

BMI Group UK Limited

BMI House
2 Pitfield, Kiln Farm
Milton Keynes MK11 3LW

Tel: +44 (0)330 123 4585 Fax +44 (0)330 123 4595

e-mail: technical.uk@bmigroup.com

website: bmigroup.com/uk



Agrément Certificate

15/5189

Product Sheet 1

PARABIT HOT-APPLIED WATERPROOFING SYSTEMS

PARABIT SOLO HOT-APPLIED ROOFING SYSTEMS

This Agrément Certificate Product Sheet⁽¹⁾ relates to Parabit Solo Hot-Applied Roofing Systems, for use in waterproofing specifications for flat roofs, including zero fall, inverted roof, podium deck roof, green roof, roof garden and protected roof 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 systems will resist the passage of moisture into the interior of a building (see section 6).

Properties in relation to fire — the systems, when used in a suitable specification, may enable a roof to be unrestricted under the national Building Regulations (see section 7).

Resistance to wind uplift — resistance to wind uplift is dependent on the ballast layers of the roofing specification (see section 8).

Resistance to mechanical damage — the systems will accept, without damage, the limited foot traffic and loads associated with installation, maintenance, pedestrian traffic and minor structural movements occurring in service (see section 9).

Resistance to penetration by roots — the systems, when used in combination with Rootbar Capsheets, will adequately resist plant root penetration (see section 10).

Durability — under normal service conditions, and when fully protected, the systems will provide a durable roof waterproofing for the service life of the roof in which they are incorporated (see section 12).

The BBA has awarded this Certificate to the company named above for the systems described herein. These systems 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 Fourth issue: 3 October 2022

Originally certificated on 12 February 2015

Hardy Giesler
Chief Executive Officer

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 MUST check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.

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

British Board of Agrément

Bucknalls Lane
Watford
Herts WD25 9BA

tel: 01923 665300

clientservices@bbacerts.co.uk

www.bbacerts.co.uk

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Regulations

In the opinion of the BBA, Parabit Solo Hot-Applied Roofing Systems, 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: Comment:	B4(2)	External fire spread When used in suitably protected specifications, the systems may be unrestricted under this Requirement. See sections 7.1, 7.2 (Wales only) and 7.3 of this Certificate.
Requirement: Comment:	C2(b)	Resistance to moisture The systems will enable a roof to satisfy this Requirement. See section 6 of this Certificate.
Regulation: Comment:	7(1)	Materials and workmanship The systems are acceptable. See section 12 and the <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation: Comment:	8(1)(2)	Durability, workmanship and fitness of materials The systems can contribute to a construction satisfying this Regulation. See sections 11 and 12 and the <i>Installation</i> part of this Certificate.
Regulation: Standard: Comment:	9 2.8	Building standards applicable to construction Spread from neighbouring buildings When used in suitably protected specifications, the systems may enable a roof to be unrestricted under clause 2.8.1 ⁽¹⁾⁽²⁾ of this Standard. See sections 7.1 and 7.3 of this Certificate.
Standard: Comment:	3.10	Precipitation The use of the systems 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 of this Certificate.
Standard: Comment:	7.1(a)	Statement of sustainability The systems can contribute to satisfying 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: Comment:	12	Building standards applicable to conversions All comments given for the 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) 2012 (as amended)

Regulation: Comment:	23(a)(i)(iii)(b)(i)	Fitness of materials and workmanship The systems are acceptable. See section 12 and the <i>Installation</i> part of this Certificate.
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Regulation:	28(b)	Resistance to moisture and weather
Comment:		The systems will enable a roof to satisfy the requirements of this Regulation. See section 6 of this Certificate.
Regulation:	36(b)	External fire spread
Comment:		When used in suitably protected specifications, the systems may be unrestricted under the requirements of this Regulation. See sections 7.1 to 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 sections: 1 *Description* (1.3 to 1.5) and 3 *Delivery and site handling* (3.1 and 3.6) of this Certificate.

Additional Information

NHBC Standards 2022

In the opinion of the BBA, Parabit Solo Hot-Applied Roofing Systems, 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, terraces and balconies*.

