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Agrément Certificate

14/5170

Product Sheet 1

PITCHMASTIC PmB ROOF WATERPROOFING SYSTEM

BLUESHIELD PmB ROOF WATERPROOFING SYSTEM

This Agrément Certificate Product Sheet⁽¹⁾ relates to the Blueshield PmB Roof Waterproofing System, a two-part polyurethane, spray-applied system for use as an elastomeric waterproofing layer on pitched, flat and zero fall roofs, and in protected roof, roof garden and green roof specifications on new or existing roofs.

(1) Hereinafter referred to as 'Certificate'.

CERTIFICATION INCLUDES:

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



KEY FACTORS ASSESSED

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

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

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

Resistance to mechanical damage — the system will accept, without damage, the foot traffic and loads associated with installation and the effects of thermal or other minor movements likely to occur in practice (see section 9).

Resistance to root penetration — the system will resist the penetration of roots from green roof and roof garden systems (see section 10).

Durability — under normal service conditions, the system 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 system described herein. This system has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of Third issue: 19 November 2021

Originally certificated on 22 October 2014

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.

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Regulations

In the opinion of the BBA, the Blueshield PmB Roof Waterproofing System, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



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

Requirement: Comment:	B4(1)	External fire spread The system is restricted by this Requirement in some circumstances. See section 7.4 of this Certificate.
Requirement: Comment:	B4(2)	External fire spread On a suitable substructure, the system may enable a roof to be unrestricted under this Requirement. See sections 7.1 to 7.3 of this Certificate.
Requirement: Comment:	C2(b)	Resistance to moisture The system will enable a roof to satisfy this Requirement. See section 6 of this Certificate.
Regulation: Comment:	7(1)	Materials and workmanship The system is 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 system comprises acceptable materials and satisfies the requirements of this Regulation. See sections 11.1 and 12 and the <i>Installation</i> part of this Certificate.
Regulation: Standard: Comment:	9 2.6	Building standards applicable to construction Spread to neighbouring buildings The system is restricted under clause 2.6.4 ⁽¹⁾⁽²⁾ of this Standard in some circumstances. See section 7.5 of this Certificate.
Standard: Comment:	2.8	Spread from neighbouring buildings When applied to a suitable substructure, the system may contribute to a roof being unrestricted under this Standard, with reference to clause 2.8.1 ⁽¹⁾⁽²⁾ . See sections 7.1 to 7.3 of this Certificate.
Standard: Comment:	3.10	Precipitation The system can 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 system can contribute to meeting the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.
Regulation: Comment:	12	Building standards applicable to conversions All comments given for the system under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ .

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation:	23(a)(i)	Fitness of materials and workmanship
Comment:	(iii)(b)(i)	The system comprises acceptable materials and satisfies the requirements of this Regulation. See section 12 and the <i>Installation</i> part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		The system will enable a roof to satisfy the requirements of this Regulation. See section 6 of this Certificate.
Regulation:	36(b)	External fire spread
Comment:		On a suitable substructure, the system may enable a roof to be unrestricted by 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 section: *3 Delivery and site handling* of this Certificate.

Additional Information

NHBC Standards 2021

In the opinion of the BBA, The Blueshield PmB Roof Waterproofing System, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards, Part 7 Roofs, Chapter 7.1 Flat roofs, terraces and balconies*.

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

Technical Specification

1 Description

The Blueshield PmB Roof Waterproofing System comprises:

Blueshield PMCS/01 Primer — a single-component, solvent-based primer containing di-phenylmethane di-isocyanate
Blueshield PmB Waterproofing — a two-part, solvent-free, blue-pigmented polyurethane elastomer, comprising Part A, PmB PU 0308 (catalyst/blue pigment) and Part B, Desmodur PU 0309.

2 Manufacture

2.1 The system components are manufactured by a batch-blending process.

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 Pitchmastic PmB Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 by Lloyd's Register Quality Assurance Ltd (Certificate LRQ10005056).

3 Delivery and site handling

3.1 The system components are delivered as detailed in Table 1. The waterproofing components are transferred into bulk storage vessels, located on the spray vehicle, and maintained at 50 to 80°C prior to spraying.

