RWHSB2-PT | SEPT 2009

Rainstream

Storage, filtration and re-use of rainwater

TERRAIN

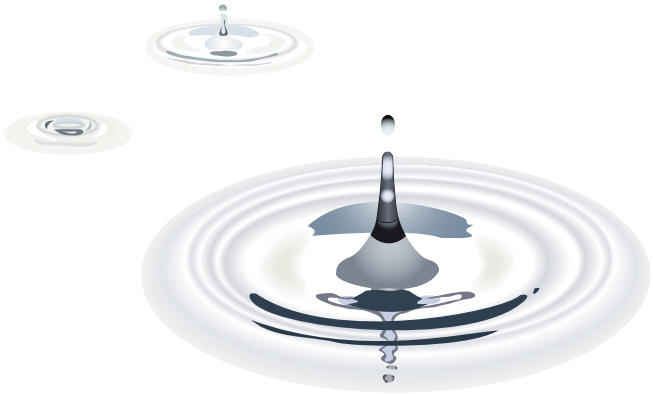
Polypipe

Polypipe from roof to re-use

Polypipe Rainstream offers a range of highly effective solutions for the storage, filtration and re-use of rainwater in commercial applications. These systems have been designed to help conserve one of our most precious resources and also help clients, architects, public health engineers, main contractors, mechanical contractors and end-users conform to numerous environmental and legislative standards.

Why Harvest Rainwater?

- Population growth and rising consumption is increasing the demand for water
- Climate change is creating pressure to conserve water
- Legislation is enforcing the need to conserve water
- Higher water charges and water metering are predicted



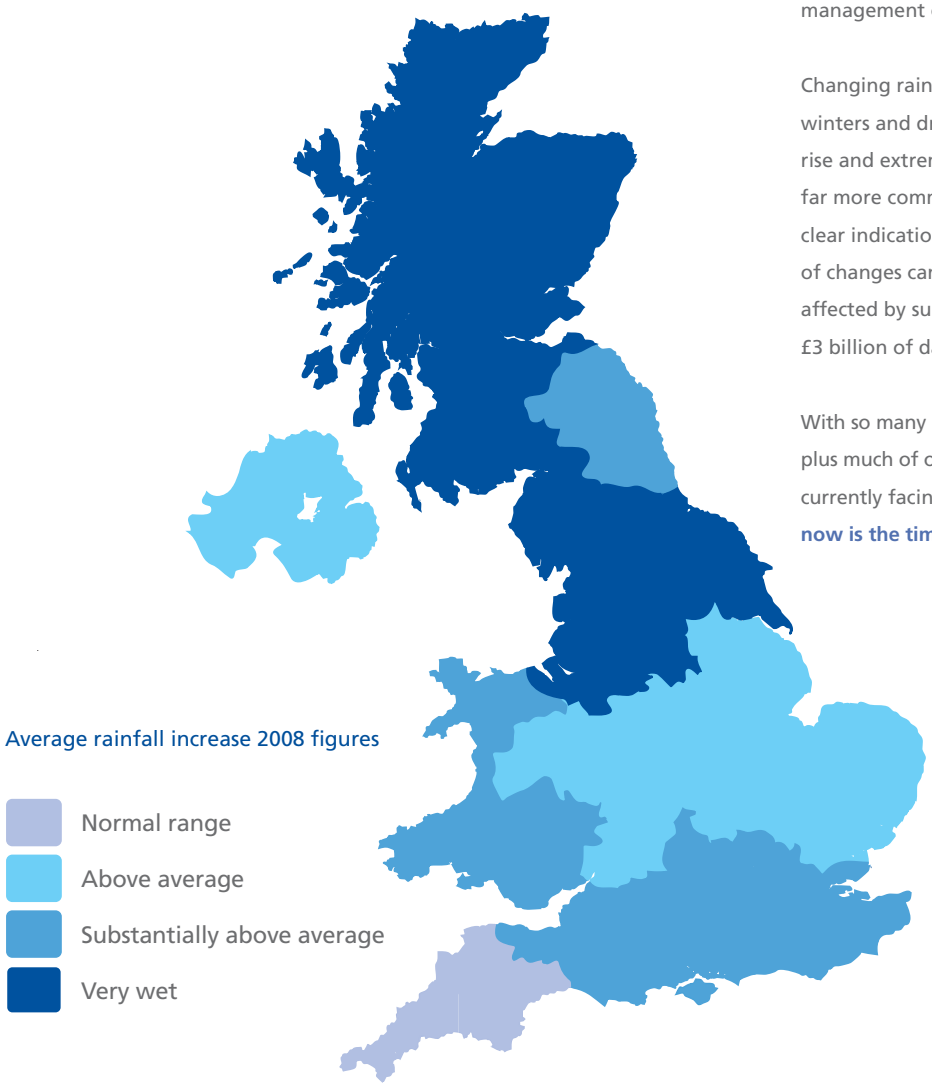
Contents

Climate change

With average UK annual temperatures predicted to rise by up to 3.5°C over the next 70 years, climate change is already driving the need for innovative solutions to the management of rainfall and surface water.

Changing rainfall patterns are likely to lead to wetter winters and drier summers, sea levels are expected to rise and extreme weather events look set to become far more commonplace. The summer of 2007 gave a clear indication of the consequences that these sorts of changes can bring when 57,000 UK homes were affected by surface water flooding which caused £3 billion of damage.

With so many homes and commercial developments, plus much of our major road network in the UK currently facing a real risk of surface water flooding, **now is the time to take action.**

