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Roads and Bridges
Agrément Certificate
No 04/H093

Designated by Government
to issue
European Technical
Approvals

RHINOPATCH

This Certificate is issued under the Highway Authorities Product Approval Scheme (HAPAS) by the BBA in conjunction with the Highways Agency (acting on behalf of the overseeing organisations of the Department for Transport; the Scottish Executive Development Department; the Welsh Assembly Government; the Department for Regional Development, Northern Ireland), the CSS (formerly 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



• THIS CERTIFICATE RELATES TO RHINOPATCH⁽¹⁾, A GILSONITE BASED ASPHALT SYSTEM FOR USE AS A PERMANENT ROAD REPAIR ON HIGHWAYS.

• Rhinopatch is a road repair system which re-heats and recycles the existing in-situ material using an infra-red heating process and gilsonite-based binder.

• The system is suitable for use on existing BS 594-1 : 2003 hot rolled asphalt surface courses for the repair of potholes, chipping loss, joint failure or similar defects on highways.

• The system is installed by the Certificate holder or their authorised contractors.

(1) Rhinopatch is a registered trademark.

HAPAS Requirements

1 Requirements

1.1 The Highways Technical Advisory Committee (HiTAC) has agreed with the British Board of Agrément the aspects of performance to be used by the BBA in assessing the Rhinopatch system. In the opinion of the BBA, Rhinopatch, when manufactured and installed in accordance with the provisions of this Certificate, will provide a satisfactory repair to the road surface.

1.2 Additional requirements of the overseeing organisations are given in the Manual of Contract Documents for Highways Works (MCHW), Volumes 1 and 2, Series 900.

Regulations

2 Construction (Design and Management) Regulations 1994 (as amended)

Construction (Design and Management) Regulations (Northern Ireland) 1995 (as amended)

Information in this Certificate may assist the client, planning supervisor, designer and contractors to address their obligations under these Regulations.

See sections: *5 Delivery and site handling (5.1 to 5.5) and 7 Precautions during installation.*

Technical Specification

3 Description

3.1 The GSB 99 and GSB 78 binders used in the Rhinopatch system consist of a solution of gilsonite petroleum bitumen diluents and plasticisers.

3.2 Rhinopatch is a repair system that re-heats and recycles the existing in-situ material using an infra-red heating process, and two gilsonite-based binders. When necessary, additional hot rolled asphalt is added to ensure satisfactory levelling of the finished surface.

3.3 The types and sizes of pre-coated chippings will be determined by the site-specific requirements, including location and contractual requirements for polished stone value (PSV); texture depth and/or other properties of the existing surface course.

4 Manufacture and quality control

GSB 99 and GSB 78 binders are manufactured by a blending process controlled under the American Association of State Highway and Transportation Officials (AASHTO) quality system recommendations and in accordance with a Quality Plan agreed by the BBA which includes requirements for the following:

- raw material selection
- method of production and process control
- inspection and testing of the finished product.

5 Delivery and site handling

5.1 GSB 99 binder is packaged and delivered to site in 205 litre drums and must be stored in a well-ventilated area between 5°C and 50°C. The product must not be allowed to freeze. The product is classified as harmful if inhaled or in contact with skin. Normal precautions are required when handling the product, ie wear suitable protective clothing and gloves and use in a well-ventilated area.

5.2 GSB 78 binder is packaged and delivered to site in 205 litre drums or bulk tanker, and must be stored at temperatures below 93°C, away from an open flame, source of heat or source of ignition. The product has a flashpoint of less than 10°C and would be classified as highly flammable under the Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 (CHIP3). Normal precautions are required when handling the product, ie wear suitable protective clothing and gloves, and use in a well-ventilated area.

5.3 Hot rolled asphalt is delivered in bulk to site in insulated vehicles and is not classified under the Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 (CHIP3). Standard material safety data sheets for hot asphalts apply.

5.4 Graded fine grit is delivered to site in 25 kg bags. Normal precautions should be adopted when handling, ie avoid contact with eyes.

Design Data

6 General

6.1 Rhinopatch is satisfactory for use as a permanent road repair system for use on BS 594-1 : 2003 hot rolled asphalt type surface course.

6.2 The pavement structure must be adequate to support the traffic without undue cracking or deformation during the expected life of the system. Where defects have penetrated substantially through the pavement depth, no expectation of life can be predicted.

6.3 The system has been used on DBM and SMA type surface courses, but this has not been assessed under this Certificate. Approval from the appropriate authorities should be sought for use in such applications.

