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Agrément Certificate
99/3586
Product Sheet 1

GENERAL MEMBRANE ROOF WATERPROOFING MEMBRANES

PHOENIX STAR AND PHOENIX STAR MINERAL ROOF WATERPROOFING MEMBRANES

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to Phoenix Star and Phoenix Star Mineral Roof Waterproofing Membranes, torch-applied, polyester reinforced, atactic polypropylene (APP) modified bitumen roof waterproofing membranes, for use as waterproofing on flat and pitched roofs.

AGRÉMENT 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 systems 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).

Durability — under normal service conditions the systems will provide a durable roof waterproofing with a service life in excess of 20 years (see section 11).

The BBA has awarded this Agrément 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

Simon Wroe
Head of Approvals — Materials

Greg Cooper
Chief Executive

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Originally certificated on 15 March 1999

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.

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Regulations

In the opinion of the BBA, Phoenix Star and Phoenix Star Mineral Roof Waterproofing Membranes, if used in accordance with the provisions of 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)

Requirement: B4(2)	External fire spread
Comment:	On suitable substructures the use of the systems will enable a roof to be unrestricted under the requirements of this Regulation. See sections 7.1 to 7.4 of this Certificate.
Requirement: C2(b)	Resistance to moisture
Comment:	The membranes, including joints, indicate that the systems meet this Requirement. See section 6.1 of this Certificate.
Requirement: Regulation 7	Materials and workmanship
Comment:	The systems are acceptable. See section 11.1 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 systems satisfies the requirement of this Regulation. See sections 10.1 to 10.3, 11.1 and the <i>Installation</i> part of this Certificate.
Regulation: 9	Building standards – construction
Standard: 2.8	Spread from neighbouring buildings
Comment:	The membranes when applied to a suitable substructure, are regarded as having low vulnerability under clause 2.8.1 ⁽¹⁾⁽²⁾ of this Standard. See sections 7.1, 7.2 and 7.4 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 membranes 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 – conversions
Comment:	Comments made in relation to these systems 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) 2000 (as amended)

Regulation: B2	Fitness of material and workmanship
Comment:	The systems are acceptable. See section 11.1 and the <i>Installation</i> part of this Certificate.
Regulation: B3(2)	Suitability of certain materials
Comment:	The systems are acceptable materials. See sections 10.1 to 10.3 of this Certificate.
Regulation: C4(b)	Resistance to ground moisture and weather
Comment:	The membranes, including joints, indicate that the use of the systems can enable a roof to satisfy the requirements of this Regulation. See section 6.1 of this Certificate.
Regulation: E5(b)	External fire spread
Comment:	On suitable substructures the use of the systems will be unrestricted by the requirements of this Regulation. See sections 7.1 to 7.4 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 2011

NHBC accepts the use of Phoenix Star and Phoenix Star Mineral Roof Waterproofing Membranes, when installed and used 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 standard 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 Phoenix Star and Phoenix Star Mineral Roof Waterproofing Membranes are torch-applied, polyester reinforced, atactic polypropylene (APP) modified bitumen roof waterproofing membranes, with either a silica sand or slated finished upper surface and a thermofusible thermoplastic film on the lower surface.

1.2 The membranes are manufactured to the nominal characteristics given in Table 1.

Characteristics (units)	Phoenix Star	Phoenix Star Mineral
Thickness* (mm)	4.0	4.0 ⁽¹⁾
Width* (m)	1.0	1.0
Length* (m)	10	10
Mass per unit area (kg·m ⁻²)	4.0	5.2
Roll weight (kg)	40	52
Tensile force* (N per 50 mm)		
longitudinal direction	900	900
transverse direction	650	650
Elongation*		
longitudinal direction	40	40
transverse direction	45	45
Nail tear* (N)		
longitudinal direction	200	200
transverse direction	200	200
Water vapour transmission — S _d * (m)	480	480
Impact* (mm)	1250	1250
Static loading* (kg)	20	20
Dimensional stability* (kg)		
longitudinal direction	± 0.3	± 0.3
transverse direction	± 0.3	± 0.3
Low temperature flexibility* (°C)	-15	-15
Heat resistance* (°C)	130	130

(1) Excluding slate finish.

