



Pitchmastic PmB Ltd

Royds Works
Attercliffe Road
Sheffield S4 7WZ
Tel: 0114 270 0100 Fax: 0114 276 8782
e-mail: pmb@dewpitchmastic.co.uk
website: www.pitchmasticpmb.co.uk

Roads and Bridges
Agrément Certificate
No 98/R101
Second issue*

Designated by Government
to issue
European Technical
Approvals

PmB BRIDGEDECK WATERPROOFING SYSTEM

Système d'étanchéité pour tablier de pont
Wasserdichtungsmittel für Brückentafel

Product



Boyne bridge

• THIS CERTIFICATE RELATES TO THE PmB BRIDGEDECK WATERPROOFING SYSTEM INCORPORATING A TWO-PART, SPRAY-APPLIED, BLUE PIGMENTED POLYURETHANE ELASTOMER.

• The system is for use as a bridgedeck waterproofing system for concrete decks of highway bridges in accordance with the requirements of the Highways Agency; acting on behalf of the Scottish Executive; the Welsh Assembly Government and the Department for Regional Development, Northern Ireland and the Conditions as set out in this Certificate.

• The system is marketed and installed by the Certificate holder.

Highways Agency Requirements

1 Requirements

The requirements for Bridgedeck Waterproofing are given in the following documents:

- (a) Manual of Contract Documents for Highway Works, Volume 1 (MCHW1) Specification for Highway Works, and Volume 2 (MCHW2) notes for Guidance on the Specification for Highway Works.
- (b) BD 47 Waterproofing and Surfacing of Concrete Bridge Decks.

Regulations

2 Construction (Design and Management) Regulations 1994 (as amended) Construction (Design and Management) Regulations (Northern Ireland) 1995 (as amended)

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

See sections:

3 Description (3.1), 4 Delivery and site handling (4.2 and 4.3), and 6 Precautions during installation.

Technical Specification

3 Description

3.1 The PmB Bridgedeck Waterproofing System comprises:

- Pitchmastic PMCS/01 Primer — a single-component, solvent-based primer containing di-phenylmethane di-isocyanate
- PmB Waterproofing — a two-part, solvent-free, blue pigmented polyurethane elastomer, comprising; Part A, PmB TP PU 0308/catalyst/blue pigment and Part B, Desmodur TP PU 0309
- Pitchmastic PM2/03 Tack Coat — a single-component, solvent-based polymer-modified bitumen tack coat, for use with additional protective layer (APL) of sand asphalt
- PM2/02 HC Tack Coat System — for use with hot-rolled asphalt (HRA) surfacing. A three-component tack coat system comprising:
 - PmB Binder — a two-part polyurethane elastomer, comprising; Part A, 08S.TC polyol and Part B, 09S.TC isocyanate
 - Dark Green Basalt Aggregate — BW 2.0–4.5 mm
 - PM2/02 HC Tack Coat — a single-component, polymer modified bitumen emulsion.
- PM-HM/01 Tack Coat System — for use with hot-rolled asphalt (HRA) surfacing. A three-component tack coat system comprising:
 - PmB Binder — a two-part polyurethane elastomer, comprising; Part A, 08S.TC polyol and Part B, 09S.TC isocyanate
 - Dark Green Basalt Aggregate — BW 2.0–4.5 mm
 - PM-HM/01 Tack Coat — a polymer-modified, bituminous-based hot melt adhesive.

3.2 The components of the system are manufactured by a batch-blending process. A series of quality control checks is conducted on each batch and on the combined components.

4 Delivery and site handling

4.1 The components of the system are delivered as detailed in Table 1.

4.2 The waterproofing components are transferred into bulk storage vessels, located on the spray vehicle, and maintained at 50°C to 80°C prior to spraying. Both components are hygroscopic; however, when stored in tightly sealed containers they will remain stable for at least six months.

