

MILES MACADAM GROUTED MACADAM SURFACE COURSE SYSTEMS FOR HIGHWAYS

MILEPAVE

This HAPAS Certificate Product Sheet⁽¹⁾ is issued by the British Board of Agrément (BBA), supported by the Highways Agency (HA) (acting on behalf of the Overseeing Organisations of the Department for Transport; Transport Scotland; 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 Certificate Product Sheets are normally each subject to a review every three years.

(1) Hereinafter referred to as 'Certificate'.

This Certificate relates to Milepave, a grouted macadam surface course for use as an alternative to conventional bituminous and concrete surface courses on new or maintenance road construction.

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

Surface characteristics — a standard mechanical brush finish will provide a satisfactory initial texture depth, skid resistance and erosion index (see section 6).

Mechanical resistance — the system has a satisfactory resistance to trafficking and loadings associated with its intended use (see section 7).

Durability — the system will provide a durable surface course with a working life equivalent to, or greater than, that expected of a conventional asphalt surface (see section 9).

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: 7 November 2013

Simon Wroe
Head of Approvals — Materials

Claire Curtis-Thomas
Chief Executive

Originally certificated on 13 January 2006

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.

Requirements

In the opinion of the BBA, Milepave when manufactured and installed in accordance with the provisions of this Certificate, will provide an alternative to conventional bituminous or concrete surface courses.

Additional requirements of the overseeing organisations for surface course products on highways are given in the Manual of Contract Documents for Highway Works (MCHW), Volumes 1 and 2, Series 900 and 1000.

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: *3 Delivery and site handling (3.2) of this Certificate.*

Technical Specification

1 Description

1.1 Milepave is a grouted macadam surface course, consisting of a proprietary 0/14 open-graded asphalt receiving course (incorporating a paving grade bitumen to BS EN 12591 : 2000 and aggregates to BS EN 13043 : 2002), and a proprietary asphaltic grout.

1.2 The system is used in conjunction with a bitumen emulsion tack coat conforming to BS EN 13808 : 2005 to seal and enhance adhesion to the substrate.

2 Manufacture

2.1 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 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 operated by the manufacturer are being maintained.

2.2 The management system of Miles Macadam Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by ISO QAR (Certificate 1140/96).

3 Delivery and site handling

3.1 The receiving course is delivered to a site in accordance with BS 594987 : 2010, section 4.

3.2 The asphaltic grout is delivered to site ready mixed. Handling and storage must be in accordance with the Certificate holder's safety data sheets.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Milepave.

Design Considerations

4 Use

4.1 Milepave is satisfactory for use as a surface course on highways with posted speed limits less than 40 mph.

4.2 The system can be applied to a bituminous or concrete substrate provided the underlying layers of the pavement are stable, and have sufficient load-spreading capabilities to support the imposed loading of the surface course during installation and expected service life.

4.3 The system can be used as part of new or maintenance pavement construction.

4.4 The choice of aggregate type will depend on site-specific details, including location and contractual requirements for polished stone value (PSV), texture depth and other properties.

5 Practicability of installation

Receiving course

5.1 The receiving course is installed by contractors approved by the Certificate holder, using conventional paving equipment.

Asphaltic grout

5.2 The asphaltic grout is applied by contractors trained and approved by the Certificate holder using proprietary grout mixing and application equipment.

6 Surface characteristics

Initial texture depth

6.1 The standard mechanical brush finish for the system can achieve a satisfactory initial (prior to trafficking) surface texture depth (see Table 2 in the *Technical Investigations* part of this Certificate).

Initial skid resistance

6.2 The standard mechanical brush finish for the system can achieve a satisfactory initial (prior to trafficking) skid resistance value (SRV) (see Table 2 in the *Technical Investigations* part of this Certificate).

7 Mechanical resistance

Resistance to permanent deformation

7.1 The system has a satisfactory resistance to rut rate and rut depth when comparable to conventional asphalt surface courses (see Table 1 in the *Technical Investigations* part of this Certificate).

Torque bond strength

7.2 The system, when installed in accordance with the provisions of this Certificate, has a satisfactory torque bond strength (see Table 1 in the *Technical Investigations* part of this Certificate).

8 Maintenance

The system does not require any routine maintenance.

9 Durability

9.1 The system will provide a satisfactory alternative to conventional bituminous and concrete surface course materials that are exposed to light, low-speed traffic.

9.2 Where satisfactory penetration of the grout is achieved, and substrates are structurally sound with load-spreading capabilities adequate to accommodate the imposed loading associated with the installation of the system and end use, available evidence indicates that the system will provide a durable surface course with a working life comparable to that of a conventional asphalt surfacing.

