HAPAS
Roads and Bridges

Dantex Ltd
36 Palmerstone Road
Earley
Berkshire RG6 1HL
Tel: 01189 661 550 Fax: 01189 664 692
e-mail: enquiries@dantexltd.com
website: www.dantexltd.com

BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
10/H150
Product Sheet 1

CRACK REPAIR SYSTEM FOR HIGHWAYS

MAXI-CRETE F FLEXIBLE INLAID CRACK REPAIR SYSTEM FOR HIGHWAYS

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; the Department for Regional Development, Northern Ireland), the County Surveyors' Society, 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 Maxi-Crete F Flexible Inlaid Crack Repair System for Highways.

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 system meets the requirements for flexible (Type F) inlaid crack-sealing systems of the *Guidelines Document for the Assessment and Certification of Crack Sealing Systems for Highways* (see section 5).

Durability — the results of tests and an assessment of the system's use in service indicate that it can be used to repair cracks in both longitudinal and transverse directions of the carriageway with a minimum life expectancy of five years (see section 7).

The BBA has awarded this Agrément Certificate to the company named above for the system described herein. The 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 First issue: 15 February 2010

Simon Wroe
Head of Approvals — Materials

Greg Cooper
Chief Executive

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 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) and HAPAS Specialist Group 2 (Crack Sealing Systems) have agreed with the BBA the aspects of performance to be used by them in assessing the compliance of crack-sealing systems for highways with the *Guidelines Document for the Assessment and Certification of Crack Sealing Systems for Highways*. In the opinion of the BBA, the Maxi-Crete F Flexible Inlaid Crack Repair System for Highways, when applied to a suitable non-porous bituminous or concrete highway in accordance with the provisions of this Certificate, will meet the relevant performance requirements.

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 and 2.5).

General

The Maxi-Crete F Flexible Inlaid Crack Repair System is installed on behalf of Dantex Ltd in the United Kingdom by Route One Highways Ltd, Bridge House, Bridge Road, Horbury Bridge, Wakefield, West Yorkshire WF4 5NN. Tel: 01924 263692, Fax: 01924 263999, e-mail: info@routeonehighways.co.uk website: www.routeonehighways.co.uk

Technical Specification

1 Description

1.1 The Maxi-Crete F Flexible Inlaid Crack Repair System for Highways comprises graded aggregates coated with a polymer-modified resin, broadcast with a 1.5 mm to 5 mm high PSV (≥60) aggregate to meet skid resistance requirements. Approved aggregates include granite, basalt and calcined bauxite.

1.2 The system may be used in conjunction with Creteprime CP primer when applied to very porous or dusty concrete surfaces.

1.3 The production process is controlled in accordance with a Quality Plan agreed by the BBA. Quality control checks are carried out on the incoming materials, during production and on the finished product.

2 Delivery and site handling

2.1 Maxi-Crete F is supplied in nominal 25 kg bags, labelled with the name of the product and batch number.

2.2 The aggregates are delivered to site in 25 kg bags.

2.3 Creteprime CP primer is supplied in 5 litre cans.

2.4 The products should be stored in cool dry conditions protected from inclement weather.

2.5 The materials are classified under *The Chemicals (Hazard and Packaging for Supply) Regulations 2009* (CHIP4) and bear the appropriate hazard warning label. The flashpoints and classifications are summarised in Table 1.

Table 1 Flashpoint and hazard classification of components

Product	Flashpoint (°C)	Classification
Maxi-Crete binder	≥220	N/A
Creteprime CP primer	56	Flammable, irritating to eyes, skin and respiratory tract

2.6 Health and Safety Data Sheets and COSHH risk assessments for the works should be deposited with 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 Maxi-Crete F Flexible Inlaid Crack Repair System for Highways.

Design Considerations

3 Use

3.1 The Maxi-Crete F Flexible Inlaid Crack Repair System for Highways is satisfactory for use as a flexible inlaid crack-sealing system for repairing cracks, typically in excess of 20 mm wide or multiple adjacent cracks, in non-porous bituminous[1], highway surfaces with texture depths not exceeding 2 mm, or concrete highway surfaces.

(1) For the purposes of this Certificate, non-porous bituminous highway surfaces are impermeable and include hot-rolled asphalt, mastic asphalt and thin surfacing systems.

3.2 The system is laid at a nominal depth of 20 mm and in lifts thereof until flush with the adjacent surfacing. Should the depth of repair exceed 40 mm Maxi-Crete F40 should be considered for application as a suitable infill material in combination with Maxicrete F20.

4 Practicability of installation

The system must only be installed by contractors trained and approved by the Certificate holder in accordance with the Certificate holder's Installation Manual.

5 Performance

The results of laboratory performance tests carried out on the binder and on the system complied with the requirements of the Guidelines Document for a flexible (Type F) inlaid system (see section 12, Table for *Laboratory performance tests on the binder* and Table for *Laboratory performance tests on the system*). This included the minimum initial and investigatory skid resistance values of 60 and 50 respectively.

