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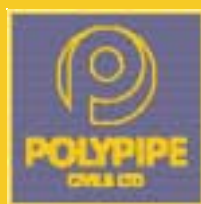
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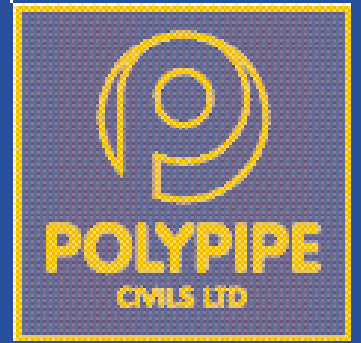
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ORDERS & INFORMATION

Designed & Produced by Technique Studios 01295 680866



RAINWATER HARVESTING SYSTEMS



ENGINEERING EXCELLENCE

Introduction to Polypipe Civils

Polypipe Civils Limited is firmly established as the UK's leading manufacturer of ducting, drainage and potable water systems to the utilities and the construction, civil engineering and agricultural industries. Polypipe Civils has set the benchmark for innovation and engineering excellence, founded on our commitment to the continued development of new and existing products.

The development of highly engineered products is supported by our unrivalled laboratory facilities, including the UKAS accredited Berry and Hayward laboratory, state of the art materials and quality control test laboratories.

The launch of new environmental products to complement our vast range of ducting and drainage systems is our highest priority, including

- Eco-Vat rainwater harvesting systems
- Ridgigreen reinforced grass paving systems
- Stormwater attenuation, control and disposal systems

A free design service is available to assist with all aspects of the design and specification of Polypipe Civils products.



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Eco-Vat systems are manufactured to precise specifications, assured by our comprehensive quality management system. Eco-Vat is the first rainwater harvesting system to be certified by the British Board of Agrément. This independent third party accreditation allows developers to gain a NHBC certificate on the product.



INTRODUCTION

Fresh water is an extremely limited and precious resource. In fact, less than 3% of all water on the planet is considered 'fresh'. During the 21st century, it is estimated that the demand for water is going to increase dramatically, to such an extent that the Government is now looking at more sustainable approaches for water conservation. In addition, changing weather patterns have resulted in increased flooding. Use of Eco-Vat systems can help meet both of these important challenges while reducing the cost of water supply and disposal.

Purified water is required for drinking, cooking, dishwashing and bathing. For all other uses, such as toilet flushing, clothes washing and hose pipes, water from an Eco-Vat rainwater harvesting system provides a healthy and acceptable alternative. It is a fact that over a third of all potable water supplied to a typical domestic premises is flushed down the toilet. Combined with garden watering and car washing the amount that must be of potable quality can be a small proportion of total consumption. In commercial and industrial applications the potable water requirement can be a small fraction of the total demand.

Unlike the water that comes from reservoirs and through our mains supply, rainwater is absolutely free. On average, each day more than 50% of the UK's total daily water requirement falls on the rooftops over our heads. All you need to collect and store it is an Eco-Vat system. The process of harvesting rainwater from a rooftop with an Eco-Vat system is relatively simple. Rainwater is collected from the catchment area and, after passing through a filter, is stored in the Eco-Vat tank ready for reuse. It is pumped through additional filters on demand to header tanks or directly to the point of supply. Complete packages designed specifically for gravity, pressurised and irrigation systems are available.

The Eco-Vat range includes modular rainwater recycling systems consisting of high quality, GRP or rotationally moulded MDPE tanks and state of the art control systems suitable for tanks of any construction. Systems can be supplied as stand alone units or incorporate automatic switching to mains supplies when high demand outstrips the rainwater supply. Eco-Vat systems can even be adapted to provide all water requirements, including potable water (the water used for bathing, drinking and cooking) through the use of additional treatment but this will require careful design and ongoing monitoring in order to comply with the relevant legislation and regulations.

Eco-Vat sets the standard in its field as the first totally integrated system on the market. It is supplied complete, including tanks, filters, pump, valves and factory fitted inlet and outlet connections. All internal tank plumbing and electrical equipment are supplied mounted on a convenient lift-out service plate. Eco-Vat systems operate virtually silently within the premises, with the pump and pressure vessel mounted inside the tank. Eco-Vat is easy to handle and install and multiple tanks can be incorporated in the system if required. Pump and control systems can also be retrofitted to existing tanks. A three phase filtration system ensures that the water provided is clean and of a high quality.

Eco-Vat was the first rainwater harvesting system to be certified by the British Board of Agrément. This independent third party accreditation allows developers to gain a NHBC certificate on the product.

