

# HAPAS

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## HAPAS Certificate

01/H058

Product Sheet 1

### TRUSTSEAL HIGH-FRICTION SURFACING SYSTEM

### KEYGRIP TYPE 1 THERMOPLASTIC

This HAPAS Certificate Product Sheet<sup>(1)</sup> is issued by the British Board of Agrément (BBA), supported by Highways England (HE) (acting on behalf of the Overseeing Organisations of the Department for Transport; Transport Scotland; the Welsh Assembly 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. HAPAS Certificates are normally each subject to a review every three years.  
(1) Hereinafter referred to as 'Certificate'.

This Certificate relates to Keygrip Type 1 Thermoplastic, a high-friction surfacing system for use on bituminous and concrete highways.

#### 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

**Performance** — the system complies with the requirements for a Type 1 system in accordance with the *Guidelines Document for the Assessment and Certification of High-Friction Surfacing for Highways* (see section 14, Table 2).

**Durability** — the system, when used in an appropriate location as defined in the *Guidelines Document for the Assessment and Certification of High-Friction Surfacing for Highways*, should have a service life of between 5 and 10 years (see section 7).



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: 26 April 2018

John Albon – Head of Approvals  
Construction Products

Claire Curtis-Thomas  
Chief Executive

Originally certificated on 7 February 2002

*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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## Requirements

In the opinion of the BBA, Keygrip Type 1 Thermoplastic, when assessed in accordance with the BBA HAPAS *Guidelines Document for the Assessment and Certification of High-Friction Surfaces for Highways*, and used in accordance with the provisions of this Certificate, will meet or contribute to meeting the requirements of the *Manual of Contract Documents for Highway Works (MCHW)*<sup>(1)</sup>, Volume 1 *Specification for Highway Works (SHW)*, Series 900, Clause 924.

(1) The MCHW is operated by the Overseeing Organisations: Highways England (HE), Transport Scotland, the Welsh Assembly Government and the Department for Infrastructure (Northern Ireland).

## 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.

See sections: 3 *Delivery and site handling*, (3.1 and 3.2) and 9 *Precautions during installation* of this Certificate.

## Technical Specification

### **1 Description**

Keygrip Type 1 Thermoplastic comprises a thermoplastic rosin ester binder incorporating a graded (nominal 1 to 3 mm) calcined bauxite aggregate.

### **2 Manufacture**

2.1 The system is manufactured by a batch-blending process.

2.2 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 and agreed 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.

2.3 The management system of Trustseal Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by the BBA (Certificate 12/Q026).

### **3 Delivery and site handling**

3.1 The material is delivered to site in granular form in 25 kg polyethylene bags. Each bag may also include a pre-weighed sachet of pigment, if a coloured system is required.

3.2 The Certificate holder has taken the responsibility of classifying and labelling the system components under the *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).

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

## Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Keygrip Type 1 Thermoplastic.

### Design Considerations

#### 4 Use

4.1 Keygrip Type 1 Thermoplastic is satisfactory for use as a high-friction surfacing system on bituminous and concrete highways with surface texture depths of between 0.5 and 2.0 mm, measured in accordance with BS EN 13036-1 : 2010 or BS 598-105 : 2000.

4.2 The system is classified as Type 1, in accordance with the requirements defined in Table 1 of the Guidelines Document and detailed in section 7 of this Certificate.

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

#### 5 Practicability of installation

The system must be installed by BBA Approved Installers<sup>(1)</sup>. Operatives must be trained and approved by the Certificate holder.

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

#### 6 Maintenance

The system is not subject to any routine maintenance requirements but any damage must be repaired (see section 13).

#### 7 Durability

7.1 The results of the performance tests and the performance of the system in use indicate that Keygrip Type 1 Thermoplastic, when used in an appropriate location as defined in the Guidelines Document, should have a service life of between 5 and 10 years (see Table 1).

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

Site category <sup>(2)</sup>	Site definition	Maximum traffic levels <sup>(3)</sup> (Type 1)
Q	Approaches to and across major junctions and approaches to roundabouts	3500
G1	Gradient from 5 to 10%, longer than 50 m	3500
S1	Bend radius <500 m – dual carriageway	3500
R	Roundabout	3500
G2	Gradient >10%, longer than 50 m	2500
S2	Bend radius <500 m – single carriageway	2500
K	Approaches to pedestrian crossings and other high-risk situations	2500

(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.

(2) Site Category as defined in HD 28/15.

(3) Commercial vehicles per lane per day.

7.2 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.

### 8 General

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

8.2 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.