6 Maintenance

Installations should be periodically inspected as part of a planned maintenance programme and, if necessary, repaired as described in section 13.

7 Durability

7.1 The results of tests and an assessment of the product's use in service indicate that the system can be used to seal and repair cracks in both longitudinal and transverse directions of the carriageway, with a minimum expected life of five years.

7.2 Where cracks have penetrated substantially through the pavement depth due to structural failure resulting in significant movement under traffic, an expectation of life cannot be predicted. Where pavements are structurally sound and cracking is confined to the surfacing layer or layers, and these remain bonded to the road-base, the five year minimum life should be achieved.

7.3 The most severe wear from trafficking (primarily by heavy goods vehicles) occurs within the wheel track zones, approximately between 0.5 m and 1.1 m, and between 2.55 m and 3.15 m from the centre of the nearside lane markings for each traffic lane. In the wheel track zones, the expected minimum life is unlikely to be exceeded. Conversely for cracks outside the wheel track zones provided the pavement surface is otherwise sound, the expected minimum life in terms of skid and deformation resistance is likely to be exceeded.

7.4 The most onerous conditions occur typically during the summer months on heavily-trafficked, exposed carriageways with significant gradients in cuttings and on the surface of the pavements carried by elevated structures, where surface temperatures can approach or even exceed 50°C. Should surface temperatures exceed this figure for periods in an exceptional summer, then the expected minimum life of the product in the wheel track zone may not be attained.

Installation

8 General

8.1 Installation of the Maxi-Crete F Flexible Inlaid Crack Repair System for Highways must be conducted in accordance with the Certificate holder's method statement and this Certificate.

8.2 Traffic management should be in accordance with the latest issue of the *Department for Transport Traffic Signs Manual*, Chapter 8, or as agreed between the purchaser and installer.

8.3 The ambient and road surface temperatures are recorded at the start and, if the weather is variable, during the installation process. Installation should only be carried out if the road surface temperature is ≥0°C.

8.4 The areas to which the system is to be applied shall be clearly defined by the purchaser prior to commencement of work on-site.

9 Preparation of the road surface

9.1 The existing surface is mechanically planed out centrally over the length of the cracks up to a depth of 100 mm. The width of the recess should be formed to extend at least 25 mm into the sound surface.

9.2 The excavated areas are mechanically swept or for small areas hand swept to remove all spoil from the site.

9.3 The recess is cleaned and dried using hot compressed air.

9.4 Porous and/or dusty concrete surfaces should be primed with Creteprime CP primer to enhance adhesion. The primer should be applied and allowed to dry in accordance with the manufacturer's recommendations.

10 Application

10.1 The Maxi-Crete F Flexible Inlaid Crack Repair System can be used in two different circumstances. Where areas of reflective cracking are evident and further movement is expected the system should incorporate Maxicrete F40 as a base course and Maxicrete F20 as a surface course.

Procedure for reflective cracking repair

10.2 The recess must be clean and dry and free from all loose aggregate, moribund sealants, road salt and any other loose material. Cleaning with a gas and air lance is essential.

10.3 The Maxi-Crete F40 compound is melted down in dedicated heated boilers that are agitated by a rotating shaft with paddles at a rate of ≥10 rpm to a laying temperature of between 180°C and 210°C. The Maxicrete F40 material must be kept at this temperature for a period of 40 minutes before using.

10.4 Maxi-Crete F40 is poured into the prepared recess and levelled using a hot tool to finish within approximately 20 mm of the adjacent surface.

10.5 If the depth of the recess is greater than 40 mm the material should be applied in layers, not exceeding 40 mm and not less than 20 mm.

10.6 The Maxi-Crete F20 is melted down in dedicated heated boilers that are agitated at a rate of ≥10 rpm to a laying temperature of between 180°C to 210°C.

10.7 Maxi-Crete F20 is then applied to the prepared recess (approximately 20 mm deep), by screed box, to finish flush and to overlap by approximately 10 mm to the adjacent surface.

10.8 The application of Maxi-Crete F20 material must be applied to the Maxi-Crete F40 base material before its temperature falls below 25°C. Should the temperature fall below 25°C the recess and Maxi-Crete F40 surface must be carefully re-heated using a gas and air lance.

10.9 Whilst the compound is still in a molten state at ≥75°C, a covering of 1.5–5 mm aggregate pre-heated to ≥100°C is applied to the surface.

10.10 Once the repair has cooled (30 to 120 minutes) the work area is mechanically swept to remove any excess aggregate.

10.11 When repairs are being undertaken in surfaces where no movement, or minor movement is expected a more general approach should be applied.

Procedure for general repairs

10.12 The recess must be clean and dry and free from all loose aggregate, moribund sealants, road salt and any other loose material. Cleaning with a gas and air lance is essential.

10.13 The Maxi-Crete F20 is melted down in dedicated heated boilers that are agitated at a rate of ≥10 rpm to a laying temperature of between 180°C to 210°C.

