NEW!

Stormwater Attenuation Systems

Sustainable Urban Drainage Solutions for Domestic & Commercial Applications

klargester.com

Klargester

Stormwater Attenuation Systems

Sustainable Urban Drainage Solutions for Domestic & Commercial Applications

Managing the Stormwater Challenge

As more river valleys become developed with hard surfaces (paths, roads and roofed areas) the volume of rainwater that runs off the land increases.

This can have a severe effect in a watercourse where flash floods can occur downstream where the volume of water entering the system can be extremely high due to a cumulative effect of development upstream.

- Global warming has also had an impact on the level of rainfall, which has gradually increased over the past few decades. This has accentuated the problem of stormwater entering waterways.
- Flash floods along with rising sea levels have been responsible for some severe flooding in the UK in recent years. This has led to rising insurance claims and leaving some areas as blackspots where insurance against flood damage cannot be obtained.

Government Policy & Building Regulations

- Building Regulations Part H3
- Planning Policy Statement 3 (PPS3)
- Planning Policy Statement 25 (PPS25)
- *CIRIA publications: 'The SUDS manual (C697)' and 'Site handbook for the construction of SUDS (C698)'*

Sustainable Urban Drainage Systems (SUDS)

To address this problem, the drainage systems of towns, cities and developments have been surveyed and a policy of Sustainable Urban Drainage Systems (SUDS) has been developed to counteract the problems being encountered.

- SUDS addresses issues of the quantity and quality of the water run-off from sites. Attenuation systems (tanks and rainwater harvesting systems) and separators (to remove oil contaminants from discharges) are required.
- To size the systems required, the flow rate from the development is calculated from rainfall records and the run-off rate for a particular type of surface, i.e. roadway, roofed area, grassed area, all of which allow surface water to run off at different rates. The design is normally based on the highest recorded rainfall in the previous 30 years, but this can vary.
- Most authorities limit the amount of rainfall run-off from a development to a level where the rate does not exceed the rate of discharge from a green field site (5 litres/sec/acre approx.) but this must be specified by the local authorities.
- A technical engineer should provide the design calculations for the surface water run-off in order to size a system. This should also include the flow rate allowed for discharge to a watercourse, and the required storage volume.

How Does An Attenuation System Work?

When the peak inflow rate in a storm exceeds the allowed discharge into the watercourse, the excess flow has to be 'attenuated' on the site for the duration of the storm. This is then released at, or less than, the allowed discharge rate after the storm.

To store the excess volume and allow the correct discharge rate to go to the watercourse, a flow regulator is installed to 'bleed off' the correct maximum flow rate. The flow regulator can be a vortex type system or a simple orifice plate system.