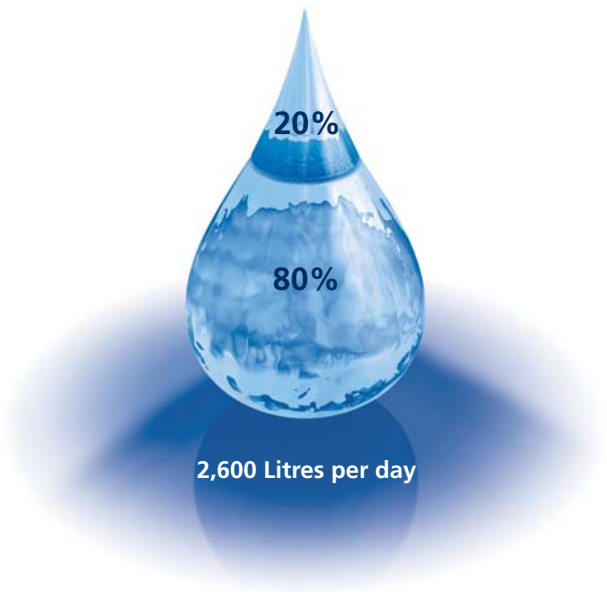


Water demand

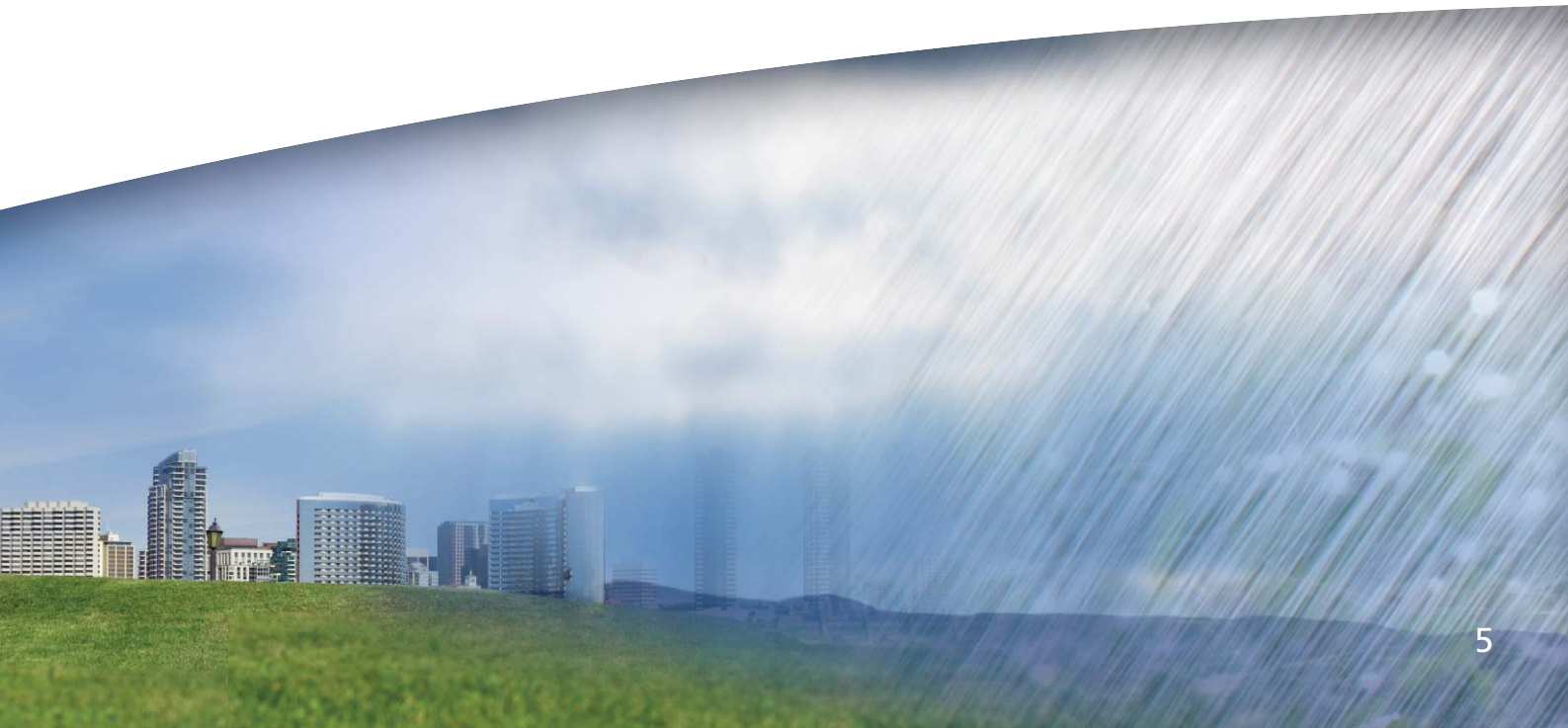
The average person in England and Wales now uses 150 litres of water every day - almost 50% more than 25 years ago. Washing and toilet flushing account for much of this figure, with drinking, cooking, car washing and garden watering also playing large parts. Yet while continental countries such as Italy and Spain enjoy water supply capacities of on average 2,785 m³ per person, per year, England and Wales has a surprisingly low capacity of just 1,334 m³ per person. The high population densities in areas such as South East England mean that there is even less water available to each person in these regions.

Rainwater re-use solutions offer a way to address this increasingly important issue by collecting and recycling rainwater, rather than simply allowing it to drain away.

This not only reduces the demand for mains water for toilet flushing, laundry, vehicle washing and irrigation purposes, but also eases the potential for flooding which can be created when rainwater deposited by extreme storms is simply left to run to ground.



On average a non-domestic building uses approximately 2,600 litres a day, with up to 80% of the water delivered for non-potable applications such as toilet flushing. Much of this could be provided by harvested rainwater.



Legislation and standards

Growing public awareness of water issues has helped create a large body of legislation and standards. Polypipe is committed to helping customers understand these issues and comply with all the necessary requirements. As an essential component of effective SUDS solutions, rainwater re-use plays a central part in this process and can help meet the requirements of PPS 25, Building Regulations Part H, the Code for Sustainable Homes and many other recognised standards. Rainwater re-use can also help achieve the aims of the Wildlife and Countryside Link's Blueprint for Water document, which offers a timetable for achieving a sustainable standard of water by 2015. It complements the EU's Water Framework Directive by aiming to reduce consumption by 20% - something which rainwater re-use can often achieve.

