

## INSTARMAC REPAIR MORTARS

## ULTRACRETE IRONWORK INSTALLATION SYSTEM

This Certificate is issued under the Highway Authorities' Product Approval Scheme (HAPAS) by the British Board of Agrément (BBA) in conjunction with the Highways Agency (HA) (acting on behalf of the overseeing organisations of the Department for Transport; the Scottish Executive; 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 Agrément Certificates are normally each subject to a review every five years.

### PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to the Ultracrete Ironwork Installation System, used for the installation and reinstatement of ironwork, up to and including Class D400 of BS EN 124 : 1994, in footways, footpaths, cycle-tracks and types 2, 3 and 4 carriageways where rapid trafficking is required.

### AGRÉMENT 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 five-yearly review.



### KEY FACTORS ASSESSED

**Performance** — the bedding mortars meet the requirements for compressive strength and rapid setting in accordance with HD 27/04, Clause 3.11. Ultracrete PY4 meets the compressive strength requirements for a rapid-setting bedding material in accordance with HA 104/09, Clause 6.1(c). Ultracrete Envirobed HA104 meets the requirements of HA 104/09, Clause 6.1(a)-(d) (see section 5).

**Durability** — provided the surrounding pavement remains structurally sound, the system will have an anticipated service life of up to five years (see section 7).

The BBA has awarded this Agrément 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



Simon Wroe  
Head of Approvals — Materials



Greg Cooper  
Chief Executive

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Originally certificated on 24 March 2005

*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)*

*Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.*

# HAPAS Requirements

## Requirements

The Highways Technical Advisory Committee (HiTAC) of HAPAS has agreed relevant assessment criteria for the system with the BBA. In the opinion of the BBA, the system, when manufactured and laid in accordance with the provisions of this Certificate, is satisfactory as an Ironwork Installation System.

## 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: 2 Delivery and site handling (2.1 to 2.3) of this Certificate.

## Technical Specification

### 1 Description

1.1 The Ultracrete Ironwork Installation System comprises the following components:

- Ultracrete Envirobred HA104 — a two component, non-shrink, fast setting, cementitious mortar, used to bed and level ironwork in highly trafficked locations, such as junctions and turning areas
- Ultracrete PY4 SG and WG (summer and winter grades) — two component, fast-setting, polyester resin-based mortars used to bed and level ironwork in highly trafficked locations such as junctions and turning areas
- Ultracrete M60 Rapid-Set Bedding Mortar — a fast-setting, cementitious mortar, used to bed and level ironwork
- Ultracrete QC10 Rapid Strength Concrete — a two part, fast-setting cementitious concrete, used for backfilling around ironwork installations
- Ultracrete QC10F Rapid Strength Concrete (Flowable) — a two part, flowable, fibre reinforced, fast-setting cementitious concrete, used for backfilling around ironwork installations
- Ultracrete Instant Road Repair — graded Permanent Cold-lay Surfacing Materials (PCSMs) available in 6 mm and 10 mm surface course grades. The 6 mm grade is available in both black and dark red colours, and 10 mm in black only
- Ultracrete Seal and Tack — a spray-applied, cold joint sealant, applied to the vertical edges at joint interfaces.

1.2 Quality control checks are carried out on the raw materials, during manufacture and on the finished products.

### 2 Delivery and site handling

2.1 The components are delivered to site in the packaging and weights given in Table 1. The tubs and bags bear the manufacturer's name, address, mixing instructions and a hazard label in accordance with *The Chemicals (Hazard Information and Packaging for Supply) Regulations 2009 (CHIP4)/Classification, Labelling and Packaging of Substances and Mixtures (CLP Regulation) 2009* (see Table 2).

Table 1 Packaging and weights

Component	Weight	Packaging type	Shelf-life (months) <sup>(1)</sup>
Ultracrete Envirobred HA104 powder	20 kg	Bag	6
liquid	2.5 litre	Bottle	6
powder	2 x 8 kg	Tub	6
liquid	2 x 1 litre	Tub	6
Ultracrete PY4 SG and WG	25 kg	Tub	6
Ultracrete M60	25 kg	Bag or tub	6
Ultracrete QC10	25 kg	Bag or tub	6
Ultracrete QC10F	25 kg	Bag or tub	6
Ultracrete Instant Road Repair	25 kg	Bag	6
	25 kg	Tub	6
Ultracrete Seal and Tack	750 ml	Aerosol can	12

(1) When stored in frost-free and dry conditions in accordance with the Certificate holder's instructions.