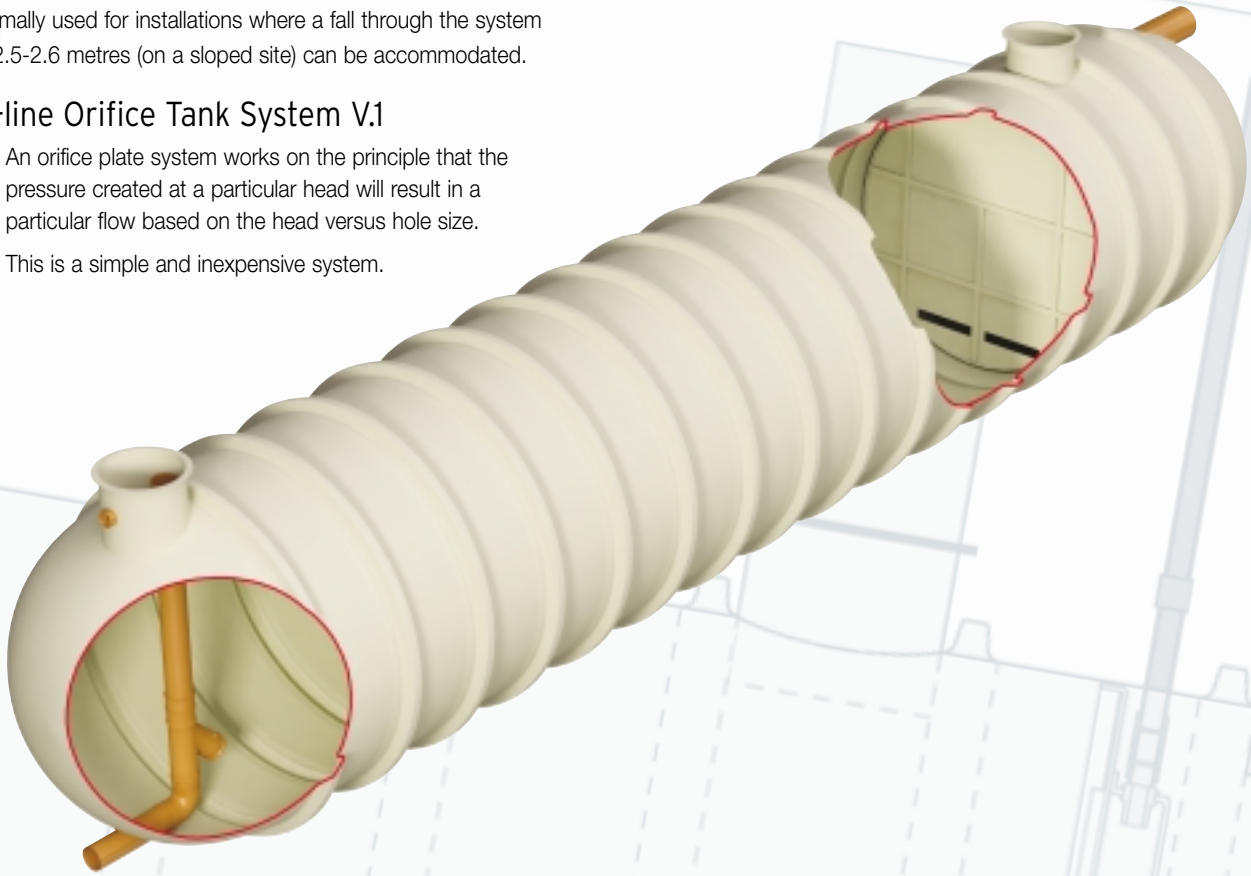
The remainder of the water is stored either **in-line** or **off-line**, depending on the design.

In-Line Attenuation Tanks

In-line systems allow the water to back up through the tank and drain by gravity through the flow regulator. This system is normally used for installations where a fall through the system of 2.5-2.6 metres (on a sloped site) can be accommodated.

