

# HAPAS

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HAPAS Certificate

06/H120

Product Sheet 1 Issue 5

## MILES MACADAM GROUTED MACADAM SURFACE COURSE SYSTEM FOR HIGHWAYS

### HARDIPAVE

This Product Sheet<sup>(1)</sup> is issued by the British Board of Agrément (BBA). The Highways Authorities Product Approval Scheme (HAPAS) is supported by National Highways (NH) (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.

(1) Hereinafter referred to as 'Certificate'.

This Certificate relates to Hardipave, a grouted macadam surface course for use as an alternative to conventional bituminous and concrete surface courses for low-speed traffic ( $\leq 40$ mph), new-build and road maintenance where high strength, rut resistance or fuel resistance are required, in accordance with the BBA HAPAS Technical Specification Document.



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 complying with the requirements of the BBA HAPAS Certification Scheme according to the assessments set out in this Certificate.

On behalf of the British Board of Agrément

Date of Fifth issue: 8 May 2024

Originally certificated on 13 January 2006

Hardy Giesler  
Chief Executive Officer

*This BBA HAPAS Certificate is issued under the BBA's accreditation to ISO/IEC 17065 (UKAS accredited Certification Body Number 0113).*

*Clauses marked † are additional information outside the scope of accreditation.*

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

**The Certificate should be read in full as it may be misleading to read clauses in isolation.**

*Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.*

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## 1 Product Description

1.1 The Certificate holder specifies the system under assessment, Hardipave, as a grouted macadam surface course for use as an alternative to conventional bituminous and concrete surface courses for low-speed traffic ( $\leq 40$  mph) on new-build and road maintenance where high strength, rut resistance or fuel resistance are required in accordance with the HAPAS Technical Specification Document.

1.2 Hardipave is a grouted macadam surface course, consisting of a 0/14 mm open-graded asphalt receiving course (incorporating a paving grade bitumen to BS EN 12591 : 2009 and aggregates to BS EN 13043 : 2002), and cementitious grout. The grout comprises Portland cement, polymer, fine mineral aggregate and water. Optional plasticising and anti-foaming agents, rapid-curing additives and coloured pigments may also be included.

1.3 The following ancillary items have been assessed for use with the product:

- a spray-applied, bitumen emulsion tack coat or bond coat conforming to BS EN 13808 : 2013 (Essential).
- 0/2 mm granite for broadcasting over the applied surface (Optional, depending on site requirements).

## 2 Requirements

Requirements for the system are outlined in the BBA HAPAS Certification Scheme and Technical Specifications Documents, and have been established from the following specification documents:

- the *Manual of Contract Documents for Highway Works (MCHW)*<sup>(1)</sup>, Volume 1, Series 900 and 1000
- the Design Manual of Roads and Bridges (DMRB), CD 236 – Surface Course materials for construction.

(1) The MCHW is operated by National Highways (NH) (acting on behalf of the Overseeing Organisations of the Department for Transport; Transport Scotland; the Welsh Government; and the Department for Infrastructure, Northern Ireland).

## 3 Summary of Product Assessment

The system was assessed on the basis of the following characteristics in accordance with HAPAS requirements.

### 3.1 Texture depth

Table 1 Texture depth characteristics

Product assessed	Assessment method	Requirement	Outcome
Hardipave	Texture depth (initial) to BS EN 13036-1 : 2010	> 0.8 mm	Pass
	Texture depth (6 months) to BS EN 13036-1 : 2010	> 0.6 mm	Pass

The assessment showed that the product complies with HAPAS requirements for this characteristic.

### 3.2 Skid resistance

Table 2 Skid resistance characteristics

Product assessed	Assessment method	Requirement	Outcome
Hardipave	Initial skid resistance to BS EN 13036-4 : 2011	Matches or exceeds that of a typical surface course	Pass
	Retained skid resistance after 6 months trafficking to BS EN 13036-4 : 2011	Matches or exceeds that of a typical surface course	Pass

The assessment showed that the system complies with HAPAS requirements for this characteristic.

### 3.3 Resistance

*Table 3 Resistance Characteristics*

Product assessed	Assessment method	Requirement	Outcome
Hardipave	Sensitivity to water to BS EN 12697-12 : 2018	ITSRmin70	Pass
	Sensitivity to diesel to BS EN 12697-12 : 2003	ITSRmin60	Pass

The assessment showed that the system complies with HAPAS requirements for this characteristic.

