

IIGO Srl

Strada di Pietrara, 54-A
05100 Terni (TR)

Italy

Tel: 00 39 0744 61 10 61 Fax: 00 39 0744 61 10 55

e-mail: info@iigo.it

website: www.iigo.it



Agrément Certificate

13/5030

Product Sheet 2

IIGO ROOF WATERPROOFING MEMBRANES

BIIG ROOF WATERPROOFING MEMBRANES

This Agrément Certificate Product Sheet⁽¹⁾ relates to BIIG Roof Waterproofing Membranes, reinforced atactic polypropylene, modified-bitumen sheets with a sand or mineral finish for use as roof waterproofing in mechanically-fastened, fully-bonded, green roof and roof garden specifications.

(1) Hereinafter referred to as 'Certificate'.

CERTIFICATION INCLUDES:

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



KEY FACTORS ASSESSED

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

Properties in relation to fire — the membranes will enable a roof to be unrestricted under the Building Regulations (see section 7)

Resistance to wind uplift — the products will resist the effects of any likely wind suction acting on the roof (see section 8).

Resistance to foot traffic — the membranes will accept the limited foot traffic and loads associated with installation and maintenance (see section 9).

Resistance to penetration of roots — the BIIG AR membranes will adequately resist plant root penetration in green roof and roof garden specifications (see section 10).

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

The BBA has awarded this Certificate to the company named above for the products described herein. These products have been assessed by the BBA as being fit for their intended use provided they are installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of First issue: 28 August 2013

Simon Wroe
Head of Approvals — Materials

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.

British Board of Agrément
Bucknalls Lane
Watford
Herts WD25 9BA

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tel: 01923 665300
fax: 01923 665301
e-mail: mail@bba.star.co.uk
website: www.bbacerts.co.uk

Regulations

In the opinion of the BBA, BIIG Roof Waterproofing Membranes, if installed, used and maintained in accordance with this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted)



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

Requirement: B4(2)	External fire spread
Comment:	On suitable substructures the use of the membranes will enable a roof to be unrestricted under the requirements of this Regulation. See sections 7.1, 7.2, 7.4 and 7.5 of this Certificate.
Requirement: C2(b)	Resistance to moisture
Comment:	The membranes, including joints, will enable a roof to meet this Requirement. See section 6.1 of this Certificate.
Regulation: 7	Materials and workmanship
Comment:	The products are acceptable. See section 12 and the <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation: 8(1)(2)	Fitness and durability of materials and workmanship
Comment:	The use of the membranes satisfies the requirements of this Regulation. See sections 11 and 12 and the <i>Installation</i> part of this Certificate.
Regulation: 9	Building standards applicable to construction
Standard: 2.8	Spread from neighbouring buildings
Comment:	The membranes, when applied to a suitable substructure, are regarded as having low vulnerability and will enable a roof to be unrestricted under this Standard, with reference to clause 2.8.1 ⁽¹⁾⁽²⁾ . See sections 7.1 to 7.5 of this Certificate.
Standard: 3.10	Precipitation
Comment:	The membranes, including joints, will enable a roof to satisfy the requirements of this Standard, with reference to clauses 3.10.1 ⁽¹⁾⁽²⁾ and 3.10.7 ⁽¹⁾⁽²⁾ . See section 6.1 of this Certificate.
Standard: 7.1(a)	Statement of sustainability
Comment:	The products can contribute to meeting the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.
Regulation: 12	Building standards applicable to conversions
Comment:	All comments given for these products 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

Regulation: 23(a)(i)(iii)(b)(i)	Fitness of materials and workmanship
Comment:	The membranes are acceptable. See section 12 and the <i>Installation</i> part of this Certificate.
Regulation: 28(b)	Resistance to moisture and weather
Comment:	The membranes, including joints, can enable a roof to satisfy the requirements of this Regulation. See section 6.1 of this Certificate.
Regulation: 36(b)	External fire spread
Comment:	On a suitable substructure, the use of the membranes will enable a roof to be unrestricted under the Requirements of this Regulation. See sections 7.1 to 7.5 of this Certificate.

Construction (Design and Management) Regulations 2007

Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See sections: 1 *Description* (1.2) and 3 *Delivery and site handling* (3.3) of this Certificate.

