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Agrément Certificate
21/5898
Product Sheet 1

GEOPAVE RESIN BOUND DECORATIVE SURFACING

GEOPAVE STANDARD NON UV RESISTANT SYSTEMS

This Agrément Certificate Product Sheet(1) relates to Geopave Standard Systems, for use as surface courses in domestic driveways, patios, pedestrian areas, lightly trafficked car parks, low speed access roads and lightly trafficked 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

Strength and stability — the systems have satisfactory resistance to the loads associated with the vehicle and pedestrian traffic conditions for which they are designed (see section 6).

Surface characteristics — the systems have satisfactory slip and skid resistance, and are resistant to wear (see section 7).

Rainwater drainage — the systems can be designed to have sufficient rainwater drainage properties to eliminate surface ponding provided that a maintenance schedule, including regular suction cleaning and sweeping, is implemented (see section 8).

Durability — when used in applications as described in this Certificate, the systems will retain their integrity and have a service life in excess of that of a traditional asphalt surface course (see section 10).

The BBA has awarded this Certificate to the company named above for the systems described herein. These systems have been assessed by the BBA as being fit for their intended use provided they are installed, used and maintained as set out in this Certificate.

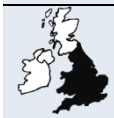
On behalf of the British Board of Agrément

Date of First issue: 2 June 2021

Hardy Giesler
Chief Executive Officer

Regulations

In the opinion of the BBA, Geopave Standard Systems, 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:	**H3(2)**	**Drainage of paved areas**
Comment:		The systems can contribute to the dissipation of rainwater from pavement areas and minimise the risk of ponding. See section 8 of this Certificate.
Requirement:	**M1**	**Access to and use of buildings other than dwellings (Volume 2)**
Requirement:	**M2**	**Access to extensions to buildings other than dwellings**
Requirement:	**M4(1)(2)(3)**	**Access to and use of buildings Volume 1: Dwellings**
Comment:		The systems are suitable for use as surface courses in car parks and on approach routes, providing external access to buildings including dwellings other than dwellings. See section 4.1 of this Certificate.
Regulation:	**7(1)**	**Materials and workmanship**
Comment:		The systems are acceptable. See section 10 and the *Installation* part of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	**8(1)(2)**	**Durability, workmanship and fitness of materials**
Comment:		The systems can contribute to a construction satisfying this Regulation. See sections 9 and 10 and the *Installation* part of this Certificate.
Regulation:	**9**	**Building standards applicable to construction**
Standard:	2.12	Fire and rescue service access
Comment:		The systems will contribute to satisfying the relevant requirements of this Standard, with reference to clauses 2.12.0(1)(2), 2.12.2(1)(2) and 2.12.3(1)(2). See section 4.1 of this Certificate.
Standard:	3.6	Surface water drainage
Comment:		The systems will contribute to satisfying the relevant requirements for rainwater drainage in this Standard, with reference to clauses 3.6.2(1)(2), 3.6.3(1)(2), 3.6.4(1)(2) and 3.6.6(1)(2). See section 8 of this Certificate.
Standard:	4.1	Access to Buildings
Comment:		Use of the systems will contribute towards compliance with this Standard, with reference to clause 4.1.4(1)(2). See section 4.1 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The systems can contribute to satisfying the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.
Regulation:	**12**	**Building standards applicable to conversions**
Comment:		All comments given for the systems under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1(1)(2) and Schedule 6(1)(2).

(1) Technical Handbook (Domestic).
(2) Technical Handbook (Non-Domestic).

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

Regulation:	**23(a)(i-iv)(b)(i)**	**Fitness of materials and workmanship**
Comment:		The systems are acceptable. See section 10 and the *Installation* part of this Certificate.
Regulation:	**82(a)(b)**	**Rainwater drainage**
Comment:		The systems will contribute to the dissipation of rainwater from pavement areas, and minimise the risk of ponding. See section 8 of this Certificate.
Regulation:	**37**	**Facilities and access for the Fire and Rescue Service**
Regulation:	**91**	**Access and use**
Regulation:	**92**	**Access to extensions**
Comment:		The systems will contribute to satisfying the relevant requirements of these Regulations for vehicular and non-vehicular access routes and hardstanding areas. See section 4.1 of this Certificate.

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

NHBC Standards 2021

In the opinion of the BBA, Geopave Standard Systems, if installed, used, and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Chapter 10.2 *Drives, paths and landscaping (2021)*.

Technical Specification

1 Description

1.1 Geopave Standard Systems are resin-bound surface course systems comprising a two-component, solvent-free, cold-applied binder, and 1 to 3 mm and 2 to 5 mm sized aggregates.

1.2 The Geopave Standard Systems include:

- Angular Buff, comprising the Standard Geveko Geopave resin and a mix of Brittany bronze and Golden Quartz aggregates
- Desert Gold, comprising the Standard Geveko Geopave resin and a mix of Golden Quartz and Autumn Gold aggregates
- Rustic Gold, comprising the Standard Geveko Geopave resin and a mix of Autumn Gold aggregates.

