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Roads and Bridges

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BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
01/H055
Product Sheet 3

TUFFGRIP THIN SURFACING SYSTEMS FOR HIGHWAYS

TUFFGRIP 6 MM (OPEN TEXTURE) THIN SURFACING SYSTEM

This Certificate is issued under the Highway Authorities' Product Approval Scheme (HAPAS) by the British Board of Agrément (BBA) in conjunction with the Highways Agency (HA) (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 SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to the Tuffgrip 6 mm (open texture) Thin Surfacing System.

AGRÉMENT 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 five-yearly review.

KEY FACTORS ASSESSED

Texture depth — complies with the requirements for a Level 1 system in accordance with Appendix B[1] (see section 5).

Wheel tracking — complies with the requirements for a Level 3 system in accordance with Appendix B[1] (see section 6).

Sensitivity to water — test data has been recorded and is considered to be satisfactory as defined in Table 2[1] (see section 7).

Bond to substrate — test data has been recorded and is considered to be satisfactory as defined in Table 2[1] (see section 8).

Durability — the system has been used in the United Kingdom since 2003 and shares common elements with Tuffgrip 10 mm including the same binder, aggregate sources and bond coat. The available evidence suggests that it will provide a durable surface course suitable for use on highways where the retained texture depth of ≥0.7 mm is required (see section 10).

(1) Of the *Guidelines Document for the Assessment and Certification of Thin Surfacing Systems for Highways*.

The BBA has awarded this Agrément Certificate to the company named above for the system described herein. The 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 Third issue: 25 May 2010
Originally certificated on 26 January 2007

Simon Wroe
Head of Approvals — Materials

Greg Cooper
Chief Executive

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.

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HAPAS Requirements

Requirements

The Highways Technical Advisory Committee (HiTAC) and HAPAS Specialist Group 3 (Thin Surfacing) have agreed with the BBA the aspects of performance to be used by them in assessing the compliance of Thin Surfacing Systems with the *Guidelines Document for the Assessment and Certification of Thin Surfacing Systems for Highways*. In the opinion of the BBA, the Tuffgrip 6 mm (open texture) Thin Surfacing System, when manufactured and laid in accordance with the provisions of this Certificate can achieve the Performance Levels given in section 5, *Texture depth* and section 6, *Wheel tracking*.

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: 2 *Manufacture, quality control, delivery and site handling* (2.2 and 2.3).

General

The Tuffgrip 6 mm (open texture) Thin Surfacing System is installed only by contractors approved by the Certificate holder using conventional paving equipment.

The Certificate holder operates an Approved Installer Scheme for the Tuffgrip Thin Surfacing System under which installers are trained, approved, registered and regularly reviewed by Hanson Quarry Products Europe Ltd to demonstrate that they are competent to carry out installation of the system in accordance with this Certificate. Details of Approved Installers are available from the Certificate holder.

Certificate holder's records relating to the ongoing maintenance of their Approved Installer Scheme will be audited by the BBA as part of its regular programme of surveillance.

Technical Specification

1 Description

1.1 The Tuffgrip 6 mm (open texture) Thin Surfacing System for Highways, comprising a mixture consisting of a blend of a polymer-modified binder (Tuffgrip 50, Tuffgrip 70, Tuffgrip 100, Tuffgrip 150, Styrelf 13/60 or Cariphalte TS), filler and graded fine and coarse aggregates (gritstone, granite or basalt).

1.2 The system is used in conjunction with K1-40, K1-70, Colbond 50, Colbond 65, or Polybond 65 bond coat.

1.3 The system is laid at nominal thicknesses between 15 mm and 30 mm, covering the Classification Type A, B and C as defined in Table 1 of the *Guidelines Document for the Assessment and Certification of Thin Surfacing Systems for Highways*.

2 Manufacture, quality control, delivery and site handling

2.1 The system is manufactured, controlled and delivered in accordance with a BBA agreed Quality Plan which includes requirements for:

- binder
- aggregate selection and approval
- plant suitability
- method of production and process control
- inspection and testing of finished product
- delivery vehicles.

2.2 Bond coat may be delivered to site either in bulk by tanker or in 200 kg drums.

2.3 The system is not classified under *The Chemicals (Hazard Information and Packaging for Supply) Regulations 2009* (CHIP4). Standard material safety data sheets for hot asphalts apply.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the Tuffgrip 6 mm (open texture) Thin Surfacing System.

