

Polystorm modular cell system

attenuation and soakaway solutions

Average UK temperatures are expected to rise by up to 3-5°C by 2080, resulting in a dramatic change in the seasonal distribution of rainfall and subsequent weather patterns. The flooding witnessed during recent years is a clear indication that climate change is causing more frequent and extreme weather events and innovative solutions are required to cope with increased pressure on our existing drainage and water management networks.



Planning Policy Statement 25 - Development and flood risk

Planning Policy Statement 25 (PPS25) sets out Government policy on development and flood risk. It's aims are to ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding and to direct development away from areas of highest risk. Where new development is exceptionally necessary in such areas, policy aims to make it safe, without increasing flood risk elsewhere and, where possible, reducing flood risk overall.

Planning Policy Statement 25: Development and Flood Risk (PPS25), published in June 2008.

Polystorm modular solution

The Polystorm range of modular cells are designed to address the above legislation on minimising flood risk. The cells retain large volumes of water and fit together to create a modular underground water tank. The tank can then be modified to be either an attenuation or soakaway solution.

Products and Solutions

Polystorm Contents

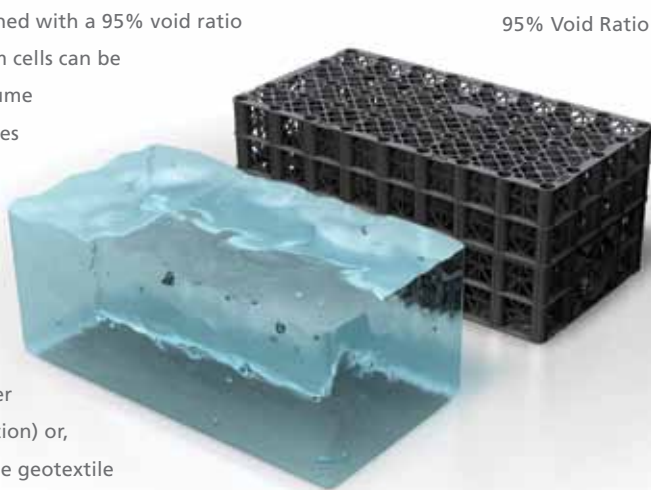
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Polystorm modular cell system

four types of Polystorm cells

The Polystorm principles

The Polystorm range of modular cell systems are designed with a 95% void ratio to retain large volumes of water run-off. The Polystorm cells can be designed and built to a specific size to a total void volume requirement dependant upon the water run-off volumes required on a particular project (i.e. car park, road or building). The Polystorm range of water storage cells are structurally strong, individual modular cells which can be built up to form a structure of any shape or size. The structure is wrapped in a non-permeable, geomembrane which can receive rainwater collected from the roof gutter system or surface drains and either releases the water within set discharge limits (attenuation) or, where soil conditions allow, be wrapped in a permeable geotextile and slowly release the water back into the surrounding soil (soakaway).



Key benefits

- **95% void ratio:** Providing greater water storage capacity and reduced excavation and disposal costs
- **Modular units:** Allow flexibility of shape - ideal for shallow excavation systems, narrow strips or use in restricted areas
- **Light weight yet robust:** Excellent Health and Safety and installation benefits
- **Easy to handle:** Unique rounded corners for ease of handling and reduces likelihood of punctures to membranes
- **Cost effective:** Especially when used as a hybrid, value engineered system
- **Recyclable:** 100% recyclable at the end of its useful life
- **Range:** Spans from 20 tonnes per square metre load bearing capacity up to a maximum of 80 tonnes per square metre load bearing capacity
- The range can be designed for non-trafficked, trafficked or heavily trafficked applications
- Suitable for both attenuation and soakaway systems
- 50 year design life
- BBA Approved
- Hybrid Solutions available

There are four different types of Polystorm cells which are Polystorm Lite, Polystorm, Polystorm Xtra and Polystorm-R. Each Polystorm cell type has a different surface load specification.

- **Polystorm Lite** is designed for use in landscaped pedestrian or other non-loaded applications
- **Polystorm** is designed for use in lightly trafficked and loaded applications
- **Polystorm Xtra** is designed for use in deeper build depths for heavily trafficked and heavy loaded applications
- **Polystorm-R** is produced from carefully researched and selected recycled materials to provide an environmentally-friendly solution to surface water drainage and storage applications. Polystorm-R has a 40 tonne per square metre compression strength and is ideal for lightly trafficked and pedestrian applications.

