

DANTEX CRACK REPAIR SYSTEM FOR HIGHWAYS

MAXI-CRETE F20 AND F40 FLEXIBLE INLAID CRACK REPAIR SYSTEM FOR HIGHWAYS

This HAPAS Certificate Product Sheet⁽¹⁾ is issued by the British Board of Agrément (BBA), supported by Highways England (HE) (acting on behalf of the Overseeing Organisations of the Department for Transport; Transport Scotland; the Welsh Government and the Department for Infrastructure, 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 Maxi-Crete F20 and F40 (F Grade) Flexible Inlaid Crack Repair System for Highways.

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 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 6).

Durability — the system 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 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

Date of Second issue: 20 November 2019

Originally certificated on 15 February 2010



Brian Moore
Director

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 MUST check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.

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Requirements

In the opinion of BBA, the Maxi-Crete F20 and F40 Flexible Inlaid Crack Repair System for Highways, when assessed in accordance with the BBA HAPAS *Guideline Document for the Assessment and Certification of Crack and Joint Repair Systems for Highways*, and used in accordance with the provisions of this Certificate, will meet or contribute to meeting the requirements of the *Manual of Contract Documents for Highway Works (MCHW)*⁽¹⁾, Volume 1 *Specification for Highway Works (SHW)*, Series 700, Clause 711, and Volume 2 *Notes for Guidance on the Specification for Highway Works*, Series NG700, Clause NG711.

(1) The MCHW is operated by the Overseeing Organisations: Highways England (HE), Transport Scotland, the Welsh Government and the Department for Infrastructure (Northern Ireland).

Regulations

Construction (Design and Management) Regulations 2015

Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See section: 3 *Delivery and site handling* (3.1 to 3.3 and 3.5) of this Certificate.

Technical Specification

1 Description

1.1 The Maxi-Crete F20 and F40 Flexible Inlaid Crack Repair System for Highways comprises graded aggregates coated with a polymer-modified resin, broadcast with a 1.5 to 5 mm high PSV (≥ 60) aggregate to meet skid resistance requirements. Approved aggregates include granite, basalt and calcined bauxite.

1.2 The system comprises the following components:

- Maxi-Crete F20 (F Grade), a hot applied flexible, polymerised resin compound incorporating fillers, aggregates, rubber and other mineral fillers
- Maxi-Crete F40 (F Grade), a hot applied, high modulus, polymerised resin compound incorporating fillers, aggregates and rubber, and other mineral fillers.

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

2 Manufacture

2.1 The system is manufactured using a batch blending process.

2.2 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 Maxi-Crete F20 and F40 Flexible Inlaid Crack Repair System for Highways is supplied in nominal 25 kg bags, labelled with the name of the system and batch number.

3.2 The aggregates are delivered to site in 20 kg bags.

3.3 Creteprime CP Primer is supplied in 5 litre cans.

3.4 The system components should be stored in cool dry conditions protected from inclement weather.

3.5 The Certificate holder has taken the responsibility of classifying and labelling the system components under the *CLP Regulation (EC) no 1272/2008 on the classification, labelling and packaging of substances and mixtures*. Users must refer to the relevant Safety Data Sheet(s).

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the Maxi-Crete F20 and F40 Flexible Inlaid Crack Repair System for Highways.

Design Considerations

4 Use

4.1 The Maxi-Crete F20 and F40 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.

4.2 Maxi-Crete F20 is used when the system is laid at a nominal depth of 20 mm and in lifts thereof until flush with the adjacent surfacing (see section 11 *Procedure for general repairs*).

4.3 Should the depth of repair exceed 40 mm, Maxi-Crete F40 is incorporated as a suitable infill material in combination with Maxi-Crete F20 (see section 11 *Procedure for reflective cracking repair*).

5 Practicability of installation

The system must be installed by a competent highways contractor experienced with this type of system.

6 Performance

The results of laboratory performance tests carried out on the binder and on the system complied with the requirements of the BBA HAPAS *Guideline Document for the Assessment and Certification of Crack and Joint Repair Systems for Highways* for a Flexible (Type F) inlaid system. This included the minimum initial and investigatory skid resistance values of 60 and 50 respectively.

7 Maintenance

Installations should be periodically inspected as part of a planned maintenance programme and, if necessary, repaired as described in section 12.

8 Durability

8.1 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.

8.2 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.

8.3 The most severe wear from trafficking (primarily by heavy goods vehicles) occurs within the wheel track zones, approximately between 0.5 and 1.1 m, and between 2.55 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.

8.4 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 prolonged periods in an exceptional summer, then the expected minimum life of the system in the wheel track zone may not be attained.

Installation

9 General

9.1 Installation of the Maxi-Crete F20 and F40 Flexible Inlaid Crack Repair System for Highways must be conducted in accordance with the Certificate holder's Method Statement and this Certificate.

9.2 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.

9.3 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 $\geq 0^{\circ}\text{C}$. The system must not be used during periods of continuous or heavy rain.

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

10 Preparation of the road surface

10.1 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.

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

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

10.4 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.

11 Application

11.1 The Maxi-Crete F20 and F40 Flexible Inlaid Crack Repair System for Highways can be used in two different circumstances. When repairs are being undertaken in surfaces where no, or minor movement is anticipated, only Maxi-Crete F20 is utilised. Where areas of reflective cracking are evident and further movement is expected, the system should incorporate Maxi-Crete F40 as a base course and Maxi-Crete F20 as a surface course.

Procedure for reflective cracking repair (System 1, Maxi-Crete F20 and F40 Flexible Inlaid Crack Repair System)

11.2 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.

11.3 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 and 210°C. The Maxi-Crete F40 material must be kept at this temperature for a period of 40 minutes before using.

11.4 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.

11.5 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.

11.6 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 to 210°C.

11.7 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.

11.8 The application of the 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.

11.9 Whilst the compound is still in a molten state at $\geq 75^\circ\text{C}$, a covering of 1.5–5 mm aggregate pre-heated to $\geq 100^\circ\text{C}$ is applied to the surface.

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

11.11 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 (System 2, Maxi-Crete F20 Flexible Inlaid Crack Repair System)

11.12 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.

11.13 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 to 210°C.

11.14 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.

11.15 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.

11.16 Whilst the compound is still in a molten state at $\geq 75^\circ\text{C}$, a covering of 1.5–5 mm aggregate pre-heated to $\geq 100^\circ\text{C}$ is applied to the surface.

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

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

12 Repair

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

Technical Investigations

13 Tests

13.1 Laboratory performance tests were carried out on the Maxi-Crete F20 and F40 Flexible Inlaid Crack Repair System for Highways in accordance with the requirements of the BBA HAPAS *Guideline Document for the Assessment and Certification of Crack and Joint Repair Systems for Highways*.

13.2 The tests and requirements are given in Tables 1 and 2.

Table 1 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 BBA HAPAS *Guideline Document for the Assessment and Certification of Crack and Joint Repair 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 2 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·h ⁻¹)	<5	
rut depth (mm)	<10	
Tensile bond (N·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 BBA HAPAS *Guideline Document for the Assessment and Certification of Crack and Joint Repair Systems for Highways*.

(2) Test methods are defined in the current Guidelines Document.

(3) Heat aged 28 days at (70 ±2)°C.

(4) Conducted on both asphalt and concrete substrates.

14 Investigations

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

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

14.3 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.

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*

BBA HAPAS *Guideline Document for the Assessment and Certification of Crack and Joint Repair Systems for Highways*

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

15 Conditions

15.1 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.

15.2 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.

15.3 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.

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

15.5 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.

15.6 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.