

## DANTEX MANHOLE REINSTATEMENT

### IRONGUARD IRONWORK REINSTATEMENT SYSTEM

This HAPAS Certificate Product Sheet(1) is issued by the British Board of Agrément (BBA), supported by the Highways Agency (HA) (acting on behalf of the Overseeing Organisations of the Department for Transport; Transport Scotland; the Welsh Assembly Government and the Department for Regional Development, Northern Ireland), the Association of Directors of Environment, Economy, Planning and Transport (ADEPT), the Local Government Technical Advisers Group and industry bodies. HAPAS Certificates are normally each subject to a review every three years.

(1) Hereinafter referred to as 'Certificate'.

This Certificate relates to the IronGuard Ironwork Reinstatement System, comprising resin-based mortar, interlocking bricks and polymer-modified grout and finished with high psv chippings, used for the reinstatement of manhole frames and ironwork up to and including Class D400 of BS EN 124 : 1994.

#### CERTIFICATION INCLUDES:

- factors relating to compliance with HAPAS requirements
- factors relating to compliance with Regulations 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

**Performance** — the installed system includes bedding mortars that meet the requirements for compressive strength in HA 104/09, Clause 6.1 (a) to (d), and packing materials and a frame supporting structure that meet HA 104/09, Clauses 7 and 9 respectively (see section 6).

**Durability** — provided the surrounding pavement remains structurally sound, the system will have an anticipated service life in excess of five years (see section 8).

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

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*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](http://www.bbacerts.co.uk)*

## Requirements

In the opinion of the BBA, the IronGuard Ironwork Reinstatement System, when used in accordance with the provisions of this Certificate, is satisfactory as an ironwork reinstatement system for a cover and frame up to and including Class D400 of BS EN 124 : 1994.

## Regulations

Construction (Design and Management) Regulations 2007

Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See section: *3 Delivery and site handling* of this Certificate.

## Technical Specification

### 1 Description

The IronGuard Ironwork Reinstatement System comprises the following components:

- proprietary mortars — two-component, fast-setting, resin-based mortars which meet rapid setting requirements for bedding materials in accordance with the requirements of HA 104/09, Clause 6.1 (a) to (d)
- mono-polymer bricks — proprietary interlocking brick system used in place of class B Engineering bricks as an alternative frame supporting structure
- polymer-modified mastic grout incorporating a 2-5mm aggregate — used as a fill material and surface course
- polymer-modified mastic blocks — added to the polymer-modified mastic grout to absorb the heat from the hot polymer modified mastic grout
- >60 PSV broadcast aggregate — pre-coated (10 mm or 14 mm) or uncoated (2-5 mm) chippings selected to ensure that the surface course meets the skid and texture requirements of the adjacent surface.

### 2 Manufacture

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 being operated by the manufacturer are being maintained.

### 3 Delivery and site handling

3.1 The mono-polymer blocks are delivered to site on pallets, with a delivery note detailing product code, quantity and order number. They are supplied either as individual components or as partially made-up units to the installation requirements.

3.2 The polymer-modified mastic grout and mastic blocks are supplied in blocks shrink-wrapped on pallets. They are labelled with the supplier's name, type and grade of product, batch number and production date. The mastic is not classified under The Chemicals (Hazard Information and Packaging for Supply) Regulations 2009 (CHIP 4)/Classification, Labelling and Packaging of Substances and Mixtures (CLP Regulation) 2009. Site handling must include appropriate measures to include adequate ventilation and appropriate PPE for handling hot asphalt materials.

3.3 The proprietary mortars are supplied to site in 25 kg tubs or bags bearing the supplier's name and address, and mixing instructions. The mortars are classified as 'irritant' under The Chemicals (Hazard Information and Packaging for Supply) Regulations 2009 (CHIP 4)/Classification, Labelling and Packaging of Substances and Mixtures (CLP Regulation) 2009, and bear the appropriate hazard warning label. Site handling must be in accordance with normal health and safety procedures associated with cementitious materials.

## Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the IronGuard Ironwork Reinstatement System.

## Design Considerations

### 4 Use

The IronGuard Ironwork Reinstatement System is satisfactory for use in the reinstatement of ironwork with a cover and frame up to and including Class D400 of BS EN 124 : 1994.

### 5 Practicability of installation

Installation of the system must only be carried out by specialist contractors trained by the Certificate holder and with experience of such systems.

### 6 Performance

6.1 The mortars used in the system achieve 30 N mm<sup>-2</sup> strength in one hour and so meet the requirements for rapid construction in HD 27/04, clause 3.11 and HA 104/09, clause 6.1 (a) to (d).

6.2 The assembled mono-polymer bricks used in the system have properties which are suitable to support a class D400 cover and frame as an alternative to class B Engineering bricks, in accordance with the advice and recommendations in HA 104/09, clause 9.15.

6.3 The polymer-modified mastic grout incorporating the mastic blocks, used as a fill material and surface course, has suitable properties to resist mechanical damage and deformation caused by traffic loadings.

6.4 Pre-coated chippings conforming to BS EN 13108-4 : 2006, Annex C, are included to ensure the surface course material surrounding the reinstatement meets the specified skid and texture requirements. Alternatively 2-5 mm broadcast aggregate of >60 PSV can be used.