The Polystorm Technical Manual is available to download at www.toolbox.polypipe.com



Polystorm Lite 20T



Polystorm 40T



Polystorm Xtra 80T



Polystorm-R 40T



Polystorm Lite

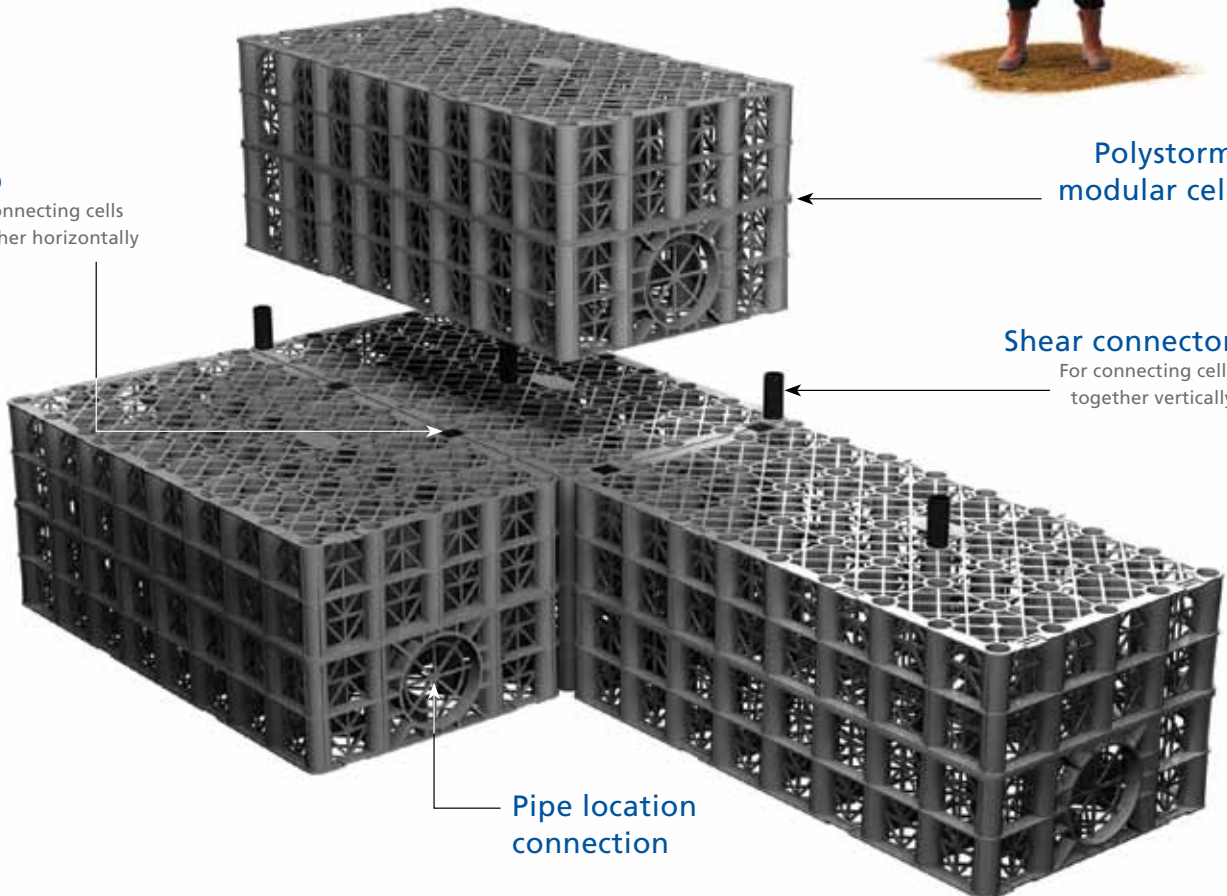


Polystorm



Clip

For connecting cells together horizontally



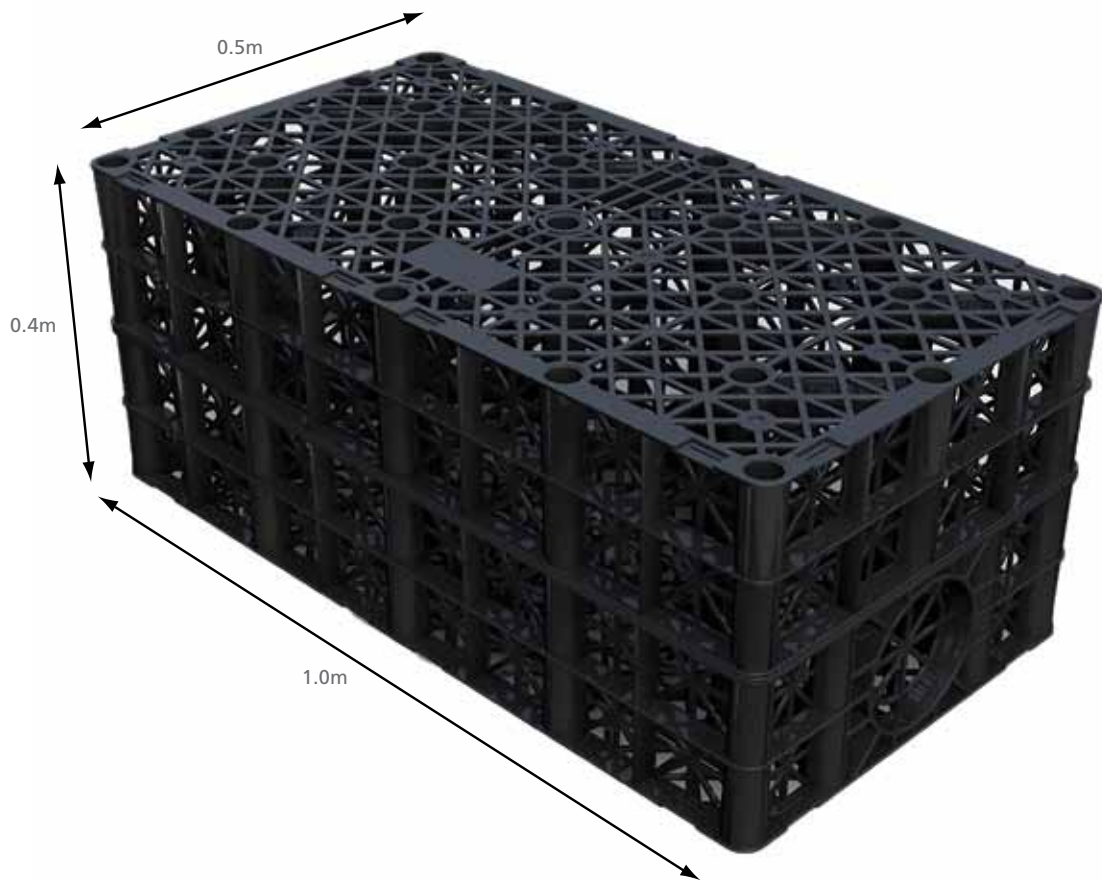
Polystorm modular cell

Shear connector

For connecting cells together vertically

Pipe location connection

Polystorm Lite



Designed for use in landscaped, pedestrian or other non-loaded applications with a load bearing capacity of:

20 tonnes

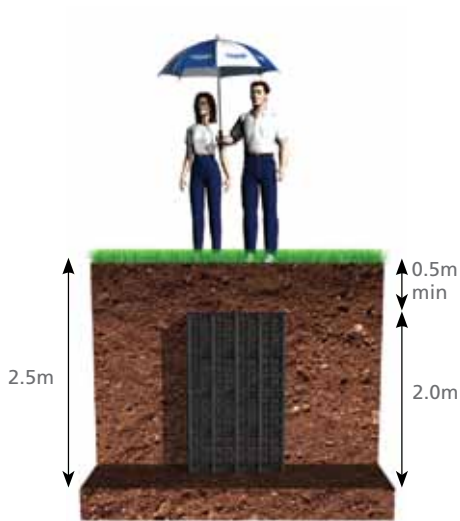
Technical Specification Overview

Unit type	Polystorm Lite
Product code	PSM2*
Dimensions	1m x 0.5m x 0.4m high
Total volume	0.2m per cube
Unit weight	7kgs**
Cube storage volume	0.19m ³ (190 litres)
Surface area	55% perforated
Compressive strength	Maximum 20 tonnes per sq metre
Maximum burial depth	2.5m***