"For most companies (water supply undertakers), the largest component of increased demand is customer water consumption; in other words it is predicted that we will nearly all use more water in our homes in the next 25 years."

Environment Agency 1998



THE SUSTAINABLE ENVIRONMENT AND SUDS

The sustainable use of the Earth's resources is a necessity in the 21st century. In particular, there is a need to strike a balance between the management of floods and surface water drainage, and the need to conserve natural resources.

Recent changes in weather patterns and consequent flooding have resulted in recognition that change is needed in the design of new developments. The most significant ever change in the design of drainage systems is the advent of Sustainable Urban Drainage Systems (SUDS). SUDS techniques are designed to manage surface water run off in a more sustainable way than traditional drainage systems. They provide more natural approaches to run off management and, when incorporated into developments, help to prevent increases in flooding or water pollution risk downstream of the development. SUDS can also provide direct improvements to amenity and biodiversity. In addition to environmental benefits, recycling rainwater has economic benefits including savings on water bills and reductions in the cost of downstream drainage and treatment systems.

The Government, water regulators and water supply undertakers are all encouraging the adoption of water conservation measures and the disposal of rainwater at source. One component of this is the appropriate usage of systems such as Eco-Vat to recycle rainwater, thereby reducing the reliance on the mains water supply and reducing run off.

Rainwater is, after all, the ultimate source of all our water supplies. It supplies reservoirs, rivers and aquifers with fresh water. The Eco-Vat system can collect this water where it falls and recycle it for non-potable uses, rather than allowing it to drain away where it can add to flooding problems.

Planning Policy Guidance Note 25, issued by the Environment Agency is leading to the necessity for developers to demonstrate the sustainability of new developments.

IMPORTANT DESIGN CONSIDERATIONS

Rainwater can be used for toilet flushing, clothes washing and hose pipes without the need for further treatment. Special considerations will apply where water is to be used for other applications such as bathing, food preparation and drinking. Water from an Eco-Vat system can be treated for these applications although further guidance should be sought from Water Regulations Advisory Scheme Guidance Notes or the Polypipe Civils Technical Department.

Ultraviolet (UV) treatment systems are well established for the effective disinfection of water and are available as optional extras. It should be noted that many industries require bacteria free water which has not been chemically treated, an ideal application for UV treated water. UV treatment is safe, effective and achievable at relatively low capital and ongoing cost.

In common with potable supplies where aerosols are generated, a risk assessment for legionella should be undertaken in accordance with Health and Safety Executive document L8.

Installation of Eco-Vat systems should always be undertaken by a competent contractor with the necessary engineering, plumbing and electrical expertise. A comprehensive design and installation manual is available from Polypipe Civils Limited that, if adhered to, will ensure compliance with current legislation and regulations regarding water usage, plumbing and electrical installations and discharges to sewers or soakaways.

"Outside river and coastal flood plains, it remains important that all proposals for development should take account of the effects of potentially increased run off.

Local planning authorities should consider, therefore, the need for policies which encourage the use in appropriate areas of more sustainable drainage systems to control the water as near its source as possible. These issues should be discussed with the Environment Agency and the sewerage undertaker during the preparation of local plans."

Planning Policy Guidance Note 25



HOUSING APPLICATIONS

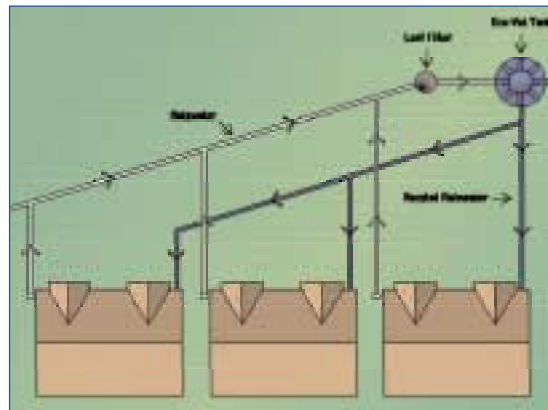
Polypipe Civils is able to offer economic Eco-Vat systems to suit almost any housing development, from single house installations to larger developments requiring multiple tanks. Standard 3,000 and 5,000 litre package systems are manufactured for the individual housing market with higher capacity bespoke systems available to suit larger developments. Eco-Vat systems can reduce domestic mains water bills by more than 50% with running costs typically 3p per cubic metre of water supplied.