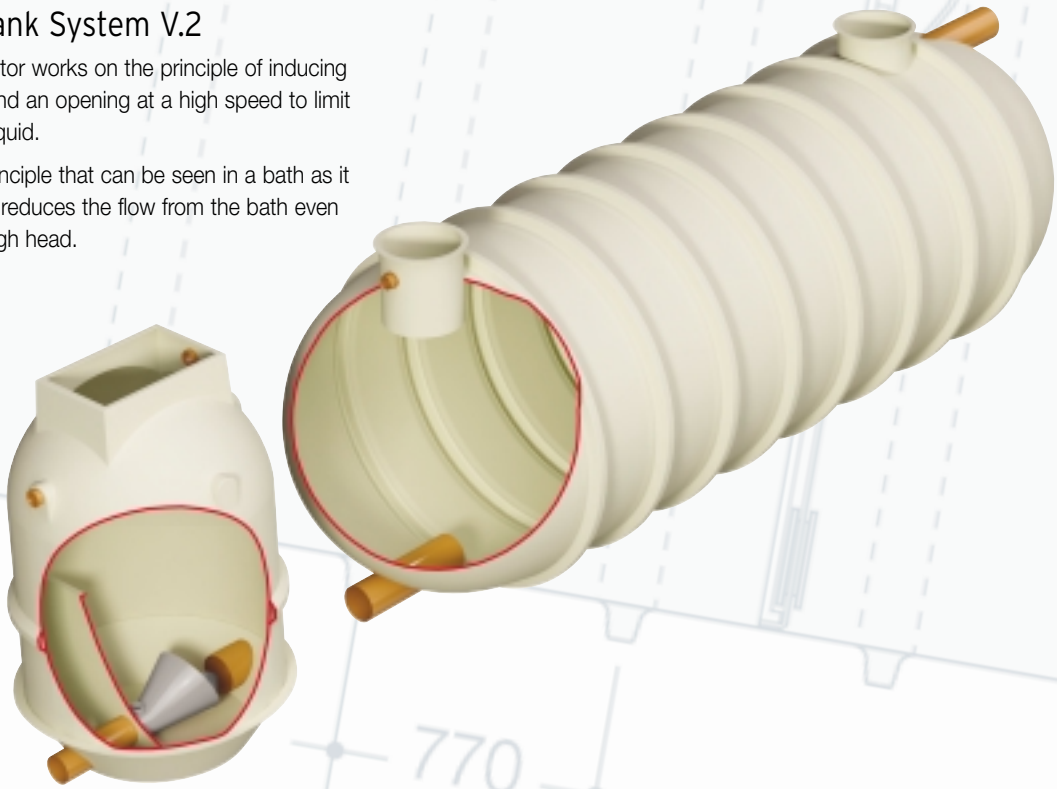
In-line Orifice Tank System V.1

- An orifice plate system works on the principle that the pressure created at a particular head will result in a particular flow based on the head versus hole size.
- This is a simple and inexpensive system.



In-line Vortex Tank System V.2

- A vortex flow regulator works on the principle of inducing a rotating flow around an opening at a high speed to limit the outflow of the liquid.
- This is the same principle that can be seen in a bath as it empties; the vortex reduces the flow from the bath even though there is a high head.

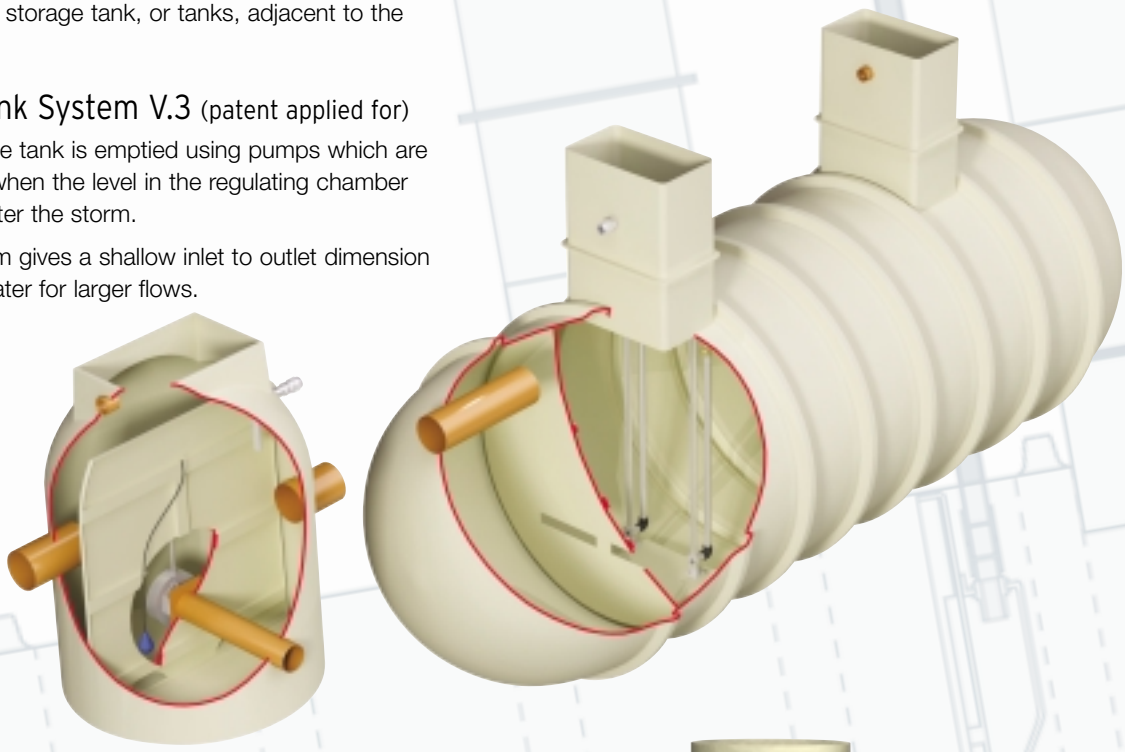


Off-Line Attenuation Tank

Off-line tank systems have the flow regulator in a separate chamber and allow the flow to build up and overspill into a storage tank, or tanks, adjacent to the chamber.

