Versicell
Modular drainage system
Enhancing Our Environment

Increasing urbanisation and industrial development has created a need for more effective drainage systems. Increased surface run off from developed areas has resulted in the requirement to build storm-water channels. These drainage systems occupy large areas of land, are an eyesore, and are expensive to build and maintain. Open waterways are often polluted by sediment and rubbish that consequently result in breeding grounds for pests and diseases. Versicell enhances our environment as it effectively captures underground water movement, maximises sustainable urban drainage systems (SUDS) and provides an efficient solution to minimise surface run off.

Versicell is a modular interlocking sub-soil drainage system, which is environmentally friendly, simple to use and amazingly effective. Its uses range from roof gardens and sports fields to landfill gas dispersal and stormwater management.

Applications

- Sports field drainage and water management
- Roof Garden drainage and water management
- Planter Box balconies, playground and pavement drainage
- Golf Course drainage
- Pond filtration systems
- Roads & Railways drainage, water management
- Retaining, basement, and tunnel walls drainage and hydrostatic relief
- Stormwater and perimeter drainage, detention, and recycling
- Bio-filtration filter systems, de-gassing, leachate collection & recycling
- Landfill gas dispersal, ventilation, building protection

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What is Versicell?

Versicell is a lightweight, high strength, plastic moulded structural panel that provides superior drainage through the combination of substantial void areas and exceptional flow rate.

It is a cost-effective alternative to traditional gravel based drainage systems that are inefficient, unpredictable, bulky to handle, difficult to install, and add unnecessary weight and stress to building structures.

Versicell offers a significant advance in environmental and operational efficiencies for the landscape, civil engineering, and building industries due to its high compressive strength, ease of installation and cost effectiveness. Over the years Versicell has been successfully installed in some of the most climactically demanding countries throughout Europe, Australia, Asia and the Middle East.

Why use Versicell?

- Versicell is an exciting technical and practical advance in the design and function of a medium for sub soil drainage and can significantly improve schemes using sustainable urban drainage system (SUDS) techniques.
- Versicell is a single source drainage module suitable for both vertical and horizontal applications. The product can be supplied in pre-assembled linear format as alternatives to fin drains or slotted pipes, or in loose form for horizontal applications and in box construction for percolation tanks.
- The bi-planar construction of the panel ensures even distribution of weight over the entire structure. The circular configuration of the holes ensures localised stresses are easily accommodated.
- The benefits associated with a lightweight module such as Versicell together with the efficiencies of flow, allows for rapid installation and assured drainage.
- Versicell is a true and proven advance in addressing the management of water underground.
- The features of Versicell provide for unheard of efficiencies in drainage in a simple and unique module.

Benefits

Efficient - more effective than slotted / perforated pipe, aggregate and other alternative systems. The high surface area and internal void volume result in exceptional drainage efficiency.

Lightweight and high strength - honeycomb design results in a lightweight high compressive strength structure.

Durable - thermoplastic material resistant to soil borne chemicals, biological attack, root penetration and thermal stresses.

Design Flexibility - greater design flexibility as the modules may be interlocked on one plane, or at right angles to one another to form continual panels, conduits, and tanks.

Ease of Installation - large easy-to-join panels or pre-assembled panels and narrow profile allow rapid installation and minimise on-site disruption.

Cost - compact, lightweight design reduces excavation and installation costs.

Environmentally Friendly - Versicell is manufactured from re-cycled plastics.
Versicell or perforated pipe and gravel?

Traditional pipe and stone systems have severe limitations in relation to percolation INTO the pipe. They need to use flow retarding material such as gravel and stone, to accommodate the deficient hole area, which is typically 2-3% of the surface area.

In a green roof this compromises the volume of available planting depth as well as increasing the overall load bearing capacity of the structure. Simply put a 100 mm diameter pipe will require an additional 50 mm plus of gravel cover, totalling in excess of 150mm as the drainage layer, compared to a more effective solution of Versicell at only 30mm height.

Benefits

98% sectional void area - to total surface area ensures the highest possible water absorption rate, at any point along the module and soil interface. The rate of absorption of water into Versicell will always be higher than the rate of percolation of water through the soil, ensuring a continuous discharge.

A complete system - apart from the usage of a filtering geotextile, there is no need for gravel, no need for membrane protection boards and no need for anything else.

High load bearing capacity - accommodates both short and long term stresses and effectively addresses the rigours of handling during the construction phase, as well as the stresses during settling and afterwards, including thermal shock.

Permeability Comparison

Comparison of Permeability between Versicell Sub-Soil Drainage Module & perforated UPVC pipe.

