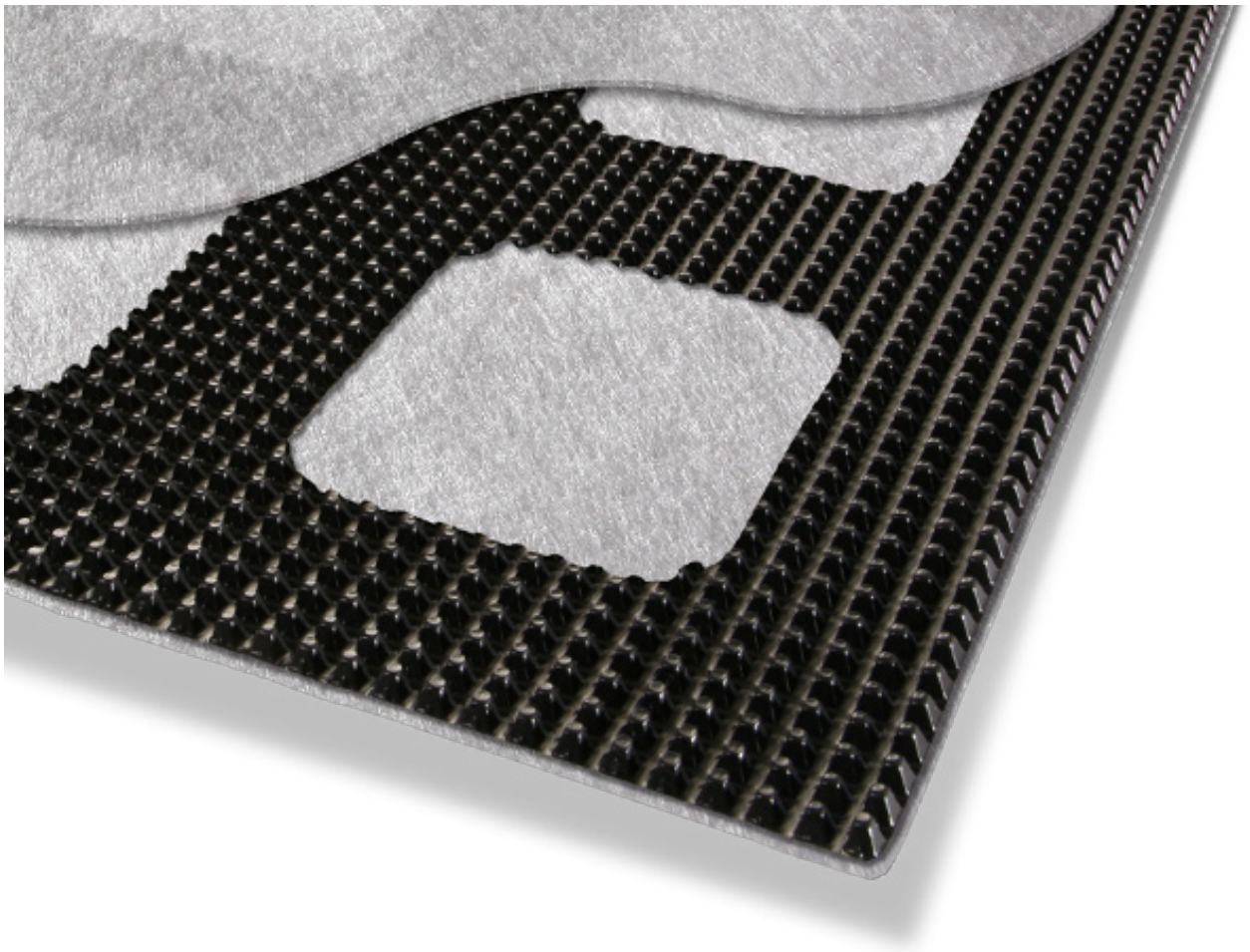
Global Synthetics
LEADERS IN GEOSYNTHETICS

# Pozidrain G Geocomposite

## Gas-Venting, Ground Water and Leachate Drainage Solution

**Enhanced Frictional Performance on Steep Slopes.**



## Product Information

Geocomposite for landfill cap drainage, gas-venting, ground water drainage and leachate management.
Particularly useful on steep slopes where its core structure offers enhanced frictional performance, whilst providing protection to the lining system.

Patented core configuration allows cross directional flow to eliminate the risk of clogging associated with drainage strips.