* Each unit includes 4 clips and 2 shear connectors. Please note that brick bond connector may be required at additional cost.

** Pallet weight dependent upon order quantity and transport type.

*** In weak clay soil conditions the maximum burial depth is 1.5 metres. Polystorm Lite should not be installed below the water table.



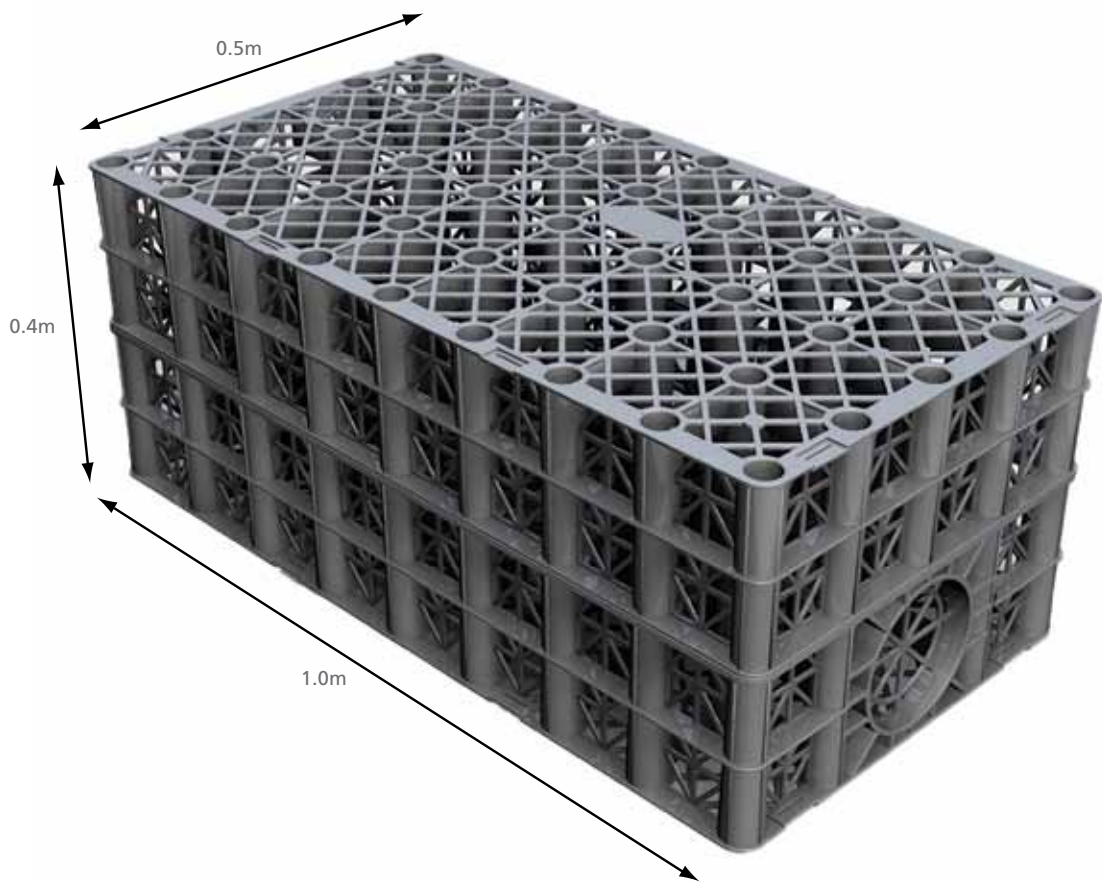
Polystorm Lite has been specifically designed for non-trafficked applications. With a 20 tonne per square metre compressive strength it will however take general maintenance vehicles such as grass cutters. Polystorm Lite can be used for both attenuation and soakaway applications. The modular structure receives rainwater collected from roofs or surface drains ready to release within a set drainage limit. Polystorm Lite can be used typically for landscaped areas, pedestrian or public open spaces such as underneath playgrounds.