### 7 Maintenance

Monitoring of reinstatement by visual inspection should be carried out during routine inspections of the road network. Any damage must be repaired by replacing the failed component(s) of the system (see sections 9 and 10).

### 8 Durability

Provided the surrounding pavement remains structurally sound, the system will have a service life in excess of five years.

## Installation

### 9 General

9.1 The installation of the IronGuard Ironwork Reinstatement System must be carried out in accordance with the procedures described in this Certificate, and the Certificate holder's installation method statement and technical literature.

9.2 The system must not be installed at temperatures below 5°C or above 30°C, during heavy rain or where there is running water.

9.3 The mortars used in conjunction with the system have a strength commensurate with the reinstatement system in accordance with HA 104/09. They must be installed in accordance with the requirements given in their installation procedures.

9.4 The polymer-modified mastic grout fill and surface material has a compressive stiffness of between 1100 and 1700 MPa and a cumulative creep strain of <1%. This is considered suitable for use with the system in most highway applications, but specifiers are advised to ensure that this is acceptable relative to the site specific requirements.

9.5 Specifiers must ensure that the minimum texture and skid resistance requirements are maintained. The surface of the polymer-modified mastic grout fill and surface material is finished with either cold pre-coated chippings, or 2-5 mm aggregates heated to 140°C and of >60 PSV.

### 10 Procedure

10.1 The perimeter of the area to be excavated is marked out around the existing frame of the failed installation, and all perimeter edges of the reinstatement are saw-cut to ensure a clean vertical face.

10.2 The existing materials are broken out, all spoil is removed (any loose debris can be removed using hot compressed air) and the existing frame is removed with a suitable lifting device. If the existing frame is to be reused, all old bedding material and any debris are removed from the frame in preparation for reinstallation.

10.3 Bedding mortar is applied to the base of the excavation to a maximum thickness of 50 mm.

10.4 A layer of interlocking, mono-polymer bricks is placed onto the mortar, ensuring that as much of the mortar is covered as possible.

10.5 The new or existing ironwork is reset on top of the bricks, with the frame level with the surrounding surface, and the bedding mortar is allowed to cure for a minimum of 15 minutes.

10.6 If the area to be repaired is concrete, a primer must be applied to the concrete and allowed to dry for 15 minutes.

10.7 The polymer modified mastic grout is heated to a maximum of 175°C, thoroughly mixed, and poured into the excavation at lift depths of between 20 and 25 mm, ensuring that all faces of the excavation are covered.

10.8 The cold polymer mastic asphalt blocks are lightly bedded into the hot liquid grout, with sufficient space between them to allow the grout to flow and fill the voids around each block. For deeper excavations over 150 mm, extra layers of bricks, grout and blocks are used as required.

10.9 When all the blocks have been placed, the grout is allowed to cool for 10 minutes.

10.10 The excavation is filled with a second application of molten grout, and the surface of the grout hand floated to ensure that the reinstatement is level with the surrounding road surface.

10.11 Cold pre-coated chippings, or 2-5 mm aggregates heated to 140°C and of >60 PSV, are pressed into the grout with a wooden float while the material is still in a warm, plastic state (75°C-90°C).

10.12 The reinstatement must be allowed to cool to ambient temperature before the site is opened to traffic. The curing time will depend on the ambient temperature: initial cure can occur within approximately 2 hours and full cure may take up to 12 hours.

## Technical Investigations

### 11 Tests

11.1 A full-scale load test of a class D400 manhole system to BS EN 124 : 1994 was carried out and the results assessed.

11.2 An evaluation was made of independent test data relating to components of the system including:

- proprietary mortars
  - compressive and flexural strength
  - freeze/thaw resistance
  - static moduli of elasticity
- mono-polymer bricks (individual and assembled)
  - Repeat Load Axial Creep test (RLAT)
  - static creep test
  - Indirect Tensile Fatigue Test (ITFT)
  - compressive strength
- polymer modified mastic grout and blocks
  - Indirect Tensile Stiffness Modulus (ITSM)
  - bulk density
  - Repeat Load Axial Creep test (RLAT).

### 12 Investigations

12.1 An installation trial was carried out to assess the practicability of installation in accordance with the Certificate holder's instructions identified in sections 9 and 10. The results of the trial concluded that the components can be satisfactorily installed.

12.2 A user survey was conducted to obtain feedback from users and specifiers of the system in service. The information received from the survey confirmed that expectations of the performance were met.

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

## Bibliography

BS EN 124 : 1994 *Gully tops and manhole tops for vehicular and pedestrian areas — Design requirements, type testing, marking, quality control*

BS EN 13108-4 : 2006 *Bituminous mixtures — Material specifications — Hot Rolled Asphalt*

HA 104/09 *Design Manual for Roads and Bridges : Volume 4, Geotechnics and Drainage : Section 2, Drainage :Part 5, Chamber Tops and Gully Tops for Road Drainage and Services — Installation and Maintenance*

HD 27/04 *Design Manual for Roads and Bridges : Volume 7, Pavement Design and Maintenance : Section 2, Pavement Design and Construction : Part 4, Pavement Construction Methods*

## Conditions of Certification

### 13 Conditions

13.1 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.

13.2 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.

13.3 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.

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

13.5 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.

13.6 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.