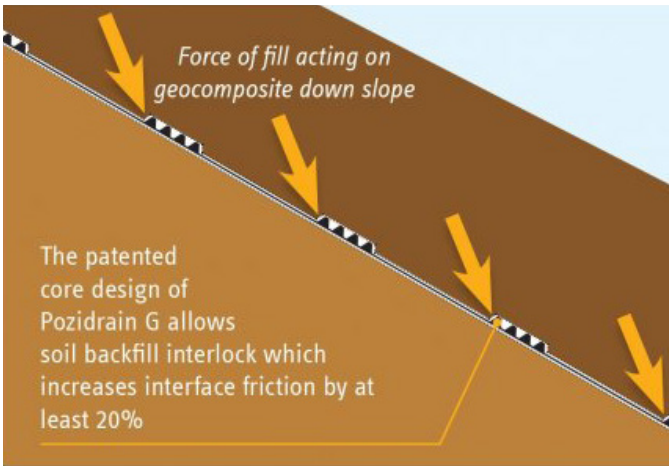
## Applications

- Landfill cap drainage
- Gas venting
- Leachate management
- Groundwater drainage control
- Liner protection
- Drainage on steep slopes
- Cost effective drainage layer for ground water drainage applications

# Pozidrain G Geocomposite

## Benefits

- Enhanced frictional performance
- Unique interlocking with soil backfill
- Superior frictional performance to any other conventional geocomposite drainage layer, enabling construction of steeper slopes
- Provides drainage capacity in both long and cross direction
- Available in 3 thicknesses (4mm, 6mm and 7mm) to provide adequate flow capacity for specific applications
- Patented geocomposite drainage layer with specifically designed drainage core to provide optimum frictional and drainage performance for steep slope installations




Pozidrain G is designed as a cost effective geocomposite for landfill cap drainage, gas-venting, ground water drainage and leachate management. It is particularly useful on steep slopes where its patented core structure offers enhanced frictional performance, whilst providing protection to the lining system.

Pozidrain G geocomposite has a lattice structure core which offers superior interface friction performance on steep slopes. This has been confirmed in a series of direct shear tests which compared the performance of Pozidrain G against other conventional geocomposites.

Results from these tests show the measured interface shear strength for the Pozidrain G4SD (4mm) geocomposite to be 20% stronger than the interface with other geocomposites. The results from tests on the 6mm and 7mm Pozidrain G interfaces show the increase in shear strength to be even greater.

This could represent an improvement in the factor of safety for the stability of very steep slopes. Alternatively this could enable the steepening of the slopes at the same factor of safety with the obvious commercial benefits in terms of increased waste capacity.

The patented core configuration in Pozidrain G geocomposite permits cross directional flow and helps mitigate the risk of system failure should the core sustain damage. Otherwise, this is a potential cause of soil saturation, leading to slope failure and is associated with products utilising drainage strips only.

# Pozidrain G Geocomposite

## Pozidrain G Range

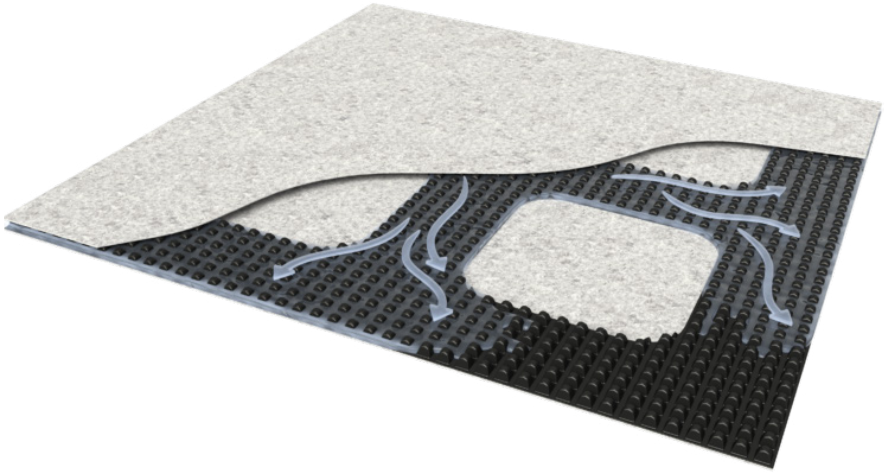
| | Units | G4S<br>G4SD | G6S<br>G6SD | G7S<br>G7SD |
|---|---|---|---|---|
| Thickness | mm | 4 | 6 | 7 |
| Flow Capacity | l/m/s | 0.3 | 0.6 | 1.0 |

EN ISO 12958 Soft Platen
Full data sheets available on request

Pozidrain GSD consists of a patented lattice, cuspated HDPE drainage core laminated between one or two layers of medium weight, non-woven filtration/protection geotextile.

The innovative use of a drainage lattice permits cross flow within the drainage composite. This offers significant advantages over other products that utilise drainage strips, rather than a lattice, within their composition. A further benefit is the lattice core prevents 'torpedoing'; a problem with products based on strips which makes them difficult both to lay and to handle.