Polystorm Lite		
Description	Code	Pack quantity
Polystorm Lite cell 1000 x 500 x 400mm	PSM2	15
Polystorm Lite flow control unit	PSMFC160/30	1
Brick bond shear connector	PSMBBSC	30
Clips	PSMCLIP	60
Shear connector	PSMSC	30
EN1401 flange adaptor - 110mm	PSMFA110	1
Ridgidrain flange adaptor - 150mm	PSMFA150	1
EN1401 flange adaptor - 160mm	PSMFA160	1
Basic silt trap	PSMST160	1
Advanced silt trap - 15 litres/sec	PSMSTA160/15	1
Mini silt trap for Polystorm Lite	PSMST110	1
Cover & frame (round)	UG501	1
Cover & frame (square)	UG502	1
450mm silt trap lid & frame	UG512	1
460mm lockable plastic cover & frame	UG511	1
Polypropylene cover & frame	ICDC1	1
Chamber riser section	ICDR1	1
Silt trap sealing ring	UG488	1



Note: Minimum cover and burial depths may vary depending on load and ground conditions. Please contact Polypipe water management solutions technical team for further information. All grades of Polystorm units may be used in situations outside of those recommended above, through the use of the appropriate protective measures designed to reduce the imposed loading on the proposed Polystorm structures.

Polystorm



Designed for use in trafficked and loaded applications with a load bearing capacity of:

40 tonnes

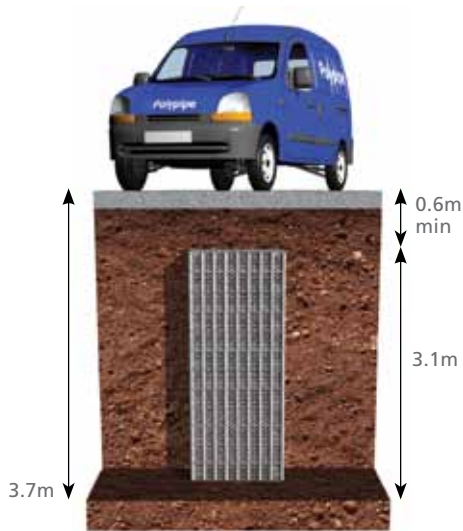
Technical Specification Overview

Unit type	Polystorm
Product code	PSM1*
Dimensions	1m x 0.5m x 0.4m high
Total volume	0.2m per cube
Unit weight	9kgs**
Cube storage volume	0.19m ³ (190 litres)
Surface area	48% perforated
Compressive strength	Maximum 40 tonnes per sq metre
Maximum burial depth	3.7 metres***

* Each unit includes 4 clips and 2 shear connectors. Please note that brick bond connector may be required at additional cost.

** Pallet weight dependent upon order quantity and transport type.

*** In weak clay soil conditions the maximum burial depth is reduced, please consult Polypipe's water management solutions technical team on 01509 615100.