Assumptions

Rainfall Intensity (R.F.I.) = 150mm/hr (EN12056) Surface Run Off = 70% Permeability to reach Sub-Soil Drainage = 30%

Calculations

**Versicell Sub-Soil Drainage**

Single layer of Nordrain V 250mm wide x 30mm thick x 6m Long

Surface Area = (250x2) + (30x2)) x 6000mm² = 3.36m²

Permeability / Surface void area = 60% of surface area

= 0.6x3.36 = 2.016m²

Rate of Run Off = (Ae x (R.F.I.) / 3600 (l/s)

Where Ae = Catchment Area (m²)

Rate of Run Off = (2.016 x 150 x 0.3) / 3600 (l/s) = 0.0252 l/s

Perforated UPVC Pipe

150mm dia x 6m long perforated UPVC Pipe

Surface Area = 3.142 x 150 x 6000mm² = 2.828m²

Permeability / Surface void area = 22% of surface area

= 0.22 x 2.828 = 0.622m²

Rate of Run Off = (Ae x (R.F.I.) / 3600 (l/s)

Where Ae = Catchment Area (m²)

Rate of Run Off = (0.622 x 150 x 0.3) / 3600 (l/s) = 0.008 l/s

These calculations show that the permeability of Versicell is 3 times more effective than that of perforated UPVC Pipe.
Versicell versus Cuspated Sheet Systems

Cuspated sheets are produced utilising an extrusion or vacuum process and results in the products having only 2 dimensions. A geotextile is normally bonded to these types of core. These products may also have double sided cusinations (egg box), which when employed horizontally allows for water to remain in the top layer only, lateral flow will only occur once these cusinations are full. This process has a retarding effect on the flow and posses a potential in high deluge situations. Water retention within these types of systems is high and may have an anaerobic effect on planting.

Load bearing is normally less than that of Versicell as the initial plastic used is thin and then stretched to formalise the shape. Geotextiles are normally rigid bonded or woven types necessary to accommodate the distances between each cusipation, which once subjected to pressure as well as saturated soil weight, can collapse into thecusations rendering an ineffective void.

In the case where cusinations are single sided, load capacity is improved. However the initial efficiency of the system is conditional to the performance of the geotextile, which itself is conditional to it being suspended from the core material, which facilitates the drainage channel. Typical cusipated systems are not trafficable, foot or otherwise, during the installation process.

Retaining/Basement Walls
Sections pre-wrapped with geotextile material” laid with interlocking joints against waterproofing membrane to external surface of wall with double units on lowest course and then backfilled with subsoil.

Green Roof/Planter/Plaza Deck
Sections laid horizontally with interlocking joints on waterproof membrane which are then overlaid with geotextile and a blinding layer of sand ready for topsoil.

Typical specification

Modular drainage system, consisting of individual components 500 x 250 mm (nominal) x 30 mm height weighing no more than 3 kg/m². Black in colour and manufactured from re-cycled polypropylene. Voids are to be circular in design and shall be at least 58% of the horizontal surface area. Discharge capacity is to be a least 5.75lit/sec (at hydraulic gradient of 1°). Horizontal compressive strength to be at least 1400 kN/m². Modules are commonly called Versicell® by Stormwater Management Ltd, Harrowbrook Ind Est, Hinckely, LE10 3DU. Tel: 01455 502222

How to Specify Versicell Modular Drainage System

Supplier
Stormwater Management Ltd, Harrowbrook Ind Est, Hinckley, LEICS. LE10 3DU. Tel: 01455 502222 Fax: 01455 502223

Product Reference Versicell Modular Drainage

Description
Size: 500 x 500mm
Height: 30mm
Weight: no more than 3kg/m²
Material: re-cycled polypropylene
Colour: black
Horizontal void area: at least 58% in a circular design Service temperature: -30°C + 120°C
Compressive strength: > 1,400 kN/m² /150 tonnes m²
Discharge capacity: 5.75 litres/sec @ 1% hydraulic gradient

Applications
Vertical in Narrow Trench
Sections pre-wrapped with geotextile material” laid with butt/interlock joints in line with right angles as required and/or irregular prefabricated angles to suit all bedded on sand/pea shingle then filled with sand/pea shingle to cover.

Paved Areas/Footways
Sections pre-wrapped with geotextile material” laid horizontally/vertically with interlocking joints on a bed of porous material blinded with sand if necessary.

Technical helpline: 01455 502222
Sportsfield
1 Versicell 2 Geotextile 3 Coarse sand 4 Earth

Concealed Drain
1 Versicell 2 Geotextile 3 Coarse sand 4 Earth

Storm Drain
1 Versicell 2 Geomesh 3 Concrete panel 4 Sandy gravel 5 Earth

Retaining Wall
1 Versicell 2 Waterproof membrane 3 Geotextile 4 Flashing 5 Backfill

Pond Filtration
1 Versicell 2 Geomesh 3 Pebbles 4 Pipe support 5 Waterproof membrane

Landscape deck/green roof
1 Versicell 2 Waterproof membrane 3 Geotextile 4 Flashing 5 Coarse sand 6 Growing media
**Plaza deck**

1. Versicell  
2. Waterproof membrane  
3. Geotextile  
4. Sand  
5. Pre-cast pavers

**Capillary Irrigation**

1. Versicell  
2. Waterproof membrane  
3. Geotextile  
4. Moisture wick  
5. Overflow pipe  
6. Flashing  
7. Coarse sand  
8. Growing media