



## Permanite Asphalt

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Designated by Government  
to issue  
European Technical  
Approvals

## PERMATRACK

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 Development Department; the National Assembly of Wales; the Department for Regional Development, Government Department in Northern Ireland), the CSS (formerly 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 PERMATRACK, A POLYMER-MODIFIED ASPHALT FOR USE AS AN INLAID CRACK-SEALING SYSTEM FOR HIGHWAYS.*

- *The product is for use as a treatment for repairing cracks in non-porous, bituminous or concrete highway surfaces in accordance with the Guidelines Document for the Assessment and Certification of Crack Sealing Systems for Highways.*

- *The product is manufactured and marketed by Permanite Asphalt, and installed by their approved installers.*

## HAPAS Requirements

### 1 Requirements

1.1 The Highways Technical Advisory Committee (HiTAC) and HAPAS Specialist Group 2 (Crack Sealing Systems) have agreed with the British Board of Agrément the aspects of performance to be used by the BBA in assessing the compliance of crack-sealing systems for highways with the Guidelines Document. In the opinion of the BBA, Permatrack, when applied to a suitable non-porous, bituminous or concrete highway in accordance with the provisions of this Certificate, will meet the relevant requirements.

1.2 Additional requirements of the overseeing organisations are given in the Manual of Contract Documents for Highway Works, Volume 1 (MCHW1) *Specification for Highway Works, 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 section:

5 *Delivery and site handling* (5.1).

## Technical Specification

### 3 Description

3.1 Permatrack is a polymer-modified asphalt system, comprising a flexible waterproof layer (Permatrack PSB) and a high-modulus surface course (Permatrack H).

3.2 14 mm or 20 mm graded, pre-coated chippings or 2 mm/3 mm calcined bauxite aggregate is applied to Permatrack H to match the adjacent highway surface and meet skid resistance requirements.

### 4 Manufacture and quality control

4.1 Permatrack H and PSB are manufactured by mixing the respective bitumens, fillers, aggregates, rubber and synthetic polymers using conventional techniques.

4.2 The production process is controlled in accordance with a Quality Plan agreed by the BBA which includes requirements for:

raw material selection

method of production and process control  
inspection and testing of finished product.

### 5 Delivery and site handling

5.1 Permatrack H and PSB are supplied in block form (similar to traditional asphalt) in nominal weights of 20 kg and 7 kg respectively. Each bears a label bearing the product type and name, batch number and the BBA identification mark incorporating the number of this Certificate.

5.2 Alternatively Permatrack H may be supplied in hot-charge (molten) form, delivered to site in purpose-built transporters which are heated, thermostatically controlled and continually agitate the product. The product information is supplied on the relevant delivery notes with each consignment.

5.3 Permatrack blocks should be stored away from contaminants such as oil-based substances and acid solutions. Double stacking of pallets is not recommended.

## Design Data

### 6 General

6.1 Permatrack is satisfactory for use as an inlaid crack-sealing system for repairing crack widths typically in excess of 20 mm or multiple adjacent cracks in non-porous, bituminous highway surfaces<sup>(1)</sup> with texture depths not exceeding 2 mm, or in concrete highway surfaces.

(1) For the purposes of this Certificate, non-porous bituminous highway surfaces are impermeable and include hot-rolled asphalt and mastic asphalt.

6.2 The product is categorised as Type H and meets the requirements of the *Guidelines Document for the Assessment and Certification of Crack Sealing Systems for Highways*, including the minimum initial and investigatory skid resistance values of 60 and 50 respectively.

6.3 Installation of the system should be carried out only when the road surface temperature is above  $-5^{\circ}\text{C}$ .

6.4 The colour retention of the product has not been assessed and is outside the scope of this Certificate.

### 7 Precautions during installation

Health and Safety Data Sheets and COSHH risk assessments for the works should be deposited with the purchaser and be maintained on site.

### 8 Maintenance and repair

In the event of damage occurring during installation or during service the product is repaired by planing out to firmly-adhered material or the existing road surface. The recess is squared off, cleaned and primed, if necessary, before Permatrack is applied.

### 9 Durability

9.1 The results of tests and an assessment of the product's use in service indicate that Permatrack can be used to seal and repair cracks in both longitudinal and transverse directions of the carriageway, with a minimum expected life of five years.