Table 1 Weights and packaging

Component	Weight	Container	Shelf-life (months)
Pitchmastic Primer	2.5 kg, 25 kg	Metal drums	6
PmB Waterproofing	60 kg, 1 tonne IBC	Plastic drum/tankers	6
Pitchmastic PM2/03 Tack Coat	60 litre, 200 litre, 1 tonne IBC	Metal drum	6
PmB Binder	19.5 kg, 25 kg	Composite packs	6
Dark Green Basalt	25 kg	sacks	N/A
PM2/02 Tack Coat	60 litre, 200 litre, 1 tonne IBC	drums	6
PM-HM/01 Tack Coat	18 kg	paper sacks	N/A

4.3 The components are classified under the Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 (CHIP3) and all containers bear the appropriate hazard warning label(s). Flashpoints and hazard classification are given in Table 2.

Table 2 Flashpoint and hazard classification

Component	Flashpoint (°C)	Classification
Primer (PMCS/01)	3	Highly flammable/Harmful
Part A (0308)	165	Harmful
Part B (0309)	>200	Harmful
Tack coat (PM2/03)	<21	Highly flammable/Harmful
PmB Binder Part A	>65	Harmful
PmB Binder Part B	>200	Harmful

Design Data

5 General

5.1 The PmB Bridgedeck Waterproofing System is suitable for use on concrete bridge decks of at least 28 days old with a maximum surface moisture content of 6% and a Class U4 uniformed surface finish.

5.2 Installation of the system should only be carried out at a minimum air temperature of 4°C and rising, and the air temperature should be at least 3°C above the dew-point.

6 Precautions during installation

Health and Safety Data Sheets and the Control of Substances Hazardous to Health Regulations 2002 (COSHH) risk assessments for the works should be deposited with the purchaser and be maintained on site.

7 Durability

Results of tests indicate that the system will provide an effective waterproof layer to the concrete bridge deck, provided it is not damaged during subsequent resurfacing.

8 General

8.1 Installation of the PmB Bridgedeck Waterproofing System should be carried out only by the Certificate holder's trained operatives under competent supervision.

8.2 The Certificate holder is responsible for training and monitoring its installers to ensure that the system is installed in accordance with the BBA agreed Method Statement and this Certificate.

9 Preparation

9.1 Imperfections in the concrete deck should be reinstated by the Highway Authority with a material agreed in consultation with the Certificate holder.

9.2 The concrete deck should be clean, dry, and free from ice, frost, laitance, loose aggregate, oil, grease, moss, algae growth, dust and other debris, and where the adhesion to the concrete would be impaired, free from curing liquids, compounds and membranes.

9.3 The air temperature together with relative humidity should be recorded and the installation should not proceed if air temperature is not a minimum of 4°C and rising, and the air temperature at least 3°C above that of the dew-point.

10 Application

Primer

10.1 Pitchmastic PMCS/01 Primer can be applied by spray, roller or brush at a coverage rate of 40 gm⁻² to 65 gm⁻² dependent on the porosity of the concrete deck.

10.2 The primer can be oversprayed with PmB Waterproofing membrane at any time, within 24 hours of application, provided the primed surface is clean and dry.

10.3 If the 24 hours is exceeded or the primed surface becomes wet due to rain or condensation, the primer should be abraded and the area re-primed.

Waterproofing membrane

10.4 PmB Waterproofing, components Part A and Part B are stored in temperature controlled tanks, maintained at 50°C to 80°C, within the spray equipment plant during application.

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

10.6 PmB Waterproofing membrane, pigmented blue, is spray applied in one, two or multiple coats at a nominal coverage rate of 2.7 kgm⁻² to give a minimum total thickness of 2 mm overall including peaks, arrises and irregularities in the concrete deck.

10.7 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 bring the total minimum thickness to 2 mm. In the multiple coat system, each coat is applied within four hours of the previous coat to bring the total minimum thickness to 2 mm. Where the four-hour interval in the two-coat and multiple coat system is exceeded, application of Pitchmastic PMCS/01 Primer will be required before applying the next coat.

Lapping

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

10.9 Where the existing membrane is clean and less than four hours old, no additional preparation is necessary.

10.10 When the membrane is clean but over four hours old, Pitchmastic PMCS/01 Primer should be applied to give a minimum margin of 20 mm greater than the lap and allowed to dry.

10.11 Where the existing membrane is dirty, the surface should be cleaned using a suitable solvent and treated as in section 10.10.