Off-line Tank System V.3 (patent applied for)

- The storage tank is emptied using pumps which are activated when the level in the regulating chamber recedes after the storm.
- This system gives a shallow inlet to outlet dimension and can cater for larger flows.



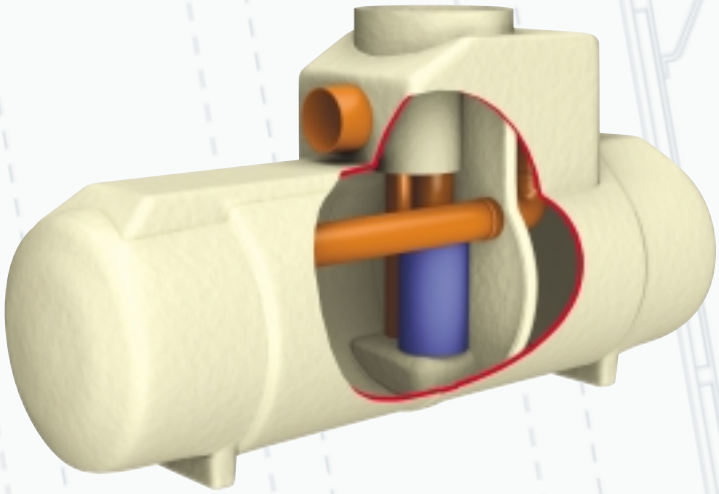
Separators

Removing Pollutants from Surface Water Run-off

Surface water drains normally discharge to a watercourse or indirectly into underground waters (groundwater) via a soakaway. Contamination of surface water by oil, chemicals or suspended solids can cause these discharges to have a serious impact on the receiving water.

Separators do not provide attenuation. They are designed to be installed within surface water drainage systems to protect attenuation systems and receiving waters from pollution by oil. This may be present due to minor leaks from vehicles or plant, or from accidental spillage.

