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Designated by Government  
to issue  
European Technical  
Approvals

**HOTGRIP HIGH-FRICTION SURFACING SYSTEM**

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; the Welsh Assembly Government; the Department for Regional Development, Northern Ireland), 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 THE HOTGRIP HIGH-FRICTION SURFACING SYSTEM, COMPRISING A THERMOPLASTIC BINDER INCORPORATING GRADED CALCINED BAUXITE AGGREGATE.

• The system is for use as a high-friction surfacing on highways with bituminous surfaces and is classified as Type 2 in accordance with the Guidelines Document for the Assessment and Certification of High-Friction Surfaces for Highways.

• The system is installed only by BBA Approved Installers.

**HAPAS Requirements****1 Requirements**

1.1 The Highways Technical Advisory Committee (HiTAC) and HAPAS Specialist Group 1 (High-Friction Surfacing) have agreed with the British Board of Agrément the aspects of performance to be used by the BBA in assessing the compliance of high-friction surfacing systems with the Guidelines Document. In the opinion of the BBA, the Hotgrip High-Friction Surfacing System, when applied to suitable bituminous surfaces, in accordance with the provisions of this Certificate, will meet the relevant requirements and is deemed to be of Type 2.

1.2 Additional requirements of the overseeing organisations are given in the Manual of Contract Documents for Highway 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 and 5.2) and *Precautions during installation* (7.1 and 7.2).

## Technical Specification

### 3 Description

3.1 The Hotgrip High-Friction Surfacing System comprises a thermoplastic binder, incorporating a graded (1 mm to 3 mm) calcined bauxite aggregate.

3.2 The system is suitable for use when road surface temperatures are between 0°C and 35°C.

### 4 Manufacture and quality control

4.1 The system is manufactured by a batch-blending process. Quality control checks are conducted to determine application properties, skid resistance value (SRV) and binder content. Each batch is given a unique recorded batch number.

4.2 The quality management system of the Certificate holder has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2000.

### 5 Delivery and site handling

5.1 The system is delivered to site pre-blended in granular form in maximum 25 kg polyethylene bags.

5.2 The components are classified under the Chemicals (Hazard Information and packaging for Supply) Regulations 2002 (CHIP3) and all containers bear the appropriate hazard warning label(s). Flashpoints and hazard classifications are given in Table 1.

Table 1 Flashpoint and hazard classification

Component	Flashpoint (°C) <sup>(1)</sup>	Classification
Hotgrip	>220	Not hazardous

5.3 When stored in accordance with the Certificate holder's instructions the unopened material will have a shelf-life of at least 12 months.

## Design Data

### 6 General

6.1 The Hotgrip High-Friction Surfacing System is satisfactory for use as a high-friction surfacing on highways with bituminous surfaces with surface texture depths of between 0.5 mm and 2.0 mm, measured using the sand patch test as defined in BS 598-105 : 2000.

6.2 The system is classified as Type 2, in accordance with the results of the performance tests as defined in Table 1 of the *Guidelines Document for the Assessment and Certification of High-Friction Surfaces for Highways* and detailed in Table 3 of this Certificate.

6.3 Installation of the system should be carried out only when the road surface temperature is between 0°C and 35°C.

6.4 The system has not been assessed for use on concrete surfaces.

6.5 The in-service colour retention has not been assessed and is outside the scope of this Certificate.

### 7 Precautions during installation

7.1 Health and Safety Data Sheets and Control of Substances Hazardous to Health (COSHH) risk assessments for the works should be deposited with the purchaser and be maintained on site.

7.2 Suitable personal protective equipment must be used to control the exposure to dust and fumes and to protect operatives from burns caused by contact with the hot material.

### 8 Maintenance and repair

Should the system be damaged or become debonded from the substrate, it may be repaired by cutting the damaged area back to firmly bonded material, squaring off the area to be reinstated, cleaning the prepared area and reinstating to the original specification. The edges of the area to be replaced must be warmed and the Hotgrip should be installed to butt up to the existing sound material.

### 9 Durability

9.1 The results of the performance tests and the performance of the system in use indicate that when used in an appropriate location, as defined in the *Guidelines Document for the Assessment and Certification of High-Friction Surfaces for Highways*, the system should have a service life of between 5 and 10 years (see Table 2).

Table 2 Area<sup>(1)</sup> of application by type classification

Site category (as defined in HD 28/04)	Site definition	Maximum traffic levels (number of commercial vehicles per lane per day)		
		1	Type 2	3
Q	Approaches to and across major junctions and approaches to roundabouts	3500	1000	250
G1	Gradient 5% to 10%, longer than 50 m			
S1	Bend radius <500 m — dual carriageway			
R	Roundabout			
G2	Gradient >10%, longer than 50 m	2500	750	175
S2	Bend radius <500 m — single carriageway			
K	Approaches to pedestrian crossing and other high-risk situations	2500	500	100

(1) Suitable areas for use of systems classified in accordance with Table 1 of the *Guidelines Document* to give an expected service life of 5 to 10 years.

9.2 If the system is used in other locations or at different traffic levels, the expected life will be increased or decreased in relation to the severity of the site.