1.3 Other components which may be used with the systems, but which are outside the scope of this Certificate, are:

- Glass, plastics, rubbers and crushed ceramics for broadcasting onto surfaces where additional skid/slip resistance is required.

2 Manufacture

2.1 The binder components are manufactured using 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.

3 Delivery and site handling

3.1 The Standard Geveko Geopave resin is delivered to site in 6.5kg packs; Part A weighing 4.83 kg in a 10l open-to-top pail and part B weighting 1.67 kg in a 2l container.

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

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the Standard Geveko Geopave Systems.

Design Considerations

4 Use

4.1 Geopave Standard Systems are satisfactory for use as surface course systems for domestic driveways, patios, pedestrian areas, lightly trafficked car parks, low speed access roads and lightly trafficked areas on sound asphalt and concrete substrates.

4.2 The systems are designed incorporating a blend of aggregates as per Table 1. The choice of aggregate type will depend on site-specific details, including location and contractual requirements for polished stone value (PSV), texture depth, colour, porosity and any other properties.

Table 1 Aggregate mix

Aggregate	Angular Buff Standard Geopave	Desert Gold Standard Geopave	Rustic Gold Standard Geopave
Britanny Bronze size 1 to 3 mm	X		
Golden Quartz size 2 to 5 mm	X	X	
Autumn Gold size 1 to 3 mm		X	X
Autumn Gold 2 to 5 mm			X

4.3 The systems can be applied to a bituminous or concrete substrate provided the underlying layers of the pavement are stable and have sufficient load-spreading capabilities to support the imposed loading of the surfacing during installation and the expected service life.

4.4 The systems can be used as part of new or maintenance pavement construction.

5 Practicability of installation

The systems are to be installed only by contractors approved by the Certificate holder, using conventional equipment for the mixing and application of the systems (see the *Installation* part of this Certificate).

6 Strength and stability

Resistance to permanent deformation

6.1 The systems when tested to BS EN 12697-22 : 2003 Small-size device, Procedure B at 60°C have a resistance to rut rate and rut depth that is classified as Type 2 in accordance with PD 6691 : 2015+ A1 : 2016, Appendix D, Table D.2.

Tensile bond strength

6.2 A visual inspection of existing sites confirmed no significant defects that could be related to de-bonding. In addition, laboratory testing to TRL Report 176 (1997), Appendix J, on a control set, and after heat ageing and water soak, confirmed satisfactory tensile bond strength to both asphalt and concrete when installed in accordance with the provisions of this Certificate.

Erosion index

6.3 A visual inspection of sites confirmed no significant defects that could be related to wear such as fretting and ravelling of aggregates from the surface. In addition, laboratory testing in accordance with the BBA HAPAS *Guidelines for Assessment and Certification of High Friction Surfacing (2017)* for scuffing at 45°C resulted in an erosion index of less than 1.0.

Chemical resistance

6.4 When tested in accordance with BS 903-A26 : 1995, ISO 48 : 1994, the systems have a good resistance to most chemicals likely to be spilt on road surfaces or parking areas, such as diesel, engine oil, hydraulic fluid, antifreeze and battery acid . However, it is recommended that any spillages are removed as soon as possible to avoid staining or potential contamination due to the porous nature of the surface.

7 Surface characteristics

Skid and slip resistance

7.1 The initial skid resistance (prior to trafficking) measured in accordance with TRL Report 176 (1997), Appendix E (pendulum test using sliders applicable to both vehicular and foot traffic), is given in Table 2.

Table 2 Initial skid resistance

System	Skid resistance
Angular Buff Standard Geopave	31
Rustic Gold Standard Geopave	40

7.2 Retained skid resistance is affected by the aggregate type and expected trafficking. Appropriate aggregate must therefore be specified in areas with a high risk of slipping, or skidding by vehicles.

Surface texture

7.3 The initial texture depth measured in accordance with BS EN 13036-1 : 2010 indicates that texture depth is dependent on the aggregate mix – see Table 3, below.

Table 3 Initial texture depth

System	Texture depth
Angular Buff Standard Geopave	0.5
Rustic Gold Standard Geopave	0.9

7.4 The retained texture depth is affected by the aggregate type and expected trafficking levels. Therefore, an appropriate aggregate must be specified in areas where specific retained texture depths are required.

8 Rainwater drainage

8.1 Results of vertical and horizontal permeability tests conducted in accordance with BS EN 12697-19 : 2004 indicate that the water will drain through the surface course into the pavement substrate, thereby reducing or eliminating surface ponding (see Table 4 of this Certificate).

8.2 Vertical and horizontal flow rate is affected by the aggregate size used in the mix.

Table 4 Vertical and horizontal permeability

Test	Method	Parameter measured	Results	
			Angular Buff Standard Geopave	Rustic Gold Standard Geopave
Permeability	BS EN 12697-19 : 2004	Permeability[(1)] (10^{-3}·m·s)		
		Vertical	0.151	0.253
		Horizontal	0.125	0.218

(1) Mean of two results. Test were carried out on 100 mm diameter cores.