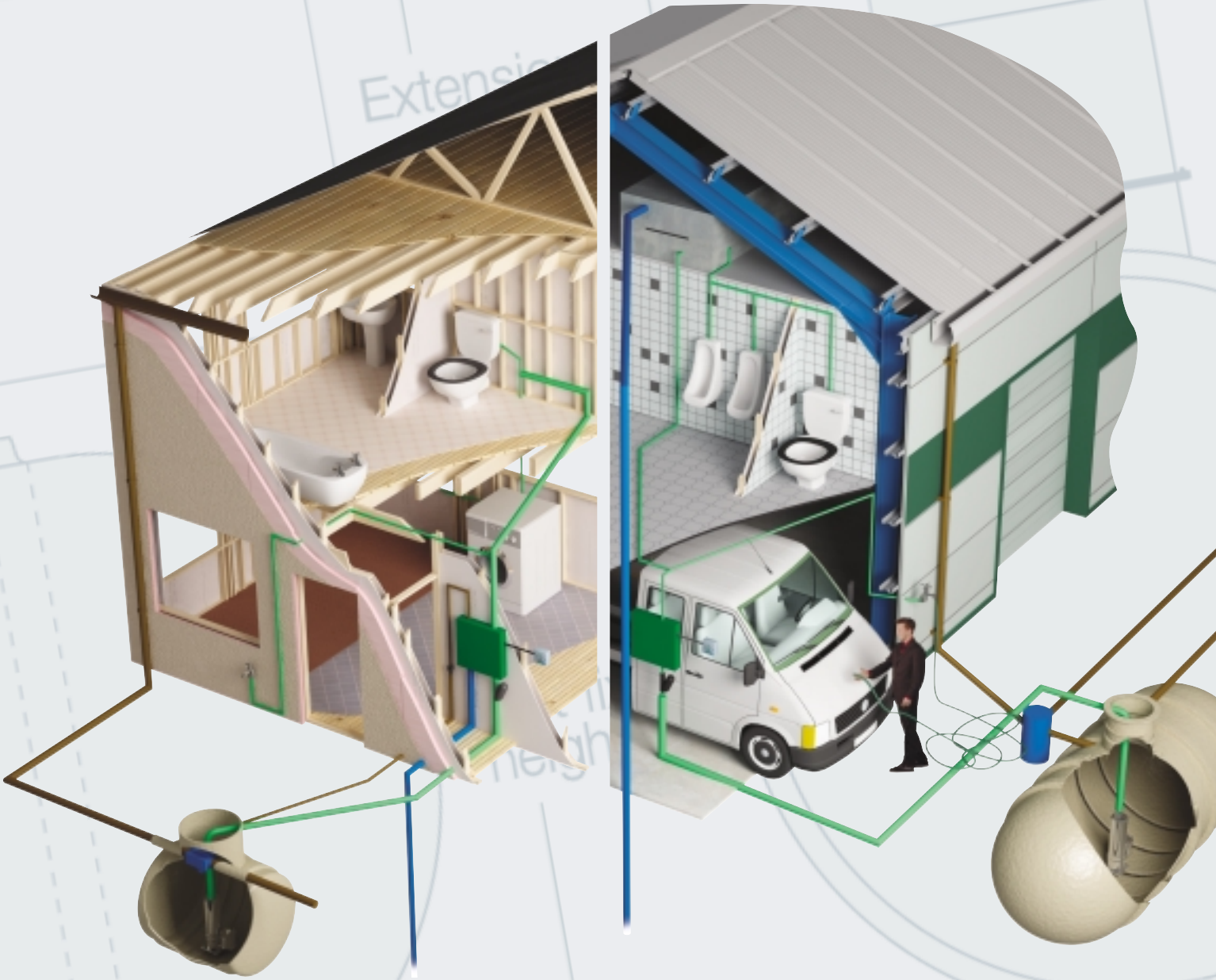
Separators should be installed upstream of the attenuation system to protect it from contamination by hydrocarbons.



- Full range to cover flow rates from 3 ltr/s up to 130 (Bypass) and 200 ltr/s (Full Retention)
- Full Retention Separator - treats the full flow delivered by the drainage system
- Bypass Separator - fully treats all flows generated by rainfall rates up to 6.5mm/hr
- Class I and II designs - Class II units meet discharge to foul sewer
- Fully certified to EN 858-1 standards and compliant to PPG3

For further information please request a copy of the Klargester Separators brochure.

Rainwater Harvesting Systems



Utilising a Free Resource from the Roof

Rainwater harvesting systems takes the captured water from a buildings roof area and uses it for internal non-potable applications such as toilet flushing. The system stores the water in an underground tank rather than allowing the rainfall to otherwise soak into the ground, evaporate or enter the drainage system.

Rainwater Harvesting has many advantages over other forms of Attenuation by delivering a number of tangible benefits including:

- Commercial properties can reduce their mains water consumption by up to 85%
- Recycled water applications include washing, toilet flushing, irrigation, etc.
- Utilises buildings' existing infrastructure
- Minimal installation requirements
- Rapid payback period on purchase costs on commercial sites

For further information please request a copy of the Klargester Envireau Rainwater Harvesting brochure.

Klargester

Advice & Information

Selecting the Right Solution

Sustainable Drainage Systems encompass much more than just installing a single product. The objective is to deal with the flow at source rather than traditional techniques that simply transfer the problem further down the drainage system.

Each site should be tackled with management and control measures designed to meet many of the following objectives:

- Control and management of stormwater run-off
- Reduce the impact of urbanisation
- Ensure the protection and enhancement of local water quality
- Enhancing the natural recharge of groundwater
- Reusing stormwater to reduce load on local resources
- Natural integration to the local environment

The Klargester range of Attenuation products have been engineered not only as process solutions, but also to offer the user a modular system that incorporates the best practice in SUDS design.