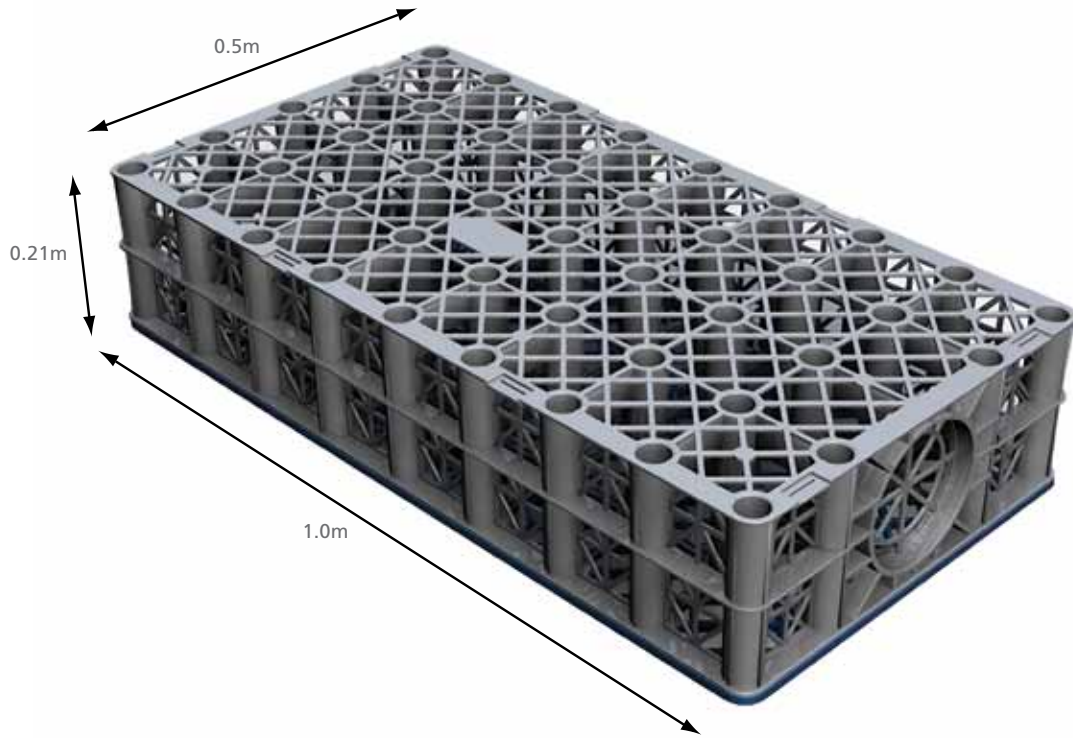
Polystorm features individual modular cells that can be built up to form a load-bearing tank structure of any shape or size to receive rainwater collected from the gutter system or surface drains ready to release within a set discharge limit. Polystorm has a 40 tonne per square metre compressive strength and is ideally suited for lightly trafficked and loaded applications. Polystorm can be used for both attenuation and soakaway applications and typically for housing developments, small car parks and light commercial developments.

Polystorm		
Description	Code	Pack quantity
Polystorm cell 1000 x 500 x 400mm	PSM1	15
Polystorm cell with 225mm connector	PSMCRD225	1
Polystorm cell with 300mm connector	PSMCRD300	1
Brick bond shear connector	PSMBBSC	30
Clips	PSMCLIP	60
Shear connector	PSMSC	30
EN1401 flange adaptor - 110mm	PSMFA110	1
Ridgidrain flange adaptor - 150mm	PSMFA150	1
EN1401 flange adaptor - 160mm	PSMFA160	1
Basic silt trap	PSMST160	1
Advanced silt trap - 15 litres/sec	PSMSTA160/15	1
Cover & frame (round)	UG501	1
Cover & frame (square)	UG502	1
450mm silt trap lid & frame	UG512	1
460mm lockable plastic cover & frame	UG511	1
Polypropylene cover & frame	ICDC1	1
Chamber riser section	ICDR1	1
Silt trap sealing ring	UG488	1



Note: Minimum cover and burial depths may vary depending on load and ground conditions. Please contact Polypipe's water management solutions technical team for further information. All grades of Polystorm units may be used in situations outside of those recommended above, through the use of the appropriate protective measures designed to reduce the imposed loading on the proposed Polystorm structures.

Polystorm Xtra



Designed for use in deeper burial depths and heavily trafficked applications with a load bearing capacity of:

80 tonnes

Technical Specification Overview

Unit type	Polystorm Xtra
Product code	PSM3*
Dimensions	1m x 0.5m x 0.21m high
Total volume	0.105m per cube
Unit weight	6kgs**
Cube storage volume	0.0986m ³ (98 litres)
Surface area	94% perforated
Compressive strength	Maximum 80 tonnes per sq metre
Maximum burial depth	4.8m heavy trafficked*** 5.3m light trafficked*** 5.45m non-trafficked***

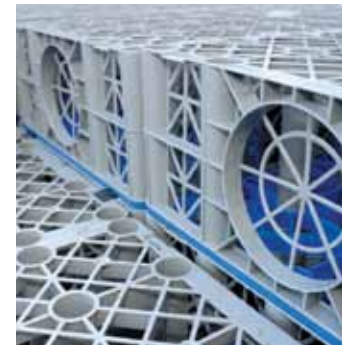
* Each unit includes 4 clips and 2 shear connectors. Please note that brick bond connector may be required at additional cost.

** Pallet weight dependent upon order quantity and transport type.

*** Based on ground conditions being dense sand and gravel with no groundwater present. In weak clay soil conditions the maximum burial depth is reduced, please consult Polypipe's water management solutions technical team on 01509 615100.



