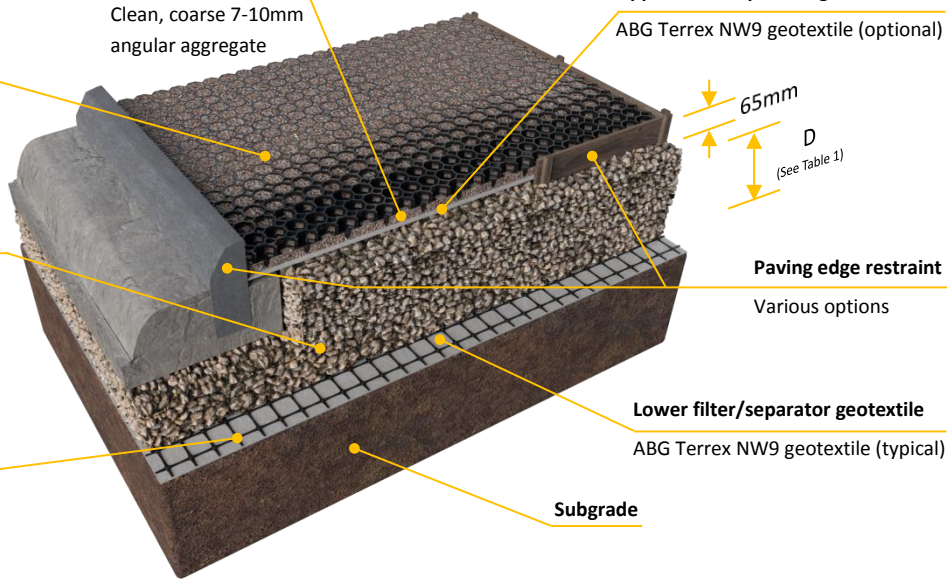
Sudsgrid™ Porous aggregate surface

Structural design, installation and maintenance guidance

Technical Note

Sudsgrid is a plastic cellular porous paving solution for use in Sustainable Drainage Systems (SuDS). Sudsgrid is suitable for a wide range of trafficked applications where a stabilised, free-draining gravel surface is required. Typical applications include car parks, emergency access, maintenance routes, cycle paths, and pedestrian and disabled access. Considerations relating to the movement and attenuation of water within the porous pavement are not covered in this document. This document is intended to be a summary presenting typical solutions. Contact ABG for detailed site specific advice.

Typical construction detail



Technical Specification

System	Sudsgrid™
Colour	Black or Green
Paving unit dimensions	40mm x 492mm x 492mm (nominal)
Coverage rate	4 units per 0.97m^2 panel – Supplied 59m^2 per pallet
Cell dimension	49 octagonal (60mm width) & 64 square shaped (22mm width) cells with octagonal base plate stiffener
Cell structure	Robust semi-stiff lattice of linked octagonal and square cells
Paving unit footprint	Open structured octagonal base plates with 25mm ground spikes (12 spikes per paver)
Paver weight	0.935kg/paver & 3.86kg/m²
Compression strength (filled)	400 tonnes/m² ≅ 4000 kN/m² (gravel filled)
Permissible axle load	16 tonnes ≅ 160kN (gravel filled) DIN EN 1072
Paver interlock mechanism	Overlapping edge latch (25mm long) and loop system. 16 connections per paver
Expansion & contraction	Semi-rigid structure. Range -50 to +90°C
Parking bay & line markers	White mouldings (55mm dia.) slot & lock into octagonal cells. Other colours available
Chemical resistance	Excellent
UV stability	High resistance to colour & strength degradation
Infiltration capacity	Limited only by the permeability of the specified infill, bedding & sub-base materials
Cell infill material	Porous, clean angular aggregate: 3-14mm particle size, with greater proportion in 7-10mm range, and in accordance with Table A.3 of BS 7533-13
Bedding layer material	Porous, clean angular aggregate: 3-14mm particle size, with greater proportion in 7-10mm range, and in accordance with Table A.3 of BS 7533-13
Bedding layer thickness	A level & uniform layer thickness: 25mm - 35mm maximum
Upper filter/separator geotextile	ABG Terrex NW9 non-woven geotextile 1.1mm thick, 120g/m^2, zero breakthrough head (optional, Ref. Note F)
Sub-base material	DTp Type 3 or a drained Type 1, or BS 7533-13 4/20 or 4/40 (Ref. Note C)
Sub-base layer thickness	Refer to Table 1 for thickness 'D' in millimetres (mm)
Sub-base stabilisation	Typically Abgrid 20/20 or 30/30 geogrid (see Table 1). Alternative options may be suitable (Ref. Note B)
Lower filter/separator geotextile	ABG Terrex NW9 non-woven geotextile 1.1mm thick, 120g/m^2, zero breakthrough head

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Structural design, installation and maintenance guidance for gravel surfaces

SUDSGRID™ INSTALLATION PROCESS

The following generic guidance must be read in conjunction with the specific project specification within the contract documents