### 3.4 Wheel tracking

*Table 4 Wheel tracking characteristics*

Product assessed	Assessment method	Requirement	Outcome
Hardipave	Wheel tracking (at 60°C) to BBA SG3 Appendix A1	Value Achieved	Class 2 to PD 6691 : 2022, Table D2
	Wheel tracking (60°C) to BS EN 12697-22 : 2020	Value Achieved	Class 2 to PD 6691 : 2022, Table D2

The assessment showed that the system complies with HAPAS requirements for this characteristic.

### 3.5 Torque bond

*Table 5 Torque bond characteristics*

Product assessed	Assessment method	Requirement	Outcome
Hardipave	BBA SG3 Appendix A3	≥200 kPa	Pass

The assessment showed that the system complies with HAPAS requirements for this characteristic.

### 3.6 Erosion index

*Table 6 Erosion characteristics*

Product assessed	Assessment method	Requirement	Outcome
Hardipave	BBA SG1 Appendix H	Control 0	Pass
		Diesel Immersion ≤3	Pass
		After freeze/thaw ≤3	Pass

The assessment showed that the system complies with HAPAS requirements for this characteristic.

### 3.7 Durability

When installed in accordance with this Certificate, Hardipave will provide a durable grouted macadam surface course for use as an alternative to conventional bituminous and concrete surface courses for low-speed traffic (≤ 40mph) on new-build and road maintenance where high strength, rut resistance or fuel resistance are required, in accordance with the BBA HAPAS Technical Specification Document.

## 4 Summary of Process Assessment

<b>Manufacturing process and quality control</b>	Complies with HAPAS requirements
<b>Delivery and site handling</b>	Complies with HAPAS requirements
<b>Installation</b>	Complies with HAPAS requirements

### 4.1 Manufacture

4.1.1 The BBA has undertaken the following tasks for the assessment of product manufacture and has established that the manufacture complies with BBA HAPAS Certification Scheme requirements:

- the BBA has recorded and evaluated the manufacturer's documentation of the methods adopted for quality control procedures and product testing against HAPAS requirements
- the BBA has assessed the quality control operated over batches of incoming materials and formulations against HAPAS Requirements
- the BBA has evaluated the process for management of non-conforming work
- the BBA has audited the production process and verified that it is in accordance with the documented process
- the BBA has checked that equipment has been properly tested and calibrated.

4.1.2 The BBA has undertaken to review 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.

† 4.1.3 The management system of the manufacturer has been assessed and registered as meeting the requirements of BS EN ISO9001 : 2015 by BM TRADA (Certificate 12988).

### 4.2 Delivery and site handling

† 4.2.1 The Certificate holder states that the receiving course is delivered to site in accordance with BS 594987 : 2015 Section 4.

4.2.2 To achieve the performance described in this Certificate, delivery and site handing of the receiving course must be performed in accordance with the Certificate holder's instructions, this Certificate, and the BBA Agreed Method Statement, incorporating the following sections of BS 594987 : 2015:

- Section 5 — *Preparatory works at the laying site* (except that bitumen emulsion tack coat or bond coat to BS EN 13808 : 2013 will be applied to ensure a minimum residual bitumen of 0.2 kg-m<sup>2</sup> and joints must not be painted to ensure satisfactory penetration of the grout)
- Section 6 — *Laying* (the receiving course can be applied at a nominal layer thickness of between 35 and 50 mm)
- Section 9 — *Compaction*
- Section 10 — *Opening to traffic*.

† 4.2.3 The cementitious powder for the grout is delivered in 750 kg pre-mixed bulk bags.

4.2.4 To achieve the performance described in this Certificate, delivery and site handing of the cementitious powder must be performed in accordance with the Certificate holder's instructions, this Certificate, and the BBA Agreed Method Statement, which includes requirements for:

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

### 4.3 Design

4.3.1 Hardipave can be used as part of a pavement design to satisfy or contribute to satisfying the relevant requirements of the MCHW, Volume 1 SHW, Series 900.

4.3.2 The system is satisfactory for use on bituminous or concrete substrates, provided they are stable and have sufficient loadbearing strength to support the loads imposed during installation and service.

† 4.3.3 Guidance on evaluating the condition of an existing surface is provided in the DMRB, CD 227 *Design for Pavement Maintenance*

† 4.3.4 Guidance on appropriate surfacing selection is provided in the DMRB, CD 236 *Surface Course Materials for Construction*

#### 4.4 Installation

4.4.1 The Certificate holder's instructions for installation of the system were confirmed as meeting the BBA HAPAS Certification Scheme requirements.