Polystorm Xtra		
Description	Code	Pack quantity
Polystorm Xtra cell 1000 x 500 x 210mm	PSM3	15
Polystorm Xtra cell with 225mm connector	PSM3CRD225	1
Polystorm Xtra cell with 300mm connector	PSM3CRD300	1
Clips	PSMCLIP	60
Shear connector	PSM3SC	30
EN1401 flange adaptor - 110mm	PSMFA110	1
Ridgidrain flange adaptor - 150mm	PSMFA150	1
EN1401 flange adaptor - 160mm	PSMFA160	1
Basic silt trap	PSMST160	1
Advanced silt trap - 15 litres/sec	PSMSTA160/15	1
Cover & frame (round)	UG501	1
Cover & frame (square)	UG502	1
450mm silt trap lid & frame	UG512	1
460mm lockable plastic cover & frame	UG511	1
Polypropylene cover & frame	ICDC1	1
Chamber riser section	ICDR1	1
Silt trap sealing ring	UG488	1



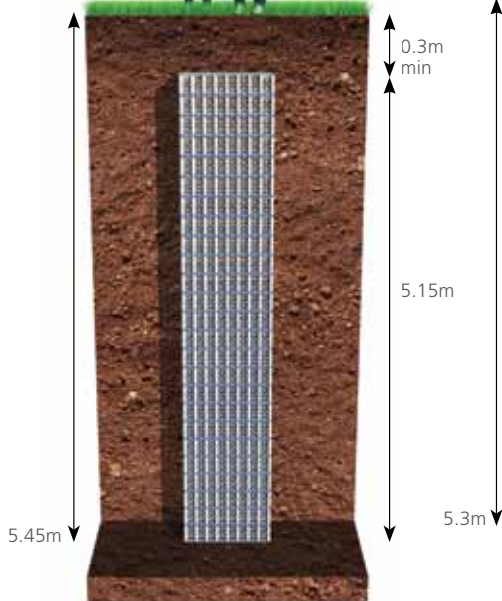
Polystorm Xtra

This illustration shows the maximum burial depths which can be achieved for Polystorm Xtra in landscaped, trafficked and heavily trafficked applications.

Polystorm Xtra

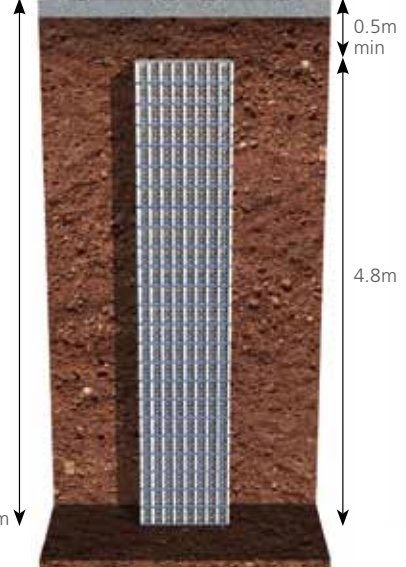
Polystorm Xtra
80 tonne

Pedestrian



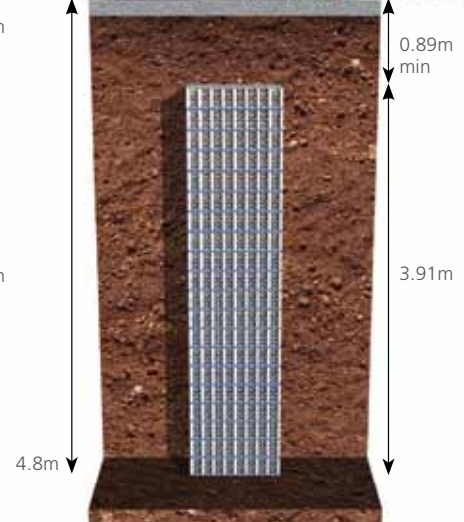
Polystorm Xtra
80 tonne

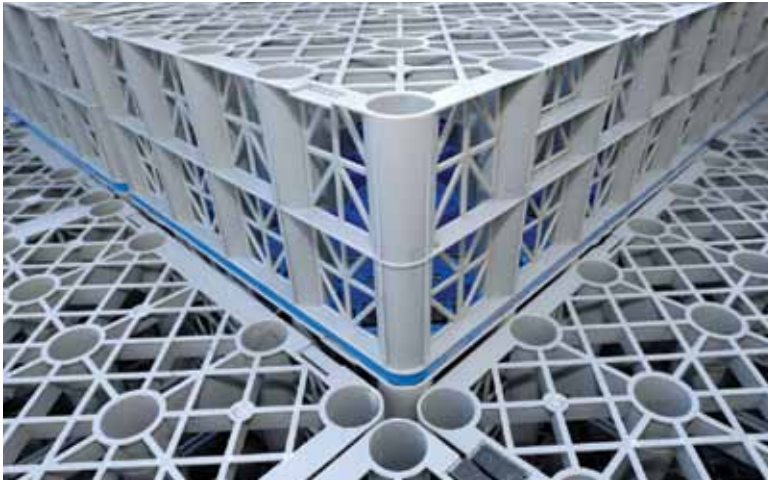
Light Traffic



Polystorm Xtra
80 tonne

Heavy Traffic





Note:

Minimum cover and burial depths may vary depending on load and ground conditions. Please contact Polypipe's water management solutions technical team on 01509 615100 for further information. All grades of Polystorm units may be used in situations outside of those recommended above, through the use of appropriate protective measures designed to reduce the imposed loading on the proposed Polystorm structures.