Sealing into parapet chase

10.12 PmB waterproofing membrane should be terminated into a primed chase when provided.

Tack coat

10.13 The appropriate tack should be applied to the cured waterproofing membrane only in areas due to receive the additional protective layer (APL) of sand asphalt or hot-rolled asphalt (HRA).

10.14 When APL is to be applied directly onto the system, Pitchmastic PM2/03 Tack Coat should be applied by spray, roller or brush at a coverage rate of 0.2 lm⁻² to 0.3 lm⁻², after one hour of initial membrane application.

10.15 When HRA is to be applied directly onto the system, either PM2/02 HC or PM-HM/01 Tack Coat system should be applied.

10.16 Initially, for both tack coat systems PmB Binder is prepared by adding the entire contents of Part B container to the Part A container, mixed until homogenous and applied either by roller or squeegee at a coverage rate of 0.7 kgm⁻² to 1.0 kgm⁻², after one hour of initial membrane application.

10.17 While the PmB Binder is still wet, Dark Green Basalt Aggregate should be applied by hand at a coverage rate of 2 kgm⁻² to 3 kgm⁻², to achieve an approximate coverage of 80% over the PmB Binder.

10.18 After one hour of initial PmB Binder application, (typical drying time for PmB Binder is one hour at 20°C), either PM2/02 HC or PM-HM/01 Tack Coat should be applied.

10.19 The PM2/02 HC Tack Coat should only be applied at a minimum air temperature of 7°C, in one coat by roller or brush at a coverage rate of 0.3 lm^{-2} to 0.8 lm^{-2} . Precautions should be taken against applying PM2/02 HC Tack Coat when rainfall is likely.

10.20 The PM-HM/01 Tack Coat should be pre-heated to between 160°C and 180°C, and applied by squeegee at a coverage rate of 1.2 kgm^{-2} to 1.7 kgm^{-2} .

10.21 The applied tack coat should be dry and contaminant free, prior to the application of the APL or HRA. Drying time of the tack coat will depend upon site conditions. Typical drying time for Pitchmastic PM2/03 Tack Coat is 30 minutes at 20°C, one hour at 20°C for PmB Binder and two hours at 20°C for PM2/02HC. The PM-HM/01 Tack Coat must be allowed to cool for a minimum of one hour.

10.22 The APL or HRA should be applied without undue delay and preferably no more than 14 days after the tack coat application. Should this period be exceeded or the tack coated areas become contaminated or damaged, the Certificate holder should be contacted for advice.

11 Repair of defects

Pin/blow holes

11.1 Within four hours of membrane application, identified pin/blow holes should be oversprayed with PmB Waterproofing membrane to a minimum thickness of 2 mm.

11.2 After four hours of membrane application, the area over and around any pin/blow holes should be cleaned using a suitable solvent, ensuring a minimum 150 mm lap. The repair area should be abraded and Pitchmastic PMCS/01 Primer applied by brush or spray. A minimum of 30 minutes should be allowed for the primer to dry and the PmB Waterproofing membrane then applied to a minimum thickness of 2 mm, ensuring a minimum peripheral lap of 100 mm around the repair.

Blisters and damage

11.3 These should be made good by cutting back to sound material and repairing as in sections 11.1 and 11.2.

12 Surfacing

The rolling temperature of the surfacing must not fall below the minimum reactivation temperature of 100°C required for the Pitchmastic PM2/03 Tack Coat, 120°C for PM 2/02 HC Tack Coat System and 100°C for PM-HM/01 Tack Coat System.

Technical Investigations

The following is a summary of the technical investigations carried out on the PmB Bridgedeck Waterproofing System.

13 Tests

Laboratory performance tests were carried out on the system which achieved the BD 47 requirements as detailed in Tables 3 and 4.

Table 3 Tests on waterproofing membrane

Test (units)	Method ⁽¹⁾	BD 47 requirements
Resistance to water penetration membrane joint	BD 47 B4.1(d)	satisfactory satisfactory

(1) Test documents are detailed in the *Bibliography*. Numbers/letters in the tables refer to the sections/parts of the document.

