

SHILDON THERMOPLASTICS HIGH-FRICTION SURFACING SYSTEM

THERMOGRIP TYPE 1

This HAPAS Certificate Product Sheet⁽¹⁾ is issued by the British Board of Agrément (BBA), supported by the Highways Agency (HA) (acting on behalf of the Overseeing Organisations of the Department for Transport; Transport Scotland; the Welsh Assembly Government and the Department for Regional Development, Northern Ireland), the Association of Directors of Environment, Economy, Planning and Transport (ADEPT), the Local Government Technical Advisers' Group and industry bodies. HAPAS Certificate Product Sheets are normally each subject to a review every five years.
(1) Hereinafter referred to as 'Certificate'.

This Certificate relates to Thermogrip Type 1, a thermoplastic high-friction surfacing for use on bituminous highway surfaces.

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

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 Surfaces for Highways* (see section 13, 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 Surfaces 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

Simon Wroe
Head of Approvals — Materials

Greg Cooper
Chief Executive

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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.

Requirements

In the opinion of the BBA, Thermogrip Type 1, when assessed in accordance with the *BBA HAPAS Guidelines Document for the Assessment of High Friction Surfacing for Highways* and used in accordance with the provisions of this Certificate, will meet the relevant requirements for a Type 1 system.

Additional requirements of the overseeing organisations are given in the Manual of Contract Documents for Highway Works (MCHW)⁽¹⁾, Volumes 1 and 2, Series 900, Clause 924 (08/08) *High Friction Surfaces*.

(1) The MCHW is operated by the Overseeing Organisations: the Highways Agency (HA), Transport Scotland, the Welsh Assembly Government and the Department for Regional Development (Northern Ireland).

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

Technical Specification

1 Description

Thermogrip Type 1 is a thermoplastic high-friction surfacing for use on highways with bituminous surfaces. The system is classified as Type 1 in accordance with the *Guidelines Document for the Assessment and Certification of High-Friction Surfaces for Highways*.

2 Manufacture

2.1 The system is manufactured using a conventional 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 Shildon Thermoplastics have been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by BSI (Certificate KM 578688).

3 Delivery and site handling

3.1 The material is delivered to site in granular form in 25 kg polythene melt bags.

3.2 The material has been classified under *The Chemicals (Hazard Information and Packaging for Supply) Regulations 2009* (CHIP4)/*Classification, Labelling and Packaging of Substances and Mixtures (CLP Regulation) 2009* and all packaging bears appropriate hazard warning labels. Suitable personal protective clothing (eg gloves and eye protection) must be worn to prevent skin contact with hot material.

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 Thermogrip Type 1.

Design Considerations

4 General

4.1 Thermogrip Type 1 is satisfactory for use as a high-friction surfacing on highways with surface texture depths of between 0.5 mm and 2 mm, measured using the sand patch test as defined in 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 for the Assessment and Certification of High-Friction Surfaces for Highways* and as detailed in section 7 of this Certificate.

4.3 The system is suitable for use on bituminous surfaces only.

4.4 The suitability of the system for use on highways with concrete surfaces and the colour retention of the system have not been assessed and are outside the scope of this Certificate.

5 Practicability of installation

The system must be installed by a BBA Approved Installer⁽¹⁾. Operatives must be trained and approved by the Certificate holder.

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

6 Maintenance

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

7 Durability

7.1 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 1).

Table 1 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)
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.

7.2 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

8 General

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

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 by the approved installer.

10 Preparation

10.1 All faults in the road surface not acceptable to the installer must 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 adhesion of the system to the road surfacing.

10.3 If there is surface contamination it must be removed using any suitable method agreed between the installer and purchaser including grit blasting, high-pressure water jetting, scabbling and hot compressed air.

10.4 All road edges of the area to be treated shall be suitably masked. This includes all existing road markings, road studs, iron work, detector loops unless otherwise directed by the client or their representative.