Additional Information

NHBC Standards 2013

NHBC accepts the use of BIIG Roof Waterproofing Membranes, provided they are installed, used and maintained in accordance with this Certificate, 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 products in accordance with harmonised European Standard BS EN 13707 : 2004. An asterisk (*) appearing in this Certificate indicates that data shown is given in the manufacturer's Declaration of Performance.

Technical Specification

1 Description

1.1 BIIG Roof Waterproofing Membranes are polyester and glass-reinforced, atactic polypropylene, modified-bitumen roof waterproofing membranes with a sand or mineral finished upper face.

1.2 The membranes are of five types, manufactured to the nominal characteristics given in Table 1.

Characteristic (unit)	BIIG 3 HP/AR ⁽¹⁾	BIIG 4	BIIG 4 HP/AR ⁽¹⁾	BIIG 5	BIIG 5 HP/AR ⁽¹⁾
Thickness* (mm)	3	4	4	5	5
Width* (m)	1.1	1.1	1	1.1	1.1
Length* (m)	10	7.27	7.27	7.27	7.27
Mass per unit area (kg·m ⁻²)	3.45	4.38	4.75	5.63	5.75
Roll weight (kg)	38	35	36	45	46
Tensile strength* (N·mm ⁻¹)					
longitudinal	1150	675	1150	675	1150
transverse	1150	650	1150	650	1150
Elongation* (%)					
longitudinal	55	50	55	50	55
transverse	55	50	55	50	55
Low temperature flexibility* (°C)	-20	-20	-20	-20	-20
Static indentation* (kg)	20	20	25	20	25
Impact* (mm)	1500	1500	1500	1500	1500

(1) AR (anti-root).

1.3 An ancillary item for use with the membranes and included within the scope of this Certificate is Alumasc bitumen primer, a bitumen primer for preparation of the substrate.

2 Manufacture

2.1 The membranes are manufactured using conventional continuous bitumen coating techniques.

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

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

2.3 The management system of the manufacturer has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 and BS EN ISO 14001 : 2004 by SGS (Certificates IT97/9497 and IT05/1121 respectively).

3 Delivery and site handling

3.1 The membranes are delivered to site in rolls sealed with tape on pallets and shrink-wrapped in polythene. The tape bears the product name, manufacturer's name, size and batch number with appropriate CE marking.

3.2 Rolls must be stored upright in a clean, dry, level area.

3.3 Alumasc bitumen primer has a flashpoint of 32°C and is classified as 'highly flammable' under *The Chemicals (Hazard Information and Packaging Supply) Regulations 2009* (CHIP4)/*The Classification, Labelling and Packaging of Substances and Mixtures (CLP Regulation) 2009*. The product bears the appropriate warning.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on BIIG Roof Waterproofing Membranes.

Design Considerations

4 Use

4.1 BIIG Roof Waterproofing Membranes⁽¹⁾ are satisfactory for use as roof waterproofing membranes:

- fully-bonded on flat and pitched roofs with limited access
- mechanically-fastened on flat and pitched roofs with limited access
- single or built up specifications
- on roof gardens on flat roofs
- on flat and pitched green roofs with limited access.

(1) BIIG 3 HP/AR is for use in roof gardens and green roofs only.

4.2 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, additional protection to the membrane must be provided (see section 9).

4.3 Flat roofs are defined for the purposes of this Certificate as those roofs having a minimum finished fall of 1:80. For design purposes, twice the minimum finished fall should be assumed, unless a detailed analysis of the roof is available, including overall and local deflection, direction of falls, etc. Pitched roofs are defined for the purpose of this Certificate as those having a fall greater than 1:6.

4.4 Decks to which the membranes are to be applied must comply with the relevant requirements of either BS 6229 : 2003 or BS 8217 : 2005 and, where appropriate, *NHBC Standards 2013, Chapter 7.1 Flat roofs and balconies*.

4.5 Insulation materials used in conjunction with the membranes must be in accordance with the Certificate holder's instructions and be either:

- as described in the relevant clauses of BS 8217 : 2005, or
- the subject of a current BBA Certificate and be used in accordance with that Certificate.

4.6 Recommendations for the design of green roofs and roof garden specifications are available within the latest edition of *The GRO Green Roof Code — Green Roof Code of Best Practice for the UK 2011*.

4.7 When used in green roof and roof garden specifications, structural decks to which the system is to be applied must be suitable to transmit the dead and imposed loads experienced in service.

