

## TARMAC POROUS ASPHALT SURFACING SYSTEM

### ULTISuDS

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 ULTISuDS, a porous asphalt surfacing system for use within a pervious pavement for surface water source control, in lightly trafficked areas such as car parks, residential and urban roads.

#### 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

**Mechanical resistance** — mix design data relating to rut rate and rut depth indicate that the asphalt layers have a satisfactory resistance to permanent deformation (see section 6).

**Water sensitivity** — the asphalt layers have a satisfactory retained stiffness after conditioning in water (see section 8).

**Surface characteristics** — the surface course of the system has a satisfactory skid resistance (see section 9).

**Permeability** — the asphalt layers are permeable and can eliminate surface ponding (see section 10).

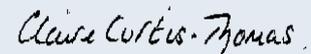
**Durability** — the porous asphalt surfacing system has been used in the UK since 1999. Available evidence indicates that it will provide a durable porous asphalt (see section 12).

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



Paul Valentine  
Technical Excellence Director



Claire Curtis-Thomas  
Chief Executive

Date of Fourth issue: 7 June 2018

Originally certificated on 5 September 2001

*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, ULTISuDS, when manufactured and installed in accordance with the provisions of this Certificate, can be designed to provide a durable porous asphalt surfacing system when used within a sustainable drainage system (SUDS) for surface water source control for lightly trafficked applications such as car parks, residential and urban roads or similar.

## 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 section: *3 Delivery and site handling* of this Certificate.

## Additional Information

### **CE marking**

The Certificate holder has taken the responsibility of CE marking the porous asphalt in accordance with harmonised European Standards BS EN 13108-1 : 2006 and BS EN 13108-7 : 2006. An asterisk (\*) appearing in this Certificate indicates that data shown are given in the manufacturer's Declaration of Performance.

## Technical Specification

### **1 Description**

1.1 ULTISuDS comprises the following asphalt layers:

- porous asphalt surface, binder and base course layers — consisting of aggregate and fillers specified in accordance with BS EN 13043 : 2002, clear synthetic or polymer-modified binders supplied to agreed specifications and/or paving-grade bitumen specified in accordance with BS EN 12591 : 2000, with cellulose fibres.

1.2 The following ancillary items may be used with the system but are outside the scope of the assessment:

- joint preparation – hot applied 40/60 penetration bitumen to BS EN 12591 : 2009 or a cold-applied, thixotropic bitumen emulsion — for use on longitudinal and transverse cut joints
- pigments used for colour purposes.

### **2 Manufacture**

2.1 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.

2.2 The management system of Tarmac Trading Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by BSI (Certificate FM 503516).

### 3 Delivery and site handling

The Certificate holder has taken the responsibility of classifying and labelling the system 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).

## Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on ULTISuDS.

## Design Considerations

### 4 Use

4.1 Installation of ULTISuDS must always be preceded by a detailed review of the proposed site to establish:

- use/type of application
- traffic loading (commercial vehicles per day)
- stability of the sub-grade/receiving course
- suitability of site conditions for attenuation/infiltration or combination system
- requirements for water harvesting
- nature of the sub-grade/receiving course (porosity – hydraulic conductivity, stability)
- other sources of surface run-off.

4.2 The choice of aggregate type used in the surface course will depend on site specific details including location and contractual requirements for polished stone values (PSV). The PSV will be measured in accordance with EN 1097-8 : 2009.

4.3 Once the review (see section 4.1) is complete, the pavement structural design and hydraulic design must be considered.

#### Pavement structural design

4.4 The structural design of the pervious pavement must take into account the anticipated traffic loading and ground conditions, and the mechanical properties of the porous asphalt and the unbound layers. For the design of lightly trafficked roads, including car parks, the analytical approach to pavement design described in TRRL Laboratory Report LR 1132 must be used.

#### Hydraulic design

4.5 The hydraulic design of the pervious pavement must be carried out in accordance with the principles of CIRIA C753 : 2015 and take into account the anticipated maximum rainfall at the location, the design storm event requirement (30, 50, 100 years), the sub-grade permeability and the required water outflow characteristics for the pavement.

4.6 The Certificate holder has the responsibility of liaising with the specifier or appointed hydraulic engineer for adequate hydraulic design.

### 5 Practicability of installation

The system must only be installed by installers who have been trained and approved by the Certificate holder.

### 6 Mechanical resistance

Test results for design and site void content\*, rut rate and depth\* were reviewed. The results indicate that a satisfactory resistance to permanent deformation\* can be attained.

## 7 Bond to substrate

The torque bond strength for the system measured greater than 400 kPa. This is considered satisfactory and would satisfy the minimum requirement of the BBA HAPAS *Guideline Document for the Assessment and Certification of Thin Surfacing Systems for Highways* (see Table 1 of this Certificate).

## 8 Water sensitivity

Sensitivity to water tests have been completed on the surface course. The bound layers will not be significantly affected by the presence of water.

## 9 Surface characteristics

The texture depth of the surface course measured in accordance with BS 598-105 : 2000 indicates that a satisfactory skid resistance can be achieved. See section 15, Table 2.

## 10 Permeability

A review of initial and retained in-situ hydraulic conductivity test results completed on various site trials indicate that water will flow through each layer at, or in excess of, the design rate of 5000 mm·h. See section 15, Tables 1 and 3.

## 11 Maintenance

The surface must be cleaned periodically using a sweeper fitted with water jetting and vacuuming equipment. Power washing or mechanical brushing must not be used to clean the laid asphalt as this will result in the detritus becoming ingrained in the surfacing.