Standard Eco-Vat systems are ideal for recycling rainwater for non-potable purposes and reducing the volume of surface water disposal for new developments on both greenfield and brownfield sites. Eco-Vat systems can be designed to incorporate stormwater attenuation as individual stand alone systems or in conjunction with other devices such as porous paving systems, soakaways and tank sewers to dramatically reduce peak discharges.

Rainwater harvested through an Eco-Vat system is suitable for domestic uses including toilet flushing, clothes washing, car washing and garden watering without the need for further treatment. Rainwater is ideal for clothes washing because it is soft. Trials in Germany have shown an extended life for washing machines running on rainwater instead of a harder mains supply.

Eco-Vat systems are available with an optional manifold system whereby up to four properties can be supplied from a single installation. This has the advantage of utilising the catchment area of all properties for recycling purposes, reducing installation costs and payback periods and reducing the metered water bills for the entire development. Eco-Vat manifold systems are ideal for installations such as

- Housing Association properties
- Multiple tenant properties with a landlord power supply
- Rural developments with communal services
- Where a single house installation is uneconomic



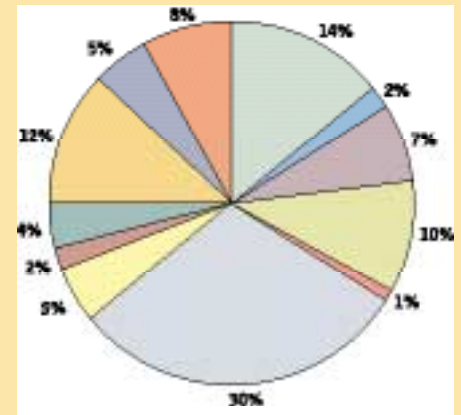
Schematic of manifold system serving several properties

The overflow from the Eco-Vat unit can be under gravity flow or pumped in locations where gravity flow is not possible. Pumped overflows are operated by means of a float switch that operates the same supply pump that feeds the premises. When the pumped overflow is activated the water is diverted to the point of discharge.

Water from an Eco-Vat can be discharged into a mains surface water sewer if allowed by the appropriate sewer undertaker, to soakaway or through micro-irrigation systems. Disposal on site helps reduce flooding and the load on sewer systems and recharges the groundwater.

The Eco-Vat system can also be adapted to cater for installations where recycled water is required for bathing, food preparation or drinking although special design and treatment considerations and local authority approval will be required. Comprehensive advice on technical requirements and the relevant regulations is available from our Technical Department.

Average water usage in the home



Anglian Water (2000)

- Washing machine cold*
- Washing machine hot*
- Kitchen sink cold
- Kitchen sink hot
- Dishwasher cold
- Toilet*
- Shower cold
- Shower hot
- Bath cold
- Bath hot
- Wash basin cold
- Wash basin hot

* Untreated water from an Eco-Vat system is ideal for these applications as well as for hose pipe use.



A recent installation at a housing development

HOUSING APPLICATIONS

Project Details

Project: Metropolitan Housing Association Office
 Client Name: Metropolitan Housing trust
 Value of scheme: £5 million
 Installed cost of Eco-Vat system: £10,000



"As a business we always consider best practice for all environmental issues, and rainwater harvesting demonstrates water conservation. The site is a five million pound demonstration project given by The Housing Forum, and incorporates a number of environmental solutions. Eco-Vat performed well and their after sales service was excellent. Eco-Vat is now a consideration on every new build scheme."

Phillip Wright, Contracts Manager

Metropolitan Housing Association

Roof area	1365m ²
Average rainfall	752mm/year
Projected non-potable water usage	1761m ³ /year
Water Authority cost @ £1.24/m ³	£2183.64/year
Water provided by Eco-Vat	1027m ³ /year
Percentage of non-potable requirements	60%
Annual savings	£1,273.48
Payback of Eco-Vat system capital costs	3.8 years

Project Details

Project: Eco House, Leicester
 Client Name: Environ
 Value of scheme: £250,000
 Installed cost of Eco-Vat system: £10,000



"The Eco House in Leicester is an environmental show home open to the general public. It practically demonstrates hundreds of environmental features, which can be incorporated into the home. One such feature was the Eco-Vat Rainwater Harvesting System. Since installation the Eco House has received over 30,000 visitors, so a quality system was important to us at the design stage. We are very pleased with the system and believe that rainwater harvesting has a great future. Why not come over to the Eco House and experience the Eco-Vat first hand?"