4.8 Imposed load, dead loading and wind load specifications are calculated in accordance with BS EN 1991-1-1 : 2002, BS EN 1991-1-3 : 2003, BS EN 1991-1-4 : 2005 and their respective UK National Annexes.

4.9 The drainage system for both green roofs and 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.

5 Practicability of installation

Installation must only be carried out by installers trained and approved by the Certificate holder and/or the distributor.

6 Weathertightness



6.1 Results of tests indicate that the membranes, including joints, when completely sealed and consolidated, will adequately resist the passage of moisture into the building and enable a roof to comply with the requirements of the national Building Regulations:

England and Wales — Approved Document C, Requirement C2(b), section 6

Scotland — Mandatory Standard 3.10, clauses 3.10.1 and 3.10.7

Northern Ireland — Regulation 28(b).

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

7 Properties in relation to fire



7.1 Tests indicate that a system comprising an 18 mm thick plywood deck, one layer of typical torch-on vapour barrier, 50 mm thick tissue-faced PIR insulation and one layer of BIIG 4 as a fully bonded cap sheet, will be unrestricted.

7.2 The membranes, 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 Requirements.



7.3 When used on flat roofs with one of the surface finishes defined in The Building Regulations (England and Wales), Appendix A, Table A5, Part iii, or The Building Regulations (Northern Ireland), Technical Booklet E, Table 4.6, Part IV, and listed below, the roof is deemed to be of designation B_{ROOF}(t4):

- bitumen-bedded stone chippings covering the whole surface to a depth of not less than 12.5 mm
- bitumen-bedded tiles of a non-combustible material
- sand and cement screed, or macadam.



7.4 The designation of other specifications should be confirmed by:

England and Wales — test or assessment in accordance with Approved Document B, Appendix A, clause 1

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

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

7.5 In the opinion of the BBA, when used in irrigated roof gardens or green roofs, the products will be unrestricted under the national Requirements:

England and Wales — Requirement B4(2)

Scotland — Mandatory Standard 2.8, clause 2.8.1

Northern Ireland — Regulation 36(b).

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

8 Resistance to wind uplift

8.1 Results of tests indicate that the adhesion of fully bonded membranes is sufficient to resist the effects of wind suction, thermal cycling or other minor structural movements likely to occur in service.

8.2 Where the membrane is bonded to insulation boards, the resistance to wind uplift will be dependent on the cohesive strength of the insulation and the method by which it is secured to the roof deck. This must be taken into account when selecting a suitable insulation material.

8.3 The resistance to wind uplift of a mechanically-fixed waterproofing layer is provided by the fasteners passing through the membrane into the substrate. The number and position of fixings will depend on a number of factors including:

- wind uplift forces to be restrained
- pull-out strength of the fasteners
- tensile properties of the membrane
- appropriate calculation of safety factors.

8.4 The number of fixings used should be established by reference to the wind uplift forces calculated in accordance with BS EN 1991-1-4 : 2005 and its UK National Annex on the basis of the maximum permissible load.

8.5 The membranes, when used in a suitable roof garden or green roof specification, will adequately resist the effects of wind uplift likely to occur in practice.

8.6 The soil used in intensive plantings must not be of type that will be removed, or become localised due to wind scour experienced on site.

8.7 It should be recognised that the type of plants used could significantly affect the expected wind loads.

9 Resistance to foot traffic

9.1 Results of tests indicate that the products can accept the limited foot traffic and light concentrated loads associated with installation and maintenance. Reasonable care should be taken to avoid puncture by sharp objects or concentrated loads. Where traffic in excess of this is envisaged, such as maintenance of lift equipment or pedestrian access, suitable protection must be provided, for example, using concrete slabs supported on bearing pads.

9.2 Once the green roof or roof garden is installed it can be regarded as providing suitable protection for the membrane in use.

10 Resistance to root penetration

Results of root penetration resistance tests on the membrane and its joints indicate it is resistant to root penetration and can be used in a roof waterproofing system for roof gardens and green roofs.

11 Maintenance



11.1 Systems using the membranes must be subject to annual inspections and maintenance to ensure continued performance.

11.2 Maintenance should include checks and operations to ensure, where applicable:

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

11.3 Where damage has occurred, it should be repaired in accordance with section 16 and the Certificate holder's instructions.