## Installation

### 10 General

10.1 Installation of the Hotgrip High-Friction Surfacing System is carried out only by BBA Approved Installers<sup>(1)</sup> with trained operatives under competent supervision.

(1) See also *Assessment and Surveillance Scheme for Installers of High-Friction Surfaces for Highways*.

10.2 The Certificate holder is responsible for training and monitoring the BBA Approved Installers to ensure the system is installed in accordance with the BBA agreed Method Statement and this Certificate.

## 11 Preparation

11.1 Any imperfections in the road surface not acceptable to the installer should be reinstated with a material approved by the purchaser in consultation with the installer.

11.2 The road surface must be clean, dry, and free from ice, frost, loose aggregate, oil, grease, road salt and other loose matter likely to impair adhesion of the system to the road surfacing.

11.3 Surface contamination can be removed by grit blasting, water jetting or other suitable measures agreed with the purchaser. Dust and other loose matter can be removed by brushing or by the use of hot, compressed air.

11.4 The ambient and road surface temperatures should be recorded. Installation should not be carried out if the road surface temperature is outside the range of 0°C to 35°C.

11.5 The material is melted and mixed in a suitable boiler fitted with thermostatic controls, and a horizontally mounted agitator. The required amount of the material is loaded into the boiler and the temperature is raised to the application temperature range of 170°C to 210°C and mixed until fully homogeneous.

11.6 The molten material can be maintained between the application temperature range for up to four hours without serious degradation or discoloration.

11.7 The maximum safe heating temperature is 220°C. Above this temperature, degradation of the binder could occur.

## 12 Application

12.1 The heated material is discharged from the boiler into buckets and transferred to the screed box.

12.2 The system is applied to the prepared surface using a screed box with a suitably designed trailing edge to give an approximate applied finish of between 3 mm and 5 mm by combing transversely across the road surface ensuring that the aggregate is evenly distributed to provide a well-textured finish, free from lumps and similar surface blemishes.

## 13 After-care

The installer conducts a visual check for uniform surface texture, surface blemishes and any discernible faults and carries out any remedial work, as necessary.

## Technical Investigations

The following is a summary of the technical investigations carried out on the Hotgrip High-Friction Surfacing System.

### 14 Tests

Laboratory performance tests were carried out on the system (see Tables 3 and 4).

### 15 Investigations

15.1 An installation trial was carried out to assess the practicability of the installation and quality control/assurance procedures.

15.2 A user/specifier survey relating to existing sites, of the appropriate classification at least two years old, was carried out to assess the system's performance and durability.

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

Table 3 Laboratory performance tests on asphalt substrates

Test	Parameter	Method in TRL Report 176 <sup>(1)</sup>	Type 2 requirement
Scuffing at 45°C	Initially	Texture depth (mm)	≥1.2
	After 500 wheel-passes	Texture depth (mm)	≥1.0
		Erosion index	≤15
	After heat ageing for 112 days at 70±3°C and 500 wheel-passes	Texture depth (mm)	≥1.0
	Erosion index	≤15	
Wear	Initially	Texture depth (mm)	≥1.2
		SRV	≥65
	After 100,000 wheel-passes	Texture depth (mm)	≥0.9
	Erosion index	≤15	
	SRV	≥65	
Tensile adhesion	Stress at -10±2°C (Nmm <sup>-2</sup> )	Appendix J	≥1.0
	Stress at 20±2°C (Nmm <sup>-2</sup> )	Appendix J	≥0.5

(1) Including any agreed amendments detailed in Appendix D of the *Guidelines Document for the Assessment and Certification of High-Friction Surfaces for Highways*.

Table 4 Additional tests

Test	Parameter	Method in TRL Report 176 <sup>(1)</sup>	Result
Resistance to freeze/thaw	Texture depth	Appendix L	satisfactory
	Erosion index		
Resistance to diesel	Texture depth	Appendix M	satisfactory
	Erosion index		
Thermal movement	Thermal expansion coefficient	Appendix N	satisfactory
Installation temperature test at 0°C	Texture depth	Appendix P	satisfactory
	Erosion Index		

(1) Including any agreed amendments detailed in Appendix D of the *Guidelines Document for the Assessment and Certification of High-Friction Surfaces for Highways*.

## 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 EN ISO 9001 : 2000 *Quality management systems — Requirements*

*Assessment and Surveillance Scheme for Installers of High-Friction Surfaces for Highways* (November 1998)

*Guidelines Document for the Assessment and Certification of High-Friction Surfaces for Highways* (November 1998)

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

HD 28/04 *Design Manual for Roads and Bridges : Volume 7, Pavement Design and Maintenance : Section 3, Pavement Maintenance Assessment : Part 1, Skid Resistance*

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)

## Conditions of Certification

### 16 Conditions

16.1 This Certificate:

- (a) relates only to the product that is named, 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, intellectual property 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 actual works in which the product is installed, used and maintained, including the nature, design, methods and workmanship of such works.

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, the Hotgrip High-Friction Surfacing System is fit for its intended use provided it is installed, used and maintained as set out in this Certificate. Certificate No 05/H111 is accordingly awarded to Adbruf Limited.

On behalf of the British Board of Agrément

Date of issue: 13th September 2005

Chief Executive