Ben Dodd, Communications Team Manager

Eco House

Roof area	220m ²
Average rainfall	596mm/year
Projected non-potable water usage	240m ³ /year
Water Authority cost @ £1.27/m ³	£304.80/year
Water provided by Eco-Vat	180m ³ /year
Percentage of total water usage	75%
Annual savings	£228.60

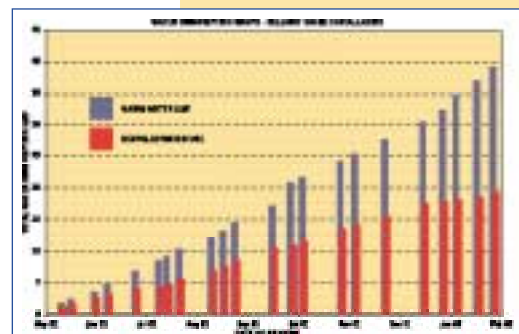
Project Details

Project: Bellway House, Derbyshire
 Client Name: Bellway Homes
 Value of scheme: £150,000
 Installed cost of Eco-Vat system: £10,000



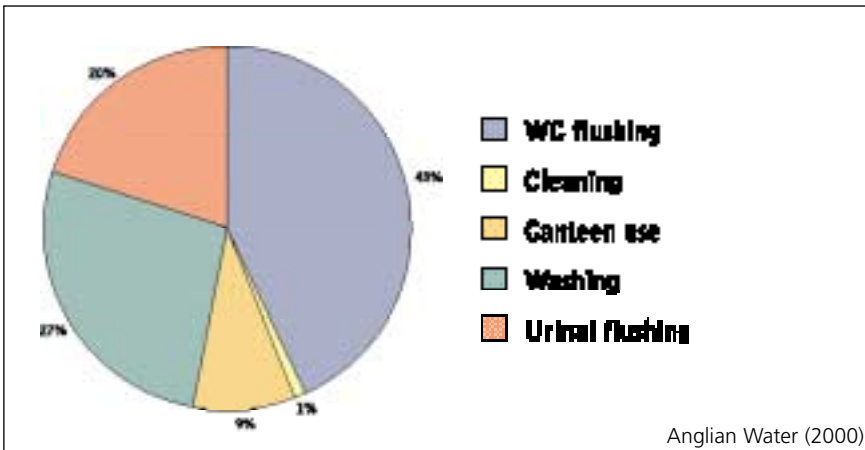
"When approached by Polypipe Civils Ltd for the installation of the Eco-Vat system we were intrigued at the overall concept of using recycled water in the home. We are currently taking the opportunity to build on the water conservation theme shown at the Ravenswood Development by installing an Eco-Vat rainwater recycling system at the Chellaston Grange development. After continuous monitoring of the system over a period of a year, we were pleased to find that the results indicated a significant saving on metered water usage. Coupled with the ease of installation and extensive support from Polypipe Civils we are currently looking into the possibility of extending the concept of the Eco-Vat system to provide storm water attenuation in addition to rainwater recycling."

Ben Wright, Regional Technical Director



The savings resulting from Eco-Vat rainwater harvesting systems in industrial and commercial developments are typically much greater than for domestic installations. This is due to increased usage of potable water combined with greater rooftop catchment areas. In most commercial, industrial and retail environments the largest single usage of water is for toilet and urinal flushing. Most or all of the requirements can be met through the use of harvested rainwater and payback periods of less than one year are not uncommon.

Average water usage in the office



Leisure facilities frequently have a high water consumption for applications such as swimming pools or for landscape irrigation. Other applications with a high water demand where Eco-Vat is ideal include horticulture, car washes, and vehicle maintenance stations.

Eco-Vat systems can also be designed to incorporate stormwater attenuation to assist in complying with ever more stringent restrictions on the discharge of water from hardstanding areas, frequently a major issue in obtaining planning permission for new developments. Peak discharges can be dramatically reduced where installed in combination with Ridgigreen reinforced grass paving systems. Polypipe Civils is also able to provide products for soakaways, tank sewers and other drainage and attenuation purposes.

A risk assessment may be required to determine the suitability of recycled water for some applications such as where aerosols may be generated. Detailed advice is available from our Technical Department to assist in determining the suitability of recycled water for any application and system design.

For developments with a small roof area, where it is important to increase the catchment area due to high consumption, porous paving in accordance with CIRIA Guidance Note C539, entitled "Rainwater and Greywater Use in Buildings", can be an acceptable design consideration. Through the natural filtration process inherent in porous paving systems, the concentrations of hydrocarbons and other contaminants are significantly reduced. The water can then be recycled using an Eco-Vat system. Eco-Vat systems can also be adapted for use with storm water balancing ponds. Special design considerations may apply to ensure that the system is protected from accidental spillages or other hazards.