## 12 Durability

The system has been used in the UK since 1999. Available evidence indicates that provided adequate maintenance is carried out in accordance with the recommendations of section 11, the system will provide a durable porous pavement for use as part of a SUDS.

## Installation

### 13 General

13.1 ULTISuDS is installed by the Certificate holder's installers in accordance with procedures detailed in their Quality Plan and the *Best Practice Guide for ULTISuDS*, and the relevant clauses of BS 594987 : 2015 which includes requirements for:

- site inspection and assessment
- surface preparation and cleanliness
- acceptable weather conditions
- minimum paver and rolling temperatures
- site specific toolbox talks
- equipment type and operation
- joint making
- compaction procedure
- precautions during installation
- record keeping
- installation method statement.

13.2 The asphalt must be delivered and compacted within four hours of manufacture. Prior to compaction, the asphalt must be visually inspected and the temperature checked to confirm that the rolling temperature can still be achieved.

13.3 The minimum surface temperature prior to laying must be  $-1^{\circ}\text{C}$  on a rising thermometer, provided the surface is dry and free from ice. Laying must be suspended when the air temperature reaches  $0^{\circ}\text{C}$  on a falling thermometer. ULTISuDS must not be laid during periods of heavy rainfall.

13.4 If an open-graded sub-base layer is required some disturbance of the sub-base surface will occur during the installation of the base course. To minimise this, the following is carried out in accordance with site work instructions, supplemented by toolbox talks:

- base course material can be compacted in a thin layer extending 1.5 m from the edge of areas such as kerbs, structures or bends to stabilise the sub-base. This practice can be completed the day before asphalt layers are installed
- the sub-base should be continuously monitored for any major disturbance. If this occurs, the paver is stopped, the delivery vehicle is pulled off the paver and the sub-base is re-compacted before continuing with the installation.

## Joins

13.5 All longitudinal and transverse joints will be prepared in accordance with BS 594987 : 2015. Any joints must be cut to a full depth vertical face, cleaned and painted with a thick uniform coating of joint preparation as identified in section 1.2.

13.6 Joints must not be overbanded with bitumen.

## 14 Repair

### Major repairs

14.1 The damaged area is removed by planing to the full depth of the affected layer. The planed area is reinstated using material to the same specification, unless otherwise agreed with the purchaser, using the procedures identified in section 13.

14.2 If pre-treatment of the substrate to maintain the hydraulic conductivity is required, the use of a sweeper fitted with water jetting and vacuuming equipment is recommended. This is followed by hydraulic conductivity tests to confirm water flow and should be at least 75% of the hydraulic conductivity requirement for the site.

### Minor repairs

14.3 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.

## Technical Investigations

## 15 Tests

Tests were carried out at, or on samples taken from, an ULTISuDS trial site. See Tables 1 to 3.

<b>Test</b>	<b>Mean result</b>	<b>Method</b>
Torque bond strength at $20\pm 2^{\circ}\text{C}$ (kPa)	557 <sup>(1)</sup>	Guideline Document, Appendix A.3
Hydraulic conductivity (mm·hr)	14997 <sup>(2)</sup>	BS DD 229

(1) Mode of failure = Failure in substrate. Age at time of test unknown.

(2) Mean hydraulic conductivity for full pavement depth.

*Table 2 Surface characteristics results for ULTISuDS 10 mm surface course*

<b>Test</b>	<b>Result<sup>(1)(2)</sup></b>	<b>Method</b>
Texture depth (mm) trafficked	1.9	BS 598-105

(1) Mean result. Measured approximately 8 months after installation.

(2) Limestone aggregate.

*Table 3 Results from tests carried out on the 32 mm base course material*

<b>Test</b>	<b>Mean result</b>	<b>Method</b>
Hydraulic conductivity (mm·hr)	24890 <sup>(1)</sup>	BS DD 229
	7172 <sup>(2)</sup>	

(1) Hydraulic conductivity measured 1 month after installation.

(2) Hydraulic conductivity measured 7 months after installation. Construction traffic caused reduction in hydraulic conductivity. Remedial work resulted in final hydraulics being satisfactory (see Table 1).

## 16 Investigations

16.1 An installation of ULTISuDS was witnessed by the BBA to confirm the practicability of the installation and on-site quality control procedures.

16.2 A user/specifier survey relating to the performance in use was carried out which confirmed the system performance and durability in applications typical of those quoted within this Certificate.

16.3 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. The inspection confirmed that the plant operated in accordance with requirements of the Quality Plan and Quality System agreed with the BBA.

16.4 Visits to existing sites were conducted by the BBA to confirm the system's performance in use.

## 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 594987 : 2015 *Asphalt for roads and other paved areas — Specification for transport, laying, compaction and product type testing protocols*

BS DD 229 : 1996 *Method for determination of the relative hydraulic conductivity of permeable surfacings*

BS EN 12591 : 2010 *Bitumen and bituminous binders — Specifications for paving grade bitumens*

BS EN 13043 : 2002 *Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas*

BS EN 13108-1 : 2006 *Bituminous mixtures — Material specifications — Asphalt Concrete*

BS EN 13108-7 : 2006 *Bituminous mixtures — Material specifications — Porous Asphalt*

CIRIA C753 : 2015 *The SuDS Manual*

EN 1097-8 : 2009 *Tests for mechanical and physical properties of aggregates — Determination of polished stone value*

*Guideline Document for the Assessment and Certification of Thin Surfacing Systems for Highways, July 2004*

TRRL Laboratory Report LR 1132 *The structural design of bituminous*

### 17 Conditions

#### 17.1 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.

17.2 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.

17.3 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.

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

17.5 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.

17.6 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.