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Agrément Certificate
11/H176
Product Sheet 1

ROADTECHS CRACK SEALING SYSTEMS FOR HIGHWAYS

ROADFLEX H INLAID CRACK SEALING 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 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 Roadflex H Inlaid Crack Sealing System for Highways, used to seal and repair static cracks typically in excess of 20 mm or multiple adjacent cracks, in non-porous bituminous and concrete highway surfaces.

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 Hard (Grade H) inlaid crack-sealing systems of the *Guidelines Document for the Assessment and Certification of Crack Sealing Systems for Highways* (see section 5).

Durability — the system can be used to repair static cracks in both longitudinal and transverse directions of the carriageway with a minimum expected life 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



Simon Wroe
Head of Approvals — Materials



Greg Cooper
Chief Executive

Date of First issue: 12 September 2011

Certificate amended on 12 November 2012 to incorporate change to Certificate Holder's details.

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 Roadflex H Inlaid Crack Sealing 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 2.4) of this Certificate..

Technical Specification

1 Description

1.1 The Roadflex H Inlaid Crack Sealing System for Highways comprises graded aggregates coated with a polymer-modified bituminous compound and broadcast with a graded high PSV aggregate to meet skid resistance requirements.

1.2 The system is used in conjunction with Roadflex Primer when applied to concrete surfaces.

2 Delivery and site handling

2.1 The Roadflex H compound is supplied in nominal 25 kg silicone-lined paper bags labelled with the product name and batch number.

2.2 The aggregate is delivered to site in nominal 25 kg bags.

2.3 The products should be stored in cool dry conditions and protected from contamination by oils, fuels and other chemicals.

2.4 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 Roadflex H Inlaid Crack Sealing System for Highways.

Design Considerations

3 Use

3.1 The Roadflex H Inlaid Crack Sealing System for Highways is satisfactory for use as a Grade H inlaid crack-sealing system for repairing cracks, typically in excess of 20 mm wide or multiple adjacent cracks, in non-porous bituminous or concrete, highway surfaces with texture depths not exceeding 2 mm.

3.2 The system is laid at a nominal depth of 20 mm. Should the depth of repair exceed 20 mm, a suitable non-rutting infill material should be applied to within 10 mm to 20 mm of the existing road surface.

4 Practicability of installation

The system is installed only by contractors using personnel trained and approved by the Certificate holder.

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 the Assessment and Certification of Crack Sealing Systems for Highways* for a Grade H inlaid system (see section 12, Table for *Laboratory performance tests on the binder* and Table for *Laboratory performance tests on the system*). This includes the minimum initial and investigatory skid resistance values of 60 and 50 respectively.

6 Maintenance

Installations should be periodically inspected for damage, loss of texture and skid resistance as part of a planned maintenance programme and, if necessary, repaired as described in section 11.

7 Durability

7.1 The system can be used to seal and repair static cracks typically in excess of 20 mm or multiple adjacent cracks, in both longitudinal and transverse directions of the carriageway. Under normal conditions it will have 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 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 The installation of the Roadflex H Inlaid Crack Sealing System must be carried out by the Certificate holder's approved installers in accordance with the Certificate holder's instructions and the Method Statement agreed with the BBA.

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 above 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 to a width of at least 100 mm and a depth of 20 mm. Should the depth of repair exceed 20 mm, a suitable non-rutting infill material should be applied to within 10 mm to 20 mm of the existing road surface. The width of the recess formed should extend at least 25 mm into a sound surface.

9.2 The excavated area and adjacent road surface are mechanically swept to remove all spoil from the site. Small areas may be hand swept.

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

9.4 Concrete surfaces must be primed with Roadflex Primer. The primer should be applied and allowed to dry in accordance with the manufacturer's instructions before the Roadflex compound is applied.

10 Application

10.1 The Roadflex compound is melted down in heated boilers that are agitated by a rotating shaft with paddles to a laying temperature of between 180°C and 225°C.

10.2 The temperature of the melted material must be monitored during the heating and installation process using a calibrated, hand-held temperature probe that is accurate to within $\pm 2^\circ\text{C}$.