4.4.2 To achieve the performance described in this Certificate, Hardipave 0/14 mm Receiving Course must be installed in accordance with the Certificate holder's installation procedures, BS 594987 : 2015 and this Certificate.

4.4.3 To achieve the performance described in this Certificate, cementitious grout must be installed in accordance with the Certificate holder's installation procedures, and this Certificate.

4.4.4 The cementitious grout must only be applied when the receiving course has been compacted and has cooled to a temperature below 40°C.

4.4.5 The grout is applied to the receiving course and spread with brooms and squeegees. Grout movement through the receiving course is by natural percolation, and a vibrating roller or plate. The grout must completely fill the receiving course. This is achieved by adding grout until asphalt is no longer visible and air bubbles have stopped rising to the surface.

4.4.6 The grout must 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.

4.4.7 Following full penetration of the grout, a 0/2 mm granite can be applied to the surface at a nominal spread rate of 0.5 kg·m<sup>2</sup>.

4.4.8 The curing time of the grout varies with ambient conditions. The Certificate holder recommends the following minimum durations, and should be consulted if doubt exists as to when the surface should be trafficked, although such advice is outside of the scope of this Certificate:

- pedestrian traffic — 12 hours
- vehicular traffic, eg commercial vehicles, cars — 24 hours
- exposure to high stress — 24 hours.

4.4.9 To achieve the performance described in this Certificate, installation of the system must be carried out by operatives familiar with this type of system.

#### 4.5 Maintenance

4.5.1 The Certificate holder advises that the system is not subject to any routine maintenance requirements. However, any damage must be repaired.

4.5.2 Any damaged areas must be cut back to sound material by planing or other suitable means and replaced with a material appropriate to the location, traffic and area of re-instatement. Materials must be selected in agreement with the Certificate holder and the purchaser.

## 5 Fulfilment of Requirements

5.1 The conclusion of this BBA assessment is that Hardipave, when used in accordance with the provisions of this Certificate, complies with the BBA HAPAS Certification Scheme requirements.

5.2 In order for the system to continue to meet Scheme requirements, it must be installed, used and maintained as per the Certificate holder's instructions and as detailed in the Certificate.

## 6 Validity of Certificate

Continuing validity of this Certificate is dependent on the following factors:

- continuing compliance with product or process requirements, as described in the HAPAS Scheme document, and the specification documents referred to therein
- ongoing BBA surveillance of factory production control, to verify that the specifications and quality control being operated by the manufacturer are being maintained
- acceptable results from long-term exposure monitoring
- acceptable data to confirm durability
- formal triennial Review of the Certificate, and Reissue for required technical or non-technical updates
- compliance with ongoing Certificate obligations by the Certificate holder and manufacturer(s).

## †7 Additional 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.

### **CLP Regulations**

The Certificate holder has taken the responsibility for classifying and labelling the system under the *GB CLP Regulation* and *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).

## 8 Bibliography

- BS 594987 : 2015 + A1 : 2017 *Asphalt for roads and other paved areas — Specification for transport, laying, compaction and product type testing protocols*
- BS EN 12591 : 2009 *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 : 2013 *Bitumen and bituminous binders — Framework for specifying cationic bituminous emulsions*
- 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 *Method for measurement of slip/skid resistance of a surface: The pendulum test*
- BS EN 12697-12 : 2018 *Bituminous mixtures — Test methods — Determination of the water sensitivity of bituminous specimens*
- BS EN 12697-22 : 2020 *Bituminous mixtures — Test methods for hot mix asphalt — Wheel tracking*
- BS EN ISO 9001 : 2015 *Quality management systems — Requirements*
- Design Manual for Roads and Bridges (DMRB), CD 236 – Surface Course Materials for Construction*
- Design Manual for Roads and Bridges (DMRB), CD 227 – Design for Pavement Maintenance*
- PD 6691 : 2022 *Guidance on the use of BS EN 13108, Bituminous mixtures*
- The Manual of Contract Documents for Highway Works (MCHW), Volume 1, Series 900 and 1000
- BBA HAPAS Technical Specification Document

## 9 Conditions of Certification

9.1 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.

9.2 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.

9.3 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.

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

9.5 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 UKCA marking and CE marking.

9.6 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.