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BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

Designated by Government to issue European Technical Approvals

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**Roads and Bridges Agrément Certificate No 02/R128**

# BRITDEX MDP (TWO COAT) BRIDGEDECK WATERPROOFING SYSTEM

Système d'étanchéité pour tablier de pont
Wasserdichtungsmittel für Brückentafel

## Product

- *THIS CERTIFICATE RELATES TO THE BRITDEX MDP (TWO COAT) BRIDGEDECK WATERPROOFING SYSTEM, INCORPORATING A TWO-PART METHACRYLATE RESIN, APPLIED IN TWO COLOUR-CODED COATS.*
- *The system is for use as a bridgedeck waterproofing system for concrete decks of highway bridges in accordance with the requirements of the Department for Transport, Local Government and the Regions, Highways Agency and the conditions set out in this Certificate.*
- *The system is marketed by Universal Sealants (UK) Ltd and is applied by Universal Sealants (UK) Ltd's authorised contractors.*

## Department for Transport, Local Government and the Regions, 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 Highways Works*, and

(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*, 4 *Delivery and site handling*, and 6 *Precautions during installation.*

## Technical Specification

### 3 Description

3.1 The Britdex MDP (Two Coat) Bridgedeck Waterproofing System comprises:

Britdex MDP Primer — a two-part, solvent-free, highly-reactive methacrylate resin, comprising Part A and Part B.

Britdex MDP Waterproofing — a two-part, solvent-free, methacrylate resin, comprising Part A and Part B.

Britdex MDP Tack Coat — a single-component, solvent-based, acrylic resin solution, orange pigmented.

Hardener Powder — 50% benzoyl peroxide with a solid plasticiser, for use in Britdex MDP Primer Part B and Britdex MDP Waterproofing Part B.

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 are delivered as detailed in Table 1. When correctly stored, the unopened containers have a shelf-life of at least six months.

*Table 1 Weights and packaging*

| Component | Weight and packaging |
|---|---|
| Britdex MDP Primer | 25 kg Part A supplied in metal containers<br>25 kg Part B supplied in metal containers |
| Britdex MDP Waterproofing | 25 kg Part A supplied in metal containers<br>23.75 kg Part B supplied in metal containers |
| Hardener Powder | 25 kg supplied in cardboard containers |
| Britdex MDP Tack Coat | 25 kg supplied in metal containers |

4.2 The components are classified under the Chemicals (Hazard Information and Packaging for Supply) Regulations 1994 (CHIP2) and all containers bear the appropriate hazard warning label(s). Flashpoints and hazard classifications are given in Table 2.

*Table 2 Flashpoint and hazard classification*

| Component | Flashpoint (°C) | Classification |
|---|---|---|
| Primer Part A | 10 | Highly flammable and Irritant |
| Primer Part B | 10 | Highly flammable and Irritant |
| Waterproofing Part A | 10 | Highly flammable and Irritant |
| Waterproofing Part B | 10 | Highly flammable and Irritant |
| Tack Coat | 1 | Highly flammable and Irritant |

## Design Data

### 5 General

5.1 The Britdex MDP (Two Coat) Bridgedeck Waterproofing System is satisfactory for use on concrete bridge decks of at least 28 days old with a Class U4 surface finish.

5.2 Installation of the system should only be carried out at a minimum air temperature of 4°C and rising.

### 6 Precautions during installation

Health and Safety Data Sheets and a COSHH risk assessment for the works should be deposited with the Highway Authority and be maintained on site.

### 7 Durability

Results of tests indicate that the Britdex MDP (Two Coat) Bridgedeck Waterproofing System will provide an effective waterproof layer to the concrete bridge deck, provided it is not damaged during subsequent resurfacing.

## Installation

### 8 General

8.1 Installation of the Britdex MDP (Two Coat) Bridgedeck Waterproofing System should be carried out only by contractors authorised and trained by the Certificate holder.

8.2 The Certificate holder is responsible for training and monitoring its authorised contractors 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 authorised contractor.

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 and relative humidity should be recorded. The installation should only proceed if air temperature is a minimum of 4°C and rising, and the bridge deck temperature is above the dew-point.

## 10 Application

### Primer

10.1 Britdex MDP Primer can be applied by spray, roller or brush, at a coverage rate of 0.20 $kgm^{-2}$ to 0.40 $kgm^{-2}$ dependent on the porosity of the concrete deck.

10.2 Britdex MDP Primer is supplied as Part A and Part B. Immediately before use the hardener powder (percentage by weight calculated on total Part A and B components) is stirred into Part B and mixed thoroughly.

10.3 For spray application the quantity of hardener powder in Part B can be varied according to the ambient temperature ie 2% at 30°C, 2.5% at 20°C, 3% at 10°C and 4% at 5°C. The two components Part A and Part B of the primer are metered and mixed in an airless spray unit at a ratio of 1:1 by volume during application.

10.4 For roller or brush application the quantity of hardener powder in Part B can be varied according to the ambient temperature ie 1.5% at 30°C, 2% at 20°C, 3% at 10°C and 4% at 5°C,. Part B is stirred into Part A of the primer at a ratio of 1:1 by volume or weight and mixed thoroughly, the material is then ready for application.

