

# FORWARD

## SPECIFICATION BOOKLET

[www.water-products.co.uk](http://www.water-products.co.uk)





## MORE THAN SUSTAINABLE



We believe in more than sustainable drainage - we believe in better drainage.

This is a mission to be more than sustainable and improve the way we manage stormwater. The devastating effects of flooding remain a constant threat, and traditional sustainable drainage systems are not enough. We have to adopt better drainage to implement improvements and reverse the effect.

**Welcome to the next generation of drainage and stormwater management at source.**

## FORMA VOID

### WHAT?

A simple way of enhancing traditional construction methods to create void space for managing rainwater at source.

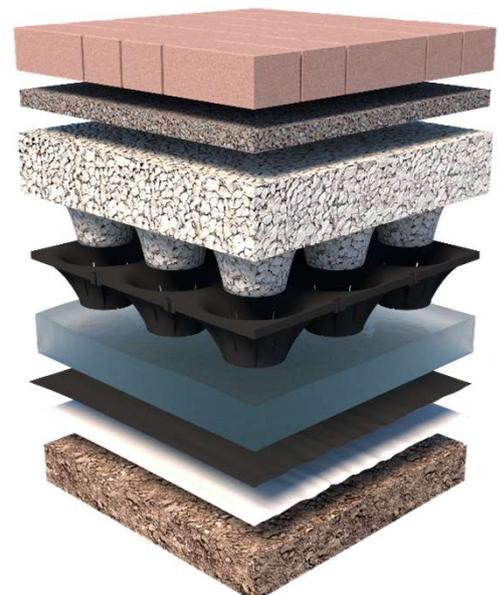
The Formavoid® module is shaped to encourage aggregates into a series of columns & arches. Load is spread through the fill material to the columns, creating an extremely strong & robust product. The space beneath the arches remains open, creating a shallow void space beneath the surface which can be utilised for stormwater attenuation and management.

### WHERE?

Subbase attenuation in the built environment | Sports field drainage | Podium deck & roof drainage

### WHY?

Reduce construction depth | Increase void/storage volume | Reduce carbon footprint | Reduce construction costs | No underground tanks





## Aggregate

Permeable Pavements, Car Parks, Service Yards, Access Roads, Sports Field Base



## Fibre Sand & Rootzone

Equestrian Facilities (Indoor & Outdoor), Natural & Hybrid Turf Sports Fields



## Soil

Urban Greening, Green Roofs, Podium Decks

# FORMAVOID 100

PRODUCT INFORMATION - WP01001



- 1 Carbon Zero Recycled PP
- 2 Perforations for Water & Air Flow
- 3 Catenary Ribs for Shape Retention
- 4 Integrated Clipping Mechanism
- 5 60% Void Space Beneath Arches



Formavoid is a plastic void former that encourages fill material into an extremely strong series of columns and arches, leaving open void space beneath the arches for source control water management & storage. When filled with aggregates such as MOT Type 3, Formavoid combines with the aggregate to create a granular base with enhanced stability and water storage capacity. A seamless addition and enhancement to source control subbase attenuation.



## APPLICATIONS

- Source Control Stormwater Management
- Shallow Attenuation, Conveyance & Infiltration
- Open Graded Subbase Attenuation
- Water Managed Sports Facilities
- Blue/Green Roofs & Podiums
- Gas Venting
- Rainwater Harvesting & Recycling

## KEY BENEFITS

- Nest stacking
- Vertical strength >120tons/m<sup>2</sup>
- Reduced construction depths
- Enhanced granular subbase storage capacity
- Improved base stability
- Better permeability/flow through aggregate
- Reduced carbon footprint

## GENERAL

Product Code	F1001
Colour	Black
Material	Carbon Neutral Recycled Polypropylene
Lifespan	>50 Years
Fill Material Examples	DOT Type 1, Type 2 & Type 3 Aggregates (SHW 803 -805). Uniformly Graded Aggregate (2mm-20mm) Concrete (permeable or impermeable) Coarse Sand Soil

# FORMAVOID 100

PRODUCT INFORMATION - WP01001

FORMAVOID



## PHYSICAL

Unit Dimensions	577mm (L) x 577mm (W) x 100mm (D) 3 units per m <sup>2</sup>	
Arch Type	Catenary	
Unit Weight	1.5kg	
Void Ratio	70% <i>When columns are filled with 30% void aggregate</i>	
Vertical Compressive Strength	>1,200kN/m <sup>2</sup> <i>When filled with 30% void aggregate with minimum 150mm cover</i>	

## PACKAGING

Pallet Size	1.2m (L) x 1.2m (W) x 1.3m (H)
Pallet Weight	225kg
Packaging	Recyclable banding
Pallet Capacity	132nr / 44m <sup>2</sup>
Pallet Space Capacity (Double Stack)	264nr / 88m <sup>2</sup>
Storage Guidance	Suitable to be stacked - maximum 4nr pallets high. Prevent direct exposure to sunlight during long periods of storage.