A recent installation at a fast food outlet

Project Details

Project: Banbridge Leisure Centre
Client Name: Banbridge District Council
Value of scheme: £5.3million
Installed cost of Eco-Vat system: £12,000



"The Council's Leisure Services Department was keen to demonstrate its commitment to incorporate environmentally friendly and cost effective systems in the new state-of-the-art leisure centre. The successful installation of Eco-Vat's rainwater harvesting system contributed significantly to achieving these objectives."

Michael Reith, Director of Leisure Services

Banbridge Leisure Centre

Roof area	3680m ²
Average rainfall	1357mm/year
Projected non-potable water usage	20075m ³ /year
Water Authority cost @ £0.74/m ³	£2696.40/year
Water provided by Eco-Vat	4992m ³ /year
Percentage of non-potable requirements	25%
Annual savings	£3,694.08
Payback of Eco-Vat system capital costs	1.9 years

Project Details

Project: Petrol Filling Station, Hornchurch
Client Name: Oceans ESU
Value of scheme: £2 million
Installed cost of Eco-Vat system: £10,000



"We found Polypipe's service prompt, attentive and professional. Their support was very helpful during installation of the Eco-Vat at a petrol filling station near London, and we look forward to working with them again in the future."

Helen Fazakerley, Environmental Consultant

Petrol Filling Station

Roof area	922m ²
Average rainfall	688mm/year
Projected non-potable water usage	708m ³ /year
Water Authority cost @ £1.02/m ³	£722.16/year
Water provided by Eco-Vat	629m ³ /year
Percentage of non-potable requirements	86%
Annual savings	£693.00
Payback of Eco-Vat system capital costs	5.06 years

Project Details

Project: Civic Centre, Gedling
Client Name: Gedling Borough Council
Value of scheme: Retrofit to existing building
Installed cost of Eco-Vat system: £9,000



"Gedling Borough Council as a member of the Nottinghamshire and Derbyshire Local Authority Energy Partnership worked with Polypipe Civils on the initial feasibility assessment, and were delighted to conclude with an installed system. The team at Polypipe Civils were very helpful and assisted us from the outset with continued liaison with our appointed contractor concluding with the final commissioning. We now look forward to the projected savings being realised and would hope this scheme can act as a beacon for other projects in the area"

Steve Wiseman, Building Services Manager

Civic Centre

Roof area	830m ²
Average rainfall	773mm/year
Projected non-potable water usage	468m ³ /year
Water Authority cost @ £1.25/m ³	£585.00/year
Water provided by Eco-Vat	457m ³ /year
Percentage of non-potable requirements	98%
Annual savings	£571.25

AGRICULTURAL & ANIMAL SANCTUARY APPLICATIONS

Rooftop rainwater harvesting can have an important role to play in reducing mains water usage and costs, vital in today's agricultural economy. Agricultural applications can include

- Irrigation of gardens and greenhouses
- Animal, vehicle and general cleaning
- Animal drinking supplies
- Domestic uses such as toilet flushing and clothes washing
- Organic farming

Rainwater is also ideal as a supplementary source for small hotels and restaurants in locations without a mains water supply and where surface water disposal is difficult or costly.

Eco-Vat irrigation systems have been specifically designed for these applications. Irrigation units consist of a suitably sized tank and pump together with a simplified wellhead and control system. Water is pumped on demand for non-potable requirements.

Eco-Vat systems can be adapted to provide potable supplies by means of additional filtration and water treatment. Use of Eco-Vat systems for other than non-potable requirements will require a thorough assessment and compliance with the Private Water Supply Regulations. Detailed advice is available from our Technical Department or the local Environmental Health Department.

Project Details

Project:	Blue Cross Kennels, Bromsgrove
Client Name:	Forum Projects
Value of scheme:	£1.5 million
Installed cost of Eco-Vat system:	£20,000

"This being the second installation we have now completed with Eco-Vat, the professional approach demonstrated resulted in a cost effective sustainable water recycling system. The on and off site liaison between Eco-Vat, the installation contractor and Forum Projects operating in a partnership format delivered a project completed on time and of the highest standard."

