BREEDONPorous

TECHNICAL DATASHEET — ASPHALT

BREEDONPorous IS A PERMEABLE SYSTEM COMPRISING OF GEOTEXTILES, GEOGRIDS AND/OR GEOMEMBRANES; OPEN GRADED, UNBOUND, GRANULAR SUB-BASE; POROUS BASE, AND/OR BINDER, AND SURFACE COURSES MANUFACTURED WITH MODIFIED BITUMEN.

Sustainable Urban Drainage Systems (SUDS) promotes the use of porous systems such as BREEDONPorous, which allow water to dissipate through the surface into the appropriate drainage system.

BREEDONPorous can be used for areas exposed to moderate traffic and for car parks. It has a high void content to ensure rapid dissipation of rainwater through the surface and into underlying materials or rainwater capture systems. BREEDONPorous surface courses may be supplied as a coloured product.

APPLICATIONS
- Playgrounds
- Car parks
- Driveways
- Problematic drainage areas
- Lightly trafficked roads

TECHNICAL DATA
BREEDONPorous is a Pervious Pavement System approved under the Highway Authorities Product Approval Scheme (HAPAS) by the British Board of Agrément (BBA) and holding a BBA HAPAS Certificate. The bituminous components contain performance enhancing additives, with high binder contents for durability and high in situ air void contents to ensure the system is 'free-draining'. The bituminous components may be supplied using paving grade (40/60 Pen) or polymer modified binders (recommended for car park or road surface courses to enhance durability).

BREEDONPorous bituminous components have the following properties:

Test method:	BREEDONPorous **6 surf**	BREEDONPorous **10 surf**	BREEDONPorous **14 surf**	BREEDONPorous **20 bin**
Air Void Content (BS EN 12697-8)	>16%	>16%	>16%	>16%
Initial Texture Depth (BS 598-105)	≥1.3mm	≥1.3mm	≥1.3mm	N/A
Hydraulic Conductivity (BS DD 229)	>5,000mm/hr	>5,000mm/hr	>5,000mm/hr	>5,000mm/hr
Water Infiltration Rate (BS EN 12616)	>5,000mm/hr	>5,000mm/hr	>5,000mm/hr	>5,000mm/hr
Horizontal Permeability (BS EN 12697-19)	$>2.5 \times 10^{-9}$	$>2.5 \times 10^{-9}$	$>2.5 \times 10^{-9}$	ND
Vertical Permeability (BS EN 12697-19)	$>2.5 \times 10^{-6}$	$>2.5 \times 10^{-6}$	$>2.5 \times 10^{-6}$	ND
ITSM Stiffness at 20°C (BS EN 12697-23)	>1000MPa	>1000MPa	>1000MPa	>1000MPa
Water Sensitivity (BS EN 12697-12 or BBA TSCS Guidelines)	>75%	>75%	>75%	>75%
Mean Wheel Tracking Depth at 60°C (BS 598-110)	≤7mm	≤7mm	≤7mm	≤7mm
Wheel Tracking Rate at 60°C (BS 598-110)	≤5mm/hr	≤5mm/hr	≤5mm/hr	≤5mm/hr
Binder Drainage at 180°C (BS EN 12697-18 Clause 5)	<0.2%	<0.2%	<0.2%	<0.2%
Torque Bond Strength (BBA TSCS Guidelines)	>400kPa	>400kPa	>400kPa	N/A

BREEDONPorous 6mm, 10mm and 14mm products were installed on BREEDONPorous 20mm supporting layer, which was laid on BREEDONPorous Sub-base. BREEDONPorous 20mm was tested before being surfaced with Breedon Porous 6mm. The hydraulic conductivity, water infiltration rates, and permeability figures show the products to be highly porous and free-draining.
The indirect tensile stiffness, water sensitivity, and wheel tracking results confirm BREEDONPorous to be a durable system.

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CONSTRUCTION

The system can only be installed by Breedon, or Approved Installers who have been trained and approved by Breedon.