1.3 Ancillary items for use with Phoenix membranes include:

- General Rapid Primer — a solution of bitumen in solvents for priming substrates
- Pegasus Spot — a perforated layer for partially bonded applications.

2 Manufacture

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

2.2 To ensure product quality is consistently maintained to the required specification, the BBA has:

- agreed with the Certificate holder 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 as part of a surveillance process to ensure that standards are maintained and that the products remain as Certificated.

2.3 The management system of General Membrane SpA has been assessed and registered as meeting the requirements of EN ISO 9001 : 2008 by Certiquality (Certificate 7220).

3 Delivery and site handling

3.1 The membranes are delivered to site in rolls sealed with tape. The roll sealing tape bears the product name and the BBA identification mark incorporating the number of this Certificate.

3.2 Individual rolls must be stored in an upright position on a clean, level surface and kept dry.

3.3 The primer is supplied in 5, 10 or 20 litre cans.

Assessment and Technical Investigations

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

Design Considerations

4 General

4.1 Phoenix Star and Phoenix Star Mineral Roof Waterproofing Membranes, are suitable for use as a roof waterproofing layer in:

- fully or partially bonded flat or pitched roofs with limited access, as part of a built-up specification and where necessary in conjunction with appropriate reinforced bitumen membranes to BS 8747 : 2007
- single-ply, loose-laid specifications, ballasted with aggregate on flat roofs with limited access
- single-ply, loose-laid specifications, under heavy protection (eg concrete slabs, etc) on flat roofs with regular pedestrian traffic.

4.2 The mineral finished membrane is satisfactory for use, where appropriate, as an exposed cap sheet or in detail work.

4.3 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).

4.4 Flat roofs are defined for the purpose 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.

4.5 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 2011*, Chapter 7.1 *Flat roofs and balconies*.


4.6 Insulation materials to be 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, and within the scope of that Certificate.

5 Practicability of installation

The products must be installed by installers trained and approved by the Certificate holder.

6 Weathertightness

 6.1 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 C4(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 Results of tests indicate the following systems will be designated as unrestricted:

- 20 mm thick primed chipboard, one layer of 3 mm glassfibre reinforced APP modified bitumen first layer, torch-bonded to the chipboard; one layer of 4 mm thick Phoenix Star cap sheet, torch-bonded to the first layer
- 20 mm thick primed chipboard, one layer of 3 mm glassfibre reinforced APP modified bitumen first layer, torch-bonded to the chipboard; one layer of 4 mm thick Phoenix Star Mineral cap sheet, torch-bonded to the first layer.

7.2 The membranes when used in protected or loose-laid and ballasted roof 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 Part iii of Table A5 of Appendix A of The Building Regulations (England and Wales), or Technical Booklet E, Table 4.6, Part IV of The Building Regulations (Northern Ireland) (and listed below), the roof is deemed to be of designation AA.

Surface finishes

- 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.

8 Resistance to wind uplift

8.1 Results of tests indicate that the adhesion of bonded systems 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 ballast requirements for loose-laid systems should be calculated in accordance with the relevant parts of BS EN 1991-1-4 : 2005 and the UK National Annex. The membrane 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.

9 Resistance to foot traffic

Results of tests indicate that the systems can accept the limited foot traffic and light concentrated loads associated with the 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.

10 Maintenance



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

10.2 Maintenance should include checks and operations to ensure the following 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 are cleared.

10.3 Where damage has occurred then it should be repaired in accordance with section 15 and the Certificate holder's instructions.