Alex Darville, Director



Blue Cross Kennels

Roof area	2551m ²
Average rainfall	596mm/year
Projected non-potable water usage	1498m ³ /year
Water Authority cost @ £1.80/m ³	£2696.40/year
Water provided by Eco-Vat	1498m ³ /year
Percentage of non-potable requirements	100%
Annual savings	£2,651.00
Payback of Eco-Vat system capital costs	1.9 years

EDUCATIONAL APPLICATIONS

Schools and other educational establishments significantly benefit from rainwater harvesting using Eco-Vat systems due to the high consumption of non-potable water combined with the large rooftop rainwater catchment area available. The main usage of water in educational establishments is typically for toilet and urinal flushing. Using harvested rainwater for these requirements realises a significant reduction in the metered mains water bill.

As an increasing number of school developments are funded by Private Finance Initiatives (PFI), the need to minimise operating costs becomes ever more important. Reducing mains metered water supply and substituting with harvested rainwater from an Eco-Vat system is one way of reducing operating costs.

Eco-Vat systems also provide an environmental case study that can feature in the students' education. Adding water meters to the Eco-Vat system allows data to be collected for projects, resulting in a better understanding of conservation issues and the environment.



FURTHER APPLICATIONS

TECHNICAL DATA

Tanks

Standard Eco-Vat tanks are single piece, rotationally moulded units with capacities of 3,000 or 5,000 litres, incorporate strengthening ribs. Tanks are suitable for both above and below ground use and can be connected in series. GRP tanks are available for use in difficult ground conditions and where a greater capacity is required, up to 80,000 litres in a single tank.

Cover

Standard Eco-Vat tanks are supplied complete with a 450mm cast iron lockable cover and polypropylene frame. GRP tanks are supplied complete with a 600mm galvanized steel pedestrian duty cover and frame.

Inlet & Outlet

Standard Eco-Vat tanks are supplied complete with 110mm fitted tank connectors to BS EN 1401. Where an add-on tank is required a 400mm length of 50mm diameter MDPE pipe and compression fittings are also supplied. GRP tanks are fitted with 110 or 160mm connectors, depending on the tank size.

Supply Connector

Standard Eco-Vat tanks are supplied complete with a fitted tank connector for direct connection to 25mm diameter MDPE service pipes. Connections to larger diameter pipes can be accommodated.

Wellhead Unit

Wellhead units consist of the depth switch, pressure switch, non-return valve, pressure vessel and screw connectors for the pump and depth switch, all mounted on a convenient, powder coated, mild steel lift out service plate. The pump is attached to the service plate by a polypropylene rope for ease of removal and installation.

Control Panel

The control panel is designed for installation inside the premises and features lights to show system healthy, pump indicators, self diagnostics and manual and automatic control modes. Systems can also be provided with custom manufactured control panels to suit individual requirements, including standby pumps with automatic switchover, water meters and alarms.

Pump

Standard Eco-Vat units are supplied with stainless steel submersible pumps, combining maximum reliability with virtually silent operation. Unlike alternative designs that utilise pumps mounted inside the premises, the Eco-Vat design eliminates pump noise in the premises and avoids the need for expensive suction pipes. Standard pumps can deliver 20 to 80 litres per minute at pressures from 1.3 to 4.3 Bar (13 to 43m Head). The actual delivery will depend on the Head being pumped against. Pressure vessels are included to stabilise water pressures and ensure that the pump does not operate continuously when water demand is low but continuous.

Filters

Eco-Vat units incorporate multiple stages of filtration. The first stage of filtration is the vortex leaf filter in which the first flush of rainwater, including leaves and any other debris, is washed through into the drainage system. When the fine filter mesh wets out, the water passes through and into the Eco-Vat tank. Tank inlets and outlets are also fitted with a mesh screen to prevent entry of vermin.

A stainless steel filter is connected to the submersible pump and floats just beneath the water surface. Filtered rainwater entering the tank may still contain fine particles that will generally settle out. The cleanest water available will be retrieved just below the water surface. The floating filter with a mesh size of 230 microns is designed to prevent any coarse particles from entering the system.

The final stage of filtration in standard units is an in-line filter, positioned in the premises before delivery to any supply points or the header tank. The in-line filter is extremely fine with a mesh size of 110 micron. Cleaning of the in-line filter is the only routine maintenance operation and is easily isolated by 2 stop taps.

Optional ultraviolet (UV) filter and treatment units are available where water of a higher quality is required.

Contact the Technical Department at Polypipe Civils for further information.



5,000 litre polyethylene tank



Wellhead unit



Control panel



Submersible pump and filter



Ultra Violet treatment filter

