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Agrément Certificate  
**88/1969**  
Product Sheet 1

### MILES MACADAM GROUTED MACADAMS

### HARDICRETE HEAVY DUTY SURFACING

This Agrément Certificate Product Sheet<sup>(1)</sup> relates to Hardicrete Heavy Duty Surfacing, for use as a heavy-duty industrial surfacing in locations such as warehouses, cargo handling areas, bus depots and airport hard standings and maintenance areas.

(1) Hereinafter referred to as 'Certificate'.

#### CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information 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

**Flexibility** — the system can accommodate minor movement of a base in a flexible construction (see section 6).

**Chemical resistance** — the chemical resistance of the system will be similar to that of concrete (see section 7).

**Durability** — when used in heavy-duty applications the system will have a service life in excess of traditional asphalt surfacing (see section 10).

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 — Engineering

Claire Curtis-Thomas  
Chief Executive

Date of Second issue: 19 July 2016

Originally certificated on 8 January 1988

*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](http://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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# Regulations

In the opinion of the BBA, Hardicrete Heavy Duty Surfacing, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



## The Building Regulations 2010 (England and Wales) (as amended)

Requirement:	B5(2)	Access and facilities for the fire service
Requirement:	H6(2)	Solid waste storage
Requirement:	M1	Access and use
Requirement:	M2	Access to extensions to buildings other than dwellings
Comment:		Use of the system will contribute towards compliance with these Requirements. See section 4.3 of this Certificate.
Regulation:	7	Materials and workmanship
Comment:		The system is acceptable. See section 10 and the <i>Installation</i> part of this Certificate.



## The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Durability, workmanship and fitness of materials
Comment:		Use of the system satisfies the requirements of this Regulation. See sections 9 and 10 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	2.12	Fire and rescue service access
Comment:		Use of the system will contribute towards compliance with this Standard, with reference to clauses 2.12.0 <sup>(1)(2)</sup> , 2.12.2 <sup>(1)(2)</sup> and 2.12.3 <sup>(1)(2)</sup> . See section 4.3 of this Certificate.
Standard:	3.25	Solid waste storage
Comment:		Use of the system will contribute towards compliance with this Standard, with reference to clauses 3.25.1 <sup>(1)</sup> and 3.25.3 <sup>(1)</sup> . See section 4.3 of this Certificate.
Standard:	4.1	Access to buildings
Comment:		Use of the system will contribute towards compliance with this Standard, with reference to clause 4.1.4 <sup>(1)(2)</sup> . See section 4.3 of this Certificate.
Regulation:	12	Building standards applicable to conversions
Comment:		Comments made in relation to the system under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 <sup>(1)(2)</sup> and Schedule 6 <sup>(1)(2)</sup> . (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



## The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation:	23(a)(b)(i)	Fitness of materials and workmanship
Comment:		The system is acceptable. See section 10 and the <i>Installation</i> part of this Certificate.
Regulation:	37	Facilities and access for the Fire and Rescue Service
Regulation:	62	Solid waste storage
Regulation:	91	Access and use
Regulation:	92	Access to extensions
Comment:		Use of the system will contribute towards compliance with these Regulations. See section 4.3 of this Certificate.

## Construction (Design and Management) Regulations 2015

## Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, Principal Designer/CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See section: 3 *Delivery and site handling* (3.3) of this Certificate.

# Technical Specification

## 1 Description

1.1 Hardicrete Heavy Duty Surfacing comprises an open-textured, bituminous receiving course with a controlled proportion of voids, fully grouted with a polymer-modified cement grout.

1.2 The system provides a jointless, flexible surfacing for heavy-duty pavements which is resistant to the fluids present in vehicle and aircraft maintenance areas and can accommodate limited movement of an unstable base.

1.3 The receiving course comprises a 0/14 mm open-graded surface course based on penetration-grade bitumen and suitable aggregates. The aggregate is graded to give a controlled proportion of air voids to accommodate the polymer-modified cement grout.

1.4 The grout comprises Portland cement, polymer, fine mineral aggregate and water. Optional plasticising and anti-foaming agents may also be included.

## 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 as part of a surveillance process to verify that the specifications and quality control operated by the manufacturer are being maintained.

2.2 The management system of Miles Macadam Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by ISO QAR (Certificate 1140/96).