Three main permeable pavement systems may be created using the BREEDONPorous system:

1. **Full infiltration ('Zero Discharge')** – all water falling onto the pavement permeates through the constructed layers and eventually into the sub-grade. Temporary retention of some water will be offered by the sub-base 'granular reservoir', before dissipating into the sub-grade. In some situations it may be advisable to install overflows for storm conditions or secondary drainage in case of the system silting and becoming less efficient.

2. **Partial infiltration** – water is allowed to percolate through the pavement layers, but perforated pipes or fin-drains (Geogrids sandwiched between Geotextiles) are introduced between the sub-grade and the sub-base, creating a link to other systems such as sewers, swales, or watercourses. This construction method is useful if the sub-grade is incapable of absorbing all the water and could potentially become unstable.

3. **Full attenuation** – water is captured above the sub-grade by an impermeable, flexible membrane. This method can be used for water-harvesting, to protect sensitive locations, or for low permeability and low strength sub-grades where the introduction of more water would be problematic. A series of perforated pipes or fin-drains may be installed on top of the membrane to direct water to sewers, watercourses, or treatment systems.

BREEDONPorous structure must be considered from two perspectives – hydraulic and structural design, offering water infiltration, retention and detention facilities which can also support pedestrians, traffic, and parking. Each site has to be assessed separately to ensure objectives are achieved. Although hydraulic requirements should be taken into consideration, structural requirements will exceed the granular sub-base thicknesses necessary to accommodate 24-hour rainfall, so these will normally take precedence.

Installation shall be in accordance with Design, Delivery and Installation Procedures, incorporating appropriate Geocells, Geogrids, Geotextiles, and/or Geomembranes, a suitable sub-base to provide a 'granular reservoir', and appropriate bituminous components. Geocells will be used in conjunction with the sub-base as extensively as possible to ensure sub-base movement is minimised.

Three aggregate options are available for the granular sub-base:

1. Type 1X Sub-base supplied in accordance with TRL Report PA/SCR243.
2. 20/31.5mm aggregate in accordance with BS EN 13043 (Grading Category G_c85/35).
3. 20/40mm Type B Filter Media in accordance with SHW Volume 1 Series 500 and BS EN 13242 (Grading Category G_c80/20).

A 'Blinding Course' of 2/6.3mm aggregate in accordance with BS EN 13242 (Grading Category G_c80/20) can be used to 'top up' the Geocells following compaction if required.

Nominal layer thicknesses shall be as follows:

Material Description	Nominal Layer Thickness (mm)	Minimum Thickness at Any Point (mm)
Granular Reservoir Sub-base	100 – 225	90
BREEDONPorous 20 base/bin	45 – 90	40
BREEDONPorous 14 surf	40 – 60	35
BREEDONPorous 10 surf	35 – 50	30
BREEDONPorous 6 surf	25 – 30	20

Typical load categories and compacted bituminous layer thicknesses are as follows:

Load Category	Bituminous Products and Nominal Thicknesses (mm)			
	20mm Base/Binder	14mm Surface	10mm Surface	6mm Surface
Pedestrian	50 – 80	N/A	N/A	25 – 30
Domestic (e.g. car)	70 - 90	40 - 60	35 - 40	25 – 30
Light (e.g. small vans)	80 - 120	40 - 60	35 - 40	N/A
Commercial (e.g. larger vans)	100 – 160	40 - 60	35 - 40	N/A

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BENEFITS

- British Board of Agrément approved in accordance with the Highway Authorities' Product Approval Scheme. BBA HAPAS Roads and Bridges Certificate Number 16/H248.
- High porosity.
- High durability.
- Free-draining.
- Reduces impermeable cover, lowering peak velocity and volume of stormwater run-off (decreasing flooding risk).
- Filters contaminants from run-off.
- Greater water through-flow cleans the in situ voids.
- Reduced build-up and risk of 'silting up'.
- Increased performance life and reduced maintenance and whole life costing (WLC).
- Recharges groundwater supply.
- Good surface textures.
- Improves traction during icy conditions.
- Extremely quiet when trafficked.
- Tailored to meet specific site requirements (full infiltration, partial infiltration, or full attenuation).
- Removes the need for costly drainage systems.
- Less likelihood of potholes and delamination (water is not held in the bituminous layers, so freeze-thaw action is eradicated).
- Faster construction than permeable block paving systems.
- Good rate of spread.
- Smooth, uniform finish.
- Low maintenance.
- Area can be opened to pedestrians once material has cooled to ≤40°C.
- Polymer modified variant has a high softening point and increased fretting and raveling resistance, reducing the risk of damage.
- Bituminous surface courses can be supplied as coloured materials.

