulted.

Installation

16 General

16.1 The Hydrotech Monolithic Membrane 6125 Roofing System must be installed on a dry and frost-free substrate. After rain or snow, at least one full day of good drying conditions must be allowed before installation can recommence. Once applied, the membrane is not affected by rain, snow or frost.

16.2 Prior to application of the system to the substrate, defects such as cracks, irregularities and areas of potential weakness should be made good, and the substrate cleaned.

16.3 The substrate should be conditioned with Hydrotech surface conditioner or other Alumasc approved bitumen conditioner (at a coverage rate between 8 m^2l^{-1} and 16 m^2l^{-1}) and allowed to dry before application of the system.

16.4 The membrane should be covered with a protective layer as soon as possible after installation, in accordance with manufacturer's instructions.

17 Procedure

17.1 Hydrotech is heated in a propane-fired, mechanically agitated heater which has a double jacket containing a heat transfer mineral oil, and fitted with thermometers to measure the melt and oil temperatures. Air-jacketed melters may also be used.

17.2 The nominal temperature range for the molten Hydrotech is 175°C to 218°C, although it can be used from 160°C to 230°C. The temperature of the melt should never exceed 230°C.

17.3 The melt is discharged from the heater into a suitable container and applied to the roof using long-handled, rubber-bladed squeegees.

17.4 The membrane, when used over construction joints, should be reinforced with either Flex-Flash F or Flex-Flash UN.

17.5 When used over bridging joints, the membrane should be reinforced with Flex-Flash UN.

17.6 The first layer of the membrane should have a minimum thickness of 3 mm.

17.7 The Flex-Flash F reinforcement should be embedded by lightly brushing it into the first layer of the membrane whilst it is still warm and tacky.

17.8 The second layer of membrane, applied over the top of the reinforcement, should have a minimum thickness of 3 mm.

Technical Investigations

The following is a summary of the technical investigations carried out on the Hydrotech Monolithic Membrane 6125 Roofing System.

18 Tests

Samples of the Hydrotech Monolithic Membrane 6125 Roofing System, Flex-Flash F and Flex-Flash UN were obtained from the manufacturer for the purpose of testing. Tests performed by the BBA, which give typical results for the materials, are summarised in Tables 1 to 4.

19 Other investigations

19.1 The manufacturing process was examined, including the methods adopted for quality control.

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

Table 1 Physical properties of reinforcements

Tests (units)	Method*	Mean result
Thickness (mm)	MOAT 31 : 6A	
Flex-Flash F		0.22
Flex-Flash UN		1.58
Mass per unit (kgm^{-2}) surface area	MOAT 31 : 6B	
Flex-Flash F		2.44
Flex-Flash UN		2.10
Tensile strength (N per 50 mm)	MOAT 31 : 6C	
Flex-Flash F		111
Flex Flash UN		
longitudinal		318
transverse		240
Elongation at break (%)	MOAT 31 : 6C	
Flex-Flash F		35.2
Flex-Flash UN		
longitudinal		776
transverse		660

*The test document is detailed in the *Bibliography*. Numbers in the table refer to sections of the document.

Table 2 Physical properties — unreinforced membrane

Test (units)	Method*	Mean result
Fines content (%)	MOAT 31 : 6F	38.5
Elastic recovery (%)	MOAT 31 : 6H	
unaged		
23°C		<25
0°C		<25
aged[1]		
23°C		<25
0°C		<25
Oil loss (%)	24 hours at 50°C	0.02
Water absorption (%)	BS 2782 : Part 4 430A : 1983	0.27
Resistance to static indentation	MOAT 27 : 5.1.9	
concrete		L_1
EPS		L_1
Resistance to dynamic indentation	MOAT 27 : 5.1.10	
perlite		I_4
EPS		I_3
Flow (mm)	ASTM D3407-78	2
Imposed `Load' resistance (mm)		
at 30 mins		
5 kg	*ad hoc*[2]	0.1
10 kg		0.22
20 kg		0.29
at 5 hours		
5 kg		0.14
10 kg		0.31
20 kg		0.63
at termination of test		
5 kg		0.16 (14 hours)
10 kg		0.39 (23 hours)
20 kg		0.99 (23 hours)
Softening point (ring and ball) (°C)	BS 2000 : Part 58	
56 days heat aged at 70°C		75.5
180 days heat aged at 180°C		68
Viscosity (cps)	Brookfield viscometer (RVT)	
unaged		2810
56 days heat aged at 70°C		1810
180 days heat aged at 70°C		2165

(1) Aged for 180 days at 70°C

(2) Samples 3 mm thick on 300 mm by 300 mm concrete slabs. Loads of 5, 10 and 20 kg were applied to 100 mm by 100 mm steel loading plates placed on the samples, and indentation with time was recorded.

*The test documents are detailed in the *Bibliography*. Numbers in the table refer to sections/parts of the various documents.

Table 3 Physical properties — reinforced membrane

Test (units)	Method*	Mean result
Mass per unit area[1] (kgm^{-2})	MOAT 31 : 6B	8.27
Dimensional stability[2] (%)	MOAT 27 : 5.1.6.1	+0.32
Low temperature flexibility (°C)	MOAT 27 : 5.4.2	
Flex-Flash F		−28[3]
Flex-Flash UN		−28[3]
Aged[4]		
Flex-Flash F		−20
Flex-Flash UN		—
Aged[5]		
Flex-Flash F		−5
Flex-Flash UN		>+10

(1) Using Flex-Flash F as reinforcement.

(2) Using Flex-Flash UN as reinforcement.