## NOTES

- Formation shall be prepared to minimum 5% CBR. Special attention required for <5% CBR.
- Formatextile (F2001) must be installed beneath Formavoid to spread load.
- Formavoid to be installed with correct manual handling technique.
- Avoid trafficking unfilled Formavoid.
- Utilise lightweight plant and machinery when filling Formavoid and avoid high torsion movements.



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# Carbon Neutral Polymer

RAW MATERIAL SUMMARY & LIFE CYCLE ASSESSMENT

FORMAVOID



100% Recycled



100% Recyclable



Carbon Neutral

The Formavoid Carbon Neutral Polymer combines **100% recycled polypropylene** with a bio-based climate positive additive (CPA), generating enough carbon offset to make the raw material blend at least **carbon neutral**.

## PROPERTIES

Material Composition	95% Mineral Reinforced Recycled Polypropylene, 5% CPA
Colour	Black
Tensile Strength	22-26MPa
E-modulus	1250-1350MPa
Charpy Notched Impact	>6KJ/m <sup>2</sup>

## Bio-Based Climate Positive Additive (CPA)

CPA uses unsorted, residual municipal waste as its primary feedstock, diverting it from high-emission landfill. Robust close-loop technology valorises municipal waste and converts it into safe, durable and recyclable thermoplastic feedstock.

1kg CPA = -11.7kg/CO<sub>2</sub>eq (GWP20)

Figures calculated using UNFCCC methodology in conjunction with IPCC data.



ZERO  
WATER  
CONSUMPTION



ZERO  
PRODUCTION  
WASTE



ZERO  
EFFLUENTS



ZERO  
COMBUSTION



ZERO  
HAZARDOUS  
FUMES



Results reviewed  
and validated by  
**Quantis**



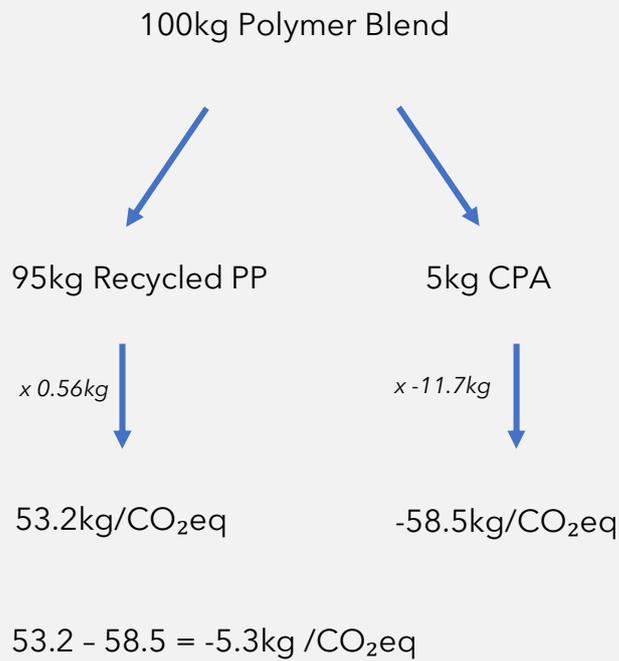
## Carbon Neutral Worked Example

Given: 1kg CPA = -11.7kg/CO<sub>2</sub>eq (GWP20)

Figures calculated using UNFCCC methodology in conjunction with IPCC data.

Assuming: 1kg Recycled PP = 0.56kg/CO<sub>2</sub>eq

Figures calculated based on recycled PP having 80% less carbon emissions than virgin PP.



Based on the above worked example, and to the best of our knowledge, it can be assumed the polymer blend has a negative carbon effect and therefore is at least carbon neutral.

The above calculations are for illustrative purposes only. Calculations may not be an exact representation and are not intended to be relied upon. A typical carbon value for recycled polypropylene has been assumed.



100% Recycled



100% Recyclable



Carbon Neutral

# FORMALINER medium duty

PRODUCT INFORMATION - F3001

  
FORMAVOID

## INTRODUCTION

Formaliner MD is a high-density polyethylene impermeable geomembrane, for Formavoid stormwater attenuation applications. Specifically selected for flexibility and robustness. Available in full rolls or cut-to-size panels to reduce site wastage. Fully compatible with a standardised range of membrane sealed connections and components.



For best results, joints can be hot air welded with a twin wedge welder and tested with an air lance. Alternatively, double sided tape can be used for jointing.

For use in accordance with harmonised standards: BS EN 13361/13362/13492.