Future water strategy

This document explains how the Government wants the water industry to operate by the year 2030. It focuses on such issues as reducing water consumption from 150 litres per day to 130 litres per day and improving water supply by building more reservoirs and issuing fewer abstraction licenses. The quality of water in the natural environment is also covered, as is the use of SUDS measures to improve surface water drainage, the wider use of water metering in water stressed areas and the need for better planning to reduce the risk of flooding from rivers and rising sea levels.
For more information visit www.official-documents.gov.uk

Planning Policy Statement 25

This sets out Government policy on flood risks associated with development. It aims to make flooding a central consideration of the planning process, so that only appropriate development is undertaken in areas at risk, with that risk limited as far as possible.
For more information visit www.communities.gov.uk

The Code for Sustainable Homes

The Code is used to rate the environmental performance of new homes in England, Wales and Northern Ireland and compliance is mandatory.
To achieve target ratings set for 2016, developers must adopt measures such as rainwater re-use that will significantly cut water consumption.
For more information visit www.communities.gov.uk/thecode

Making better use of a valuable resource

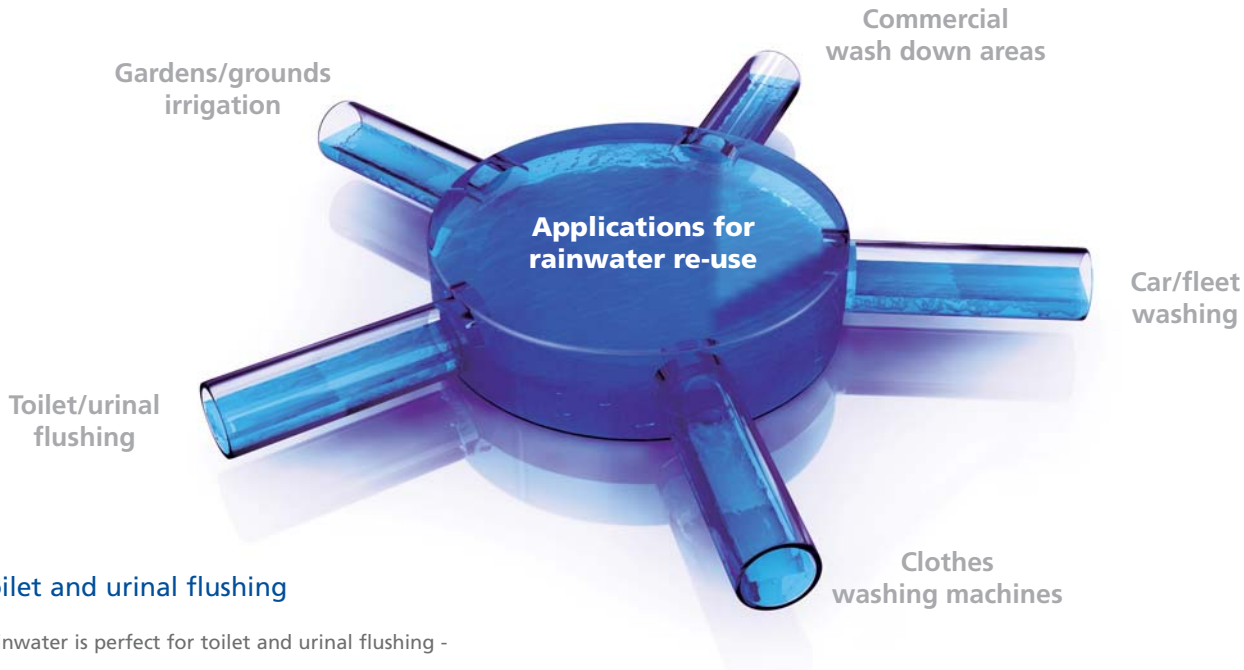
BS: 8515

This BSI rainwater harvesting code of practice gives guidance on design, installation, testing and maintenance of systems for non-potable applications.
For more information visit www.bsi-global.com

BREEAM

The Building Research Establishment Environmental Assessment Method (BREEAM) is now recognised as the standard measure of sustainable building design. It addresses environmental and sustainability issues and enables developers to prove the environmental credentials of their buildings to planners and clients.
For more information visit www.breeam.org

Re-using Rainwater



Toilet and urinal flushing

Rainwater is perfect for toilet and urinal flushing - often the highest consumer of water in commercial buildings, schools and colleges. Using rainwater for this purpose can cut mains water consumption by up to 80%. Polypipe Rainstream systems incorporate a mains water backup to maintain operation if sufficient rainwater is not available.

Laundry washing

Although great efforts are made by equipment and detergent manufacturers to reduce the environmental impact of laundry washing, the actual water consumption is often overlooked. 'Soft' rainwater needs less detergent and is also beneficial to the machine as it prevents lime scale build-up - an important advantage for commercial laundries, health clubs, hotels and prisons.

Vehicle washing

Buildings with large roof areas such as distribution centres and train stations often collect more rainwater than they need for toilet flushing, with the excess being available for vehicle washing. Again, 'soft' rainwater requires less detergent and leaves a streak-free finish.

Commercial wash down

The UK's roads and pavements are washed by nature every time rain falls. The same rainwater can provide a cost-effective solution for washing down commercial buildings, retail outlets, visitor centres and markets.