10.5 The material is melted and mixed in a suitable boiler fitted with an agitator. The required quantity is gradually loaded into the boiler and the material is gently heated to the application temperature range of between 200°C and 220°C. The material is mixed until fully homogenous and maintained between these temperatures. The temperature of the material is checked using a calibrated digital thermometer, accurate to $\pm 2^\circ\text{C}$, fitted with a suitable probe.

10.6 The molten material can be maintained at the maximum application temperature of 220°C for up to four hours with constant agitation, without serious degradation or discoloration.

10.7 The maximum safe heating temperature is 230°C and the material must 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 with a trailing edge designed to give an applied nominal depth of finish between 5 mm and 8 mm.

11.2 The material is applied to the prepared surface by combing the screed box transversely across the road surface. The system should be evenly distributed to provide a well-textured finish, free from lumps and other surface blemishes.

11.3 On a surface with texture depths between 0.5 mm and 2.0 mm the coverage rate should be between 11 kg·m⁻² and 12.5 kg·m⁻² (80 m² to 90 m² per tonne).

11.4 All masking tape is progressively removed during application and before the material has cooled. The applied surfacing must be allowed to fully harden before any disturbance or trafficking is permitted.

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

12 Repair

In the event of damage occurring during installation or in service the system must be repaired by:

- marking out the affected area and squaring with a straight edge
- cutting out the damaged area, removing de-bonded/ loose material using hot compressed air and preparing the underlying road surface in accordance with sections 10.1 to 10.4
- masking around the cut area ensuring a 25 mm overlap onto sound material
- re-applying the system in accordance with section 11.

Technical Investigations

13 Tests

Tests were carried out on samples of Thermogrip Type 1, which are detailed in Tables 2 and 3. The results of these tests comply with the requirements for a Type 1 system.

Table 2 Laboratory performance tests and requirements

Test	Parameter Measured (unit)	Type 1 requirement	Method TRL Report 176 ⁽¹⁾
Scuffing at 45°C	initial	Texture depth (mm)	Appendix G
	after 500 wheel-passes	Texture depth (mm)	
		Erosion index	
	after heat ageing for 112 days at 70±3°C and 500 wheel-passes	Texture depth (mm)	
Wear	initial	Erosion index	Appendix H
	after 100 000 wheel-passes	Texture depth (mm)	
		SRV	
		SRV	
Tensile adhesion	at (-10±2)°C	Stress at failure (N·mm ⁻²)	Appendix J
	at (20±2)°C	Stress at failure (N·mm ⁻²)	

(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 3 Additional tests

Test	Parameter Measured (unit)	Result	Method TRL Report 176 ⁽¹⁾
Resistance to freeze/thaw	Texture depth/erosion index	Satisfactory	Appendix L
Resistance to diesel	Texture depth/erosion index	Satisfactory	Appendix M
Thermal movement	Thermal expansion coefficient	Satisfactory	Appendix N
Low temperature installation test (0°C)	Texture depth/erosion index	Satisfactory	Appendix P

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

14 Investigations

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

14.2 This installation was used as a performance trial which was monitored and tested by the BBA at approximately six monthly intervals over a two year period in-service to assess the durability of the system.

14.3 Tests carried out at these intervals and on cores taken at the end of the two year trial period were satisfactory and complied with the requirements for a Type 1 system as defined in Table 4 of the *Guidelines Document for the Assessment and Certification of High-Friction Surfaces for Highways*.

14.4 An evaluation of the installation was conducted by a BBA HAPAS Inspection Panel to visually assess the performance of the system at the end of the two year trial period. The Inspection Panel concluded that the system had performed satisfactorily during the trial period and awarded a Performance Level 4 as defined in Table 2 of Appendix F of the *Guidelines Document for the Assessment and Certification of High-Friction Surfaces for Highways*.

14.5 The manufacturing process was evaluated, including the methods adopted for quality control, and details were obtained 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 ISO 9001 : 2008 *Quality management systems — Requirements*

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

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

Guidelines Document for the Assessment and Certification of High-Friction Surfaces for Highways

15 Conditions

15.1 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.

15.2 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.

15.3 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.

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

15.5 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.

15.6 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.