What Information is Required to Specify the System?

To specify the correct Attenuation Tank system the following information should be attained from the client or his representative:

Peak inflow rate:	… l/sec
Attenuated outflow rate:	… l/sec
Attenuated storage volume required:	… m^3
Inlet pipework diameter:	… mm
Proposed invert level of inlet pipe:	… m
Proposed invert level of outlet pipe:	… m
Area available for installation:	… m^2
Is system under roadway/green area:	.....
Level of water table at installation location:	… m

Glossary of Terms

SUDS – Sustainable drainage systems or sustainable (urban) drainage systems: a sequence of management practices and control structures designed to drain surface water in a more sustainable fashion than some conventional techniques.

Attenuation: Reduction of peak flow and increased duration of a flow event.

Catchment: The area contributing surface water flow to a point on a drainage or river system.

Flow control device: Device to manage the movement of surface water into and out of an attenuation facility.

Impermeable surface: An artificial non-porous surface that generates a surface water run-off after rainfall.

Infiltration device: Device designed to aid infiltration of surface water into the ground.

Orifice plate: Structure with a fixed aperture to control the flow of water.

Permeable surface: Surface formed of material that is impervious to water but with voids in the surface which allows infiltration of water to the sub-base, e.g. concrete block paving.

Pervious surface: Surface that allows inflow of surface water into the underlying construction or soil.

Rainwater harvesting: Process to collect rainwater where it falls, e.g. roofs, rather than allowing it to drain away.

Soakaway: Subsurface structure into which surface water flows to allow infiltration into the ground.

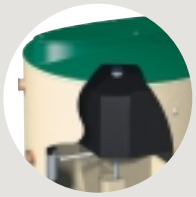
Source control: Control of run-off at or near its source, e.g. rainfall on a car park.

Suspended solids (SS): Undissolved particles in a liquid.

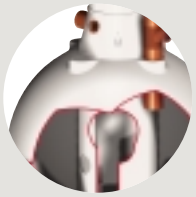
Vortex flow control: The induction of a spiral/vortex flow of water in a chamber to control or restrict the flow.

Klargester Off-Mains Solutions

BioDisc® Sewage Treatment Plants

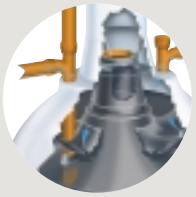


AirFlow Sewage Treatment Plants

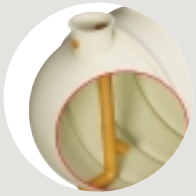


Sigma SuperSeptic

HillMaster Package Pump Systems

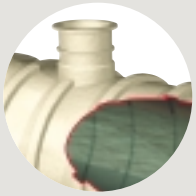


Septic Tanks



Attenuation Systems

Pumpstor24 Pumping Systems

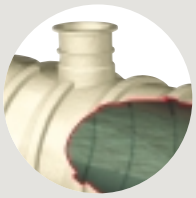


Cesspools

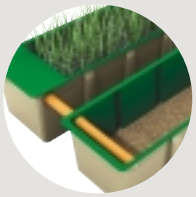
Grease Traps

Silt Traps

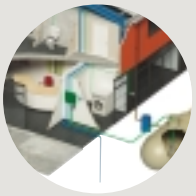
Oil/Water Separators



Silage Effluent Tanks



Reed Beds



Rainwater Harvesting

Garden Watering Systems

In keeping with Company policy of continuing research and development and in order to offer our clients the most advanced products, Klargester reserves the right to alter specifications and drawings without prior notice.

BRITISH WATER

Klargester

Klargester Environmental

Head Office: College Road North, Aston Clinton, Aylesbury, Buckinghamshire HP22 5EW
Tel: +44 (0) 1296 633000 Sales Office Tel: +44 (0) 1296 633033 email: uksales@klargester.co.uk
Klargester Scotland: Tel: +44 (0) 1355 248484
Klargester Ireland: NI Tel: +44 (0) 28 302 66799 ROI Tel: +353 (0) 48 302 66799 email: info@klargester.ie
klargester.com

Issue No. 1: April 2007