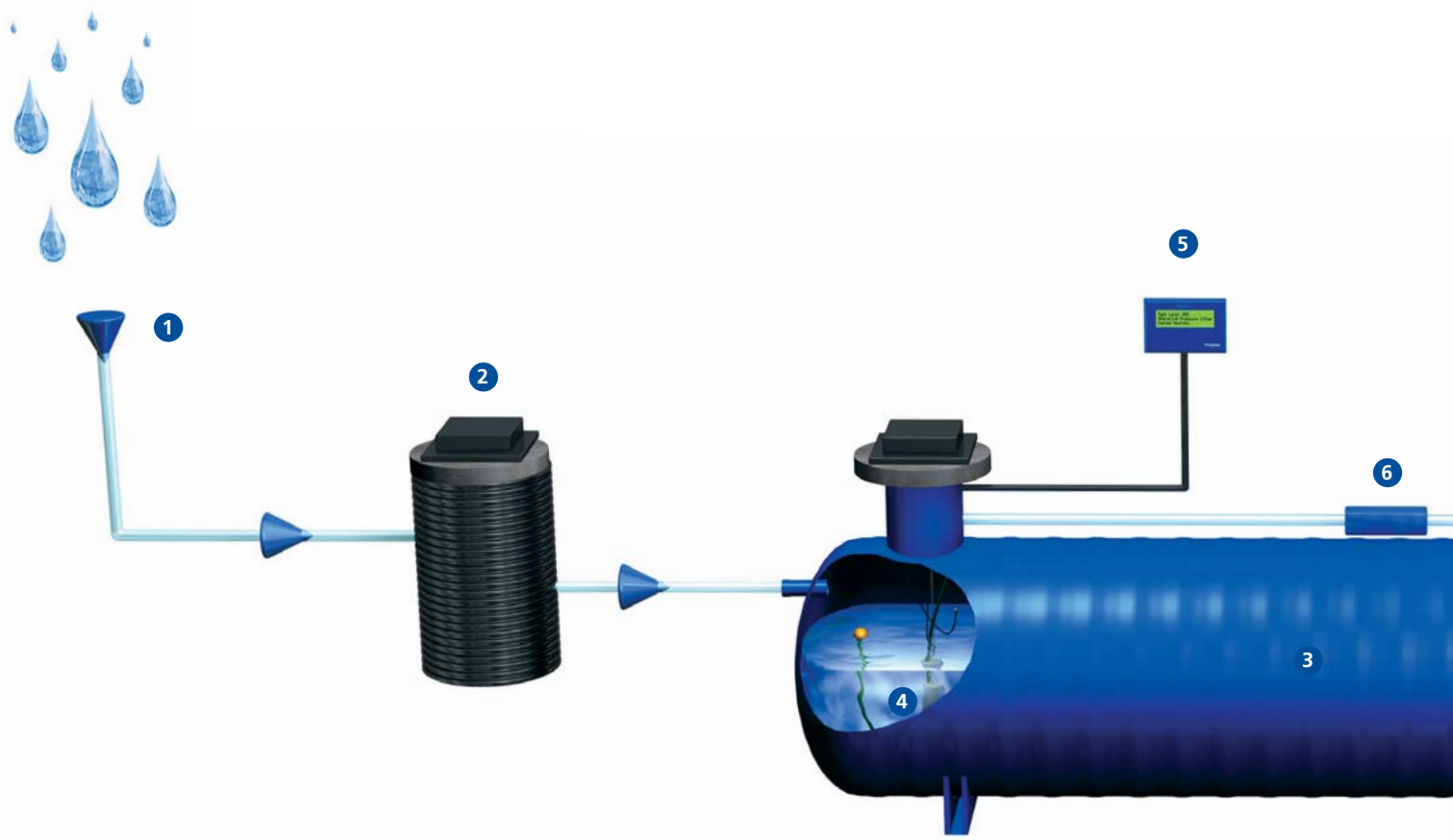
Irrigation

Garden centres, sports grounds, stadia, public gardens and landscaped areas can also benefit from rainwater re-use. With no dehydrating chlorine or salt content, rainwater will keep grass and plants watered and healthy.

Water quality

Polypipe Terrain advises that the available water quality and intended use are carefully considered and a risk assessment completed where necessary. The company's technical team is always available to advise on such issues.

Rainstream the complete system



The flexible nature of the Polypipe Rainstream approach to rainwater re-use means that no two systems are ever the same, as each one is designed to meet the specific requirements of an individual application. A number of elements are common to many types of system however and the operating principles are largely standard throughout.

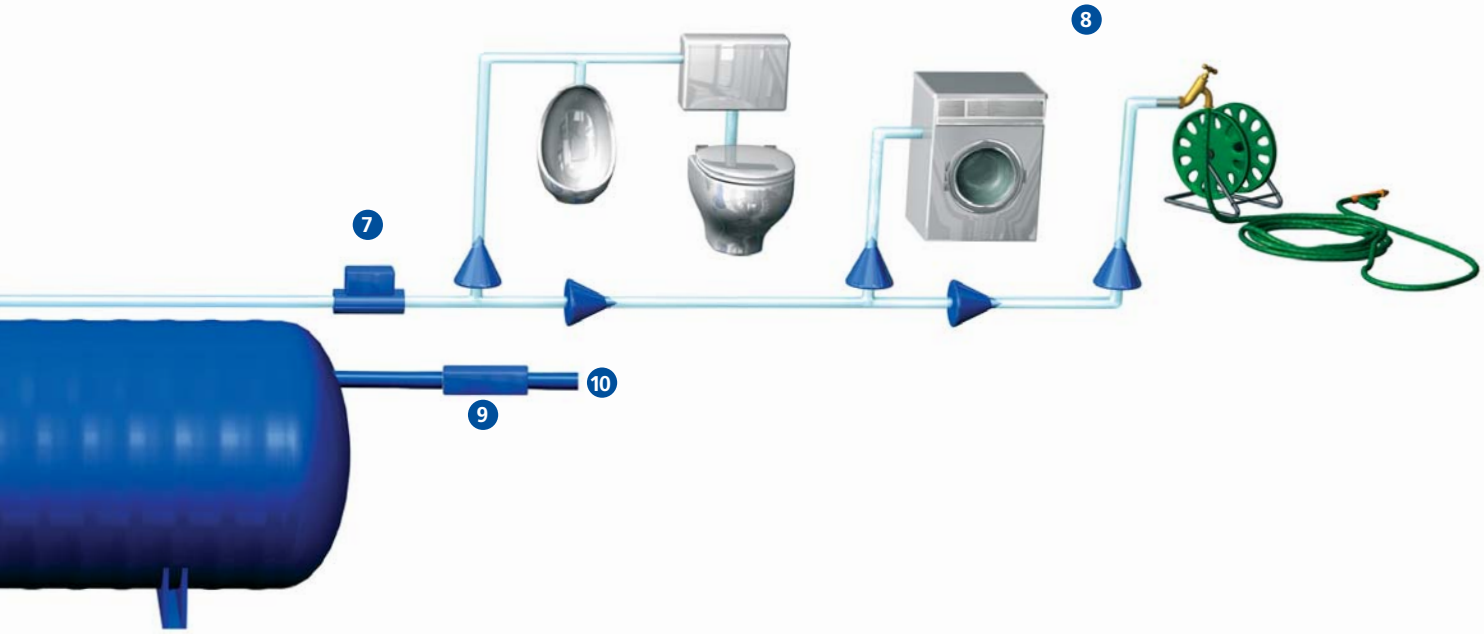
1. Rainwater falling onto roofs, roads and paved areas can be collected by a variety of measures which include guttering, channel drainage and specialised roof drain systems.

2. Pre-tank filtration then removes any larger pieces of debris such as leaves, before the collected water passes to the storage tank.

3. The storage vessel is typically a large tank which can sometimes be included within a building, surface mounted externally or buried below the surface of the site.

4. Captured water is re-distributed through a second stage filtration and pump assembly.

5. A sophisticated control unit monitors water levels in various parts of the system and matches these to the water demand at the outlets.



6 Third stage in-line filtration to remove finer particles of debris before use.

7 An optional ultraviolet disinfection process can be used to kill off bacteria and improve the quality of the collected water.