Using this core technology, Pozidrain G range offers engineers and contractors a high performance drainage solution with a combination of high-flow capacity, separation and reinforcement properties, helping address construction issues in many civil engineering applications.



# Pozidrain G Geocomposite

## Carbon Footprint Reduction – Global Synthetics Systems vs Traditional Methods

Global Synthetics are committed to reducing the carbon footprint caused directly or indirectly by our manufacturing processes, products and their installation within civil engineering projects. The tables below show examples of the percentage carbon savings you could make using an Global Syntheticssolution in place of traditional methods.

### Soil Drainage

The use of Global Synthetics Pozidrain Drainage Geocomposite can save up to 64% on carbon footprint compared with traditional granular soil drainage methods:

| Global Synthetics System | Traditional Method | Carbon Saving |
|---|---|---|
| **Pozidrain** | **Granular Drainage Blanket** | |
| • Light-weight drainage geoomposite<br>• Reuse of site soils<br>• Recycled Materials | • Imported Quarried Drainage Gravel with a Geotextile Filter<br>• Additional Excavation and Waste Soils | 64%<br>Saves 4.0kg $CO_2$ e/m$^2$ |

Carbon saving value based on the average value of two assessments: French Drain vs. ABG Fildrain Type 6 (93% carbon saving), and Stone Drainage Blanket vs. Pozidrain 7S250/NW8 (95% carbon saving). The French Drain was assumed to be 700mm deep and 500mm wide, lined with a typical non-woven separation geotextile. Fildrain Type 6 is a 7mm thick drainage geocomposite which is installed vertically in a trench with a perforated pipe at the base. The trench is backfilled with arisings and the system provides equivalent or better drainage performance to standard French Drain designs. It is assumed that the carbon value of installation is approximately equivalent for each method. The Stone Drainage Blanket was assumed to be a 300mm thick layer of drainage gravel lined with a geotextile separator above and below. Pozidrain 7S250/NW8 is a 7mm thick drainage geocomposite which provides equivalent or better water flow to that of a 300mm thick granular drainage layer. The soil sent to waste has not been included in the analysis.

### Block of Wall Drainage

The use of Global Synthetics Deckdrain geocomposite can save up to 94% carbon footprint compared with traditional concrete block backfilled with gravel methods

| Global Synthetics System | Traditional Method | Carbon Saving |
|---|---|---|
| **Deckdrain** | **Porous Concrete Blocks** | |
| • Light-weight drainage geoomposite<br>• Low Carbon Hand Installation<br>• Recycled Materials | • Concrete Blocks Backfilled with Gravel<br>• Machine Installation | 94%<br>31kg $CO_2$ e/m$^2$ |

Carbon saving taken directly from the Costain case study (Wilson, 2018) which is a case study comparing the use of ABG Deckdrain with traditional solutions for drainage behind concrete bridge abutment retaining walls. The traditional solutions assessed were no-fines concrete (97% carbon saving) and hollow concrete blocks backfilled with gravel (92% carbon saving). The carbon saving stated is based on the hollow concrete blocks. The assessment in the case study discounted the removal of waste material, was based on actual distances to quarries/suppliers and material quantities as assessed by Costain.

# Pozidrain G Geocomposite

### Permeable Paving

The use of Global Synthetics Sudspave permeable paving can save up to 54% carbon footprint compared with traditional permeable block paving methods.

| Global Synthetics System | Traditional Method | Carbon Saving |
|---|---|---|
| **Sudspave** | **Permeable Block Paving** | |
| • Interlocking Geosynthetic Pavers with Porous Gravel Backfill<br>• Quick Installation<br>• Recycled Materials | • Concrete Blocks Backfilled with Porous Jointing<br>• Labour-intensive Laying Process | 54%<br>Saves 20kg $CO_2$ e/m$^2$ |

This assessment was based on a permeable block paving surfacing compared with ABG Sudspave – a porous paving surface comprising interlocking plastic pavers backfilled with gravel. The carbon footprint associated with excavation and road foundation construction have not been included in this assessment, since just the surfacing is compared. The carbon footprint associated with construction is also discounted due to the difficulty of comparison, although it is expected that the installation of a Sudspave solution would have a lower carbon footprint. The permeable block paving assumes a 60mm paver on a 50mm bedding layer. The embodied carbon is assessed as 36 kgCO2e/kg (Marshalls.co.uk, 2018) which includes transportation. Added to this is the embodied carbon in the bedding layer and fine gravel in the joints between the pavers. The Sudspave design is a 40mm plastic paver on a 20mm bedding layer (a design which is generally structurally and hydraulically equivalent or better). The carbon footprint of transportation has been added to the Sudspave assessment.