Hybrid - Polystorm range of modular cells creating a cost-effective hybrid construction



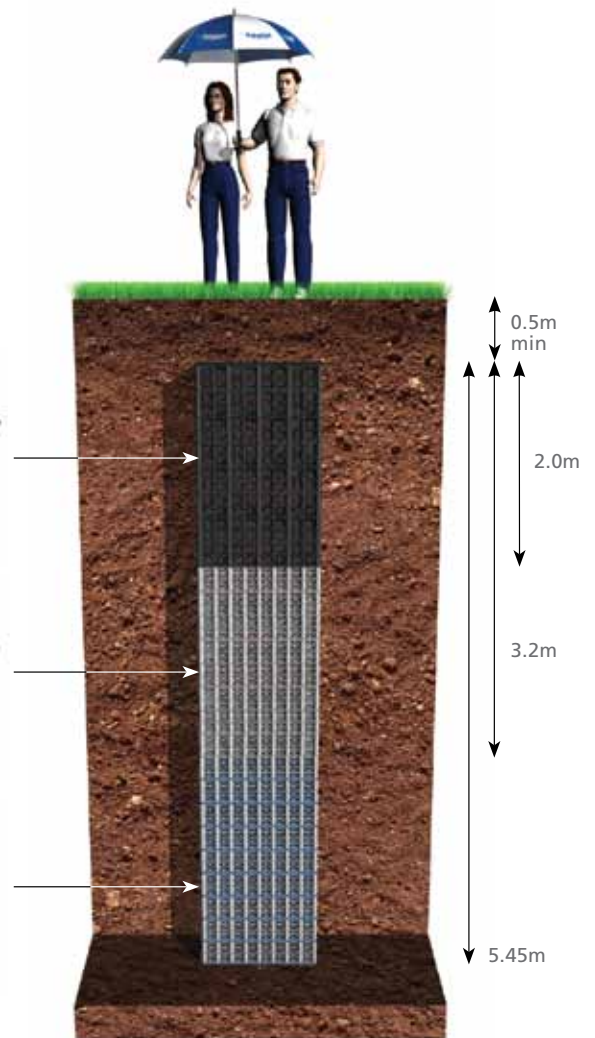
Polystorm Lite 20T



Polystorm 40T

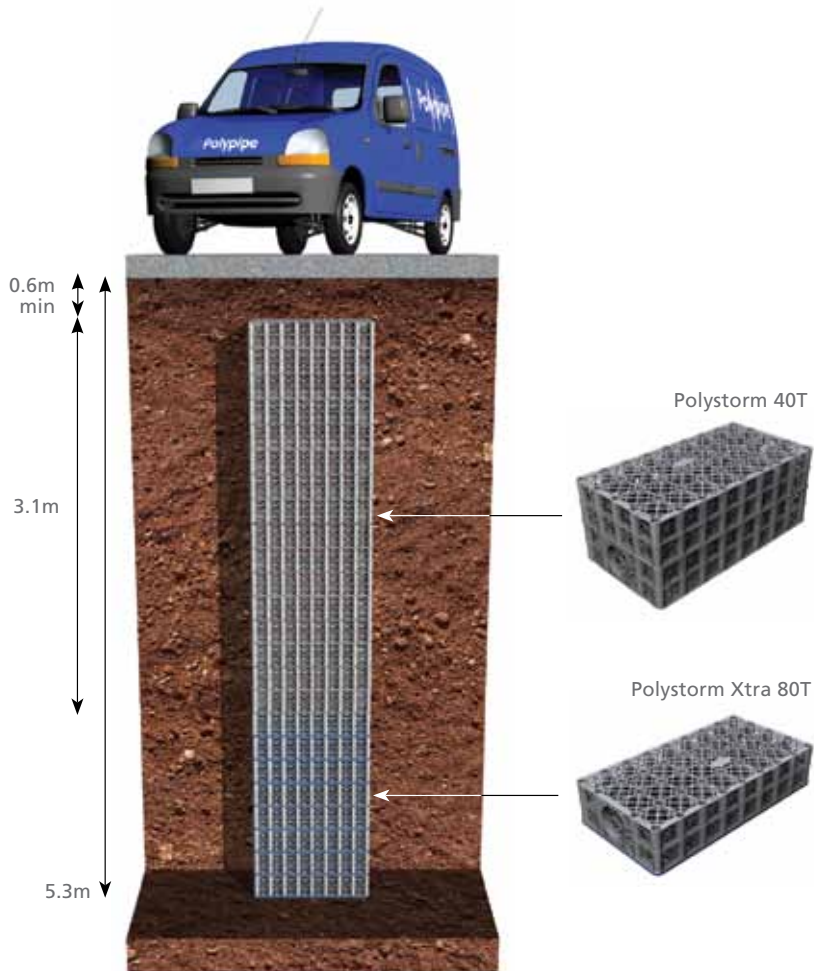


Polystorm Xtra 80T



Value engineered structures

Polypipe are the only manufacturer who can offer a complete value engineered hybrid system utilising all three Polystorm cells to create a bespoke solution based on the load requirements and burial depths for any given project. When integrated as a hybrid structure, a complete value engineered solution can be adopted for any given project. To reduce costs, it's possible to construct a hybrid tank which contains all types of cells, the stronger Polystorm cells at the bottom and Polystorm Lite cells at the top.