10.3 To avoid degradation, the material must not be left molten in the boiler for more than six hours at 180°C to 225°C. In the event of a prolonged delay then the temperature of the material must be reduced to 150°C and the stirring maintained.

10.4 Once the material is fully melted and within the correct installation temperature range it is drawn off via the boiler drain tap into a bucket and applied into the prepared recess using a suitable screed box to finish level but overlap the adjacent road surface by approximately 10 mm.

10.5 When the compound has cooled, but still molten, a preheated (50°C to 120°C) 2 mm to 3.5 mm graded granite aggregate with ≥ 60 PSV or 1 mm to 3 mm calcined bauxite aggregate is then broadcast into the surface and the system allowed to set.

10.6 During the setting period no disturbance or trafficking of the system is permitted.

10.7 Once the repair has cooled to the surrounding road surface temperature, the area is mechanically swept to remove all excess aggregate. This will normally be between 30 minutes to one hour, depending on the installation depth and ambient temperature.

10.8 Before opening to traffic the installer must conduct a visual check for uniform surface texture and any other discernible faults and carry out remedial work if necessary.

11 Repair

11.1 Damage to the system can be repaired by mechanically planing out the defective section(s) and reapplying the system to the original specification in accordance with the Certificate holder's instructions.

11.2 Minor damage can be repaired by smoothing the surface with a hot iron. If required additional aggregate must be applied in accordance with section 10.5 to ensure the required level of skid resistance is maintained.

Technical Investigations

12 Tests

12.1 Laboratory performance tests were carried out on the Roadflex H Inlaid Crack Sealing System for Highways in accordance with the requirements of the Guidelines document for flexible inlaid crack-sealing systems. The results were satisfactory.

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

Table 1 Laboratory performance tests on the binder⁽¹⁾

Test	Requirement ⁽²⁾	Method
Cone penetration (dmm)		BS EN 13880-2
control	≥ 10	
heat aged ⁽³⁾	$\geq 60\%$ of control value	
Resilience (%)		BS EN 13880-3
control	Record value	
heat aged ⁽³⁾	$\geq 60\%$ of control value	
Flow resistance at 60°C (mm)	≤ 2	BS EN 13880-5

(1) Binder without aggregates.

(2) Requirements for Grade H, inlaid crack-sealing systems as defined in the *Guidelines Document for the Assessment and Certification of Crack Sealing Systems for Highways* (Draft 5, January 2010).

(3) Heat aged 28 days at 70°C.

Table 2 Laboratory performance tests on the system

Test	Requirement ⁽¹⁾	Method ⁽²⁾
Skid Resistance Value (SRV)		
initial	≥ 60	Appendix A, Method 1
after wheel tracking	≥ 50	Appendix A, Method 3
Rut resistance		Appendix A, Method 3
rate ($\text{mm}\cdot\text{h}^{-1}$)	≤ 5	
rut depth (mm)	≤ 7	
Tensile bond ($\text{N}\cdot\text{mm}^{-2}$) ⁽³⁾		TRL Report 176, Appendix J
control	≥ 0.5	
heat aged ⁽⁴⁾	$\geq 60\%$ of control value	
Texture depth (mm)		Appendix B, Method 4
initial	≥ 1.5	
after rut resistance test	≥ 0.75	
Yield (%)	≥ 2.5	Appendix A, Method 6

(1) Requirements for Grade H, inlaid crack-sealing systems as defined in the *Guidelines Document for the Assessment and Certification of Crack Sealing Systems for Highways* (Draft 5, January 2010).

(2) Test methods are defined in Appendix A of the Guidelines Document.

(3) Tested on asphalt and primed concrete substrate.

(4) Heat aged 28 days at $(70\pm 2)^\circ\text{C}$.

13 Investigations

13.1 An installation trial was carried out to assess the practicability of the installation in accordance with the agreed method statement. An assessment of the results of SRV and texture depth tests carried out on the installation was satisfactory.

13.2 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 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*

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

Guidelines Document for the Assessment and Certification of Crack Sealing Systems for Highways (*Draft 5, January 2010*)

14 Conditions

14.1 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.

14.2 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.

14.3 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.

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

14.5 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.

14.6 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.