(3) −28°C was lowest temperature tested.

(4) Aged 56 days at 70°C.

(5) Aged 180 days at 70°C.

— no measurement carried out.

*The test documents are detailed in the *Bibliography*. Numbers in the table refer to sections of the various documents.

Table 4 Service performance — reinforced membrane

Test (units)	Method*	Mean result
Water vapour permeability 75% RH/25°C ($g^{-2}d^{-1}$)[1]	BS 3177 : 1959	0.18
Water vapour resistance ($MNsg^{-1}$)	BS 3177 : 1959	1140
Resistance to cracking	DOT spec Part C (iv)	
at 0°C		
Flex-Flash F		no cracks
Flex-Flash UN		no cracks
at 20°C		
Flex-Flash F		no cracks
Flex-Flash UN		no cracks
Resistance to cyclic movement[2]	MOAT 31 : 6K	
unaged		no damage after 500 cycles
aged[3]		no damage after 200 cycles
Resistance to static indentation	MOAT 27 : 5.1.9	
Flex-Flash F		
concrete		L_1
EPS		L_2
Flex-Flash UN		
concrete		L_3
EPS		L_1
Resistance to dynamic indentation	MOAT 27 : 5.1.10	
Flex-Flash F		
perlite		I_3
EPS		I_2
Flex-Flash UN		
perlite		I_4
EPS		I_4
Resistance to peel (N)[1]	MOAT 27 : 5.1.3	
concrete substrate		34
chipboard substrate		27
plywood substrate		27
Aged[3]		
chipboard substrate		38
7 days water immersion		
concrete substrate		24
Resistance to sliding[2] (mm)	MOAT 27 : 5.1.7	
10° slope		0
20° slope		5

(1) Membrane reinforced with Flex-Flash F.

(2) Membrane reinforced with Flex-Flash UN.

(3) Aged 28 days at 70°C.

*The tests documents are detailed in the *Bibliography*. Numbers in the tables refer to sections/parts of the various documents.

Bibliography

BS 476 *Fire tests on building materials and structures*
Part 3 : 1958 *External fire exposure roof test*
Part 58 : 1993 *Determination of softening point of bitumen. Ring and ball method*

BS 2000 *Methods of test for petroleum and its products*
Part 58 : 1993 *Determination of softening point of bitumen. Ring and ball method*

BS 2782 *Methods of testing plastics*
Part 4 *Chemical properties*
Methods 430A to 430D : 1983 *Determination of water absorption at 23°C. Determination of water absorption at 23°C with allowance for water-soluble matter. Determination of boiling water absorption. Determination of boiling water absorption with allowance for water-soluble matter*

BS 3177 : 1959 *Method for determining the permeability to water vapour of flexible sheet materials used for packaging*

BS 6229 : 1982 *Code of practice for flat roofs with continuously supported coverings*

BS 8217 : 1994 *Code of practice for built-up felt roofing* (supersedes CP 144 : Part 3)

MOAT No 27 : 1984 UEAtc *General Directive for the Assessment of Waterproofing Systems*

MOAT No 31 : 1984 UEAtc *Special Directives for the Assessment of Reinforced Homogeneous Waterproof Coverings of Styrene-Butadiene-Styrene (SBS) Elastomer Bitumen*

ASTM D3407-78 *Joint sealants, Hot-poured, for Concrete and Asphalt Pavements*

DOT spec Part C *Department of Transport Checks and Tests for Bridge Deck Waterproofings*

Conditions of Certification

20 Conditions

20.1 This Certificate:

(a) relates only to the product that is described, installed, used and maintained as set out in this Certificate;

(b) is granted only to the company, firm or person identified on the front cover — no other company, firm or person may hold or claim any entitlement to this Certificate;

(c) has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective;

(d) is copyright of the BBA.

20.2 References in this Certificate to any Act of Parliament, Regulation made thereunder, Directive or Regulation of the European Union, Statutory Instrument, Code of Practice, British Standard, manufacturers' instructions or similar publication, shall be construed as references to such publication in the form in which it was current at the date of this Certificate.

20.3 This Certificate will remain valid for an unlimited period provided that the product and the manufacture and/or fabricating process(es) thereof:

(a) are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA;

(b) continue to be checked by the BBA or its agents; and

(c) are reviewed by the BBA as and when it considers appropriate.

20.4 In granting this Certificate, the BBA makes no representation as to:

(a) the presence or absence of any patent or similar rights subsisting in the product or any other product;

(b) the right of the Certificate holder to market, supply, install or maintain the product; and

(c) the nature of individual installations of the product, including methods and workmanship.

20.5 Any recommendations relating to the use or installation of this product which are contained or referred to in this Certificate are the minimum standards required to be met when the product is used. They do not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date of this Certificate or in the future; nor is conformity with such recommendations to be taken as satisfying the requirements of the 1974 Act or of any present or future statutory, common law or other duty of care. In granting this Certificate, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the installation and use of this product.

BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

In the opinion of the British Board of Agrément, Hydrotech Monolithic Membrane 6125 Roofing System is fit for its intended use provided it is installed, used and maintained as set out in this Certificate. Certificate No 90/2431 is accordingly awarded to Alumasc Exterior Building Products Ltd.

On behalf of the British Board of Agrément

Date of Third issue: 8th May 2000

Chief Executive

**Original Certificate issued 13th March 1990, with a Second issue on 24th September 1997. This revised version issued to include change of Certificate holder's name, address, telephone and facsimile numbers, reference to the revised Building Regulations and associated text, reference to the CDM Regulations 1994 and new* Conditions of Certification.

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