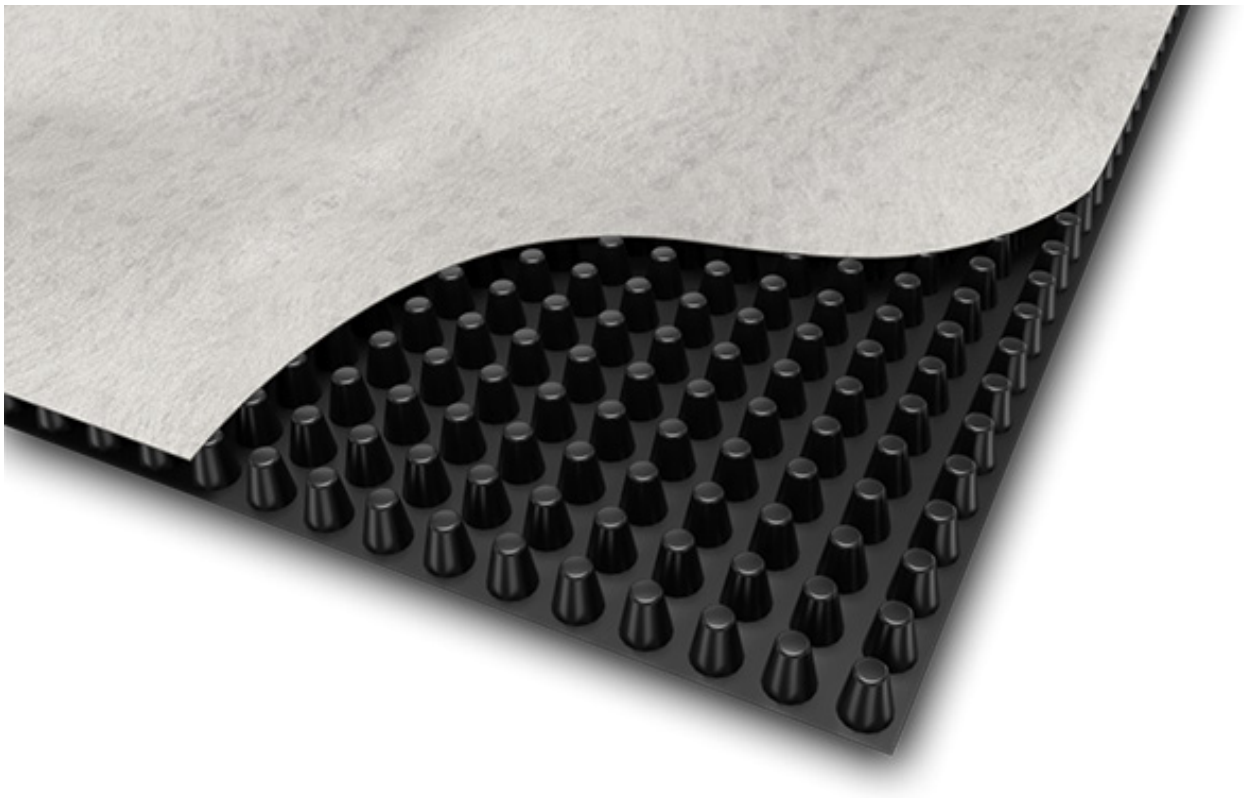
Global Synthetics
LEADERS IN GEOSYNTHETICS

Deckdrain Drainage Geocomposite

Replaces the Requirement for Stone Filter Layers

The Filter Geotextile Prevents Clogging of the Core



Product Information

Deckdrain is a high performance geocomposite drainage system. Designed to provide an environmentally friendly alternative to traditional structural drainage techniques, it delivers high flow capacity and added protection to waterproofing.

Deckdrain's unique drainage core replaces the requirement for stone filter layers, whilst giving superior flow.
The filter geotextile prevents clogging of the core.

Applications

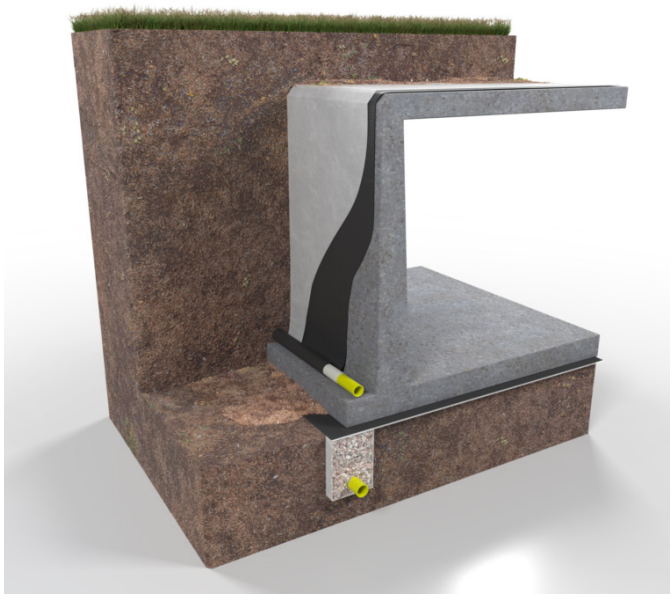
- Relief of external water pressure from buried structures
- Highways Bridge abutment and wingwall drainage
- Structural drainage on rail projects
- Drainage on Green Bridges
- Drainage behind retaining walls
- Covered reservoir roofs and walls
- Tunnel drainage
- Roof garden drainage
- Block paving drainage
- Relief of uplift pressure beneath tanks, slabs and culverts
- Capillary break layer below base slabs
- Structural drainage
- Green Tunnels