## FORMALINER MD Information

Product Code	F3001
Material	High Density Polyethylene
Roll Dimensions	5.1m(width) x 100m (length)
Density	0.939g/cm <sup>3</sup> (ASTM D 1505)
Break Strength	20kN/m (ASTM D 6693 type IV)
Break Elongation	800% (ASTM D 6693 type IV)
Tear Resistance	70N (ASTM D 1004)
Puncture Resistance	190N (ASTM D 4833)
Carbon Black Content	2-3% (ASTM D 4218/6370)

## Oxidative Induction Time (OIT)

Standard OIT	100min (ASTM D 3895)
High Pressure OIT	400min (ASTM D 5885)
Oven Ageing at 85°C	35% (ASTM D 5721)
UV Resistance HP OIT % retained after 1600hrs	35% (ASTM D 5885)

- ✓ Only buy what you need with cut-to-size panels.
- ✓ Fully compatible with our standard range rigid membrane sealed tank adaptors.
- ✓ Compatible with our membrane checkdam components.

# FORMALINER medium duty

PRODUCT INFORMATION - F3001

FORMAVOID

## Packaging

Packaging	Roll
Roll Size	100m x 5.1m (510m <sup>2</sup> )
Roll Weight	Approx. 370kg
Storage	Store in original packaging indoors where possible

Formavoid 100  
**FORMALINER MD**  
Formatextile  
>5% CBR Formation



## NOTES

- Compatible with all Water Products' membrane sealed components.
- Formaliner MD to be placed on a Formatextile (F2001) protection geotextile.
- Joints can be made using Formaseal Tape (F3201), however twin wedge hot air welding is preferred where possible.
- Overlaps of minimum 150mm are required. Overlaps can be sensibly reduced when panels of geomembrane are twin wedge welded.



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# FORMATEXTILE 300

PRODUCT INFORMATION - F2001

  
FORMAVOID

## INTRODUCTION

Formatextile 300 is a purpose built heavy duty non-woven needle punched permeable geotextile, to be used in conjunction with Formavoid 100 units (F1001). The unique manufacturing process delivers a high tensile strength, low elongation geotextile with good permeability and protection/puncture resistance.

Such characteristics are required to create a tensile layer beneath a Formavoid raft to effectively spread load between columns and permit small recoverable deflections without tearing/compromising under heavy load. Formatextile 300 also reduces the likelihood of settlement/sinking into the formation.



## Formatextile 300 Information

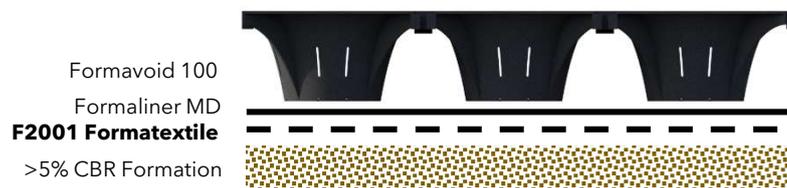
Product Code	F2001
Material	High Density Polyethylene
Weight	275gsm ( $\pm 10\%$ )
Machine Direction Tensile	15kN/m (EN ISO 10319)
Cross Direction Tensile	20kN/m (EN ISO 10319)
Machine Direction Elongation	50% (EN ISO 10319)
Cross Direction Elongation	50% (EN ISO 10319)
Resistance to Static Puncture	2.5kN (EN ISO 12236)
Dynamic Perforation Resistance	15mm (EN ISO 13433)



- Permits low elongation to reduce tearing.
- High tensile strength, preventing excessive settlement/deflection.
- Effectively spreads heavy load between Formavoid columns.
- High permeability and protection characteristics.
- Effective separation and protection against particle migration.

## Packaging

Packaging	Roll
Roll Size	110m x 4m (440m <sup>2</sup> )
Roll Weight	Approx. 135kg
Storage	Store in original packaging indoors where possible



## NOTES

- Formatextile 300 to be placed on a formation prepared to minimum 5% CBR. Special attention required for <5% CBR.
- Geotextile to be placed continuously on all surfaces prior to installation of Formavoid 100 (F1001) units.
- Overlaps of minimum 300mm are required. Overlaps can be sensibly reduced when panels of geotextile are twin wedge welded.

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## INTRODUCTION

**MOT Type 3 aggregate with maximum 40mm particle size and 30% void ratio** is the recommended granular infill material for a Formavoid enhanced subbase attenuation systems.

The Type 3 shall be transported, laid and compacted without drying out or segregation. The properties of the aggregates used in Type 3 shall be in accordance with BS EN 13242, The Type 3 shall comply with BS EN 13285 and the grading requirements are summarised in the table below.