9 Maintenance

In order to maintain the permeability of the surface, it must be cleaned periodically using a pressure washer or a sweeper fitted with water jetting and vacuuming equipment.

10 Durability

The systems, when used in domestic driveways, patios, pedestrian areas, lightly trafficked car parks, low speed access roads and lightly trafficked areas, will have a service life in excess of conventional asphalt surfacing.

Installation

11 General

11.1 Ambient and pavement surface temperatures, along with relative humidity, should be recorded at the start and, if the weather is variable, during the installation process. Installation should not proceed if:

- the relative humidity is greater than 80%
- the surface temperature is less than 3°C above the dew point of the measured air temperature and relative humidity
- the operating temperature and road surface temperature and/or air temperature is outside the range of 5 to 30°C.

11.2 The Certificate holder is responsible for training and monitoring their approved contractors to ensure the systems are installed in accordance with the BBA Agreed Method Statement and this Certificate.

11.3 The Certificate holder must be consulted on the structural design and suitability of the pavement structure. The base and binder course layers must consider the anticipated rainfall, traffic loading and ground conditions, and the key factors assessed and identified in this Certificate.

11.4 Rates of spread will be dictated by the required installed depths and the aggregate size. The minimum nominal installation depth is 12 mm for pedestrian use and 18 mm for vehicular use.

12 Preparation

12.1 All imperfections in the substrate not acceptable to the installer should be reinstated with a material approved by the purchaser in consultation with the installer.

12.2 The substrate must be clean, dry and free from ice, frost, loose aggregate, oil, grease, road salt and other loose matter which may impair the adhesion of the systems.

13 Application

13.1 The aggregates are mixed in the forced action mixer as dictated by the mix design for 30 seconds using a timer, to combine the aggregate types or segregated material.

13.2 The binder components are supplied in pre-weighed packs. The total content of Geopave Standard activator (part B) is added to the Part A pail (sufficient ullage has been allowed) and mixed together until homogenous, using a drill and spiral mixing blade (typically 1 to 2 minutes). Once the activator has been totally mixed into the base resin component, the curing process will start and no delays prior to and during the laying of the product should be allowed.

13.2 The Geopave Standard resin is poured in and mixed with the aggregate until homogeneous and evenly coated (typically 3 minutes).

13.3 The mixed material is immediately spread evenly across the surface at the required depth using a flat-bladed squeegee. To ensure that the correct depth and spread rate is achieved, battens of the required thickness can be used to gauge the depth as work progresses.

13.4 The surface is finished with a double-ended hand trowel for the final compaction.

14 Aftercare

The systems must be allowed to cure. During the curing period, no disturbance or trafficking is permitted.

15 Repair

Any damaged area must be cut back to firmly bound material and replaced with material mixed and installed in accordance with this Certificate.

Technical Investigations

16 Tests

Tests were conducted on samples of Geopave Standard, and its components, and the results were assessed to determine:

- tensile characteristics
  - — control
  - — UV exposure (400 mj-m^2 at 50°C, 10 years equivalence)
  - — heat aged at 70°C for 28 days
  - — water soak at 23°C for 7 days (including chlorinated water)
- scuffing resistance
- skid and slip resistance

- texture depth
- erosion index
- resistance to permanent deformation at 60°C
- tensile adhesion
  — control
  — heat aged 70°C for 28 days
  — water soak 23°C for 7 days
- colour stability after UV exposure (400 mj-m^2 at 50°C, 10 years equivalence)
- hardness test
  — 1 and 7 day exposure to:
- diesel
- hydraulic fluid
- antifreeze
- engine oil
- battery acid
- permeability.

17 Investigations

17.1 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.

17.2 An installation trial was carried out to assess the practicability of the installation and on-site quality control procedures. A visual inspection of the site concluded that it was free from significant abnormalities.

17.3 Existing sites of at least two years in service were visited to confirm visually the systems' performance in use. The visual condition survey carried out by the BBA inspection marked all sites as moderate to excellent condition, with no significant defects.

Bibliography

BBA HAPAS *Guidelines for Assessment and Certification of High Friction Surfacing (2017)*

BS 903-A26 : 1995, ISO 48 : 1994 *Physical testing of rubber — Method for determination of hardness (hardness between 10 IRHD and 100 IRHD)*

BS EN 12697-19 : 2004 *Bituminous mixtures — Test methods for hot mix asphalt — Permeability of specimen*
BS EN 12697-22 : 2003 *Bituminous mixtures — Test methods — Wheel tracking*

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

PD 6691 : 2015 + A1 : 2016 *Guidance on the use of BS EN 13108, Bituminous mixtures — Material specifications*

TRL Report 176 *Laboratory tests on high friction surfaces for highways (1997)*

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.

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