Installation

10 General

Receiving course

10.1 The Milepave 0/14 mm receiving course is installed in accordance with the Certificate holder's installation procedures, and a BBA Agreed Method Statement incorporating the following sections of BS 594987 : 2010:

- 5 *Preparatory works at the laying site* (except that bitumen emulsion tack coat to BS EN 13808 : 2005 will be applied to ensure a minimum residual bitumen of 0.2 kg·m⁻² and joints must not be painted to ensure satisfactory penetration of the grout)
- 6 *Laying* (the receiving course can be applied at a nominal layer thickness of between 30 mm and 50 mm)
- 9 *Compaction*
- 10 *Opening to traffic*.

Asphaltic grout

10.2 The grout is applied by the Certificate holder in accordance with the Certificate holder's installation procedures and a BBA Agreed Method Statement which includes recommendations for:

- spread rates of the grout
- limiting weather conditions
- compaction
- support coat requirements.

10.3 The grout can be applied immediately after compaction of the receiving course.

10.4 The grout is applied to the receiving course and spread with brooms and squeegees. Grout movement through the receiving course is by natural percolation.

10.5 Grout spread rate is calculated by measuring the square metre coverage versus the tonnage of grout used.

10.6 The grout should not be applied to the receiving course if free-standing water, ice or snow is present, during periods of heavy rain, or if exposure to frost is likely to occur during initial curing.

10.7 Partial penetration of the grout must be achieved.

Curing

10.8 Once the grout has been applied and partial penetration has been achieved, the road can be opened to traffic in accordance with the recommendations given in BS 594987 : 2010.

11 Repair

In the event of damage during the installation or during service, the system can be repaired by removing the damaged area and reinstalling the system in accordance with the procedures given in section 10.

Technical Investigations

12 Tests

A series of laboratory and road tests was carried out on the system. The results of the tests were assessed and are detailed in Tables 1 and 2.

Table 1 Laboratory tests carried out on cores taken from a witnessed trial

Test (unit)	Mean result	Method ⁽¹⁾
Wheel tracking at 60°C ⁽²⁾ rate (mm·h ⁻¹) rut depth (mm)	4.9 7.7	Appendix A.1 Guideline Document
Torque bond strength at 20 ± 2°C (kPa)	285 ⁽³⁾	Appendix A.3 Guideline Document

(1) Test method appendices A.1, A.2 and A.3 are located in the BBA HAPAS *Guideline Document for the Assessment and Certification of Thin Surfacing Systems for Highways* (www.bbacerts.co.uk/hapas)

(2) Mean core thickness = 39 mm

(3) Mode of failure = interface failure. Cores taken at 7 days and tested at 38 days after installation. Milepave was applied to a bituminous substrate with a K1-40 tack coat.

Table 2 Road tests

Test (unit)	Result ⁽¹⁾	Method
Texture depth (mm) initial ⁽²⁾ retained ⁽³⁾	1.1–1.8 1.1–1.8	BS 598-105 : 2000
Skid resistance initial ⁽²⁾ retained ⁽³⁾	49–56 56–89	TRL Road Note 27 ⁽⁴⁾

(1) Range of results measured.

(2) Initial measured approximately one month after installation.

(3) Retained measured six months after initial.

(4) Road Research Laboratory Note 27 : 1960 *Instructions for Using the Portable Skid Resistance Tester*.

13 Investigations

13.1 A trial was carried out to assess the practicability of the installation and on-site quality control procedures for the receiving course and the asphaltic grout. A visual inspection of the site concluded that it was free from significant abnormalities.

13.2 A user/specifier survey relating to the performance in use was carried out which confirmed the system performance and durability in applications typical of those quoted within this Certificate.

13.3 The manufacturing process for the asphaltic grout was evaluated by inspection of the factory and the methods adopted for quality control, and the quality and composition of the materials used. The inspection confirmed that the plant operated in accordance with requirements of the Quality Plan and Quality System agreed with the BBA.

13.4 The BBA carried out additional visual inspections at existing sites to confirm the performance of the system.

Bibliography

- 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 594987 : 2010 *Asphalt for roads and other paved areas — Specification for transport, laying and compaction and type testing protocols*
- BS EN 12591 : 2000 *Bitumen and bituminous binders — Specifications for paving grade bitumens*
- BS EN 13043 : 2002 *Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas*
- BS EN 13808 : 2005 *Bitumen and bituminous binders — Framework for specifying cationic bituminous emulsions*
- BS EN ISO 9001 : 2008 *Quality management systems — Requirements*
- Guideline Document for the Assessment and Certification of Thin Surfacing Systems for Highways*, July 2004

Conditions of Certification

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.

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
- 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.

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.