7 Precautions during installation

Health and safety data sheets and COSHH risk assessments for the works should be deposited with the purchaser and be maintained on site.

8 Maintenance and repair

In the event of damage occurring during installation or during service the system can be repaired using the installation techniques detailed under sections 10 to 13.

9 Durability

9.1 The durability of the system will depend on the nature and state of the substrate, the exact location of the repair, and the expected traffic levels.

9.2 The results from the performance tests and the performance of the system in use indicate that when used in accordance with the details given in this Certificate, Rhinopatch should have a minimum service life of three years.

Installation

10 General

10.1 Installation of Rhinopatch must be carried out by the Certificate holder in accordance with the Certificate holder's instructions, the agreed BBA Method Statement and this Certificate.

10.2 Traffic management should be in accordance with the Department of Transport *Traffic Signs Manual*, Chapter 8, 1991, or as agreed between the purchaser and the installer.

10.3 Installation can be carried out in damp or frosty conditions but should not be used in periods of continuous or heavy rain.

11 Preparation

11.1 The surface to be repaired is heated to a temperature of 170°C±20°C using infra-red heating equipment. The heat must penetrate to 40 mm or the full depth of the surface course.

11.2 When the pavement has been heated to the required temperature a joint 100 mm inside the perimeter of the heated area is cut into the surface.

11.3 The surface is raked thoroughly to expose the maximum surface area within the material.

12 Application

12.1 An even spray of GSB 99 is applied over the heated and raked area at a rate of 0.8 litres m⁻² using a fully-pressurised 10 litre (90 psi) applicator. If the asphalt is identified as aged or rich in binder, the rate of application can be adjusted by ±20%.

12.2 GSB 99 is raked into the surface, with additional hot rolled asphalt added when necessary to ensure good levelling. To create a seamless repair the new material is merged into the existing surface at the joints.

12.3 Joints are compacted immediately using a standard roller. If required, pre-coated chippings are then applied to the surface taking care to ensure the finished texture level is achieved.

12.4 When the temperature has dropped to 50°C or below, GSB 78 is applied uniformly to the surface using a fully-pressurised 10 litre (90 psi) applicator. An even coat is applied over the surface extending a minimum of 100 mm on each side of the heated area at a rate of 0.5 litres m⁻².

12.5 Immediately following the application of GSB 78, an even coating of grit at an approximate spread rate of 0.5 kgm⁻² is hand cast by shovel, or spreader if provided.

13 Aftercare

13.1 Visual checks for uniform surface texture, blemishes and any discernible faults are conducted by the installer and any remedial works carried out as necessary.

13.2 During the cooling period no disturbance or trafficking of the system is permitted. Before opening to traffic at the end of the cooling period any excess grit is removed by sweeping or other suitable means.

Technical Investigations

The following is a summary of the technical investigations carried out on the Rhinopatch system.

14 Tests

A series of tests was carried out before and after a Rhinopatch repair on an installation trial on the Abbey Barn Lane, High Wycombe. The results are detailed below in Tables 1 and 2.

Table 1 Laboratory performance tests carried out on bulk samples or cores taken from the Abbey Barn Lane, High Wycombe

| Test | Method | Mean result | |
|--|---|--------------------|--------------------|
| | | Before | After |
| Wheel tracking at 45°C ⁽¹⁾ | BS 598-110 | | |
| rate (mm h ⁻¹) | | 1.2 ⁽¹⁾ | 3.0 ⁽²⁾ |
| rut depth (mm) | | 1.7 | 3.7 |
| Indirect tensile stiffness modulus (MPa) | BS DD 213 | 3255 | 2390 |
| Recovered binder | BS 2000-397 BS 2000-49 BS 2000-58 | | |
| penetration (dmm) | | 33 | 46 |
| softening point (°C) | | 56.5 | 52.1 |
| Torque bond (kPa) | Appendix A.3 Guidelines document | N/A | 804 ⁽³⁾ |

(1) Mean core thickness 42 mm.

(2) Mean core thickness 46 mm.

(3) No failure at interface — material rupture.

Table 2 Road performance tests carried out on the surface after the completion of the Rhinopatch repair on the Abbey Barn Lane, High Wycombe

| Test | Method | Mean result ⁽¹⁾ |
|--------------------|----------------------------------|----------------------------|
| Skid resistance | TRRL Road Note 27 ⁽²⁾ | 72.3 |
| Texture depth (mm) | BS 598-105 | 1.2 |

(1) Measurements taken prior to the application of GSB 78 and finely graded grit.