10.5 The primer can be overcoated with Britdex MDP Waterproofing membrane provided the primer is fully cured and the surface is clean and dry.

### Waterproofing membrane

10.6 Britdex MDP Waterproofing can be applied by spray, roller or brush at a coverage rate of 1.5 $kgm^{-2}$ per coat on a U4 surface. The coverage rate will vary with surface irregularity.

10.7 Britdex MDP Waterproofing is supplied as Part A and Part B. Immediately before use the hardener powder (percentage by weight calculated on total Part A and Part B components) is stirred into Part B and mixed thoroughly. Part B is either pigmented yellow or grey.

10.8 For spray application the quantity of hardener powder in Part B can be varied according to the ambient temperature ie 2% at 30°C, 2.5% at 20°C, 3% at 10°C and 4% at 5°C. The two components Part A and Part B of the waterproofing are metered and mixed in an airless spray unit at a ratio of 1:1 by volume during application.

10.9 For roller or brush application the quantity of hardener powder in Part B can be varied according to the ambient temperature ie 1.5% at 30°C, 2% at 20°C, 3% at 10°C and 4% at 5°C, Part B is stirred into Part A of the waterproofing at a ratio of 1:1 by volume or weight and mixed thoroughly, the material is then ready for application.

10.10 Britdex MDP Waterproofing is applied in two coats, first coat pigmented yellow and second coat pigmented grey. Each coat shall be applied to give a minimum wet film thickness of 1.2 mm to ensure a minimum dry film thickness of 1 mm overall, and a total minimum dry film thickness of 2 mm overall, including peaks, arrises and irregularities in the concrete deck.

10.11 The second coat shall be applied directly onto the first coat once it has cured. This will vary with temperature but is typically 20 minutes at 20°C.

### Lapping

10.12 Where the waterproofing membrane is to be joined to an existing Britdex MDP Waterproofing membrane and at day joints, the new application should be lapped onto the existing by a minimum of 50 mm.

10.13 Where the existing membrane is clean, additional preparation is not necessary.

10.14 Where the existing membrane is dirty or contaminated, the surface should be cleaned using a suitable solvent, eg acetone.

### Sealing into parapet chase

10.15 Britdex MDP Waterproofing membrane should be terminated into a primed chase when provided.

### Integrity

10.16 The integrity of the cured Britdex MDP Waterproofing membrane shall be confirmed for each coat application using a non-destructive electronic test, prior to the application of the tack coat.

10.17 Any defects identified in each coat application of the waterproofing membrane shall be reinstated as in section 11 of this Certificate, and only the repaired areas re-tested for each coat, prior to the application of the tack coat.

### Tack coat

10.18 The Britdex MDP Tack Coat 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).

10.19 Britdex MDP Tack Coat can be applied either by spray, roller or brush at a coverage rate of 0.1 $kgm^{-2}$ to 0.4 $kgm^{-2}$, to give a minimum wet film thickness of 0.3 mm on the cured membrane.

10.20 The tack coat should be dry before the application of the APL or HRA. Drying time of the tack coat will depend upon site conditions. Typical drying time for the tack coat is 30 minutes at 20°C.

10.21 The APL or HRA should be applied without undue delay after the tack coat application.

## 11 Repair of defects

### Pin/blow holes

11.1 After application of each coat, any identified pin/blow holes should be overcoated with Britdex MDP Waterproofing membrane at an additional minimum wet film thickness of 1.2 mm per coat.

### Blisters and damage

11.2 Any blisters or damage should be made good by cutting back to sound material, the periphery prepared if necessary as for lapping and a repair coat of Britdex MDP Waterproofing membrane applied as in sections 10.10 and 10.11, ensuring a minimum peripheral lap of 50 mm around the repair.

11.3 Where the damage is through to the concrete deck, the exposed concrete should first be cleaned and then re-primed.

## 12 Surfacing

Temperature of the surfacing when applied should exceed the minimum reactivation temperature of 80°C required for Britdex MDP Tack Coat.

# Technical Investigations

The following is a summary of the technical investigations carried out on the Britdex MDP (Two Coat) 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.

## 14 Other 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.

*Table 3 Tests on waterproofing membrane*

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

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

## Bibliography

BD 47 *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, (MCHW1) *Specification for Highway Works* : May 2001

## Conditions of Certification

### 15 Conditions

15.1 This Certificate:

(a) relates only to the product that is 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) has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective;

(d) is copyright of the BBA.

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, shall be construed as 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 fabricating process(es) 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 by the BBA or its agents;

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

(d) remain in accordance with the requirements of the Department for Transport, Local Government and the Regions, Highways Agency.

15.4 In granting this Certificate, the BBA makes no representation as to:

(a) the presence or absence of any patent 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 nature of individual installations of the product, including methods and workmanship.

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.

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In the opinion of the British Board of Agrément, the Britdex MDP (Two Coat) Bridgedeck Waterproofing System is fit for its intended use provided it is installed, used and maintained as set out in this Certificate. Certificate No 02/R128 is accordingly awarded to Universal Sealants (UK) Ltd.

On behalf of the British Board of Agrément

Date of issue: 13th May 2002

Chief Executive

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