Design Considerations

3 General

3.1 The Tuffgrip 6 mm (open texture) Thin Surfacing System is satisfactory for use as a thin surfacing system on highways.

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

3.3 The system is suitable for application to highway surfaces at a minimum temperature of 5°C, measured on a rising thermometer, provided the substrate is free from standing water or ice and that the minimum specified rolling temperature can be maintained in accordance with the Certificate holder's installation procedures.

3.4 When laid above 20 mm thick, the system is suitable for use at a minimum surface temperature of 0°C.

4 Practicability of installation

The system is installed only by contractors approved by the Certificate holder using conventional paving equipment.

5 Texture depth

The system, when manufactured and laid in accordance with the provisions of this Certificate, can be designed to achieve the Performance Levels for texture depths given in Table 1.

Table 1 Performance Levels achieved using Tuffgrip 6 mm (open texture)

Test parameter	Performance Level achieved[1]	Requirement
Texture depth	1	
untrafficked (mm)		⩾1.0
after two years of trafficking (mm)		⩾0.7

(1) Performance Levels are defined in Appendix B of the Guidelines Document.

6 Wheel tracking

The system, when manufactured and laid in accordance with the provisions of this Certificate, can be designed to achieve the Performance Levels for wheel tracking given in Table 2.

Table 2 Performance Levels achieved using Tuffgrip 6 mm (open texture)

Test parameter	Performance Level achieved[1]	Requirement
Wheel tracking	3	
rate (mean/max individual) ($mm \cdot h^{-1}$)		⩽5.0/⩽7.5
rut depth (mean/max individual) (mm)		⩽7.0/⩽10.5

(1) Performance Levels are defined in Appendix B of the Guidelines Document.

7 Sensitivity to water

The retained stiffness for the system using the approved binders and aggregates has been recorded in accordance with the Guidelines Document. The mean results fall within the range of 81% to 134% (see Tables 3 and 6 in the *Technical Investigations* part of this Certificate).

8 Bond to substrate

The torque bond strength for the system using the approved bond coats has been recorded in accordance with the Guidelines Document. The mean results fall within the range of 725 kPa to 779 kPa (see Table 3 in the *Technical Investigations* part of this Certificate).

9 Maintenance

The system is not subject to any routine maintenance requirements but any damage should be repaired (see section 12).

10 Durability

The system has been used in the United Kingdom since 2003 and shares common elements with Tuffgrip 10 mm including the same binder, aggregate sources and bond coat. The available evidence suggests that it will provide a durable surface course for use on highways where the retained texture depth of ⩾0.7 mm is required.

Installation

11 General

The Tuffgrip 6 mm (open texture) Thin Surfacing system is installed by contractors approved by the Certificate holder in accordance with their installation procedures which include requirements for:

- site approval procedure
- limitations in respect of weather
- equipment
- installation procedures
- maintenance and repairs
- storage, handling and delivery
- substrate preparation
- on-site quality control and records
- joints.

12 Repair

Major repairs

12.1 The damaged area is removed by planing, to provide a length of at least 15 m for resurfacing. The planed area is resurfaced using material to the same specification in accordance with the Certificate holder's installation procedures.

Minor repairs

12.2 Minor repairs can be carried out by cutting out the damaged section and replacing it with a material of suitable specification agreed between the Certificate holder and the purchaser.

12.3 Where possible a diamond patch reinstatement shall be used that extends a minimum of 0.25 m beyond the damaged section.

12.4 Joints must be saw cut, cleaned and painted with a thick uniform coating of hot bitumen.

Technical Investigations

13 Tests

Mandatory laboratory and road tests

13.1 A series of tests was carried out on a mixture based on basalt aggregate, Tuffgrip 100 binder, Colbond 65 and K1-40 bond coats laid on the Oak Road installation. The results of the tests are given in Tables 3 and 4.

