HAPAS

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HAPAS Certificate
15/H241
Product Sheet 1

ROADTECHS SURFACE TREATMENTS FOR HIGHWAYS

RECLAMITE

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 Reclamite(2), a maltene-based cationic emulsion, cold-spray-applied rejuvenation treatment overlaid with a fine graded blast furnace slag (BFS) dust, for use as part of a highways maintenance programme to extend the life of an existing bituminous surface course.

(2) 'Reclamite' is a registered trademark.

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

Texture depth — the mean surface macrotexture depth of a treated surface can be reduced as a result of this treatment and should be monitored post-treatment against any required minimum levels for the treated surface (see section 6).

Skid resistance — the skid resistance of a treated surface, measured before and after the treatment, was found to be unaffected (see section 7).

Effect on binder — rheological properties of the binder recovered from a treated surface indicate that the treatment has returned the existing aged binder to softening point and penetration levels similar to a short-term aged binder (see section 8).

Effect on permeability — the permeability of a treated surface was found to be reduced when compared with pre-treated values (see section 10).

Durability — the product will extend the life of a bituminous surface course provided it is treated as described within this Certificate (see section 12).

The BBA has awarded this Certificate to the company named above for the product described herein. This product 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: 14 September 2020

Originally certificated on 7 October 2015

Hardy Giesler
Chief Executive Officer

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 the BBA, Reclamite, when used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the requirements of the *Manual of Contract Documents for Highways Works* (MCHW)(1), Volume 1 *Specification for Highways Works* (SHW), Series 900, Clause 950 *Surface preservation systems*.

(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* of this Certificate.

Technical Specification

1 Description

1.1 Reclamite is a cold-spray-applied cationic maltene emulsion used to extend the life of an existing bituminous surface course.

1.2 The product is overlaid with a finely graded BFS to reduce vehicle tyre pick-up following application and to absorb any excess deposits of the product.

2 Manufacture

2.1 Reclamite is manufactured using conventional production techniques in a colloid mill. The product is diluted at a ratio of 1:1 Reclamite/water prior to transportation to site and spray application.

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 binder is delivered to site in intermediate bulk containers (IBCs).

3.2 The BFS is delivered to site in bulk.

3.3 The Certificate holder has taken the responsibility of classifying and labelling the product 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 Reclamite.

Design Considerations

4 Use

4.1 Reclamite is satisfactory for use as part of a highway maintenance programme to extend the life of a bituminous surface course. This Certificate only covers use of the product on bituminous materials as defined in BS EN 13108 : 2016.

4.2 Pre-existing faults such as cracks, fretting, delamination or ravelling must be repaired prior to application. The Certificate holder can advise on suitable methods of repair which are compatible with the product.

5 Practicability of installation

The product must only be installed by the Certificate holder or their authorised contractors.

6 Texture depth

6.1 The texture depth of a pre-treated surface course was measured and found to be 1.4 mm. After application, the texture depth was measured again after 4 and 12 months of trafficking and found to be 1.1 and 1.2 mm respectively. The texture measured was considered suitable for the trial site but this reduction must be taken into account on sites where a minimum retained texture depth is required.

6.2 The retained texture depth (after trafficking) will be affected by the type of surface course, traffic levels and cleanliness of the surface.

7 Skid resistance

A site trial comparing pre- and post-treatment skid resistance measured using a pendulum test in accordance with BS EN 13036-4 : 2011 and SCRIM (Sideways-Force Coefficient Routine Investigation Machine) showed that skid resistance was maintained.

8 Effect on binder

8.1 An evaluation of binder properties from an existing surface course was carried out to determine the depth of penetration of the treatment into the treated surface course. A comparison was made between cores taken from pre- and post-treated surface courses. The post-treated surface course showed an increase in penetration and decrease in softening point on the binder recovered when compared to the pre-treated course. Although the effect was not as great in the lower 20 mm of the core the evaluation indicated that the binder had penetrated and softened the treated aged binder.

8.2 A laboratory study was carried out to compare complex modulus, phase angle, softening point and penetration of medium and long-term aged untreated and aged treated 40/60 P paving grade bitumen. Results showed that the medium and long-term aged binder treated with the product had penetration and softening point values comparable with a short-term aged binder (3-5 years in service).

9 Consolidation of the surface

9.1 A comparison of cores from pre- and post-treated sites indicated that the torque bond strength and associated modes of failure were not affected by installation of the product. The results showed that the interface strength was maintained and when failure was observed this was either in the lower layer (binder course) or at the interface. The torque bond strength for both pre- and post- treated samples was >1000 kPa.

9.2 A comparison of site cores taken pre- and post-treatment indicated that deformation resistance would be maintained.

10 Effect on permeability

A laboratory comparison of pre- and post-treated SMA surfaces indicated that the permeability of the surface will be reduced but will not become impermeable.

11 Maintenance

The product does not require any routine maintenance since in itself it acts as part of a surface maintenance programme to extend the life of an existing pavement.

12 Durability

12.1 In order to increase the anticipated working life of a surface course, the Certificate holder recommends repeat applications of the product every three to five years as part of a surface maintenance programme.