### Gravity Retaining Walls

The use of Global Synthetics Webwall Geocell can save up to 77% on the carbon footprint compared with traditional gabion basket gravity retaining walls:

| Global Synthetics System | Traditional Method | Carbon Saving |
|---|---|---|
| **Webwall** | **Gabion Baskets** | |
| • Geocellular Recycled plastic backfilles with site won soil<br>• Reduced soil waste and reduced imported soil<br>• Green finish | • Galvanised or PVC coated stainless steel mesh baskets<br>• Hand placed imported stone fill | 77%<br>Saves 234kg $CO_2$ e/m$^2$ |

This assessment was based on the results from the 'Axis Business Park Environmental Bund' case study from the WRAP report (Corney, 2010). This case study has been adjusted to be specific to the use of ABG products transported to the same location (60 miles from ABG). The WRAP report calculated the carbon footprint of a 9.5m high gabion basket wall and compared it to a that of an equivalent reinforced earth design (the latter was the adopted solution). The ABG carbon saving assessment used the values assessed in the WRAP report for the gabion design and compared it to the calculated footprint of an ABG Reinforced Webwall design very similar to the equivalent reinforced soil design in the WRAP report. The emissions during construction were assumed to be the same as those in the WRAP report.

# Pozidrain G Geocomposite

### Highway Fin Drains

The use of Global Synthetics Fildrain Fin Drain geocomposites can save up to 74% carbon footprint compared with traditional granular stone fin drain methods.

| Global Synthetics System | Traditional Method | Carbon Saving |
|---|---|---|
| **Filldrain** | **Granular Findrain** | |
| • Light-weight drainage geocomposite<br>• Re-use of site soils<br>• Recycled materials | • Impoted quarried drainage gravel with a geotextile wrap<br>• Additional excavation and waste soils | 74%<br>Saves 4.2kg $CO_2$ e/m$^2$ |

### Embankment Starter Layers

The use of Global Synthetics Fildrain Drainage Geocomposite can save 57% on the carbon footprint compared with traditional granular stone drainage methods for embankment starter layers:

| Global Synthetics System | Traditional Method | Carbon Saving |
|---|---|---|
| **Filldrain** | **Granular Drainage Blanket** | |
| • Light-weight drainage geocomposite<br>• Re-use of site soils<br>• Recycled materials | • Impoted quarried drainage gravel with a geotextile wrap<br>• Additional excavation and waste soils | 57%<br>Saves 4.2kg $CO_2$ e/m$^2$ |

### General Assumptions

The analysis method follows that described in the WRAP report (Corney, 2010). The carbon associated with four key stages is assessed a) the carbon associated with waste soil, b) the embodied carbon of imported materials, c) the transportation of imported materials to site, and d) the carbon associated with construction on site. The carbon footprint of waste material is based on fuel burnt during excavation, loading, and transportation to landfill. These calculations assume that waste material is transported at a rate of 10m$^3$ per load, 15 minutes excavation and loading time per load, and a 15 mile return journey to the nearest landfill. The fuel efficiency of the vehicles used is assumes as 25 L/hr (excavation and loading) and 4.4 miles/L (transportation). The carbon footprint of burning diesel is assessed as 2.67 kg $CO_2$ e/L based on the value given for 'Diesel (average biofuel blend)' in the DEFRA report (Department for Environment Food & Rural Affa irs, 2018).

The embodied carbon of the various imported gravels used in these assessments is assumed to be quarried limestone or similar, with an embodied carbon footprint of 0.09 kg $ECO_2$ e/kg (kilograms of embodied carbon dioxide equivalent per kilogram of product) as per the ICE report (Hammond and Jones, 2011). The embodied carbon of all ABG's geosynthetic products is based on Global Synthetics internal assessments (Heritage, 2018) and 'Obtaining reliable embodied carbon values for geosynthetics' (Raja, 2015).

The transportation of imported materials is generally based on the installation site being 100 miles from ABG and 5 miles from the nearest quarry. Fuel economy is estimated as 4.4 miles/L. The weight of material transported varies for each item. The carbon footprint associated with construction is based on estimates where possible and ignored in more complicated situations for simplicity of calculations.

# About Us

## Leaders in Geosynthetics

Global Synthetics is a 100% Australian-owned company, proud to offer a complete range of high-quality geosynthethic products backed by over 200 years of combined staff experience in the industry.

We have supplied products to some of the largest recent infrastructure works in Australia. Global Synthetics provides major benefits to any geotechnical engineering project with the right products and our technical expertise.

Global Synthetics products are used in the following applications:

- Pavement Stabilisation
- Ground Improvement
- Soil Reinforcement and Retaining Structures
- Water Management
- Drainage Systems & Hydraulic Works
- Landfills
- Coastal Erosion Structures

## Get in Touch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