Table 1 Weights and packaging

Component	Weight (kg)	Container	Shelf-life (months)
Blueshield PMCS/01 Primer	20, 25	Metal/plastic drums	6
Blueshield PmB Waterproofing (Part A)	20, 25, 1000	Metal drums/plastic IBCs	6
Blueshield Pmb Waterproofing (Part B)	20, 25, 1000	Metal drums/plastic IBCs	6
Blueshield PMCS/01 Primer	20, 25	Metal/plastic drums	6

3.2 The Certificate holder has taken the responsibility of classifying and labelling the system components under the *CPL Regulations (EC) No 1273/2008 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 the Blueshield PmB Roof Waterproofing System.

Design Considerations

4 Use

4.1 The Blueshield PmB Roof Waterproofing System is satisfactory for use as a waterproofing layer on new or existing pitched, flat and zero fall roofs in:

- inverted roof specifications using aggregate ballast on flat roofs with limited access
- protected roof specifications using pavers or other suitable protection on flat roofs with limited or pedestrian access
- green roof specifications on flat roofs with limited or pedestrian access, or pitched roofs with limited access
- roof garden specifications on flat roofs with limited or pedestrian access
- biodiverse specifications on flat roofs with limited or pedestrian access or pitched roofs with limited access.

4.2 The system is suitable for use on concrete and metal substrates.

4.3 Decks to which the system is to be applied must comply with the relevant requirements of BS 6229 : 2018 Section 8.4, BS 8217 : 2005 Sections 5.1.2 and 6.7, and, where appropriate, *NHBC Standards 2021*, Chapter 7.1. Attention is drawn to the requirements of these Standards to ensure that reinforced concrete roof slabs are finished to an acceptable standard, allow free drainage of water and are allowed to dry prior to the installation of the waterproofing. When these conditions are not met, appropriate remedial treatment is essential.

4.4 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, and 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
- biodiverse roof — a roof planted with the aim either to recreate the habitat that was lost when the building was erected or to enhance it.

4.5 Limited access roofs are defined for the purpose of this Certificate as those subjected only to pedestrian traffic for maintenance of the roof covering, cleaning of gutters, etc. Where traffic in excess of this is envisaged, additional protection to the waterproofing membrane must be provided. Pedestrian access roofs are defined for the purpose of this Certificate as those not subjected to vehicular traffic.

4.6 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 overall and local deflection, direction of falls, etc.

(1) NHBC Standards 2021 require a minimum fall of 1:60 for green roofs and roof gardens.

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

4.8 Zero fall roofs are defined for the purpose of this Certificate as those having a finished fall of between 0 and 1:80⁽¹⁾ degrees. Recommendations for the design of roof falls are available in the Liquid Roofing and Waterproofing Association (LRWA) *Note 7 — Specifier Guidance for Flat Roof Falls*.

(1) NHBC Standards 2021 require a minimum fall of 1:60 for green roofs and roof gardens.

4.9 Imposed loads, dead loading and wind load specifications should be calculated by a suitably experienced and competent individual 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.

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

4.11 The drainage system for inverted roof, zero fall roofs, green roofs, roof gardens or biodiverse roofs must be correctly designed, and the following points should be addressed:

- where applicable, roof drainage should be designed in accordance with BS EN 12056-3 : 2000
- 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*.

4.12 Insulation materials used in conjunction with the system must be in accordance with the manufacturer's instructions and be either:

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

4.13 The NHBC requires that the roof membranes, once installed, be inspected in accordance with of *NHBC Standards 2021*, Chapter 7.1, Clause 7.1.12, including the use of an appropriate integrity test, where required. Any damage to the membrane is repaired in accordance with section 17 of this Certificate and reinspected.

5 Practicability of installation

The system is installed by the Certificate holder's trained operatives.

6 Weathertightness



The system will adequately resist the passage of moisture into the interior of a building and so enable a structure to comply with the requirements of the national Building Regulations.