Component	Hazard classification
Ultracrete Envirobed HA104 powder	Irritant
Ultracrete PY4 SG and WG	Harmful, Flammable
Ultracrete M60	Irritant
Ultracrete QC10	Irritant
Ultracrete QC10F	Irritant
Ultracrete Instant Road Repair	Irritant
Ultracrete Seal and Tack	Harmful, Extremely flammable

2.2 When handling Ultracrete Envirobed HA104, Ultracrete M60, Ultracrete QC10 and Ultracrete QC10F on site, the normal health and safety procedures associated with cementitious materials should be observed.

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

## Assessment and Technical Investigations

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

## Design Considerations

### 3 Use

The Ultracrete Ironwork Installation System is satisfactory for use in the installation and reinstatement of ironwork, up to and including Class D400 of BS EN 124 : 1994, in footways, footpaths, cycle-tracks and types 2, 3 and 4 carriageways where rapid trafficking is required.

### 4 Practicability of installation

Installation of the system must be carried out by specialist contractors with experience of these systems.

### 5 Performance

5.1 Ultracrete Envirobed HA104, Ultracrete PY4 and M60 bedding mortars can achieve the 20 N·mm<sup>-2</sup> strength requirement in two hours as required for rapid construction in HD 27/04, Clause 3.11.

5.2 In addition, Ultracrete PY4 can achieve 30 N·mm<sup>-2</sup> in one hour and therefore meets the compressive strength requirements for a rapid-setting bedding mortar in accordance with HA 104/09, Clause 6.1(c).

5.3 Ultracrete Envirobed HA104 meets the requirements of a rapid-setting bedding material in accordance with HA 104/09, Clause 6.1(a)-(d).

### 6 Maintenance

The system is not subject to any routine maintenance requirements but any damage should be repaired (see sections 9 and 10).

### 7 Durability

Provided the surrounding pavement remains structurally sound, the system will have an anticipated service life of up to five years.

## Installation

### 8 General

8.1 The installation of the Ultracrete Ironwork Installation System must be carried out in accordance with the procedures described in this Certificate and the manufacturer's literature.

8.2 Precast concrete inspection chambers should comply with the requirements of BS 5911-4 : 2002 and BS EN 752-3 : 1997.

8.3 The system's compressive strength and rapid-setting characteristics are affected by temperature and it must not be installed at temperatures below 5°C or above 30°C.

8.4 The various components of the system are installed within the thickness limits given in Table 3.

Table 3 Minimum and maximum material thickness

Component	Thickness (mm)	
	Minimum	Maximum
Ultracrete Envirobred HA104	10	50
Ultracrete PY4 SG and WG	5	50
Ultracrete M60	10	75
Ultracrete QC10	20	250
Ultracrete QC10F	20	250

8.5 Ultracrete Instant Road Repair is applied in accordance with the Certificate holder's installation instructions, Appendix A8 *Compaction Requirements* of the *Specification for the Reinstatement of Openings in Highways*, and sections 10.13 and 10.14 of this Certificate.

8.6 Where other materials are to be used in conjunction with the system (eg to repair/rebuild the supporting structure), such materials should have a strength commensurate with the reinstatement system in accordance with HA 104/09, Clause 9.15.

8.7 The frame and cover should be aligned so as to ensure safe access to the reinstatement.

## 9 Preparation

9.1 A perimeter area, indicating the minimum width needed for excavation, is marked out around the existing frame of a failed installation (see Figure 1). This area should be extended to include any defects.

Figure 1 Failed ironwork



9.2 The supporting structure must be of adequate size and strength to support the frame, cover and expected loading.

9.3 The marked area is saw cut and excavated to uncover the flange of the existing cover and frame (see Figure 2). The existing cover and frame are removed using a suitable lifting device, taking care to avoid dropping loose materials in to the shaft.