Note:

Minimum cover and burial depths may vary depending on load and ground conditions. Please contact Polypipe's water management solutions technical team on 01509 615100 for further information. All grades of Polystorm units may be used in situations outside of those recommended above, through the use of appropriate protective measures designed to reduce the imposed loading on the proposed Polystorm structures.

Polystorm case histories

Bespoke holistic water management solution used during construction of Advanced Learning Centre

A range of Polypipe products were provided for a holistic water management solution required during the construction of a new school building to replace the existing Dearne Secondary School building in Barnsley, Yorkshire.



Main contractors Laing O' Rourke required 23 bespoke manhole chambers and catchpits, 150m³ of Polystorm modular cells and over 1,700 metres of Ridgidrain drainage pipe in various diameters up to 300mm. In a bid to manage the flow of surface water run-off from the attenuation solution back into the existing drainage network, a Stormcheck flow-control chamber was also installed, which helped to prevent localised flooding.

Polypipe's water management solutions technical team worked closely with the groundworker, on behalf of the main contractor, during the initial design of the attenuation solution. Original specification for the project included concrete chambers constructed on-site, however through advocating the use of plastic, pre-fabricated manholes and catchpits that could reduce installation time significantly, 23 chambers were specified for the project.

The customer on this particular project was impressed with Polypipe's ability to design a bespoke water management solution which incorporated many products saving installation time and costs.



Polystorm Lite -

Innovative Hybrid SUDS System Provides the Solution for the A3 Road Improvement Project



Four separate soakaway structures, including a circular modular cell installation to manage surface water run-off on the A3 road improvement scheme at Hindhead, Surrey.

The £371 million A3 Hindhead road project, undertaken on behalf of the Highways Agency required an innovative yet heavy duty soakaway solution. Polypipe water management solutions team worked closely with Balfour Beatty to provide a solution using its Polystorm and Polystorm Xtra modular cells, creating four separate soakaway structures.

Daniel Machnik, Senior Buyer for Balfour Beatty Civil Engineering was impressed with the innovative water management solution provided by Polypipe. "This project has demonstrated the Polypipe team's design service and technical support capabilities. The adaptability of the Polystorm and Polystorm Xtra cells offered an advantage on this challenging scheme and the installation guidance the team has demonstrated on-site has been of great value."

Polypipe water management solutions team also undertook further design work for £200,000 worth of cable protection products supplied for the project. To improve the installation times of the cable protection within a tunnel section of the project, Polypipe suggested a large bank of sealed ducts in 94 and 150mm diameter were installed using its 150mm Ridgidrain Plus pipe with integral sockets.

As part of an overall commitment to reducing its impact on the environment, Polypipe also implemented a recycling scheme on-site, collecting off-cuts of pipe for re-use in its manufacturing process.

Polystorm case histories

Hybrid SUDS solution for casting facility extension



When constructing an extension to the WM Lee Casting Facility in Chesterfield, Beighton Construction required an adaptable SUDS solution which could be installed at a shallow depth to attenuate surface water run-off from a car park and other hard standing areas.

Polypipe supplied over 1,900 of its Polystorm and Polystorm Xtra modular cells as a hybrid structure. Installed at a depth of two metres, the cells were covered with 500mm compacted sand and hardcore to support the construction of a new car park. Installing the products at this depth and within the designed footprint of 43 x 7.5 metres was made possible by the inclusion of Polystorm Xtra on top of the Polystorm cells. The hybrid installation ensures that the required attenuation capacity could be achieved with a cell-depth of one metre, without the need to alter the development footprint or change the cover depth.

Polystorm - for commercial development

Lytham St. Annes

Two stormwater management systems were supplied by Polypipe within 12 months of one another on adjoining sites in Lytham St. Annes - a BMW garage and a Vauxhall Chevrolet and SAAB dealership.



Working closely alongside contractor James West Ltd and consultant Atkinson Peck, who specified the drainage on-site, Polypipe supplied several cubic metres of Polystorm cells to provide an attenuation unit for absorbing vast quantities of rainwater. The Polystorm cells were also installed on the area surrounding the new car storage point, as this provided easy access to the large outfall drain and would further reduce the possibility of water logging on-site. 200 metres of Polysewer and 4000 metres of general purpose duct were also supplied alongside 400 metres of 150mm and 375 metres of Ridgidrain pipe.