## 3 Delivery and site handling

3.1 The receiving course is delivered to site in accordance with BS 594987 : 2010.

3.2 The cementitious powder for the grout is delivered in 750 kg pre-mixed bulk bags.

3.3 The cementitious grout is not classified as 'dangerous for supply'. However, in addition to the recommendations in the Certificate holder's safety data sheets, normal procedures for storage and handling of cement and fillers should be observed.

# Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Hardicrete Heavy Duty Surfacing.

## Design Considerations

### 4 Use

4.1 Hardicrete Heavy Duty Surfacing is satisfactory for use as a heavy-duty industrial surfacing (new or remedial).

4.2 Provided the existing surface is stable and able to accept the expected traffic loading without cracking or undue deflection, the system can be used:

- directly over new bitumen macadam, hot-rolled asphalt, lean or pavement-quality concrete in accordance with normal construction practice, for example HD 26/06
- directly over existing sound, level concrete or asphalt
- with a regulating layer<sup>(1)</sup>, over an existing irregular concrete or asphalt base.

(1) The regulating layer is outside the scope of this Certificate.

 4.3 The system is able to sustain the abrasion and loading caused by industrial traffic (including steel-wheeled and tracked vehicles in consultation with the Certificate holder), heavy commercial vehicles, public service vehicles or aircraft in such locations as warehouses, cargo handling areas, bus depots and airfields (hard standings and maintenance areas).

### 5 Practicability of installation

The system is installed only by the Certificate holder.

## 6 Flexibility

6.1 The system does not require expansion joints and can accommodate the minor movement to be expected in a flexible construction.

6.2 Where it is laid over an existing concrete surface, any joints should be retained in the system to avoid reflective cracking. Alternatively, where the joints are not retained, the system should be laid over a geotextile and regulating course. The Certificate holder must be consulted for details.

## 7 Chemical resistance

7.1 The system's chemical resistance is similar to concrete.

7.2 The system is particularly suitable for vehicle (including aircraft) maintenance areas, where there is the possibility of spillage of fuel, oil and hydraulic fluids.

7.3 Where abnormal chemical spillage is expected, the advice of the Certificate holder must be sought.

## 8 Curing

8.1 The curing time of the grout varies with atmospheric conditions, but the following minimum periods before use by different types of traffic must be observed:

- pedestrians 12 hours
- cars 1 day
- lorries, standing loads, possibility of oil spillage 7 days<sup>(1)</sup>.

(1) A rapid-curing specification is also available but is not covered by this Certificate.

8.2 Where exceptional loads (eg point loading from trailer jockey wheels or stands) or chemical spillage are expected, longer curing periods may be necessary. The Certificate holder's advice should be sought in these cases.

## 9 Maintenance



Where conditions are very severe (eg areas where steel-wheeled or tracked vehicles regularly turn or reverse) localised damage may take place. This must be repaired promptly by patching, under the guidance of the Certificate holder.

## 10 Durability



The system will have a service life in excess of normal asphalt surfacing in areas where greater resistance to permanent deformation, mechanical damage, and attack by fuel and oils is required.

# Installation

## 11 Base construction

11.1 The Hardicrete Heavy Duty Surfacing receiving course must be laid directly onto existing clean, sound, firm and acceptably level concrete or asphalt surfaces to ensure that the minimum specified thickness of the receiving course is achieved.

11.2 The design for construction should be in accordance with accepted techniques, for example those stipulated in HD 26/06.

11.3 Where the existing base is irregular, an intermediate regulating layer of asphalt will be required.

## 12 Mixing of grout

The grout is mixed on site using a combined mixer/pump unit at the rear of the mobile grout production/laying unit. Care must be taken to prevent settlement of the fine aggregates.