Deckdrain Drainage Geocomposite

Benefits

- Horizontal or vertical drainage applications (walls)
- Thinner drainage layers when compared to traditional aggregate drainage solutions
- Reduced dead loads on structure means thinner slabs are possible
- High, factory controlled consistent flow capacity
- Wide rolls of Deckdrain available to enable rapid installation
- Enhances the performance of structural waterproofing by providing an additional barrier that prevents the majority of water reaching the liner
- High CBR puncture resistance of Deckdrain provides protection
- Allows use of lower specification backfill
- Reduced delivery traffic volumes when compared with stone delivery vehicles

Deckdrain is used in civil engineering and construction drainage applications; including bridge abutments, buried structures, retaining walls, tunnels, roof gardens and covered potable water reservoirs. Deckdrain geocomposite consists of a high strength, flexible polyethylene cuspated core with a non-woven filter geotextile bonded onto one or both sides. The geotextile filters a wide range of materials whilst allowing water to percolate into the core of the geocomposite before draining to a discharge point.



The HDPE cuspated core of the geocomposite provides a free flowing drainage void. The cusps are designed to support the geotextile which is bonded to the core, to ensure that it doesn't deform into the drainage void under the pressure of the backfill material. Deckdrain is designed to allow flow in all directions, unlike linear or pipe systems.

Deckdrain is durable and sufficiently robust to resist the mechanical stresses imposed during installation and then on throughout its design life. Use of Deckdrain eliminates the need for further protection of the waterproofing system. Deckdrain has been creep tested at compressive loads of up to 1,000kPa to give a design life of 120 years.

Deckdrain is a UK manufactured BBA certified product, with a long history of use on National Highways, Transport Scotland and other major Highways schemes. Deckdrain is available in a range of flow capacities from 1 l/m/s to 95 l/m/s, corresponding to thicknesses ranging from 4mm to 50mm, and can be supplied in a variety of roll sizes designed to suit differing site requirements.

Deckdrain geocomposite is used in the construction of green bridges and green tunnels to protect the waterproofing and provide drainage to the structure, which removes the need for bulky porous blocks and the logistical challenge of importing granular fill.

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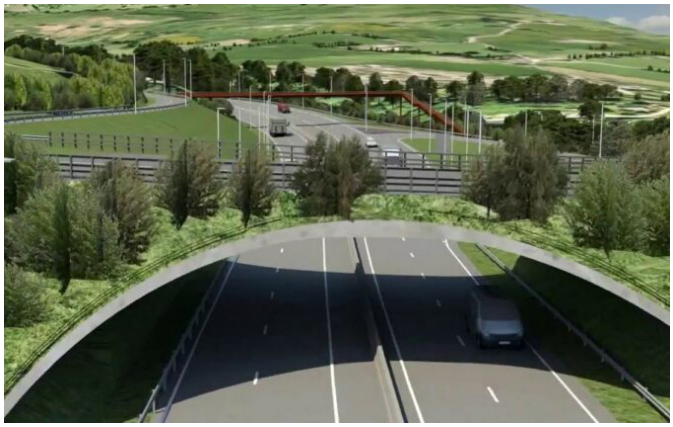
Deckdrain G for Leak Detection

The increasing demand for leak detection and location "intelligent membranes" requires a complementary drainage and protection layer. Deckdrain G has been designed with a special latticed cuspate design, developed to support this technology and as implemented on a range of reservoirs across the UK. In addition to providing multi-directional flow, the Deckdrain G offers protection against puncture of the underside of the geomembrane layer. In the event of a tear to the membrane, the water has an easy drainage pathway to the sump so that the source of the leak can be identified and repaired.



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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 • Reuse of site soils • Recycled Materials	• Imported Quarried Drainage Gravel with a Geotextile Filter • Additional Excavation and Waste Soils	64% 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 • Low Carbon Hand Installation • Recycled Materials	• Concrete Blocks Backfilled with Gravel • Machine Installation	94% 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.

Deckdrain Drainage 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 • Quick Installation • Recycled Materials	• Concrete Blocks Backfilled with Porous Jointing • Labour-intensive Laying Process	54% 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 • Reduced soil waste and reduced imported soil • Green finish	• Galvanised or PVC coated stainless steel mesh baskets • Hand placed imported stone fill	77% 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.

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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 • Re-use of site soils • Recycled materials	• Impoted quarried drainage gravel with a geotextile wrap • Additional excavation and waste soils	74% 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 • Re-use of site soils • Recycled materials	• Impoted quarried drainage gravel with a geotextile wrap • Additional excavation and waste soils	57% 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

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