10.14 Maxi-Crete F20 is then applied to the prepared recess and levelled using a smoothing iron or screed box to finish flush to the adjacent surface and to overlap by approximately 10 mm.

10.15 If the depth of the recess is greater than 20 mm the Maxi-Crete F20 material should not be applied in layers exceeding 20 mm.

10.16 Whilst the compound is still in a molten state at ≥75°C, a covering of 1.5–5 mm aggregate pre-heated to ≥100°C is applied to the surface.

10.17 Once the repair has cooled (30 to 120 minutes) the work area is mechanically swept to remove any excess aggregate.

10.18 After application of the system the installer should conduct a visual check for uniform surface texture and any other discernable faults and carry out any remedial work as necessary prior to opening the site to traffic.

11 Repair

Damage to the system can be repaired by mechanically planing out the defective area and re-applying the system to the original specification.

12 Tests

12.1 Laboratory performance tests were carried out on the Maxi-Crete F Flexible Inlaid Crack Repair System for Highways in accordance with the requirements of the Guidelines Document for flexible inlaid crack-sealing systems. The results were satisfactory and comply with SG2 Grade F material for the properties tested.

12.2 The tests and requirements are given in Tables 2 and 3.

Table 2 Laboratory performance tests on the binder

Test	Requirement[1]	Method[2]
Cone penetration (dmm)		BS EN 13880-2
control	>25	
heat aged[3]	≥60% of control value	
Resilience (%)		BS EN 13880-3
control	Record value	
heat aged[3]	≥60% of control value	
Flow resistance	≤2	BS EN 13880-5

(1) Requirements for Type F, inlaid crack-sealing systems as defined in the *Guidelines Document for the Assessment and Certification of Crack Sealing Systems for Highways*.

(2) The test documents are detailed in the *Bibliography*. Numbers and letters in the table refer to sections/parts of the various documents.

(3) Heat aged for 28 days at 70°C.

Table 3 Laboratory performance tests on the system

Test	Requirement[1]	Method[2]
Skid resistance value (SRV)		Appendix B, Method 1
initial	≥60	Appendix B, Method 3
heat aged[3]	≥50	
Rut resistance		Appendix B, Method 3
rate ($mm \cdot h^{-1}$)	<5	
rut depth (mm)	<10	
Tensile bond ($N \cdot mm^{-2}$)[4]		TRL Report 176, Appendix J
control	≥0.5	
heat aged[3]	≥60% of control value	
Texture depth (mm)		Appendix B, Method 4
initial	≥1.5	
after rut resistance test	≥0.75	
Elongation		Appendix B, Method 6
load at 30% extension (N)	≤1000	

(1) Requirements for Type F, inlaid crack-sealing systems as defined in the *Guidelines Document for the Assessment and Certification of Crack Sealing Systems for Highways*.

(2) Test methods are defined in the current *Guidelines Document for the Assessment and Certification of Crack Sealing Systems for Highways*.

(3) Heat aged 28 days at (70 ±2)°C.

(4) Conducted on both asphalt and concrete substrates.

13 Investigations

13.1 An installation trial was carried out to assess the practicability of the installation in accordance with the agreed method statement.

13.2 A user/specifier survey and visits to existing sites were carried out to assess the system's performance and durability.

13.3 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

BS EN 13880-2 : 2003 *Hot applied joint sealants — Test method for the determination of cone penetration at 25°C*

BS EN 13880-3 : 2003 *Hot applied joint sealants — Test method for the determination of penetration and recovery (resilience)*

BS EN 13880-5 : 2004 *Hot applied joint sealants — Test method for the determination of flow resistance*

Guidelines Document for the Assessment and Certification of Crack Sealing Systems for Highways

TRL Report 176 : 1997 *Laboratory tests on high-friction surfaces for highways*

14 Conditions

14.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is granted only to the company, firm or person named on the front page — no other company, firm or person may hold or claim any entitlement to this Certificate
- 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.

14.2 Publications and documents referred to in this Certificate are those that the BBA deems to be relevant at the date of issue or re-issue of this Certificate and include any: Act of Parliament; Statutory Instrument; Directive; Regulation; British, European or International Standard; Code of Practice; manufacturers' instructions; or any other publication or document similar or related to the aforementioned.

14.3 This Certificate will remain valid for an unlimited period provided that the product/system and the manufacture and/or fabrication including all related and relevant 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.

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

- 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 the nature, design, methods and workmanship of or related to the installation
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

14.5 Any information relating to the manufacture, supply, installation, use and maintenance 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 and maintained. It does 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; 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. 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 manufacture, supply, installation, use and maintenance of this product/system.

British Board of Agrément
Bucknalls Lane
Garston, Watford
Herts WD25 9BA

tel: 01923 665300
fax: 01923 665301
e-mail: mail@bba.star.co.uk
website: www.bbacerts.co.uk