The NHBC Standards do not cover the use of the systems in the refurbishment of existing roofs.

CE marking

The Certificate holder has taken the responsibility of CE marking the membranes used in the systems in accordance with harmonised European Standard EN 13707 : 2013.

Technical Specification

1 Description

1.1 Parabit Solo Hot-Applied Roofing Systems consist of a hot-applied modified bitumen, reinforced with interwoven glass fibre and used in conjunction with a range of modified bitumen roofing membranes.

1.2 The systems comprise:

- Parabit Hot Melt Compound — a polymer-modified bitumen hot-applied liquid membrane
- Parabit Solo reinforcing grid — an open weave glass fibre 110 g·m² reinforcing mesh (available in 50 x 1 m)
- Siplast Primer — cold bituminous primer for priming plywood, concrete and screeded decks
- Power Elastomeric 250 Sand (covered by Product Sheet 2 of BBA Certificate 91/2618) — a polyester-reinforced, styrene-butadiene-styrene (SBS)-modified bitumen membrane used in conjunction with Parabit Hot Melt Compound and Parabit Solo reinforcing grid. Additional protection is required when used as a capsheet
- Thermaweld (covered by Product Sheet 4 of BBA Certificate 07/4409) — a polyester-reinforced, SBS-modified bitumen membrane for torch-applied details at joints and upstands (not for use with green roofs)
- Rootbar Capsheet Mineral (covered by Product Sheet 1 of BBA Certificate 05/4269) — a polyester-reinforced, SBS-modified bitumen membrane for use as an anti-root layer in green roof applications and used above the Power Elastomeric 250 Sand on green roofs. The capsheet has a mineral on the upper surface and thermofusible film on the lower surface

- Rootbar Capsheet Sanded — a polyester-reinforced, SBS-modified bitumen membrane for use as an anti-root layer in green roof applications and used instead of Power Elastomeric 250 Sand on green roofs. The capsheet has a sand finish on both sides
- Néodyl Strip and Néodyl Cord — an SBS-modified bitumen strip and a synthetic rubber cord, for use at structural joints and expansion joints and subsequently covered with mineral layer
- Xtra-Seal Protection Board — a bitumen-impregnated, water-resistant cellulose board for use on sites where covering of the waterproofing is delayed and excessive foot traffic is anticipated.

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

<i>Table 1 Nominal characteristics</i>			
Characteristic (unit)	Power Elastomeric 250 Sand	Thermaweld	Rootbar Capsheet Mineral/ Sanded
Thickness (mm)	2.1	4.3 ⁽¹⁾	3.2 ⁽¹⁾
Roll width (m)	1	1	1
Roll length (m)	16	8	8
Mass per unit area (kg·m ⁻²)	2.5	5.25	5
Watertightness	pass	pass	pass
Tensile strength (N per 50 mm ⁻¹)			
longitudinal	600	900	740
transverse	550	900	540
Elongation at break (%)			
longitudinal	22	35	40
transverse	25	35	49
Low temperature flexibility (°C)	≤ -15	≤ -20	≤ -15
Flow resistance (°C)	≥ 90	≥ 75	≥ 100
Dimensional stability (%)	≤ 1	≤ 0.5	≤ 0.5
Impact (mm) (soft substrate B)	–	–	1500
Static loading (kg) (soft substrate A)	–	–	20
Surface finish			
lower	sand	thermofusible film	thermofusible film/sand
upper	sand	slate flakes	slate flakes/sand

(1) Including mineral finish.

1.4 Néodyl Strip and Néodyl Cord are manufactured to the following nominal characteristics:

Strip

Roll length (m)	10
Roll width (m)	0.33
Roll weight (kg)	20

Cord

Diameter (mm)	30
Length (m)	10
Weight (kg)	11.

1.5 Xtra-Seal Protection Board is manufactured to the following nominal characteristics:

Board length (m)	2
Board width (m)	1
Board thickness (mm)	2.5
Mass per unit area (kg·m ⁻²)	3.3.