1. Install the specified lower filter/separator geotextile and sub-base stabilisation onto the prepared subgrade formation.
2. Install the specified sub-base and edge restraints.
3. Install the upper filter/separator geotextile on top of the sub-base.
4. Install the specified bedding layer to a uniform thickness.
5. Ensure an accurate right-angled Sudsgrid laying pattern by setting-out the site using pins and string-lines. Check the lines regularly for accuracy. Start installing the individual Sudsgrid units by placing the spiked face downward onto the bedding layer. Place the panels with the connecting rings facing in the direction of laying on the two leading edges, with the edge latches on the reverse edges.
6. Progress across the site in rows by overlapping edge latches into edge rings, ensuring that they all fully connect and units are flat onto the bedding layer.
7. Avoid starting more than 2 new rows of panels prior to completing the row which is in progress. Avoid installing in a diagonal pattern too far ahead of completed rows. Regularly check and adjust the completed leading edge to ensure that it is straight. It is recommended that protective gloves are worn to avoid abrasions during installation.
8. Sudsgrid can be cut to fit around curves or obstacles using a hand-saw or disc-saw. Using cut-pieces which do not have integral latches and rings should be avoided wherever possible. However, if use of small pieces is unavoidable, these must be securely attached to adjacent panels using strong cable-ties or appropriate screws.
9. Installation of parking bay/line marker inserts is best done prior to filling cells. Push markers into the hexagonal cells until they lock in to place.
10. Fill the cells with the specified aggregate, so that the final level is to the top of the cells. If placing pavers and filling the cells simultaneously, it is important to keep bulk materials and vehicles away from the leading edge to avoid distortion. Do not drive vehicles on the installed panels until cells are filled with aggregate. Do not over-fill or surcharge the cells unless specified by the designer.
11. After initial settlement and trafficking, aggregate may need topping up.
12. A routine management and maintenance programme to keep the surface in good condition and free of debris and weed growth, will help to sustain the porosity, quality and longevity of the system.

NOTES

A. Advice on subgrade CBR% strengths, ground conditions, and construction over weak ground is available from ABG.
B. Alternative ABG stabilisation geosynthetics may be used in lieu of ABG Abgrid geogrid. These include ABG Gridtex Type 2 high-strength woven geotextile or ABG Abweb geocells. If the sub-base stabilisation is omitted, the total sub-base layer thickness ('D' on Table 1) is typically increased by a minimum of 50%.
C. A permeable open-graded (reduced-fines) aggregate is recommended, such as DTp Type 3 low-fines roading aggregate, or BS 7533-13:2009 SuDS aggregate (4/20 or 4/40). However, where a conventional DTp Type 1 sub-base is to be used, it is essential that a drainage system such as ABG Fildrain is incorporated. Specific advice is available from ABG.
D. Maximum sub-base particle size should match minimum sub-base thickness but must not exceed 75mm diameter. For sub-base thicknesses of around 100mm, a minimum 37.5mm particle size should be adopted to allow effective installation of the Abgrid.
E. Typical paving edge restraint solutions include concrete, timber, railway sleepers, steel and heavy-duty plastic.
F. The sub-base is typically overlaid by an ABG Terrex NW9 geotextile to provide enhanced water treatment function.
G. To provide a stable bedding layer for Sudsgrid, the bedding layer must not be sand.
H. The maximum advised gradient for vehicular trafficked applications is generally 12% (1:8) 7°. For Disabled access applications, a maximum of 8% (1:12) 5° is suggested.
I. When designed in accordance with the recommendations, Sudsgrid complies with BS8300:2009 : "Design of buildings and their approaches to meet the needs of disabled people" – Code of Practice (ISBN 9780 580 57419) & Building Regulations Document 'M' Section 6.
J. All stated dimensions & weights are nominal and in accordance with manufacturing +/- tolerances.
K. The recommendations in this document are only suitable for use with ABG products.

Table 1: Sudsgrid™ typical DTp Type 3 sub-base thickness (D) requirements – refer to specific construction drawing

CBR strength of subgrade soil (%)	DTp Type 3 sub-base thickness (D, mm)		ABG Abgrid
(*see Table 2*)	Light vehicles only with emergency HGV access	Light vehicles with one HGV per week	Geogrid
>6	100	150	20/20
4 – 6	150	200	20/20
2 – 4	175	250	30/30
1 - 2	275	375	30/30

Table 2: Field guidance for estimating sub-grade shear strengths

CBR (%)	DCP Result[1] (Sandy Soils)	HSV Result[1] (Clayey Soils)	Tactile (Clayey Soils)	Visual (Clayey or Sandy Soils)
<1	<1	<30kPa	Easily indented by fingers	Adult standing will sink >30mm
1 - 2	<1	30-60kPa	Indented by strong finger/thumb pressure	Adult walking sinks 10-30mm
2 - 4	1 - 2	60-120kPa	Cannot be indented by thumb pressure	Utility truck ruts 10-25mm
5 – 7	2 - 3	120-200kPa	Can be indented by thumb nail	Loaded construction vehicle ruts by 25mm
>8	>3	>200kPa	Difficult to indent by thumb nail	Loaded construction vehicle ruts by <10mm

Note: 1. DCP results are expressed as blows per 100mm penetration. HSV results are expressed as "undrained shear strength" or C_u