11.4 Green roofs and roof gardens must be the subject of regular inspections, particularly in autumn after leaf fall and in the spring to ensure that vegetation and other debris are cleared from the roof and that the drainage outlets are clear. Guidance is available within the latest edition of Guidelines to Green Roofing published by *The Green Roof Organisation (GRO)*.

12 Durability



BIIG Roof Waterproofing Membranes, when subjected to normal conditions of exposure and use, will retain their integrity for a period of at least 25 years.

13 Reuse and recyclability

The products are made from bitumen and polyester that can be recycled.

Installation

14 General

14.1 Installation of BIIG Roof Waterproofing Membranes must be carried out by installers trained and approved by the Certificate holder and/or the distributor in accordance with the relevant clauses of BS 8000-4 : 1989 and BS 8217 : 2005, the Certificate holder's instructions and this Certificate.

14.2 Substrates to which the membranes are to be applied must be sound, dry, clean and free from sharp projections such as nail heads and concrete nibs. When used over a rough substrate, a suitable protection layer must be placed first.

14.3 Installation should not be carried out during inclement weather (eg rain, fog or snow) nor when the temperature is below 5°C.

14.4 If the roof is likely to be subject to uncontrolled pedestrian access, the substructure must meet the requirements of BS 8217 : 2005 and, to prevent damage to the roof covering, one of the appropriate surface finishes referred to in clause 6.12 of the Code must be used.

14.5 For fully bonded systems with falls in excess of 1:11, the provision for additional mechanical fixings as required by BS 8217 : 2005 must be observed.

14.6 On completion of the roof, the mineral finished membrane, when used as a top layer in flat roof specifications, may have a surface finish applied in accordance with BS 8217 : 2005, clause 8.19. Surface finishes in the Code of Practice include:

- precast concrete paving slabs
- proprietary tiles on bonding compound.

14.7 Additional surface protection is not required when using the mineral surface finished membrane on roofs with limited access.

14.8 Detailing must be formed in accordance with the Certificate holder's instructions.

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

14.10 Detailing must be formed in accordance with the Certificate holder's instructions.

15 Procedure

Fully bonded applications

15.1 When required for fully bonded applications the substrate is primed using Alumasc Bitumen primer at a rate of between 3.5 and 12 square metres per litre depending on the porosity of the substrate.

15.2 Bonding is achieved by melting the lower surface by torching and pressing the membrane down. Care must be taken not to overheat the coating.

Mechanically-fastened

15.3 For mechanically-fastened systems, the type of fixings used will vary according to the type of deck and insulation used. Further information can be obtained from the Certificate holder.

Lap joints

15.4 Side and end laps should be a minimum of 100 mm and 150 mm respectively.

15.5 Joints are sealed by torching and consolidating using a roller of suitable width and weight.

15.6 A bead of molten material must exude from all laps to indicate a satisfactory seal.

16 Repair

In the event of damage, the sheets can be effectively repaired, after cleaning, with pieces of the membrane torch-welded over the damaged area.

Technical Investigations

17 Tests

17.1 Tests were carried out on BIG Roof Waterproofing Membranes and the results assessed to determine:

- dimensions
- static loading
- dynamic indentation
- tensile bond strength
- water vapour transmission.

17.2 An assessment was made of data in relation to:

- watertightness
- low temperature flexibility
- tensile strength and elongation
- shear of joints
- peel of joints
- dimensional stability
- heat resistance
- nail tear resistance
- effect of heat ageing
- root resistance.

18 Investigations

18.1 An evaluation was made of fire test reports.

18.2 An evaluation was made of wind uplift to ETAG 006 for mechanically-fastened systems.

18.3 An evaluation was made of tests on the membranes before and after UV ageing.

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

Bibliography

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

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

BS 8217 : 2005 *Reinforced bitumen membranes for roofing — Code of practice*

BS EN 13707 : 2004 *Flexible sheets for waterproofing — Reinforced bitumen sheets for roof waterproofing — Definitions and characteristics*

BS EN 1991-1-4 : 2005 *Eurocode 1 — Actions on structures — General actions — Wind actions*

NA to BS EN 1991-1-4 : 2005 *UK National Annex to Eurocode 1 — Actions on structures — General actions — Wind actions*

BS EN ISO 9001 : 2008 *Quality management systems — Requirements*

BS EN ISO 14001 : 2004 *Environmental management systems — Requirements with guidance for use*

19 Conditions

19.1 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.

19.2 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.

19.3 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.

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

19.5 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.

19.6 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.