1.6 The Certificate holder recommends the following ancillary items for use with the system, but these materials have not been assessed by the BBA and are outside the scope of this Certificate:

- termination bar — an extruded aluminium termination bar providing a compression seal to concrete or brickwork
- drainage board — a prefabricated drainage board for use in green roofs, plazas and podiums.

2 Manufacture

2.1 Parabit Hot Melt Compound is manufactured by heating and blending bitumen and polymer in a temperature-controlled cycle.

2.2 The membranes are manufactured by saturating and coating the reinforcement with SBS-modified bitumen, and calendaring to the correct thickness.

2.3 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.

2.4 The management system of Icopal BV, the manufacturer of Icopal Parabit Hot Melt, has been assessed and registered as meeting the requirements of EN ISO 9001 : 2015 by Bureau Veritas (Certificate NL007511-1).

2.5 The management system of Icopal SAS, the manufacturer of Rootbar Capsheet Mineral and Rootbar Capsheet Sanded, has been assessed and registered as meeting the requirements of EN ISO 9001 : 2015 by Bureau Veritas (Certificate 1.927.221/C).

2.6 The management system of BMI Group UK Limited, the manufacturer of Power Elastomeric 250 Sand and Thermaweld, has been assessed and registered as meeting the requirements of EN ISO 9001 : 2015 and EN ISO 14001 : 2015 by TÜV NORD (Certificates 44 100 191677 and 44 104 191677 respectively).

3 Delivery and site handling

3.1 Parabit Hot Melt Compound is delivered to site in blocks packaged in silicon-lined cardboard cartons with labels bearing the product name, article number, weight, date of production, batch number, address of the Certificate holder and the BBA logo incorporating the number of this Certificate. The material must be stored under cover and away from heat sources.

3.2 Parabit Hot Melt Compound is unaffected by the temperatures likely to occur during storage and should have an indefinite shelf-life when stored under normal conditions.

3.3 The membranes are delivered to site in rolls in printed wrappers bearing the product name, Certificate holder's name and the BBA logo incorporating the number of their corresponding Certificate.

3.4 Rolls should be stored upright on a clean, level surface and kept dry, away from excessive heat and under cover.

3.5 Parabit Solo Reinforcing Fabric, Néodyl Strip, Néodyl Cord and Xtra-Seal Protection Board are packaged with labels bearing the product trade name, and should be stored under cover and kept dry.

3.6 The Certificate holder has taken the responsibility of classifying and labelling the systems components under the *CLP Regulations (EC) No 1272/2008 on the classification, labelling and packaging of substances and mixtures*. Users must refer to the relevant Safety Data Sheet(s).

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Parabit Solo Hot-Applied Roofing Systems.

Design Considerations

4 General

4.1 Parabit Solo Hot-Applied Roofing Systems are satisfactory for use as a waterproofing layer during installation on flat roofs, including zero fall, with limited access, in:

- inverted roof specifications
- protected roof specifications (including podium deck roofs), eg covered by pavers or other suitable protection
- roof gardens or green roof systems.

4.2 Decks to which the systems are to be applied must comply with the relevant requirements of BS 6229 : 2018, BS 8217 : 2005 and, where appropriate, *NHBC Standards 2022*, Chapter 7.1.

4.3 Concrete substrates to which the systems are to be applied must comply with the relevant requirements of BS 6229 : 2018 and, where appropriate, *NHBC Standards 2022*, Chapter 7.1. The following substrates are suitable for use with the systems:

- in-situ structural concrete
- precast concrete
- concrete block in vertical applications
- lightweight structural concrete (subject to the manufacturer's recommendations)
- new exterior grade plywood (to BS EN 636 : 2012, Clause 8), fixed in accordance with the relevant requirements of BS 6229 : 2018 and BS 8217 : 2005.

4.4 In-situ structural concrete with a density of less than $1850 \text{ kg}\cdot\text{m}^{-3}$ (owing to substrate friability) and lightweight insulating concretes are not acceptable substrates for application of the systems.