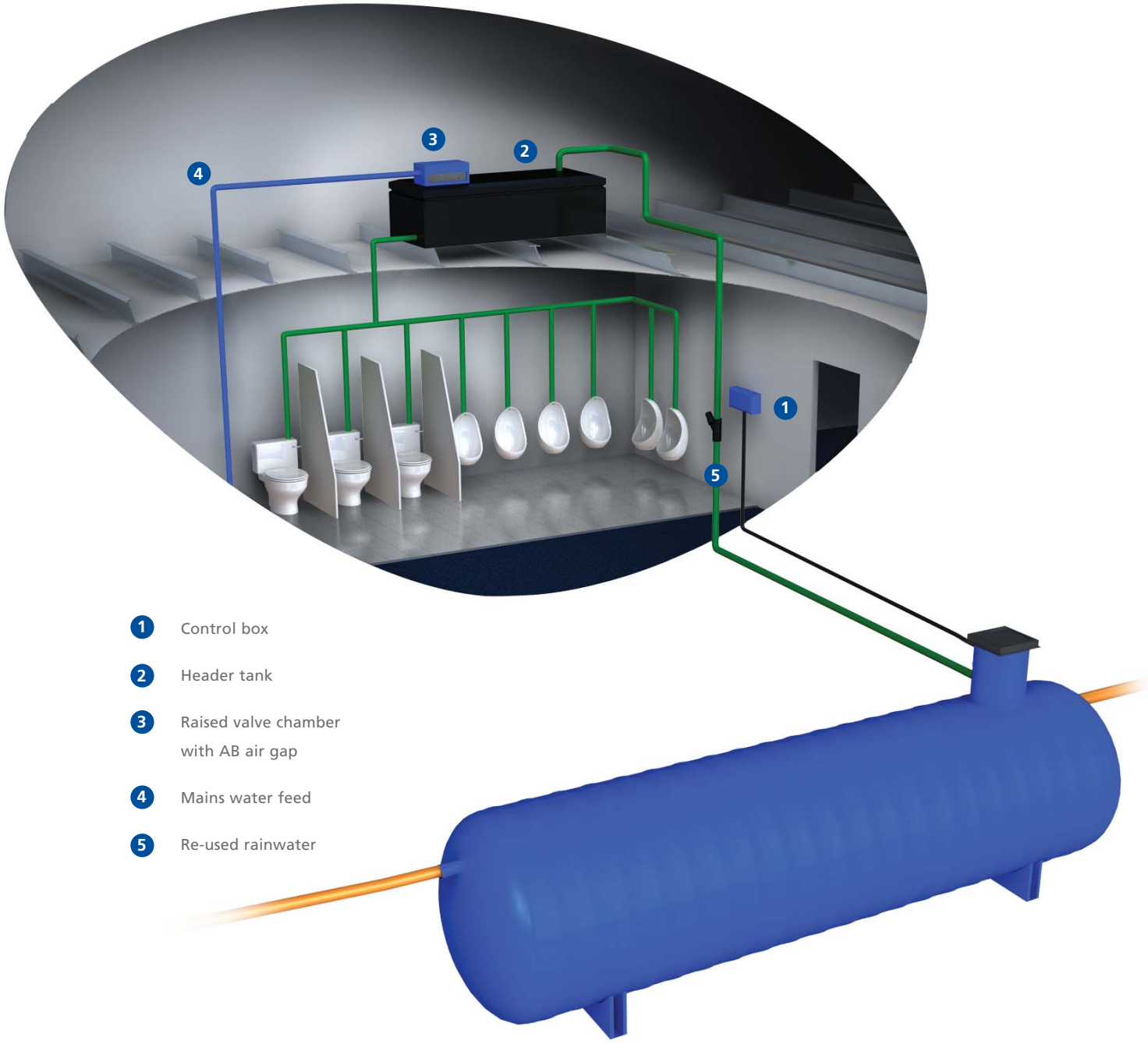
8 Water is supplied on demand to a number of outlets around the property and can be used for many different purposes including flushing toilets, watering gardens or cleaning vehicles.