(2) *Instructions for Using the Portable Skid Resistance Tester.*

15 Investigations

15.1 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.

15.2 An assessment of the change in skid resistance on a HRA surface treated with GSB 78 and grit was carried out by the BBA. The results are detailed in Table 3.

Table 3 Skid resistance monitoring on car park installation trial

| Test | Method | Mean result ⁽¹⁾ |
|------------------|--|----------------------------|
| Skid resistance | TRRL Road Note 27 ⁽²⁾ (Appendix E) TRL Rubber (for car tyres) | |
| untreated (20°C) | | 69 |
| treated | | |
| 1 day (8°C) | | 78 |
| 7 days (8°C) | | 64 |
| 28 days (6°C) | | 76 |
| 42 days (11°C) | | 78 |

(1) Results were taken from a car park surface.

(2) *Instructions for Using the Portable Skid Resistance Tester.*

15.3 A user specifier survey relating to existing sites was carried out to assess the systems performance and durability.

15.4 The BBA carried out additional visits to existing sites to confirm the visual performance of the system.

15.5 The binder manufacturing process was examined including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

Bibliography

BS 594-1 : 2003 *Hot rolled asphalt for roads and other paved areas — Specification for constituent materials and asphalt mixtures*

BS 598-105 : 2000 *Sampling and examination of bituminous mixtures for roads and other paved areas — Methods of test for the determination of texture depth*
BS 598-110 : 1998 *Sampling and examination of bituminous mixtures for roads and other paved areas — Methods of test for the determination of wheel-tracking rate and depth*

BS 2000-49 : 1993 *Methods of test for petroleum and its products — Determination of needle penetration of bituminous material*

BS 2000-58 : 1993 *Methods of test for petroleum and its products — Determination of softening point of bitumen — Ring and ball method*

BS 2000-397 : 1995 *Methods of test for petroleum and its products — Recovery of bitumen binders — Dichloromethane extraction rotary film evaporator method*

BS DD 213 : 1993 *Method for determination of the indirect tensile stiffness modulus of bituminous mixtures*

Manual of Contract Documents for Highway Works, Volume 1 *Specification for Highway Works*, August 1998 (as amended)

Manual of Contract Documents for Highway Works, Volume 2 *Notes for Guidance on the Specification for Highway Works*, August 1998 (as amended)

Guidelines Document for the Assessment and Certification of Thin Surfacing Systems for Highways (working draft 4, dated 10 January 2000)

Conditions of Certification

16 Conditions

16.1 This Certificate:

- (a) relates only to the product that is described, installed, used and maintained as set out in this Certificate;
- (b) is granted only to the company, firm or person identified on the front cover — no other company, firm or person may hold or claim any entitlement to this Certificate;
- (c) is valid only within the UK;
- (d) has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective;
- (e) is copyright of the BBA;
- (f) is subject to English law.

16.2 References in this Certificate to any Act of Parliament, Regulation made thereunder, Directive or Regulation of the European Union, Statutory Instrument, Code of Practice, British Standard, manufacturers' instructions or similar publication, are references to such publication in the form in which it was current at the date of this Certificate.

16.3 This Certificate will remain valid for an unlimited period provided that the product and the manufacture

and/or fabrication including all related and relevant processes thereof:

- (a) are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA;
- (b) continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine;
- (c) are reviewed by the BBA as and when it considers appropriate; and
- (d) remain in accordance with the requirements of the Highway Authorities Product Approval Scheme.

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

- (a) the presence or absence of any patent or similar rights subsisting in the product or any other product;
- (b) the right of the Certificate holder to market, supply, install or maintain the product; and
- (c) the nature or standard of individual installations of the product or any maintenance thereto, including methods and workmanship.

16.5 Any recommendations relating to the use or installation of this product which are contained or referred to in this Certificate are the minimum standards required to be met when the product is used. They do 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 or in the future; nor is conformity with such recommendations to be taken as satisfying the requirements of the 1974 Act or of any present or future 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 installation and use of this product.



In the opinion of the British Board of Agrément, Rhinopatch is fit for its intended use provided it is installed, used and maintained as set out in this Certificate. Certificate No 04/H093 is accordingly awarded to Asphalt Systems International Ltd.

On behalf of the British Board of Agrément

Date of issue: 28th May 2004

A handwritten signature in black ink, appearing to read 'P. Q. Newson'.

Chief Executive