11 Durability



11.1 Phoenix Star and Phoenix Star Mineral, when subjected to normal conditions of exposure and use, will retain their integrity for a period of at least 20 years.

11.2 With the mineral surfaced product, some localised loss of the mineral surfacing may occur after some years in areas where complex detailing of the roof design is incorporated.

12 Reuse and recyclability

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

13 General

13.1 Installation of Phoenix Star and Phoenix Star Mineral Roof Waterproofing Membranes must be carried out by installers trained and approved by the Certificate holder in accordance with the relevant Clauses of BS 8000-4 : 1989 and BS 8217 : 2005, the Certificate holder's instructions and this Certificate.

13.2 Substrates to which the membranes are 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 over the substrate.

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

13.4 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.

13.5 At falls in excess of 1:11, the provision for mechanical fixings as required by BS 8217 : 2005 should be observed.

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

- stone aggregate in dressing compound
- precast concrete paving slabs
- proprietary tiles on bonding compound.

13.7 When using the mineral surface finished membrane, further surface protection is not required when it is used on roofs with limited access.

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

14 Procedure

14.1 When required for fully and partially bonded applications the substrate is primed using General Rapid Primer at a rate between 200 and 350 g·m⁻² dependent on the porosity of the substrate.

Fully bonded applications

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

Partially bonded applications

14.3 Pegasus Spot perforated venting layer is loose-laid edge to edge, over the substrate.

14.4 The membrane is then fully torch-welded onto the perforated layer, ensuring that the bitumen seeps regularly onto the perforations.

14.5 At the perimeter, the waterproofing system must be fully bonded to the substrate for at least one metre from the edge of the roof.

Loose-laid applications

14.6 The membrane is loose-laid over the substrate with the required overlaps (see section 14.9). At the perimeter, the membrane must be fully bonded to the substrate for at least one metre from the edge of the roof.

14.7 To combat the effects of wind uplift the membranes must be ballasted, for example, by:

- a covering of at least 50 mm of well-rounded gravel on 0.2 mm thick polyethylene protective sheet
- paving on plastic pads.

14.8 When using paving on plastic pads, a separation layer must be placed between the membrane and the pads.

Lap joints

14.9 Side and end lap specifications are a minimum of 100 mm and 150 mm respectively.

14.10 Joints are sealed by torching and then consolidated using a roller of suitable width and weight.

14.11 A bead of molten material must exude from all laps to indicate a satisfactory seal and which should be levelled out using a heated, rounded-tip trowel.

15 Repair

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

16 Tests

16.1 An assessment was made on data to EN 13707 : 2004 in relation to:

- thickness*
- width*
- length*
- mass per unit area*
- watertightness*
- tensile force*
- elongation at break*
- static indentation (soft support)*
- dynamic indentation (rigid support)*
- nail tear*
- peel resistance of joint*
- shear resistance of joints*
- low temperature flexibility*
- dimensional stability*
- heat resistance*
- adhesion of granules*.

16.2 An assessment was made on test data in relation to:

- to determine
 - fatigue cycling
 - peel resistance
 - sliding resistance
 - effect heat ageing
 - effect of UV ageing
 - effect of water immersion.
- to assess
 - the effect of substrate movement
 - resistance to wind
 - effect of temperature
 - durability.

17 Investigations

An assessment of the installation instructions was made on the practicability of installation.

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 excavation and filling*
- BS 8217 : 2005 *Reinforced bitumen membranes for roofing — Code of practice*
- BS 8747 : 2007 *Reinforced bitumen membranes (RBMs) for roofing — Guide to selection and specification*
- 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*
- EN ISO 9001 : 2008 *Quality management systems — Requirements*
- EN 13707 : 2004 *Flexible sheets for waterproofing — Reinforced bitumen sheets for roof waterproofing — Definitions and characteristics*

18 Conditions

18.1 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.

18.2 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.

18.3 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.

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

18.5 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
- individual 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.

18.6 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.