Table 4 Tests on waterproofing membrane/system bonded to concrete

Test (units)	Method ⁽¹⁾	BD 47 requirements
Tensile adhesion (Nmm^{-2}) at -10°C at 23°C at 40°C	BD 47 B4.2(d)	0.3 min 0.3 min 0.2 min
Resistance to chloride ion penetration (%)	BD 47 B4.2(e)	0.04 max
Resistance to freeze/thaw tensile adhesion (Nmm^{-2}) chloride ion penetration (%)	BD 47 B4.2(f)	satisfactory 0.3 min 0.04 max
Resistance to heat ageing tensile adhesion (Nmm^{-2}) chloride ion penetration (%)	BD 47 B4.2(g)	satisfactory 0.3 min 0.04 max
Resistance to chisel impact — chloride ion penetration (%) at -10°C at 23°C at 40°C	BD 47 B4.2(h)	satisfactory 0.04 max 0.04 max 0.04 max
Resistance to aggregate indentation — chloride ion penetration (%) at 40°C at 80°C at 125°C	BD 47 B4.2(i)	satisfactory 0.04 max 0.04 max 0.04 max
Thermal shock, heat ageing and crack cycling — chloride ion penetration (%) at -10°C at 23°C at 40°C	BD 47 B4.2(j)	satisfactory 0.04 max 0.04 max 0.04 max
Surfacing to waterproofing system interface shear adhesion (Nmm^{-2}) sand asphalt at -10°C at 23°C at 40°C hot rolled asphalt at -10°C at 23°C at 40°C	BD 47 B4.2(k)	satisfactory 0.2 min 0.2 min 0.1 min 0.2 min 0.2 min 0.1 min
Surfacing to waterproofing system interface tensile bond (Nmm^{-2}) sand asphalt hot-rolled asphalt	BD 47 B4.2(l)	satisfactory 0.1 min 0.1 min

(1) Test documents are detailed in the *Bibliography*. Numbers/letters in the tables refer to the sections/parts of the document.

14 Investigations

14.1 A site trial was carried out to assess the practicability of the installation and quality control/assurance procedures.

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

Bibliography

BD 47/94 *Waterproofing and Surfacing of Concrete Bridge Decks, Appendix B Certification Test Requirements for Waterproofing Systems on concrete Bridge Decks*

Manual of Contract Documents for Highway Works, Volume 1 *Specification for Highway Works*, August 1998 (as amended)

Manual of Contract Documents for Highway Works, Volume 2 *Notes for Guidance on the Specification for Highway Works*, August 1998 (as amended)

Conditions of Certification

15 Conditions

15.1 This Certificate:

- (a) relates only to the product that is named, described, installed, used and maintained as set out in this Certificate;
- (b) is granted only to the company, firm or person identified on the front cover — no other company, firm or person may hold or claim any entitlement to this Certificate;
- (c) is valid only within the UK;
- (d) has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective;
- (e) is copyright of the BBA;
- (f) is subject to English law.

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

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

- (a) are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA;
- (b) continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine;

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

(d) remain in accordance with the requirements of the Highways Agency.

15.4 In granting this Certificate, the BBA is not responsible for:

- (a) the presence or absence of any patent, intellectual property or similar rights subsisting in the product or any other product;
- (b) the right of the Certificate holder to market, supply, install or maintain the product; and
- (c) the actual works in which the product is installed, used and maintained, including the nature, design, methods and workmanship of such works.

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



In the opinion of the British Board of Agrément, the PmB Bridgedeck Waterproofing System is fit for its intended use provided it is installed, used and maintained as set out in this Certificate. Certificate No 98/R101 is accordingly awarded to Pitchmastic PmB Ltd.

On behalf of the British Board of Agrément

Date of Second issue: 31st March 2006

Chief Executive

**Original Certificate issued on 13th August 1998. This amended version includes a change of name and address of the Certificate holder, details of additional tack coat systems for use with HRA surfacing, revised CDM Regulations and new Conditions of Certification.*

British Board of Agrément

P O Box No 195, Bucknalls Lane
Garston, Watford, Herts WD25 9BA
Fax: 01923 665301

©2006

e-mail: mail@bba.star.co.uk
website: www.bbacerts.co.uk



For technical or additional information,
contact the Certificate holder (see
front page).

For information about the Agrément
Certificate, including validity and
scope, tel: Hotline 01923 665400,
or check the BBA website.