MAINTENANCE AND REPAIR

BREEDONPorous requires infrequent maintenance and the following procedures should be followed:

- If used for vehicle parking, the vehicles shall be moving when the wheels are turned and shall be parked in different positions.
- Any heavy vehicles, trailers, caravans and ladders with small footprints parked on the material should use wooden boards to disperse the loading.
- Fuel spillages should be removed immediately (oil absorbent pads and spill kits can be useful for this task).
- The surface should be inspected at least annually for deterioration.

- Debris and detritus (mud, leaves or grit) should be removed on a regular basis by gentle brushing or preferably, vacuum sweeping.
- Should algae, moss, weeds or grass develop on the surface, these should be treated with a suitable weedkiller as soon as possible.
- Weeds and grass should not be pulled up to avoid disruption to the surface.
- To prevent clogging and damage, power washing should be avoided, unless absolutely necessary.
- When applicable, the surface should be allowed to dewater.
- If used, snow ploughs should exercise caution to prevent surface damage.
- Ploughed snow accumulations shall not be allowed to melt on the pavement as they often contain high sediment contents which can block the voids.
- Prevent use by heavy vehicles (e.g. refuse collection vehicles).
- Prohibit use of sand, salt or other deicers which may clog the surface.
- Sealing or overlaying with non-porous materials should never be undertaken.

Major repairs

If possible, any damaged areas are to be removed by planing to the appropriate depth to provide a minimum length of 15m for paver resurfacing. The sections will be resurfaced using material to the same specification.

Minor repairs

- Minor repairs can be carried out by cutting out the damaged section and replacing it with a material of suitable specification.
- A K1-40 (C40 B 4) or K1-60 (C60 B 4) tack coat, or an acceptable proprietary bond coat, will be lightly applied to the receiving substrate.
- Joints must be saw cut vertical, cleaned and painted with a thick uniform coating of hot bitumen, hot elastomeric polymer modified bituminous binder, or cold applied thixotropic bituminous compound prior to laying.

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WHY CHOOSE BREEDON PROPRIETARY MATERIALS?

The Proprietary Materials offered by Breedon are extensively designed and rigorously tested to exceed the performances of traditionally used asphalts in specific applications. Our Proprietary Materials often include additives to achieve these high levels of operation.

PRECAUTIONS AND LIMITATIONS

Asphalt remains relatively soft for up to one year after laying; until it has time to oxidise and harden (i.e. elasticity is reduced). It is recommended that the surface is not trafficked for at least 4 hours (PMB version) or 24 hours (40/60 Pen option) following installation, when it is most susceptible to damage. When trafficked by vehicles, it is recommended that they are moving when the wheels are turned. If a vehicle is stationary when tyres are turned (particularly with modern power steering), the asphalt can be displaced and marked by stresses applied at that particular point. It is also recommended that (wherever possible) vehicles are parked in different positions to avoid marking the asphalt, and heavy vehicles, trailers, plant, machinery and ladders with small footprints are parked on wooden boards to disperse the loading. Fuel spillages should also be contained and cleaned up as soon as possible as these will compromise durability. Recommended procedure for removing diesel spillages is as follows:

- Stem the leak.
- If necessary, contain the spillage by deploying booms around the source and block any drains.
- Apply absorbent pads or socks to the spillage area.
- Remove the absorbent pads or socks and dispose of in accordance with environmental regulations.
- Gently sweep the surface or prefereably, vacuum sweep.

QUANTITY REQUIRED

As a guide, please refer to the Material Calculator on our website (www.breedongroup.com).

AVAILABILITY

BREEDONPorous can be laid all year round (depending on climatic conditions), and may be installed by, or under license from, Breedon.

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE 16/H248

TO DISCUSS YOUR PROJECT REQUIREMENTS, AND FOR MORE INFORMATION ABOUT OUR PRODUCTS CONTACT:

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