Sieve Size (mm)	Percentage by Mass Passing		
	Overall Grading Range	Supplier Declared Value	Tolerance
40	80-99		
20	50-78	58-70	±8
10	31-60	39-51	±8
4	18-46	26-38	±8
2	10-35	17-28	±7
1	6-26	11-21	±5
0.500	0-20	5-15	±5
0.063	0-5		

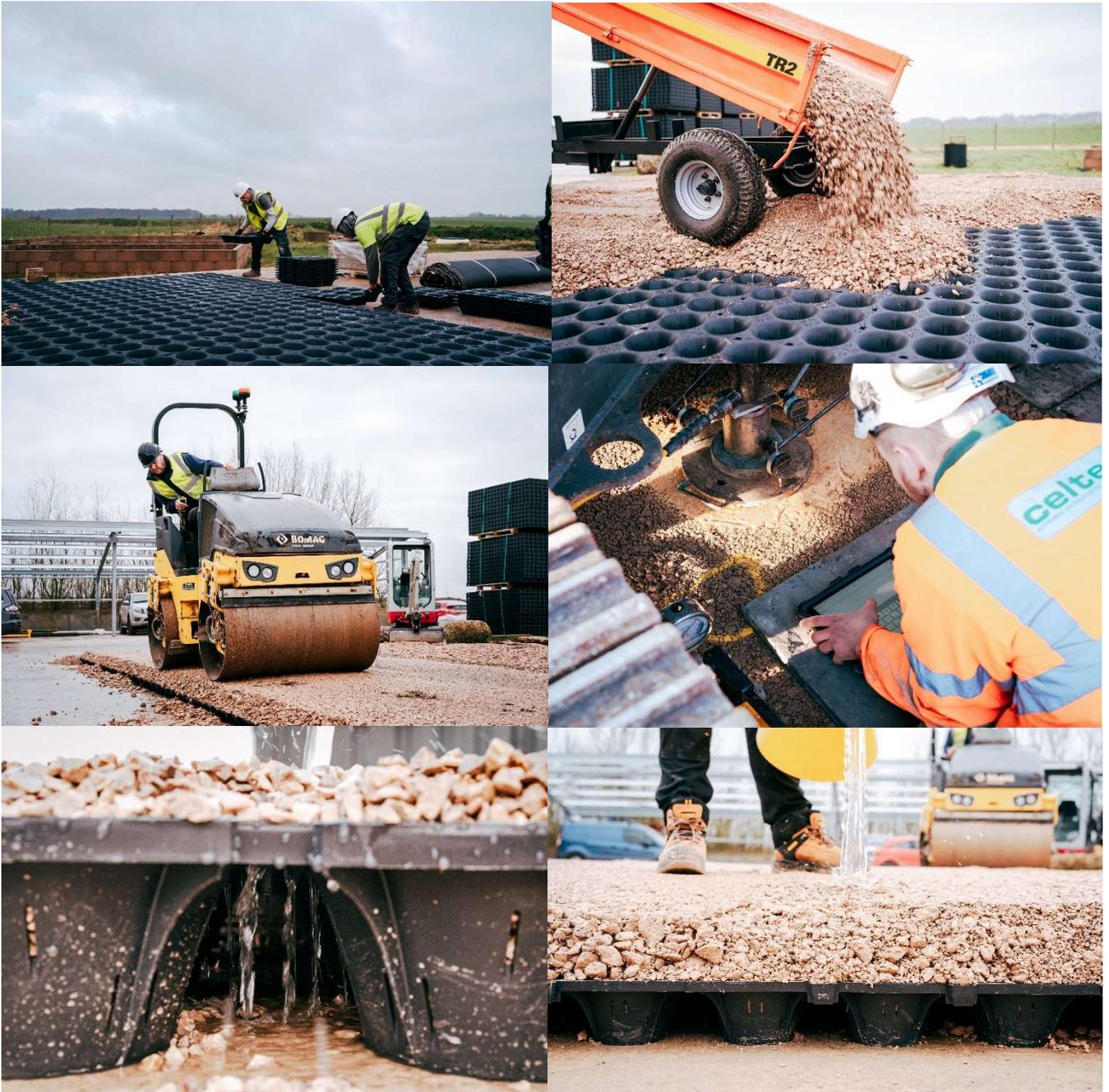
Grading of individual batches - differences in values passing selected sieves

Retained Sieve Size (mm)	Passing Sieve Size (mm)	Percentage by Mass Passing	
		Not Less Than	Not More Than
10	20	10	25
4	10	10	25
2	4	7	20
1	2	4	15



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## INDEPENDENT UKAS ACCREDITED TESTING



- ✔ >1200kN/m<sup>2</sup> ultimate compressive strength  
(when filled with MOT type 3 to 150mm cover)
- ✔ High water permeability & flow
- ✔ Noticeable aggregate interlock & containment
- ✔ Improved stability & compaction



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