4.5 The following terms are defined for the purpose of this Certificate as:

- roof garden (intensive) — a roof with a substantial layer of growing medium with planting that can include shrubs and trees, generally accessible to pedestrians
- green roof (extensive) — a roof with a shallow layer of growing medium planted with low-maintenance plants such as mosses, sedums, grasses and some wildflower species.

4.6 Limited access roofs are defined for the purpose of this Certificate as those subjected only to pedestrian traffic associated with the installation of the membrane or for maintenance of the roof covering prior to encapsulation, cleaning of gutters etc. Where traffic in excess of this is envisaged, additional protection to the systems must be provided (see section 9).

4.7 Flat roofs are defined for the purpose of this Certificate as those having a minimum finished fall of 1:80⁽¹⁾. For design purposes, twice the minimum finished fall should be assumed, unless a detailed analysis of the roof is available, including such features as overall and local deflection and direction of falls.

(1) *NHBC Standards 2022* require a minimum fall of 1:60 for green roofs and roof gardens.

4.8 Pitched roofs are defined for the purpose of this Certificate as those having a fall greater than 1:6.

4.9 Zero fall roofs are defined for the purpose of this Certificate as those having a finished fall which can vary between 0° and 1:80⁽¹⁾. Reference should also be made to the appropriate clauses in the Liquid Roofing and Waterproofing Association (LWRA) Note 7 – *Specifier Guidance for Flat Roofs*.

(1) *NHBC Standards 2022* require a minimum fall of 1:60 for green roofs and roof gardens.

4.10 The structural decks to which the systems are to be applied must be suitable to transmit the dead and imposed loads experienced in service. Allowance needs to be made for loading deflections, to ensure that the free drainage of water is maintained.

4.11 Imposed loads, dead loading and wind loads specifications 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.

4.12 When the systems are used in gravel-ballasted protected roof or inverted roof specifications, a suitable filter layer/water flow reducing layer must be used between the ballast and the rest of the specification.

4.13 When the systems are used in roof garden or green roof specifications, Rootbar Capsheet Mineral or Rootbar Capsheet Sanded must be used as part of the systems.

4.14 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*.

4.15 The drainage systems for inverted roofs, green roofs or roof gardens must be correctly designed, and the following points should be addressed:

- provision made for access for maintenance purposes
- for zero fall roofs, it is particularly important to identify the correct drainage points, to ensure that drainage is sufficient and effective
- dead loads for green roof and roof gardens can increase if the drains become partially or completely blocked causing waterlogging of the drainage layer
- additional guidance for inverted roof specifications is given in BBA Information Bulletin No 4 *Inverted roofs – Drainage and U value corrections*.

4.16 Insulation systems or materials used in conjunction with the systems must be:

- as described in the relevant clauses for inverted roofs in BS 6229: 2018, or
- the subject of a current BBA Certificate for inverted roofs and used in accordance with, and within the limitations of, that Certificate, and approved by the Certificate holder.

4.17 The NHBC requires that the waterproofing membranes, once installed, are inspected in accordance with *NHBC Standards 2022*, Chapter 7.1, Clause 7.1.12, and undergo an appropriate integrity test, where required. Any damage to the membrane is repaired in accordance with section 15 of this Certificate and reinspected.

5 Practicability of installation

The systems should only be installed by trained contractors using specialist equipment.

6 Weathertightness



The membranes, including joints, when completely sealed and consolidated, will adequately resist the passage of moisture into the interior of a building and so satisfy the requirements of the national Building Regulations

7 Properties in relation to fire



7.1 A roof incorporating the systems will be unrestricted with respect to proximity to a boundary under the national Building Regulations in the following circumstances:

- protected or inverted roof specifications, including an inorganic covering listed in the Annex of Commission Decision 2000/553/EC
- a roof garden covered with a drainage layer of gravel 100 mm thick and a soil layer 300 mm thick
- irrigated roof gardens and green roofs.



7.2 Exposed areas of the capsheets, when used with one of the surface finishes detailed in Approved Document B, Appendix A, Table A5, part iii (Wales) and Technical Booklet E, Table 4.6, part iv (Northern Ireland), and as listed below, would be deemed to be unrestricted with respect to proximity to a boundary:

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



7.3 The classification and permissible areas of use of other specifications should be confirmed by reference to the requirements of the documents supporting the national Building Regulations.