Figure 2 Excavating failed ironwork



9.4 All old bedding mortar is removed and the supporting structure cut back or loose bricks removed until a sound base is achieved.

9.5 The newly-exposed substrate must be clean and structurally sound prior to commencing the reinstatement work.

9.6 The depth needed to install the frame and cover level to the road surface is determined, taking into account the depth of the frame and the manufacturer's recommended maximum and minimum thicknesses (see Table 3).

9.7 The finishing course of the supporting structure must be adjusted accordingly. For brick structures, levelling should be achieved prior to the installation of the final course.

9.8 Concrete structures must be repaired using conventional concrete repair techniques and materials. The Certificate holder can advise on suitable materials.

9.9 All old bedding material, loose paint, rust and any other debris is removed from the frame prior to installation.

## 10 Installation

10.1 The component products are mixed and laid strictly in accordance with this Certificate and the Certificate holder's recommendations.

10.2 When using Ultracrete Envirobed HA104 and Ultracrete M60, the substrate is wetted prior to application of the mortar (see Figure 3).

Figure 3 Application of bedding mortar to the prepared substrate



10.3 When packing materials are used to support and level the frame, they must be compatible with the bedding mortar to be used. The Certificate holder can advise on suitable materials.

10.4 The appropriate bedding mortar is mechanically mixed as follows:

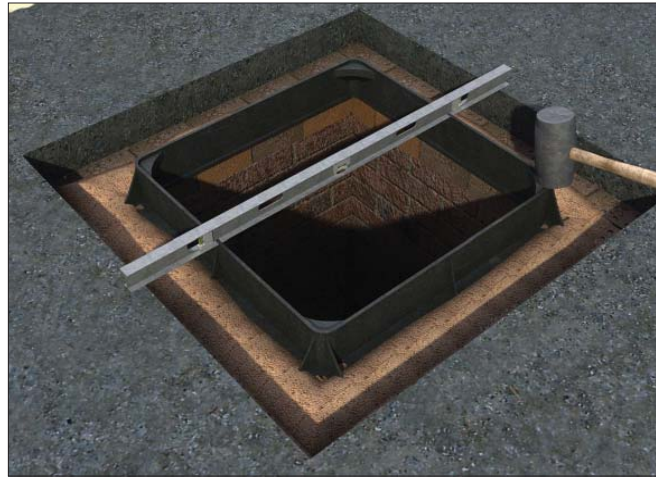
- Ultracrete Envirobed HA104 — one bag/tub of powder is mixed with one bottle of Envirobed HA104 liquid to obtain a stiff, non-slump mix with a uniform consistency. The amount of liquid may be adjusted according to the consistency required
- Ultracrete PY4 SG or WG — the filler is slowly added to the resin in the ratio of one complete tin of resin to one pack of filler/activator and mixed until a homogeneous mix is obtained. Part tins or packs should not be mixed
- Ultracrete M60 — 25 kg of powder is mixed with approximately 3 litres of potable water to obtain a stiff, non-slump mix with a uniform consistency.

10.5 The mixed bedding materials are immediately placed on the supporting structure, allowing a 5 mm excess thickness. They must be used within ten minutes of mixing.

10.6 The frame is lowered into position using a suitable lifting device and placed on the bedding mortar, ensuring that it is fully supported and checking that the frame does not overhang the mortar at any point. Care should be taken to eliminate voids in the bedding material under the frame, particularly in the vicinity of the cover seating.

10.7 The frame is tamped down into place, ensuring the correct level is obtained (see Figure 4). This can be checked by placing a straight edge over the frame and surrounding carriageway.

Figure 4 Tamping and levelling of the frame



10.8 Any holes within the frame are infilled and the flanges of the frame enveloped by a minimum thickness of 10 mm of the bedding material.

10.9 Exposed surfaces of the bedding material around the frame are float finished, ensuring any voids or loose material are removed, and the inside surface pointed to a smooth finish.