9 A back flow prevention device stops a backward flow of contaminated water from the sewer and acts as a rodent barrier.

10 Outlet to the sewer, soakaway or attenuation.

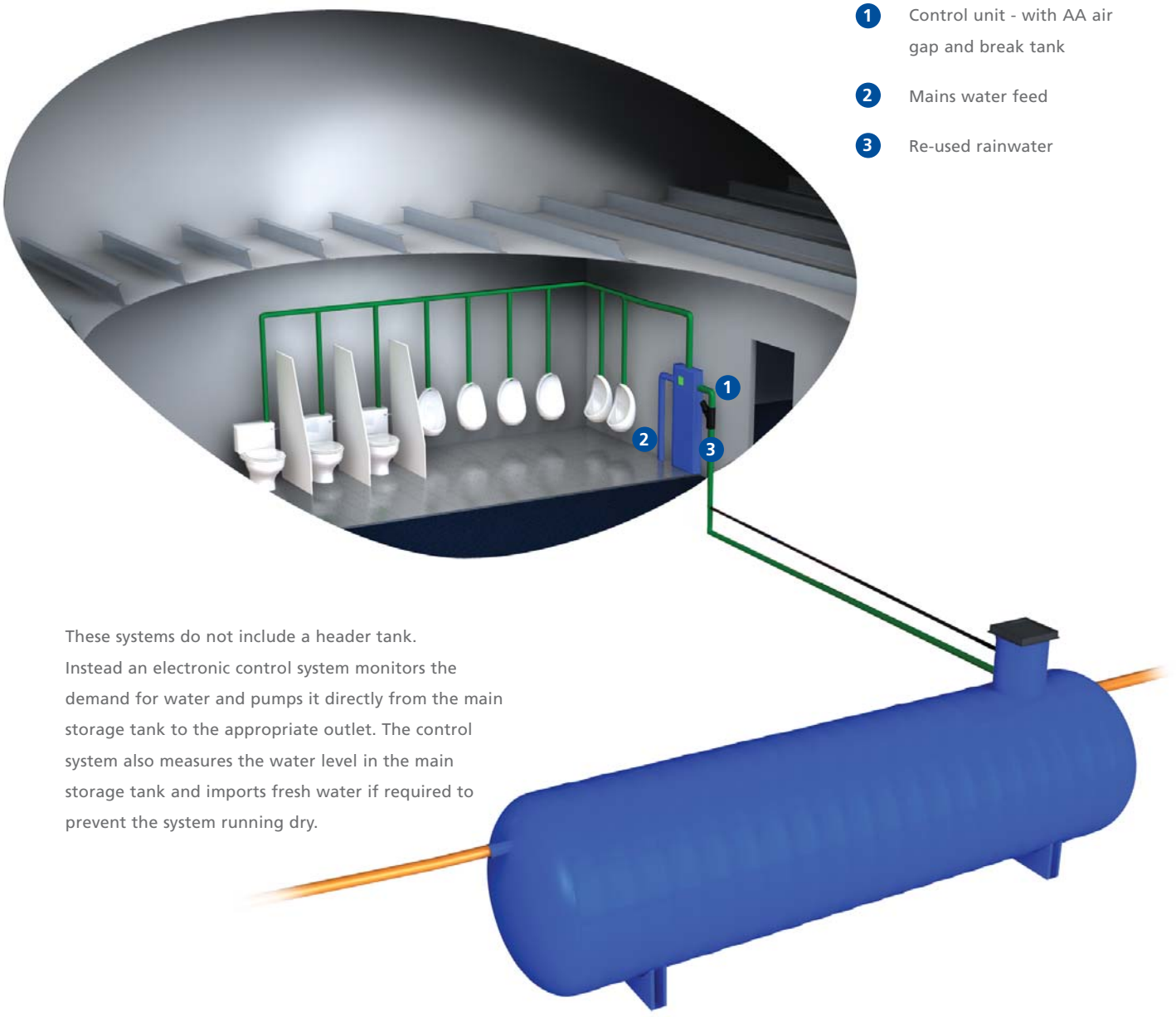
Gravity (indirect) systems

With a Rainstream gravity (indirect) system the captured water is filtered down to 130 microns after being pumped from the system's primary storage tank to a header tank located at a high point within the building being served. Water from the header tank is distributed to the point of use via gravity, with a back-up function that ensures that the water supply is maintained even during a power failure. The availability of standard (one pump) and duty stand-by (two pump) configurations makes Rainstream gravity systems suitable for a wide variety of applications. The water levels in the tanks are monitored electronically so that fresh mains water can be added to prevent the system running dry, should the rainwater volume fall below a predetermined level.



1. Control box
2. Header tank
3. Raised valve chamber with AB air gap
4. Mains water feed
5. Re-used rainwater

Pressure (direct) system



1. Control unit - with AA air gap and break tank
2. Mains water feed
3. Re-used rainwater

These systems do not include a header tank. Instead an electronic control system monitors the demand for water and pumps it directly from the main storage tank to the appropriate outlet. The control system also measures the water level in the main storage tank and imports fresh water if required to prevent the system running dry.

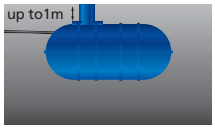
Pressure systems save space within the building by eliminating the need for a header tank and can provide water at a greater pressure than a gravity system. The water is filtered down to 130 microns, and again, both standard and advanced systems are available with one and two pumps respectively.

Tanks

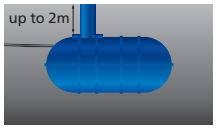
Below ground solutions

Rainstream tanks for below ground installation represent a practical and effective way to accommodate a large part of the rainwater re-use system and preserve the appearance of the site. Below ground installation protects the captured water from fluctuating temperatures and exposure to sunlight.

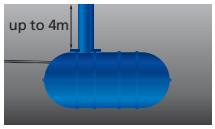
Manufactured from GRP they are available in capacities that range from 1,500 – 300,000 litres. A variety of duty types are offered which can be buried between 1 – 4 metres from the surface to accommodate different site conditions.



Normal duty



Heavy duty

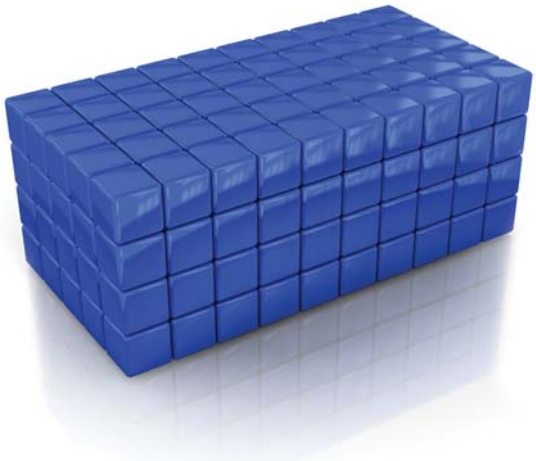


Super heavy duty

Above ground solutions

Rainstream above ground sectional tanks are also available in capacities from 2,000 litres upwards. Manufactured from tough pre-insulated GRP panels they offer exceptional design flexibility and allow tanks of different sizes and shapes to be created to suit individual projects. These tanks are suitable for installation inside buildings once they have been constructed.

Designed with a flat bottom for installation onto a hard-standing surface, Rainstream above ground one piece tanks are manufactured from rugged Glass-Reinforced Plastic (GRP). Their one-piece construction provides maximum strength and robustness and they are available with capacities ranging from 6,000 - 36,000 litres.



Filters and disinfection

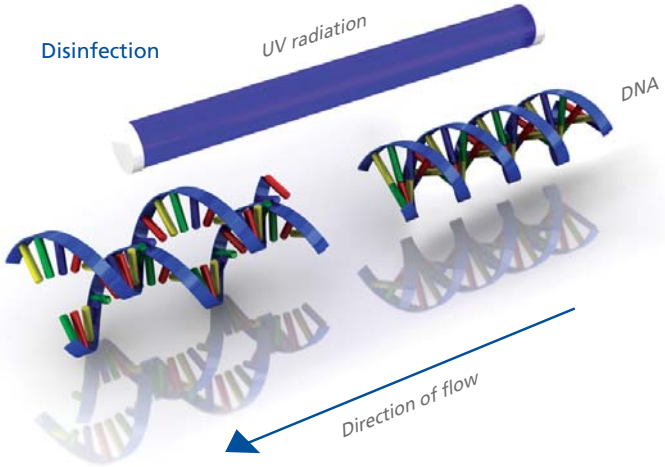
Although captured water quality can be compromised by debris picked up from the collection surface, it is still suitable for non-potable purposes provided it is processed by a system that has been correctly designed and installed. The use of high quality components and proven system design principles allows Polypipe Rainstream systems to meet the requirements of BS8515.