12.2 A calculation of the extension of working life of a treated surface will depend on the condition of the surface course at the time of treatment (see section 14.1), the surface type, the site location and the traffic levels.

Installation

13 General

13.1 Application of Reclamite must be carried out in accordance with the Certificate holder's instructions and this Certificate.

13.2 Application should only be carried out on substrates with a surface temperature greater than 10°C.

13.3 The initial application should be carried out before any significant deterioration of the surface course is visible. The timescale is dependent on many factors which will be determined as part of a site inspection carried out in accordance with section 14.1.

14 Procedure

14.1 Prior to application, the site should be assessed by the Certificate holder or their approved contractors as to its suitability for the product. Any repairs necessary should be completed before the treatment is applied.

14.2 The area to be treated must be thoroughly swept clean by mechanical sweeper and/or by using air blowers as required. All vegetation must be removed or cut back. If water flushing is required, it must be completed a minimum of 24 hours prior to application to allow for adequate drying. Areas not to be sprayed must be masked or covered.

Table 1 Application rates

Component	Applicator	Amount
Reclamite	sprayer truck	0.35 $l \cdot m^{-2}$
BFS grit	grit spreader	0.5 – 1 $kg \cdot m^{-2}$

14.3 Application rates are as described in Table 1.

14.4 Kerb lines and areas with restricted vehicular access should be treated using a hand-operated applicator with a margin extended at least 100 mm. The rate of application should remain as described in Table 1.

14.5 Once the emulsion has broken (turned from pink to brown), the surface area should be inspected for any 'rich' spots. These areas should be removed by squeegeeing or brooming. The BFS grit is then applied to the surface.

15 After care

Any excess BFS grit can be swept the following day or allowed to dissipate with traffic. However, during this period loose chipping signs must be erected far enough in advance to allow drivers to slow down. The signs must be retained for as long as loose chippings persist.

16 Tests

A series of laboratory and road tests was carried out on the product as detailed in Table 2.

Table 2 Performance tests

Test	Method
Wheel-tracking slope[1] (WTS_{AIR}), Proportional rut depth (PRD_{AIR}), Rut depth (RD_{AIR})	BS EN 12697-22 : 2003 + A1 : 2007 Small Device, Procedure B, samples conditioned in air
Torque bond[1] (kPa)	Guidelines Document, Appendix A.3
Texture depth[1] (mm)	BS EN 13036-1 : 2010
Skid resistance value[1]	BS EN 13036-4 : 2011
Road hardness[1]	TRL Road Note 39
Drying time over installed temperature range 5°C, 15°C and 35°C	BBA method (touch dry)
Resistance to water penetration	BBA method based on *Guidelines Document for the Assessment and Certification of Waterproofing Systems for use on Concrete decks of Highway Bridges*
Binder rheology comparing pre- and post-treatment results including:	
G* and phase angle[2]	Clause 956 (08/08) Determination of the Complex Shear (Stiffness) Modulus and Phase Angle of Bituminous Binders using the Dynamic Shear Rheometer (DSR)
Penetration[2][3]	BS EN 1426 : 2007
Softening point[2][3]	BS EN 1427 : 2007
Vialit pendulum[3]	BS EN 13588 : 2008

(1) Tests carried out before and after treatment on an installation trial on the A1151 Wroxham Road, Norwich.
(2) Tests carried out as part of a laboratory trial using ageing protocols and methods of testing as described in Highways England Report 2/1308 Task 395 (1308) MOTT, July 2011.
(3) Tests carried out before and after treatment on an installation trial on the A140 Daniels Road, Norwich. Core depths were 40 mm.

17 Investigations

17.1 An installation trial was carried out to assess the practicability of the installation and on-site quality control procedures. A visual inspection of the site concluded that it was free from significant abnormalities.

17.2 A user specifier survey relating to existing sites was carried out to assess the product's performance and durability.

17.3 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 1426 : 2007 *Bitumen and bituminous binders — Determination of needle penetration*

BS EN 1427 : 2007 *Bitumen and bituminous binders — Determination of the softening point — Ring and ball method*

BS EN 12697-22 : 2003 *Bituminous mixtures — Test methods for hot mix asphalt — Wheel tracking*

BS EN 13036-1 : 2010 *Road and airfield surface characteristics — Test methods — Measurement of pavement surface macrotexture depth using a volumetric patch technique*

BS EN 13036-4 : 2011 *Road and airfield surface characteristics — Test methods — Method for measurement of slip/skid resistance of a surface — The pendulum test*

BS EN 13108 : 2016 *Bituminous mixtures — Material specifications*

BS EN 13588 : 2008 *Bitument and bituminous binders — Determination of cohesion of bituminous binders with pedulum test*

Manual of Contract Documents for Highways Works (MCHW)[(1)], *Specification for Highways Works* (SHW), Volume 1, Series 900, Clause 950 *Surface preservation systems*

18 Conditions

18.1 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.

18.2 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.

18.3 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.

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

18.5 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.

18.6 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.