10.10 Once the bedding mortar has reached its initial set the backfill material is placed. Ultracrete QC10 or Ultracrete QC10F is mechanically mixed by adding the bag of cement to the sand/aggregate and mixing with water<sup>(1)</sup> until the desired workability is obtained. The product may also be mixed by hand, if required, but care must be taken to ensure that a uniform consistency is achieved.

(1) The volume of water required will vary depending on the moisture content of the aggregate. Typically, one to two litres of water will achieve the required workability. Ultracrete QC10F should achieve a flowable consistency.

10.11 The area to be infilled is wetted and the material placed within 10 minutes of mixing to 60 mm below the required surface fill level, then compacted, ensuring no voids are present (see Figure 5). The final surface is then rough floated to achieve a textured level surface ready to receive the Ultracrete Instant Road Repair.

Figure 5 Backfilling using Ultracrete QC10 or Ultracrete QC10F



10.12 Once Ultracrete QC10 and Ultracrete QC10F has reached initial set, all vertical edges of the excavated area and the manhole frame are sprayed with Ultracrete Seal and Tack, ensuring all surfaces are covered (see Figure 6).

Figure 6 Application of Ultracrete Seal and Tack



10.13 Ultracrete Instant Road Repair is applied to a depth of approximately 45 mm and compacted to 30 mm (see Figure 7).

Figure 7 Installation of Ultracrete Instant Road Repair



10.14 Vertical edges are sprayed again using the Ultracrete Seal and Tack and Ultracrete Instant Road Repair is applied with a 50% excess. The material is then compacted level with the existing surface course (see Figure 8).

Figure 8 Final compaction of Ultracrete Instant Road Repair



10.15 An Ultracrete Envirobed HA104 or Ultracrete M60 installation should not be trafficked for a minimum of two hours following completion of the installation. This may be reduced to one hour for an Ultracrete PY4 installation.

## 11 Tests

11.1 Tests were carried out on the following components and the results assessed to determine:

### Ultracrete Instant Road Repair

- skid/slip resistance

### Ultracrete Envirobed HA104

- compression strength
- tensile strength
- workability
- shrinkage

### Ultracrete PY4 SG and WG

- shrinkage
- accelerated ageing
- pot life

### Ultracrete M60

- freeze/thaw resistance
- compressive strength
- shrinkage
- pot life

### Ultracrete QC10

- freeze/thaw resistance
- shrinkage
- pot life

### Ultracrete QC10F

- compressive strength

### Ultracrete Seal and Tack

- adhesion and corrosion protection.

11.2 A reassessment was made of the data contained in Agrément Certificate 01/H060 relating to the Ultracrete Instant Road Repair.

## 12 Investigations

12.1 An assessment was made of independent test data relating to:

### Ultracrete Instant Road Repair

- rut resistance
- PSV and AAV values

### Ultracrete PY4 SG and WG

- flexural strength
- compressive strength

### Ultracrete M60

- freeze/thaw resistance
- compressive strength
- chloride content

### Ultracrete QC10

- compressive strength
- chloride content

### Ultracrete Ironwork Installation System

- full-scale load test
- watertightness.

12.2 A postal user survey was conducted to investigate the performance of the product in service.

12.3 A visit was made to a site to witness installation of the system.

12.4 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.

## Additional Information

The management systems of Instarmac Group plc have been assessed and registered as meeting the requirements of ISO 9001 : 2008 by National Quality Assurance Ltd (Certificate No 6987).



## Bibliography

BS 5911-4 : 2002 *Precast concrete pipes and ancillary concrete products — Specification for unreinforced and reinforced concrete inspection chambers*

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

BS EN 752-3 : 1997 *Drain and sewer systems outside buildings — Planning*

BS EN 1917 : 2002 *Concrete manholes and inspection chambers, unreinforced, steel fibre and reinforced*

BS EN 12591 : 2009 *Bitumen and bituminous binders — Specifications for paving grade bitumens*

ISO 9001 : 2008 *Quality management systems — Requirements*

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*

*New Roads and Street Works Act 1991 : Specification for the Reinstatement of Openings in Highways : Code of Practice* (June 2002)

## 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
- remain in accordance with the requirements of Highway Authorities' Product Approval Scheme.

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
- individual 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.

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.