The filtration process

Water arriving at the filter is distributed evenly across the full width of the filter cascade. The cascade pre-cleans the water by diverting the larger particles of debris away to the sewer. Water then flows over the secondary filter sieve where a special mesh allows the remaining dirt particles to fall away to the sewer. Cleaned water flows into the storage tank ready for re-use.

Filtration

Disinfection



The disinfection process

The captured water passes through a disinfection unit where it is exposed to a high level of ultraviolet radiation. This alters the nucleic acid (DNA) of any viruses, bacteria, moulds or parasites and prevents them from reproducing, leaving the water chemically unaltered while improving the quality.

This is a particularly important process where those people more susceptible to infection may come into contact with the recycled water particularly the very young or the elderly. If this is likely, or if the water may be used in an aerosol form - e.g. a vehicle wash-down area - Polypipe recommends that a risk assessment is carried out to ascertain the need for ultraviolet disinfection.

The Rainstream range offers a wide variety of filtration options, ranging from basic leaf filters to systems capable of removing metals, oil, chemicals and even bacteria such as legionella. Polypipe's experts are on hand to help you choose the most appropriate option for your application.

Pumps and controls

A variety of accurate and reliable pump and control options allow Rainstream systems to offer a high degree of flexibility.

Standard systems

The standard Rainstream control set includes a single pump assembly, inline filtration unit and a control module compatible with both gravity and pressure operated systems.

In a gravity system the control unit constantly monitors the water level in the header tank, automatically drawing in more water from the main storage tank if required. The storage tank is also monitored so that fresh mains water can be imported if needed. This ensures that the header tank always contains the minimum water volume required for safe operation.

For a pressure system the control unit automatically detects any demand for water and delivers a pressurised flow to all outlets. If the storage tank volume drops below the minimum, the control unit draws in sufficient mains water to ensure that the required output level is maintained.

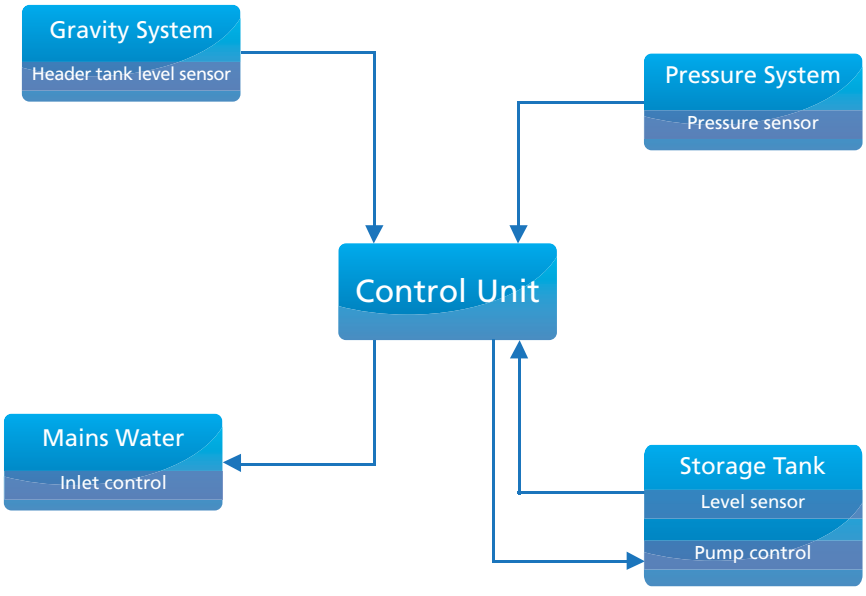
Duty standby systems

Rainstream duty standby component sets include a double pump assembly, in-line filtration and a control module suitable for both gravity and pressure-fed systems.

This maintains efficiency, increases operating life and ensures continuity of supply even in the unlikely event of one pump failing.

Advanced systems

Rainstream advanced pressure-fed systems provide the most reliable control over the water supply and feature a duty standby function which delivers a constant supply of water to all outlets. The storage tank level is constantly monitored and if necessary the system will switch to using fresh water to maintain the supply at the outlets.



Associated products

Drainage and piping systems

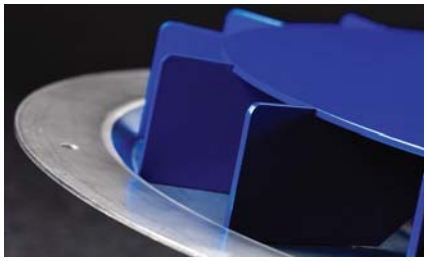
Polypipe's unique range of drainage and piping products allow roof to re-use systems to be created for any type of project.

Rainwater gutter systems

The various guttering products available from Polypipe enable the creation of bespoke guttering systems that maximise rainwater capture efficiency.
They include half-round, square section, deep, high and ogee extra capacity profiles, plus complementary products such as spacers, adaptors, brackets, rafter arms and connectors.