9.2 Where cracks have penetrated substantially through the pavement depth due to structural failure resulting in significant movement under traffic, an expectation of life cannot be predicted. Where pavements are structurally sound and cracking is confined to the surfacing layer or layers, and these remain bonded to the road-base, the five-year minimum life should be achieved.

9.3 The most severe wear from trafficking (primarily by heavy goods vehicles) occurs within the wheel track zones, approximately between 0.5 m and 1.1 m, and between 2.55 m and 3.15 m from the centre of the nearside lane

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markings for each traffic lane. In the wheel track zones, the expected minimum life is unlikely to be exceeded. Conversely for cracks outside the wheel track zones, provided the pavement surface is otherwise sound, the expected minimum life in terms of skid and deformation resistance is likely to be exceeded.

9.4 The most onerous conditions occur typically during the summer months on heavily-trafficked, south-facing carriageways with significant gradients in cuttings and on the surface of pavements carried by elevated structures, when surface temperatures can approach or even exceed 50°C. Should surface temperatures exceed this figure for periods in an exceptional summer, then the expected minimum life of the product in the wheel track zone may not be attained.

## Installation

### 10 General

10.1 Installation of Permatrack must be carried out by the Certificate holder's approved installers in accordance with the Certificate holder's instructions and the agreed BBA Method Statement.

10.2 Traffic management should be in accordance with the Department for Transport *Traffic Signs Manual*, Chapter 8 1991, or as agreed between the purchaser and installer.

10.3 The ambient and road surface temperatures are recorded at the start and, if the weather is variable, during the installation process. Installation should not be carried out if the road surface temperature is below -5°C.

### 11 Preparation

11.1 The existing surface is mechanically planed-out centrally over the length of the cracks, with a minimum width of 150 mm and depth of 20 mm. The width of the recess should be formed to encompass the defective area and extend to at least 50 mm into the sound surface (see Figure 1).

Figure 1 Mechanical planing-out of cracks



11.2 The recessed area and local road surface is swept, spoil is removed, and the recess dried and cleaned using hot compressed air (see Figure 2).

Figure 2 Drying and cleaning the recess



11.3 On high-suction substrates, such as concrete, a proprietary bitumen primer should be applied by brush or spray and allowed to dry, typically one hour in favourable conditions.

### 12 Application

12.1 The recess must be clean and dry, and free from ice, frost, loose aggregate, oil, grease, road salt and other loose material.

12.2 Permatrack PSB is melted in a mechanically-agitated cauldron (or similar) to a laying temperature of between 150°C and 190°C. The temperature must not exceed 200°C at any stage.

12.3 Permatrack PSB is applied to the prepared base and sides of the recess with a squeegee or trowel to a minimum thickness of 5 mm and allowed to cool. All surfaces must be covered and all cracks and joints filled level (see Figure 3).

Figure 3 Application of Permatrack PSB to recess



12.4 Permatrack H blocks do not contain the required amount of coarse aggregate which is added during the re-melt process. The blocks are broken into suitably-sized pieces and melted in a mechanically-agitated mixer. The coarse aggregate is supplied in pre-weighted 25 kg bags and the required amount is added to the mixer. The two components are thoroughly mixed together until homogeneous.

12.5 Permatrack H is drawn from the mixer at a temperature of between 150° and 210°C. The temperature must not exceed 250°C at any stage.

12.6 Permatrack H is poured into the recess to form a flush finish with the surrounding road surfacing. Due allowance must be made for the surface finish of calcined bauxite or pre-coated chippings as appropriate. Where the recess depth exceeds 60 mm, Permatrack H is installed in two layers ensuring that the thickness of the final layer is between 20 mm and 60 mm. Levelling of Permatrack H is achieved with suitable tools such as shovels, trowels, floats and scraper boxes (see Figure 4).

Figure 4 Application of Permatrack H



12.7 Chinese or Guyanan calcined bauxite aggregate (graded 2mm/3 mm) or 14 mm/20 mm pre-coated chippings are rolled into the Permatrack H surface whilst it is still warm. The bauxite is warmed to remove any moisture and broadcast over the repair ensuring that all areas are covered. Pre-coated chippings are warmed and spread at a rate of between 7.5 kgm<sup>-2</sup> and 10 kgm<sup>-2</sup>, and 10 kgm<sup>-2</sup> and 14 kgm<sup>-2</sup> for the 14 mm and 20 mm chippings respectively (see Figure 5).