Table 3 Mandatory laboratory tests carried out on the coarse aggregate, cores taken from the Oak Road installation trial of Tuffgrip 6 mm (open texture) or on laboratory-prepared samples of the same mixture recipe

Test	Mean result	Performance Level	Method
Coarse aggregate properties			
PSV	62	n/a	BS EN 1097-8
AAV	3.3	n/a	BS EN 1097-8
Wheel tracking at 60°C[1]			Guidelines Document, Appendix A.1
rate ($mm \cdot h^{-1}$)	n/a	n/a	
rut depth (mm)	n/a		
Sensitivity to water retained stiffness ($ITSM_{c3}$)[2] (%)	95	n/a	Guidelines Document, Appendix A.2
Torque bond strength at 20±2°C on			Guidelines Document, Appendix A.3
100 mm diameter cores (kPa)	*725*[3][5] *779*[4][6]	n/a	

(1) Mean core thickness less than 20 mm.

(2) Retained indirect stiffness modulus at 20±0.5°C after three water conditioning cycles carried out on laboratory-prepared samples.

(3) Mixture using Tuffgrip 100 binder, basalt aggregate and Colbond 65 bond coat.

(4) Mixture using Tuffgrip 100 binder, basalt aggregate and K1-40 bond coat.

(5) Mainly interface shear between the system and substrate.

(6) Rupture within the system material.

n/a = Not applicable.

Table 4 Mandatory checks and tests carried out on the Oak Road installation

Test	Mean result	Requirement	Method
Initial texture depth sand patch (mm)	1.0	⩾1.0	BS 598-105
Visual observations	Good uniform surface with no significant faults or abnormalities noted		

Additional tests

13.2 A series of tests was carried out to confirm the performance of the system in relation to wheel tracking. The results of the tests are given in Table 5.

Table 5 Wheel tracking at 60°C test on Tuffgrip 6 mm (open texture)

Binder type	Mean thickness (mm)	Mean result		Method
		Rate ($mm \cdot h^{-1}$)	Rut depth (mm)	
Tuffgrip 50	30	0.7	1.5	Guidelines Document, Appendix A.1
Tuffgrip 100	27	2.5	4.2	
Styrelf 13/60	30	1.6	3.6	
Cariphalte TS	30	0.6	1.5	

13.3 A series of tests was carried out to confirm the performance of the system in relation to sensitivity to water. The results of the tests are given in Table 6.

Table 6 Sensitivity to water test on Tuffgrip 6 mm (open texture)

Binder type	Aggregate type	Retained stiffness ($ITSM_{c3}$)(1) (%)	Method
Tuffgrip 50	basalt	86	Guidelines Document, Appendix A.2
Tuffgrip 50	granite	105	
Tuffgrip 50	gritstone	96	
Tuffgrip 100	granite	98	
Tuffgrip 100	gritstone	82	
Styrelf 13/60	basalt	81	
Styrelf 13/60	granite	91	
Styrelf 13/60	gritstone	92	
Cariphalte TS	basalt	107	
Cariphalte TS	granite	134	
Cariphalte TS	gritstone	96	

(1) Retained indirect stiffness modulus at 20 ±0.5°C after three water conditioning cycles carried out on laboratory-prepared samples.

14 Investigations

14.1 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. Results from the installation confirmed that it complied with the contractual requirements.

14.2 A user/specifier survey relating to existing sites that were at least two years old was carried out to confirm the system's performance in use.

14.3 The manufacturing process was examined by inspection of a typical coating plant, including the methods adopted for quality control, and details were confirmed of the quality and composition of materials used.

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 1097-8 : 2000 *Tests for mechanical and physical properties of aggregates — Determination of the polished stone value*

Guidelines Document for the Assessment and Certification of Thin Surfacing Systems for Highways, July 2004.

15 Conditions

15.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is granted only to the company, firm or person named on the front page — no other company, firm or person may hold or claim any entitlement to this Certificate
- 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.

15.2 Publications and documents referred to in this Certificate are those that the BBA deems to be relevant at the date of issue or re-issue of this Certificate and include any: Act of Parliament; Statutory Instrument; Directive; Regulation; British, European or International Standard; Code of Practice; manufacturers' instructions; or any other publication or document similar or related to the aforementioned.

15.3 This Certificate will remain valid for an unlimited period provided that the product/system and the manufacture and/or fabrication including all related and relevant 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.
- remain in accordance with the requirements of Highway Authorities' Product Approval Scheme.

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

- 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
- individual installations of the product/system, including the nature, design, methods and workmanship of or related to the installation
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

15.5 Any information relating to the manufacture, supply, installation, use and maintenance 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 and maintained. It does 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; 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. 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 manufacture, supply, installation, use and maintenance of this product/system.

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