HydroMax siphonic drainage system

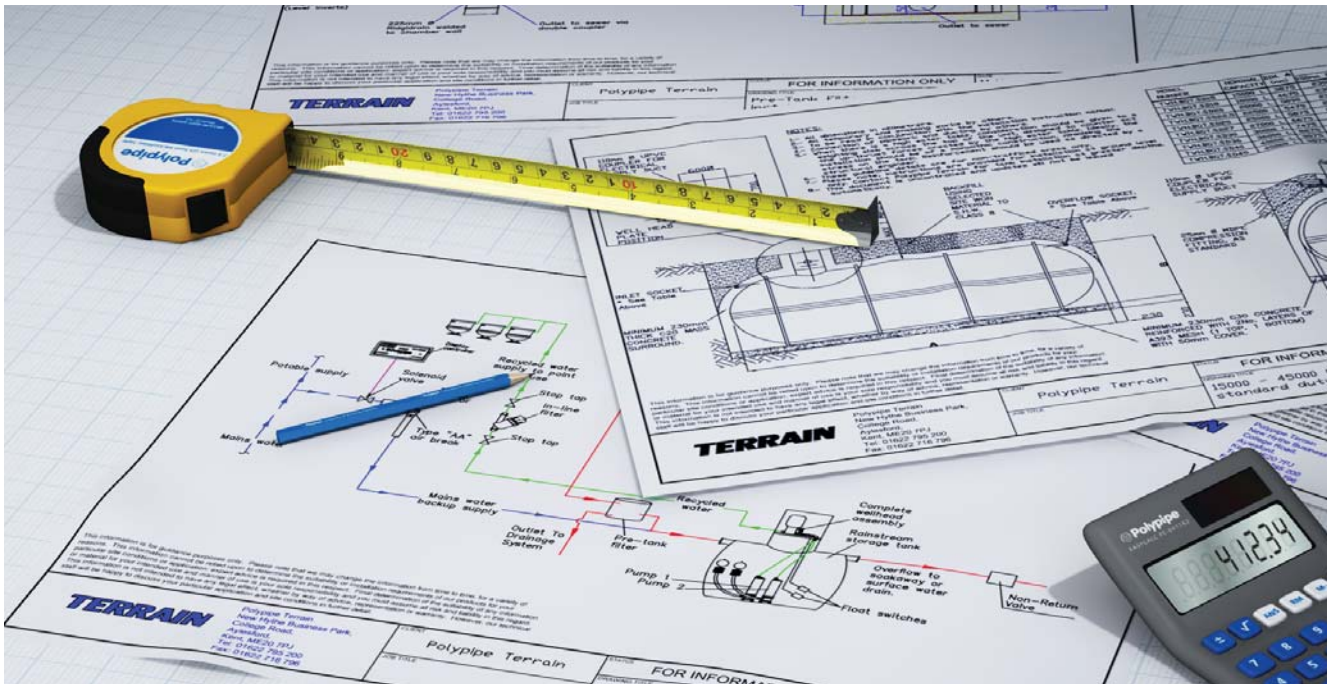
The HydroMax siphonic roof drainage system removes rainwater from large roof areas quickly and efficiently. Using siphonic principles to literally 'suck' the rainwater from the roof into small diameter pipes allows the self-cleaning HydroMax system to create a flow capacity up to ten times greater than an equivalent gravity-fed system.



Attenuation and soakaway

Polypipe provides a variety of pipeline or modular cell based solutions for attenuation or soakaway applications, depending on the requirements of the project. Ridgistorm-XL provides a large diameter pipe and storage solution for any scale of rainwater re-use project. Designed as a bespoke solution for each project, Ridgistorm-XL is the most advanced large diameter plastic pipe system available in the UK.
The Polystorm range of modular cells offer a sustainable and adaptable solution for any attenuation or soakaway project. Polystorm cells can be constructed to accommodate all types of ground conditions, planning requirements and design considerations.

Technical services

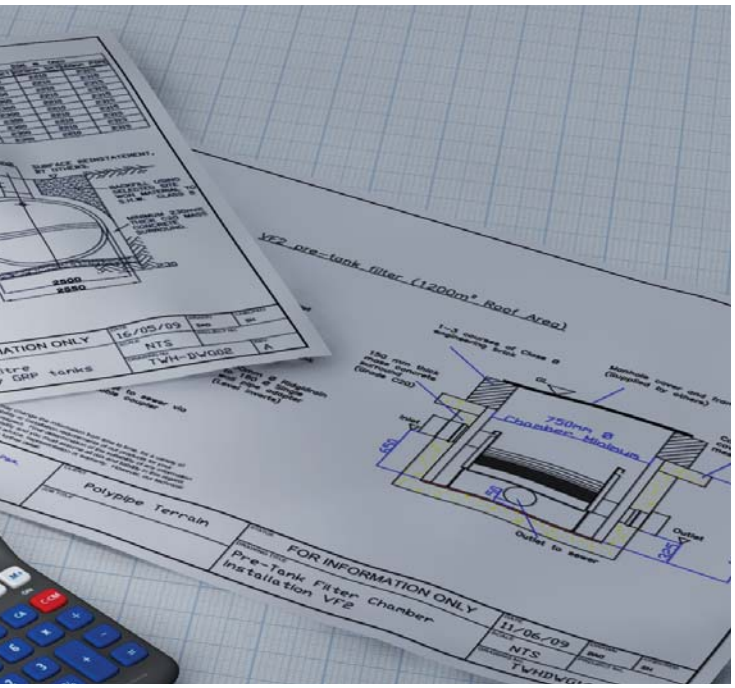


Assessment and advice

Polypipe Terrain offers a wide range of advice and support to help understand the solutions available for the effective capture, storage, filtration and re-use of rainwater. Services include - assessment, tank sizing calculations, technical detail and system schematics. Together these services ensure that customers receive the most suitable and effective rainwater re-use system for their particular application.

Research and development

Polypipe has dedicated and unrivalled research and development facilities setting the highest standards in the industry. Over the last decade we have invested heavily in laboratory facilities including the independent UKAS accredited Berry & Hayward Laboratory. Our laboratories allow product development and certification testing to be undertaken in-house therefore shortening time to market and maximising product benefits for our customers.



Quality control

The company prides itself on providing customers with the very highest levels of product quality. Wherever possible, many of the Polypipe products and systems are covered by independent third party assessments and this allows our customers to be sure that those high levels of product quality are maintained at all times.

Technical support and after sales services

The Polypipe Rainstream experts are always available to provide detailed technical support, whether it is via telephone or during a site visit. Technical literature is also available to give guidance on the various components which are used to create Polypipe Rainstream systems.

Education

Terms such as climate change, sustainability and global warming all now make the news headlines on a regular basis and many people take an interest in these issues. Polypipe believes that it is essential we encourage future generations to become more aware and actively involved.

With this in mind the company has developed a suite of teaching aids which parents and teachers can use to engage children in water usage and other environmental issues.

Terry our wise rainwater harvesting owl is used at our Rainstream Classroom sessions to help talk about water conservation with the children

Polypipe Rainstream Classroom

Polypipe Rainstream Classroom is designed for children between the ages of 4 to 11 and offers a range of activities which encourage them to interact with their local environment. Created to help them discover the answers to the questions they have, Rainstream Classroom introduces the children to topics such as rainwater recycling and includes access to a source of online content and a 'moving water' activity pack.

Polypipe Rainstream Monitor

Installing a Polypipe Rainstream Monitor pack encourages users to monitor the water usage in their building. Primarily intended for use with Rainstream Classroom to monitor water use within schools, children and teachers will have the opportunity to collect water usage data and understand how water is used in their school.

Polypipe Rainstream Monitor is also offered in other designs, including the option to customise (e.g. to match a school crest or company name) allowing companies to demonstrate a proactive awareness of water use issues to staff and visitors.

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