7 Properties in relation to fire



7.1 A system comprising a fibre cement board roll primed with polyurethane at a rate of $125 \text{ g}\cdot\text{m}^{-2}$, a base coat of Blueshield PmB Waterproofing spray applied at a rate of $2700 \text{ g}\cdot\text{m}^{-2}$, tested in the flat orientation, is classified⁽¹⁾ as B_{ROOF}(t4) in accordance with BS EN 13501-5 : 2016 and so is unrestricted with respect to proximity to a boundary under the documents supporting the national Building Regulations:

(1) Warringtonfiregent –Classification Report Number 20267D. The report is available from the Certificate holder.

7.2 In the opinion of the BBA, a roof incorporating the system will also be unrestricted under the national Building Regulations with respect to proximity to a boundary in the following circumstances:

- when protected by an inorganic covering (eg gravel or paving slabs) 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 green roofs, roof gardens and biodiverse roofs.

7.3 The designation of other specifications should be confirmed by reference to the requirements of the documents supporting the national Building Regulations.



7.4 In England and Wales, the system, when used in pitches of greater than 70° , excluding upstands, should not be used on buildings that have a storey at least 18 m above ground level and contain: one or more dwellings, an institution, a room for residential purposes (excluding any room in a hostel, hotel or boarding house), student accommodation, care homes, sheltered housing, hospitals or dormitories in boarding schools.



7.5 In Scotland, the system, when used in pitches of greater than 70° , excluding upstands, should not be used on buildings that have a storey at least 11 m above ground level.

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

8 Resistance to wind uplift

8.1 The adhesion of the waterproofing component of the system is sufficient to resist the effects of wind suction, thermal cycling or other minor structural movements likely to occur in service.

8.2 The ballast requirements for the insulation in inverted roof specification components 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. The insulation should always be ballasted with a minimum depth of 50 mm of aggregate or paving. In areas of high-wind exposure, the Certificate holder's advice should be sought.

8.3 The soil used in roof gardens must not be of the type that will be removed, or become localised, owing to wind scour experienced on the roof.

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

9 Resistance to mechanical damage

9.1 When covered with aggregate, the system can accept the limited foot traffic and light concentrated loads associated with installation and maintenance. Superficial damage to the insulation component can be reduced by the use of a filter layer laid directly over the insulation boards. Where pedestrian access is required, inverted roof specifications incorporating pavers or other suitable protection can be used.

9.2 Whilst the membrane can withstand distributed loads, it can be damaged by concentrated point loads and these should be avoided.

9.3 The system is capable of accepting minor structural movement while remaining weathertight.

10 Resistance to penetration of roots

10.1 When used in green roofs and roof gardens, the waterproofing will adequately resist penetration by plant roots.

10.2 Advice on suitable planting specifications can be obtained from the Certificate holder.

11 Maintenance



11.1 The system must be the subject of six-monthly inspections and maintenance in accordance with BS 6229 : 2018, Chapter 7, to ensure continued satisfactory performance.

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

11.3 Any damage must be repaired in accordance with section 17 of this Certificate and the Certificate holder's instructions.

12 Durability



12.1 Under normal service conditions, the system will have a service life in excess of 25 years.

12.2 Where the system is used in a fully protected specification and subjected to normal service conditions, it 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.

Installation

13 General

13.1 The Blueshield PmB Roof Waterproofing System must be installed in accordance with the relevant clauses of BS 8000-0 : 2014, BS 8000-4 : 1989, Liquid Roofing and Waterproofing Association (LRWA) *Note 7 – Specifier Guidance for Flat Roof Falls*, the Certificate holder's instructions and this Certificate.

13.2 Concrete surfaces should have a smooth finish, free from cavities, loosely adhering material and sharp protrusions. Surfaces must be dry and free from oil, grease, curing compounds, moss, algae growth, bituminous products, dust and frost.

13.3 Installation should not be carried out during inclement weather (eg rain, fog or snow). When the temperature is below 0°C, suitable precautions against surface condensation must be taken. During the installation of the system the substrate temperature must be above the dew-point.

14 Site and surface preparation

14.1 Substrates on which the waterproofing component of the system is to be applied must be properly prepared in accordance with the Certificate holder's instructions.