Figure 5 Rolling-in pre-coated chippings



### 13 Aftercare

The installer conducts a visual check for uniform surface texture, blemishes and any discernible faults and carries out any remedial works as necessary.

The following is a summary of the technical investigations carried out on Permatrack.

### 14 Tests

Laboratory characterisation and performance tests were carried out on the product. The test results comply with the requirements of the Guidelines Document (see Tables 1 and 2).

Table 1 Laboratory binder<sup>(1)</sup> characterisation tests

Test	Parameter	Method <sup>(2)</sup>	Guideline criteria <sup>(3)</sup>
Cone penetration (dmm)	Control	BS 2000-50 : 1993	>35 (F grades) >10 (H grades) ≥60% of control value
	heat aged <sup>(4)</sup>		
Resilience (%)	Control	BS 2499-3: 1993, Method 12	Value ≥60% of control value
	heat aged <sup>(4)</sup>		
Flow resistance (mm)	Flow	BS 2499-3 : 1993, Method 12	<2.0

(1) All product characterisation tests were conducted on both Permatrack H and PSB binders (but flow resistance applied only to PSB binders).

(2) The test documents are detailed in the *Bibliography*. Numbers in the table refer to sections/parts of the various documents.

(3) Guidelines Document for the *Assessment and Certification of Crack Sealing Systems for Highways*.

(4) 28 days heat aged at 70°C.

Table 2 Laboratory system<sup>(1)</sup> performance tests

Test	Parameter	Method <sup>(2)</sup>	Guideline criteria <sup>(3)</sup>
SRV	Initial SRV	Appendix B, Method 1	≥60
	SRV after rut resistance		
Rut resistance	Rut rate (mm per hour)	Appendix B, Method 3	<5.0
	Overall rut depth (mm)	Appendix B, Method 3	<7.0
Tensile bond <sup>(4)</sup>	Control (Nmm <sup>-2</sup> )	TRL Report 176 Appendix J	>0.50 >60% of control
	Heat aged <sup>(5)</sup> (Nmm <sup>-2</sup> )		
Texture depth	Initial (mm)	Appendix B, Method 4	≥1.5
	After rut resistance test (mm)	Appendix B, Method 4	≥0.75
Yield strain	Yield strain %	Appendix B, Method 7	>2.5

(1) All system performance tests were conducted on Permatrack samples with both 2 mm/3 mm calcined bauxite chippings and 20 mm pre-coated aggregate.

(2) The test documents are detailed in the *Bibliography*. Numbers in the table refer to sections/parts of the various documents.

(3) Guidelines document for the *Assessment and Certification of Crack Sealing Systems for Highways* criteria for Grade H (High modulus) materials.

(4) Conducted on both asphalt and concrete substrates.

(5) 28 days at 70°C.

## 15 Other investigations

15.1 An installation trial was carried out to assess the practicability of the installation and quality control assurance procedure.

15.2 Skid resistance and texture depth on the trial site were taken initially and after a period of nine months, to assess the product's retention of surface properties.

15.3 A user/specifier survey relating to existing sites, dating from 1998, was carried out to assess the system's performance and durability.

15.4 The manufacturing process was examined, including the methods adopted for quality control, and details were obtained of the quality and composition of materials used.

## Bibliography

BS 2000-50 : 1993 *Methods of test for petroleum and its products — Determination of cone penetration of lubricating grease*

BS 2499-3 : 1993 *Hot-applied joint sealant systems for concrete pavements – Methods of test*

*Guidelines Document for the Assessment and Certification of Crack Sealing Systems for Highways*

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

Manual of Contract Documents for Highway Works, Volume 1 : *Specification for Highway Works* : May 2001 edition

## Conditions of Certification

### 16 Conditions

16.1 This Certificate:

- (a) relates only to the product that is 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) has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective;
- (d) is copyright of the BBA.

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, shall be construed as 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 fabricating process(es) 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 by the BBA or its agents;

(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 makes no representation as to:

- (a) the presence or absence of any patent 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 nature of individual installations of the product, including methods and workmanship.

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.



In the opinion of the British Board of Agrément, Permatrack is fit for its intended use provided it is installed, used and maintained as set out in this Certificate. Certificate No 02/H072 is accordingly awarded to Permanite Asphalt.

On behalf of the British Board of Agrément

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Chief Executive



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For information about Agrément Certificate validity and scope, tel: Hotline 01923 665400, or check the BBA website.