## 13 Procedure

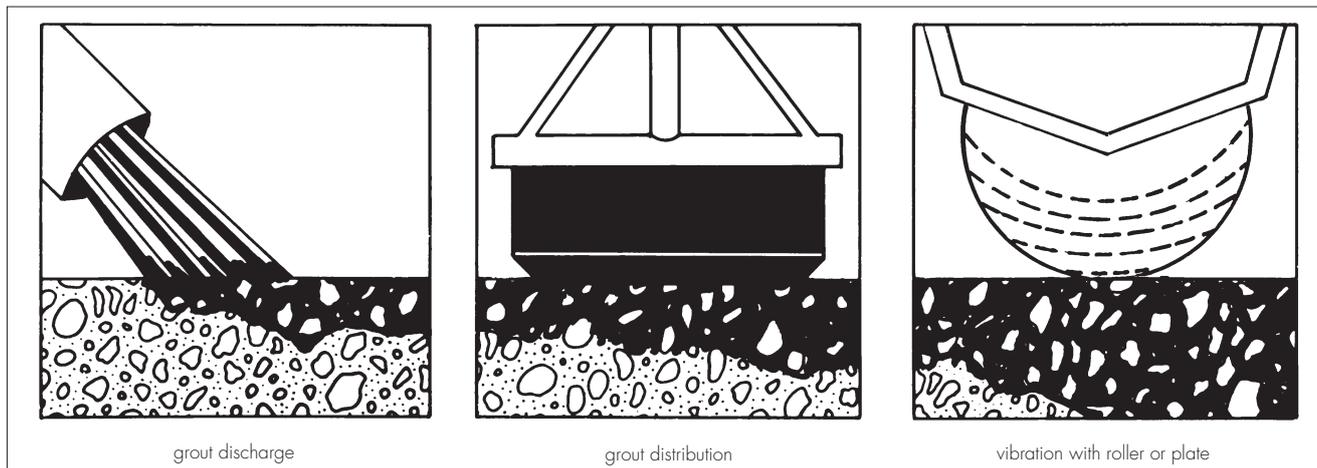
13.1 The receiving course is applied and compacted by traditional surfacing techniques, in accordance with BS 594987 : 2010, and allowed to cool to below 40°C before grouting. Laying of the system must not be carried out when the air temperature reaches 0°C on a falling thermometer, except in calm, dry conditions. Laying must cease if the air temperature reaches -3°C, if there is standing water, ice or snow present or during periods of heavy rain.

13.2 The receiving course must not be opened to traffic before the grout is applied and cured, and any areas accidentally damaged or contaminated must be removed and replaced.

13.3 The mixed grout is pumped from the mixer and discharged directly onto the receiving course.

13.4 The grout is spread with brooms and/or squeegees, and worked into the voids within 30 minutes of discharge using a vibrating roller or plate (see Figure 1).

Figure 1 Application of grout



13.5 The receiving course is deemed to be fully penetrated when, following vibration, no further grout can be forced into the voids and surplus grout remains on the surface.

13.6 Excess grout is removed by sweeping and the final finish is achieved using either a powered brush or a hand broom.

13.7 If grouting of the whole area cannot be completed within a working day, the area to be treated must be divided into suitably smaller areas and the edges masked.

13.8 A 0/2 mm granite can be applied to the surface of the system at a minimum spread rate of  $0.5 \text{ kg}\cdot\text{m}^{-2}$ .

13.9 The cure time of the grout required prior to trafficking will be dependent on the ambient conditions. The Certificate holder must be consulted prior to opening the site to trafficking.

## 14 Checks on the finished installation

14.1 A visual check is carried out to verify uniform surface texture and to identify any discernible faults.

14.2 Cores may also be taken after approximately one week to confirm the satisfactory penetration of the grout into the receiving course.

## 15 Repair

In the event that the surfacing is damaged during installation or service, it may be repaired by removing the damaged area and re-applying the surfacing in accordance with the procedure detailed in sections 13 and 14.

# Technical Investigations

## 16 Tests

Tests were carried out on Hardicrete Heavy Duty Surfacing and the results assessed to determine:

- chemical resistance to acids, alkalis, solvents and oils
- freeze/thaw resistance.

## 17 Investigations

17.1 Data relating to the following characteristics were assessed:

- resistance to penetration
- compressive strength
- stiffness modulus
- Poisson's ratio
- fatigue characteristics
- permanent deformation
- deflection measurements
- resistance to wheel loading
- effect of high temperatures
- requirements of sub-grade
- pavement design.

17.2 Visits were made to established sites and a user survey was conducted to evaluate the surfacing's performance in use.

17.3 Visits were made to sites in progress to assess the practicability of application, and to compare application techniques.

17.4 A re-evaluation was made of the data and investigations on which previous Certificates were based. The conclusions drawn from the original data remain valid.

17.5 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

BS 594987 : 2010 *Asphalt for roads and other paved areas — Specification for transport, laying, compaction and type testing protocols*

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

Design Manual for Roads and Bridges, Volume 7 *Pavement Design and Maintenance, Section 2 Pavement Design and Construction, Part 3 HD 26/06 Pavement Design*

## Conditions of Certification

### 18 Conditions

18.1 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.

18.2 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.

18.3 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.

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

18.5 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.

18.6 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.