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

8 Resistance to wind uplift

8.1 The systems, when used within a suitable specification, will adequately resist the effects of wind uplift likely to occur in practice.

8.2 The ballast requirements for inverted roof system should be calculated by a suitably experienced and competent individual in accordance with the relevant parts of BS EN 1991-1-4 : 2005 and its UK National Annex. When gravel ballast is used, the systems should always be loaded 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.

8.3 The soil used in intensive plantings should not be of a type that will be removed, or become localised, owing to wind scour experienced on site.

8.4 It should be recognised that the type of plants used could significantly affect the expected wind loads experienced in service.

9 Resistance to mechanical damage

9.1 The systems can accept the limited foot traffic and light concentrated loads associated with installation and maintenance. Reasonable care should be taken to avoid puncture of the systems by sharp objects or concentrated loads. Where traffic in excess of this is envisaged, such as for maintenance of lift equipment or pedestrian areas, suitable protection of the installed membrane (for example, using concrete slabs supported on bearing pads) must be used.

9.2 Once the green roof, roof garden or specified membrane protection/covering is installed, it can be regarded as a suitable protection for the membrane in use.

9.3 When used over construction or expansion joints, the systems can accommodate, without damage, the minor structural movements likely to occur under normal service conditions.

9.4 The systems are capable of accepting minor structural movement while remaining weathertight.

10 Resistance to penetration by roots

Results of root penetration resistance tests on Rootbar Capsheet Mineral or Rootbar Capsheet Sanded, including joints, indicate that they are resistant to root penetration and can be used in roof waterproofing specifications for roof gardens and green roofs.

11 Maintenance



11.1 The systems should be the subject of six-monthly inspections and maintenance in accordance with BS 6229 : 2018, Chapter 7, and the manufacturer's own maintenance requirements, where relevant, to ensure continued satisfactory performance.

11.2 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 for the maintenance of roof gardens and green roofs is available within the latest edition of *The GRO Green Roof Code — Green Roof Code of Best Practice for the UK*.

11.3 Where damage has occurred it should be repaired at the earliest opportunity, in accordance with section 15 and the Certificate holder's instructions.

12 Durability



When fully protected and subject to normal service conditions, the systems can provide an effective barrier to the transmission of liquid water and water vapour for the design life of the roof in which they are incorporated.

Installation

13 General

13.1 Parabit Solo Hot-Applied Roofing Systems must be installed in accordance with this Certificate and the Certificate holder's instructions, on a dry and frost-free substrate. After rain or snow, the substrate must be allowed to dry before installation can commence. The installing contractor can aid drying by suitable means approved by the Certificate holder. Once applied, the systems are not affected by rain, snow or frost.

13.2 The surface of the concrete substrate must be sound and free from contaminants, with a surface finish in accordance with the Certificate holder's criteria.

13.3 To assess the suitability of a substrate to receive the membranes, bond tests must be carried out in accordance with the Certificate holder's instructions. If bonding problems occur, advice should be sought from the Certificate holder.

13.4 The substrate is primed using Siplast Primer at a nominal coverage rate of $5 \text{ m}^2 \cdot \ell^{-1}$, dependent on substrate porosity, and allowed to dry.

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

14 Procedure

14.1 Parabit Hot Melt Compound blocks are heated in an air-jacketed boiler (with continuous agitation) or a thermostatically controlled bitumen boiler to a temperature of approximately 180°C , with a maximum allowable temperature of 205°C . Overheating of the hot melt compound must be avoided.

14.2 Parabit Solo Reinforcing Fabric is unrolled over the primed substrate, with overlaps of 75 mm minimum at the sides and end of a roll.

14.3 Power Elastomeric 250 Sand is unrolled over the reinforcement with overlaps of 100 mm at the side and 150 mm at the end. The membranes must always be installed with end laps staggered a minimum of 300 mm and in such a manner that no counter-seams in the direction of outlets are made. The membrane is rolled back on itself, prior to the application of the hot-melt compound.

