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HAPAS
Roads and Bridges
Agrément Certificate
No 05/H115

BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

Designated by Government to issue European Technical Approvals

TYREGRIP 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 TYREGRIP HIGH-FRICTION SURFACING SYSTEM, COMPRISING A TWO-COMPONENT EPOXY BINDER AND A GRADED (1 mm to 3 mm) CALCINED BAUXITE AGGREGATE.*
- *The system is for use as a high-friction surfacing on highways with bituminous surfaces and is classified as Type 1 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 Tyregrip High-Friction Surfacing System, when applied to a suitable asphalt surface, in accordance with the provisions of this Certificate, will meet the relevant requirements and is deemed to be of Type 1.

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 to 5.3); *7 Precautions during installation*.

Technical Specification

3 Description

3.1 The Tyregrip High-Friction Surfacing System comprises a two-component, modified epoxy binder and a graded (1 mm to 3 mm) calcined bauxite aggregate.

3.2 Tyregrip is also available in a range of colours. The coloured system comprises colour-coated calcined bauxite with pigmented and unpigmented binder options. It should be noted that the colour retention has not been assessed and is, therefore, outside the scope of this Certificate.

4 Manufacture and quality control

The binder components are manufactured by a batch-blending process. A series of quality control checks is conducted on each batch of individual components and on the combined components. The combinations tested are identified by batch numbers and detailed on a Certificate of Conformity prior to delivery to site.

5 Delivery and site handling

5.1 The binder components can be delivered to site in 200 litre drums or pre-weighed combination packs.

5.2 If binder components are transferred to bulk storage vessels for decanting, then they must be stored in vehicle mounted tanks and maintained within a temperature range of 20–30°C.

5.3 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)[1]	Classification
Part A	>100	Environment hazard
Part B	>100	Toxic corrosive

(1) Closed cup.

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

5.5 The calcined bauxite aggregate is delivered to site in bags and/or bulk, and stored on board a suitable vehicle prior to use.

Design Data

6 General

6.1 The Tyregrip High-Friction Surfacing System is satisfactory for use as a high-friction surfacing on highways 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 1, 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*.

6.3 Installation of the system should be carried out only when the road surface temperature is between 5°C and 35°C.

6.4 The suitability of the system for use on highways with concrete surfaces has not been assessed and is, therefore, outside the scope of this Certificate.

7 Precautions during installation

Health and Safety Data Sheets and the control of Substances Hazardous to Health Regulations 2002 (COSHH) risk assessments for the works should be deposited with the purchaser and be maintained on site.

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, cleaning the prepared area using hot compressed air, masking the perimeter and reinstating to the original specification.

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*, it should have a service life of between 5 and 10 years (see Table 2).

Table 2 Area[1] 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)		
		Type 1	2	3
Q	Approaches to and across major junctions and approaches to roundabouts	3500	1000	250
G1	Gradient from 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	Approach to hazard, such as roundabout, traffic signals, pedestrian crossing, railway level crossing	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 then the expected life will be increased or decreased in relation to the severity of the site.

Installation

10 General

10.1 Installation of the Tyregrip High-Friction Surfacing System is carried out only by BBA Approved Installers.

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.

10.3 The ambient and road surface temperatures must be recorded. Installation should not be carried out if the road surface temperature is outside the range of 5°C to 35°C.

11 Preparation

11.1 All 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.

12 Application

Hand-mixed material

12.1 The pre-weighed components are decanted into a clean container of suitable size. For colour options, the pigment is added to Part A at this stage.

12.2 The components are mixed until homogeneous, using a high-torque slow-speed drill fitted with a helical mixing blade.

Application of the binder and calcined bauxite aggregate

12.3 The mixed binder can be applied by brush or squeegee onto the prepared surface at a minimum coverage rate, which will vary according to the texture and porosity of the surface but shall not be less than 1.35 kgm^{-2}.

12.4 After the binder is applied, an excess of calcined bauxite aggregate is broadcast over the binder and is evenly spread out using a broom or squeegee.

12.5 After the binder is sufficiently cured, the excess aggregate is removed by vacuum sweeper or other suitable means.

12.6 Rolling of the aggregate is not permitted.

13 Aftercare

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 Tyregrip 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, 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	Type 1 requirement
Scuffing at 45°C	Initially (standard and winter grade)	Texture depth (mm)	Appendix G	≥1.4
	After 500 wheel-passes (standard and winter grade)	Texture depth (mm) Erosion index	Appendix G	≥1.2 ≤3
	After heat ageing for 112 days at 70±3°C and 500 wheel-passes	Texture depth (mm) Erosion index	Appendix G	≥1.2 ≤5
Wear	Initially	Texture depth (mm) SRV	Appendix H	≥1.4 ≥65
	After 100,000 wheel-passes	Texture depth (mm) Erosion index SRV	Appendix H	≥1.1 ≤3 ≥70
Tensile adhesion		Stress at −10±2°C (Nmm^{-2})	Appendix J	≥1.0
		Stress at 20±2°C (Nmm^{-2})	Appendix J	≥0.5

Table 4 Additional tests

Test	Parameter	Method in TRL Report 176	Result
Resistance to freeze/thaw	Texture depth Erosion index	Appendix L	satisfactory
Resistance to diesel	Texture depth Erosion index	Appendix M	satisfactory
Thermal movement	Thermal expansion coefficient	Appendix N	satisfactory

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*

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.

BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

In the opinion of the British Board of Agrément, the Tyregrip 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/H115 is accordingly awarded to Prismo Ltd.

On behalf of the British Board of Agrément

Date of issue: 30th September 2005

Chief Executive

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