14.2 Adhesion to substrates will depend on the condition and cleanliness of the substrate. Substrates must be visibly dry, sound and free from loose materials or contamination (eg moss or algae).

14.3 New concrete must be well compacted and finished, preferably by power floating and power trowelling to a dense, smooth finish, free from defects. The substrate must be prepared by captive blasting, hydroblasting or other methods approved by the Certificate holder. Concrete toppings and screeds must be properly formulated, applied and compacted. They must be bonded to the substrate and have a floated finish with minimum laitance.

14.4 Surfaces must be dry, and free from laitance and other contaminants likely to affect the adhesion of the system. Any existing coatings must be removed. The substrates must be prepared by shot blasting, hydro-blasting or other approved methods. All loose material must be removed by vacuum cleaning or sweeping the surface.

14.5 Cracks and other defects in the substrate must be repaired using an approved repair material. The advice of the Certificate holder should be sought for approved products.

15 Application

Primer

15.1 Blueshield PMCS/01 Primer is applied by airless spray, roller or brush at a minimum coverage rate of $65 \text{ g}\cdot\text{m}^{-2}$.

15.2 The primer is over-sprayed with Blueshield PmB Waterproofing membrane within 24 hours of application, provided the primed surface is clean and dry.

15.3 If more than 24 hours elapse or the primed surface becomes wet due to rain or condensation, the primer must be abraded and the area re-primed.

Waterproofing membrane

15.4 Blueshield PmB Waterproofing components Parts A and B are stored in temperature-controlled tanks, maintained at between 50 and 80°C, within the spray equipment plant during application.

15.5 The spray equipment is computer controlled, and maintains a Part A : Part B mix ratio of 100 : 96 \pm 5% by weight.

15.6 Blueshield PmB Waterproofing membrane (pigmented blue) is spray-applied in one coat, two coats or multiple coats at a coverage rate of $2.7 \text{ kg}\cdot\text{m}^{-2}$ to give a minimum total thickness of 2 mm including peaks, arrises and irregularities in the concrete deck.

15.7 In the two-coat system, a minimum thickness of 1 mm is applied in the first coat and allowed to dry. Within four hours the second coat is applied to achieve a total minimum thickness of 2 mm. In the multiple-coat system, each coat is applied within four hours of the previous coat to achieve a total minimum thickness of 2 mm. If the four-hour interval in the two-coat and multiple-coat system is exceeded, an additional coat of Blueshield PMCS/01 Primer is required before the next coat is applied.

Lapping

15.8 Where a new waterproofing membrane is joined to an existing Blueshield PmB Waterproofing membrane, and at day joints, the new application must be lapped onto the existing membrane by a minimum of 100 mm.

15.9 Where the existing membrane is clean and less than four hours old, no additional preparation is necessary. If it is dirty or contaminated, the membrane surface must be cleaned using a suitable solvent, eg acetone.

15.10 Where the existing membrane is over four hours old, Blueshield PMCS/01 Primer must be applied to give a minimum margin of 20 mm greater than the lap and allowed to dry.

15.11 Detailing (eg upstands) must be carried out in accordance with the Certificate holder's instructions.

Pin/blow holes/blisters

15.12 Within four hours of membrane application, identified pin holes, blow holes and blisters are over-sprayed with Blueshield PmB Waterproofing membrane to a minimum thickness of 2 mm.

15.13 After four hours of membrane application, the area over and around any pin hole, blow hole or blister is cleaned using a suitable solvent, ensuring a minimum 150 mm lap. The repair area is abraded and Blueshield PMCS/01 Primer is applied by brush or spray.

15.14 A minimum of 30 minutes must be allowed for the primer to dry before the Blueshield PmB Waterproofing membrane is applied to a minimum thickness of 2 mm, ensuring a minimum peripheral lap of 100 mm around the repair.

On-site quality control

15.15 Site control checks are made by the Certificate holder's trained operatives in accordance with their instructions.

16 Protective finishes

16.1 The top of the ballast/protective layer must be a minimum of 150 mm from the top of parapets, details and services.

Gravel

16.2 To prevent flotation, wind uplift and UV degradation, inverted insulation boards up to 50 mm thick must be loaded with at least a 50 mm deep covering of river-washed, rounded stones of nominal size 20 to 32 mm, round washed broken stone of similar size, or similar stone approved by the Certificate holder.