14.4 The hot-melt compound is poured through the reinforcement at an application rate of $3 \text{ kg}\cdot\text{m}^{-2}$ ensuring that the reinforcement is fully encapsulated by the hot-melt.

14.5 Power Elastomeric 250 Sand is immediately unrolled into the hot melt compound; excess compound may extrude from the edges of the membrane. The hot-melt is poured ahead of the unrolled membrane. The membrane must be fully bonded to the hot-melt.

14.6 For green roof and roof garden applications, Rootbar Capsheet Sanded should replace Power Elastomeric 250 Sand. Rootbar Capsheet Mineral is used at exposed details.

14.7 Upstands and other detailing are carried out in accordance with the Certificate holder's installation instructions.

15 Repair

In the event of minor damage, the capsheets can be fully repaired with an additional patch of the applicable capsheet bonded to the damaged area using the appropriate installation method.

Technical Investigations

16 Tests

16.1 Tests were conducted on Parabit Hot Melt Compound and the results assessed to determine:

- fines content
- cone penetration at 50°C
- flow at 60°C for 5 hours at 75° angle
- low temperature flexibility
- effects of re-melting
- effects of prolonged heating.

16.2 Tests were conducted on Rootbar Capsheet Mineral and Rootbar Capsheet Sanded and the results assessed to determine:

- roll weight
- thickness
- length
- low temperature flexibility
- heat resistance
- dimensional stability
- tensile strength and elongation
- nail tear resistance
- root resistance
- resistance to leakage at joints
- tensile shear of joints
- adhesion
- peel resistance of joints
- water exposure (for 180 days at 60°C)
- chemical resistance.

16.3 Tests were conducted on Power Elastomeric 250 Sand and the results assessed to determine:

- thickness
- width
- mass per unit area
- water resistance
- water vapour transmission
- tensile strength and elongation
- low temperature flexibility
- nail tear resistance
- dimensional stability
- static indentation
- dynamic indentation
- heat resistance
- unrolling at low temperatures
- heat ageing
- water soak.

16.4 Tests were conducted on an assembled system and the results assessed to determine:

- water vapour permeability
- watertightness
- dynamic indentation (control and after heat ageing)
- static indentation (control and after water exposure)
- fatigue cycling (control and after heat ageing).

17 Investigations

17.1 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.

17.2 Data on CE marking for the roofing membranes to EN 13707 : 2013 were examined.

Bibliography

- BS 6229 : 2018 *Flat roofs with continuously supported flexible waterproof coverings — Code of practice*
- BS 8217 : 2005 *Reinforced bitumen membranes for roofing — Code of practice*
- BS EN 636 : 2012 + A1 : 2015 *Plywood — Specifications*
- BS EN 1991-1-1 : 2002 *Eurocode 1 : Actions on structures — General actions — Densities, self-weight, imposed loads for buildings*
NA to BS EN 1991-1-1 : 2002 UK National Annex to *Eurocode 1 : Actions on structures — General actions — Densities, self-weight, imposed loads for buildings*
- BS EN 1991-1-3 : 2003 + A1 : 2015 *Eurocode 1 : Actions on structures — General actions — Snow loads*
NA to BS EN 1991-1-3 : 2003 + A1 : 2015 UK National Annex to *Eurocode 1 : Actions on structures — General actions — Snow loads*
- BS EN 1991-1-4 : 2005 + A1 : 2010 *Eurocode 1 : Actions on structures — General actions — Wind actions*
NA to BS EN 1991-1-4 : 2005 + A1 : 2010 UK National Annex to *Eurocode 1 : Actions on structures — General actions — Wind actions*
- EN 13707 : 2013 *Flexible sheets for waterproofing — Reinforced bitumen sheets for roof waterproofing — Definitions and characteristics*
- EN ISO 9001 : 2015 *Quality management systems — Requirements*
- EN ISO 14001 : 2015 *Environmental management systems — Requirements with guidance for use*
- ETAG 005 *Guideline for European Technical Approval of Liquid Applied Roof Waterproofing kits Part 1 : General*, March 2004

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
- 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.

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.