### 9 Precautions during installation

9.1 Health and Safety Data Sheets and the *Control of Substances Hazardous to Health Regulations 2002 (COSHH)* risk assessments for the works must be deposited with the purchaser and be maintained on site by the approved installer.

9.2 Suitable personal protective clothing (eg gloves and eye protection) must be worn to prevent skin contact with hot material.

### 10 Preparation

10.1 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.

10.2 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 the adhesion of the system to the road surfacing.

10.3 Surface contamination is removed using any suitable method agreed between the installer and purchaser, including grit blasting, high-pressure water jetting, scabbling and hot compressed air. Oil contamination is removed by washing with a suitable detergent followed by flushing with clean water, and dried.

10.4 Existing road markings, iron works and studs must be masked.

10.5 The material is melted and mixed in a suitable boiler, fitted with an agitator. The required amount of the material is loaded into the boiler and the temperature of the material is raised to the application temperature range of between 200 and 250°C, and mixed until fully homogeneous. The temperature of the mixed material is checked using a long-handled, digital temperature probe accurate to  $\pm 2^\circ\text{C}$ .

10.6 The molten material can be maintained at the maximum application temperature of 250°C for up to four hours with constant agitation, without serious degradation or discolouration.

10.7 The maximum safe heating temperature is 265°C and the material should not be heated above this as it will lead to degradation of the binder.

### 11 Application

11.1 The mixed material is discharged from the boiler into buckets and transferred to a screed box.

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

11.3 On a surface with an average texture depth of 1.5 mm the coverage rate should be between 9 and 11  $\text{kg}\cdot\text{m}^{-2}$ . This coverage rate may be increased on a more highly textured surface.

### 12 Aftercare

The installer conducts a visual check on the installation for uniform surface texture, surface blemishes and any discernible faults. Any remedial work must be conducted as necessary.

## 13 Repair

Should the system be damaged or become debonded from the substrate, it must be repaired as follows:

- loose material is cut away back to sound material and the area is then cut into a regular shape
- the prepared area is cleaned using hot compressed air or a propane torch
- the perimeter is masked off and reinstated with the original material to the original specification.

## Technical Investigations

## 14 Tests

Laboratory performance tests were carried out on Keygrip Type 1 Thermoplastic (see Tables 2 and 3). The results of the tests complied with the requirements for a Type 1 system.

*Table 2 Laboratory performance tests*

Test	Parameter measured	Type 1 requirement	Method in TRL Report 176 <sup>(1)</sup>	
Scuffing at 45°C initially	Texture depth (mm)	≥1.4	Appendix G	
	after 500 wheel-passes	Texture depth (mm)		≥1.2
		Erosion index		≤3
	after heat ageing for 112 days at 70±3°C and 500 wheel-passes	Texture depth (mm)		≥1.2
	Erosion index	≤5		
Wear initially	Texture depth (mm)	≥1.4	Appendix H	
		SRV		≥65
	after 100 000 wheel-passes	Texture depth (mm)		≥1.1
		Erosion index		≤3
	SRV	≥70		
Tensile adhesion at (-10±2)°C	Stress at failure (N·mm <sup>-2</sup> )	≥1.0	Appendix J	
	at (20±2)°C	Stress at failure (N·mm <sup>-2</sup> )		≥0.5

(1) Including any agreed amendments detailed in Appendix D of the Guidelines Document.

*Table 3 Additional tests*

Test	Parameter measured	Result	Method in TRL Report 176 <sup>(1)</sup>
Resistance to freeze/thaw	Texture depth	Satisfactory	Appendix L
	Erosion index		
Resistance to diesel	Texture depth	Satisfactory	Appendix M
	Erosion index		
Thermal movement	Thermal expansion coefficient	Satisfactory	Appendix N
Installation temperature test at 0°C	Texture depth	Satisfactory	Appendix P
	Erosion index		
Concrete substrate test	Texture depth	Satisfactory	Appendix P
	Erosion index		
	Tensile adhesion at 20±2°C		

(1) Including any agreed amendments detailed in Appendix D of the Guidelines Document.

## 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 evaluated, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

## Bibliography

*Assessment and Surveillance Scheme for Installers of High-Friction Surfacing for Highways*, March 2008

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 13036-1 : 2010 *Road and airfield surface characteristics — Test methods — Measurement of pavement surface macrotexture depth using a volumetric patch technique*

BS EN ISO 9001 : 2008 *Quality management systems — Requirements*

*Guidelines Document for the Assessment and Certification of High-Friction Surfacing for Highways*, March 2008

HD 28/15 *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, Series 900 Road Pavements — bituminous bound materials*

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

### 16 Conditions

#### 16.1 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 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.

16.2 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.

16.3 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.

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

16.5 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.

16.6 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.