16.3 It is essential that the depth and size of gravel are such that the system is completely covered and protected.

16.4 The proportion of fines in the aggregate must be kept to a minimum to prevent the risk of gullies being blocked and to discourage organic growth.

16.5 The dead load imposed by 50 mm of gravel is approximately 80 kg·m⁻². The deck must be capable of withstanding this as well as any additional loads, static or imposed.

16.6 The gravel loading specification is used on roofs in sheltered regions or low- to medium-rise buildings up to ten storeys. When laid in moderate exposure zones, or on buildings of up to fifteen storeys, this gravel specification is permitted but the perimeter should be loaded with paving. For severe exposure zones or tall buildings, specialist advice should be sought. BRE Digest 311 should be used when a calculation is required for a specific building project.

Paving slabs

16.7 Depending on access to the roof and wind effects, one of the following arrangements should be used:

- standard pressed concrete paving slabs to BS EN 1339 : 2003 on appropriate spacers, (see section 16.8), or
- standard pressed concrete paving slabs or paving bricks on 20 mm depth of either gravel graded 4 to 8 mm, or sand or small gravel, on a slip sheet of non-woven, synthetic fibre fleece or fine polyethylene mesh, aperture 2 mm or less, or similar material approved by the Certificate holder.

16.8 The paving should have a minimum thickness of 50 mm. Ballast requirements should be calculated in accordance with the relevant parts of BS EN 1991-1-4 : 2005 and its UK National Annex.

16.9 The deck must also safely carry the additional static load of approximately $25 \text{ kg}\cdot\text{m}^{-2}$ for 50 mm thick slabs. When laid in conjunction with an intermediate layer of sand to a depth of 20 mm, a further static load of approximately $40 \text{ kg}\cdot\text{m}^{-2}$ must be taken into account.

16.10 The method of laying and bedding will depend upon the form of the roof, and the Certificate holder's advice should be sought.

Green roofs, roof gardens and biodiverse roofs

16.11 Green roofs, roof gardens and biodiverse roofs should be of a suitable design. In cases of doubt the Certificate holder's advice should be sought.

17 Repair

The repair of minor damage to the system can be achieved effectively by cleaning back to the unweathered material and recoating the damaged area with the membrane as described in sections 15.13 and 15.14.

Technical Investigations

18 Tests

Tests for physical properties and performance were conducted on samples of the system and results assessed to determine:

- water vapour permeability
- water vapour resistance
- water absorption
- tensile strength and elongation
- resistance to water penetration
- resistance to chisel impact
- resistance to thermal shock, heat ageing and crack cycling
- resistance to aggregate indentation
- tensile adhesion to concrete
- fatigue cycling
- static indentation
- dynamic indentation
- effects of long-term heat ageing
- effects of long-term water exposure.

19 Investigations

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

19.2 A visit was made to existing site to assess the system's performance in use.

19.3 Test data on root resistance for the waterproofing membrane was assessed.

Bibliography

BRE Digest 311 *Wind scour of gravel ballast on roofs*

BS 6229 : 2018 *Flat roofs with continuously supported flexible waterproof coverings — Code of practice*

BS 8000-0 : 2014 *Workmanship on construction sites — Introduction and general principles*

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 1339 : 2003 *Concrete paving flags — Requirements and test methods*

BS EN 1991-1-1 : 2002 *Eurocode 1: Actions on structures — General actions — Actions on structures exposed to fire*

NA to BS EN 1991-1-1 : 2002 UK National Annex to *Eurocode 1: Actions on structures — General actions — Actions on structures exposed to fire*

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*

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

BS EN 13501-5 : 2016 *Fire classification of construction products and building elements — Classification using data from fire resistance tests on products and elements used in building service installations: fire resisting ducts and fire dampers*

BS EN ISO 9001 : 2015 *Quality management systems — Requirements*

20 Conditions

20.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page – no other company, firm, organisation or person may hold 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.

20.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

20.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

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

20.5 In issuing this Certificate the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

20.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.