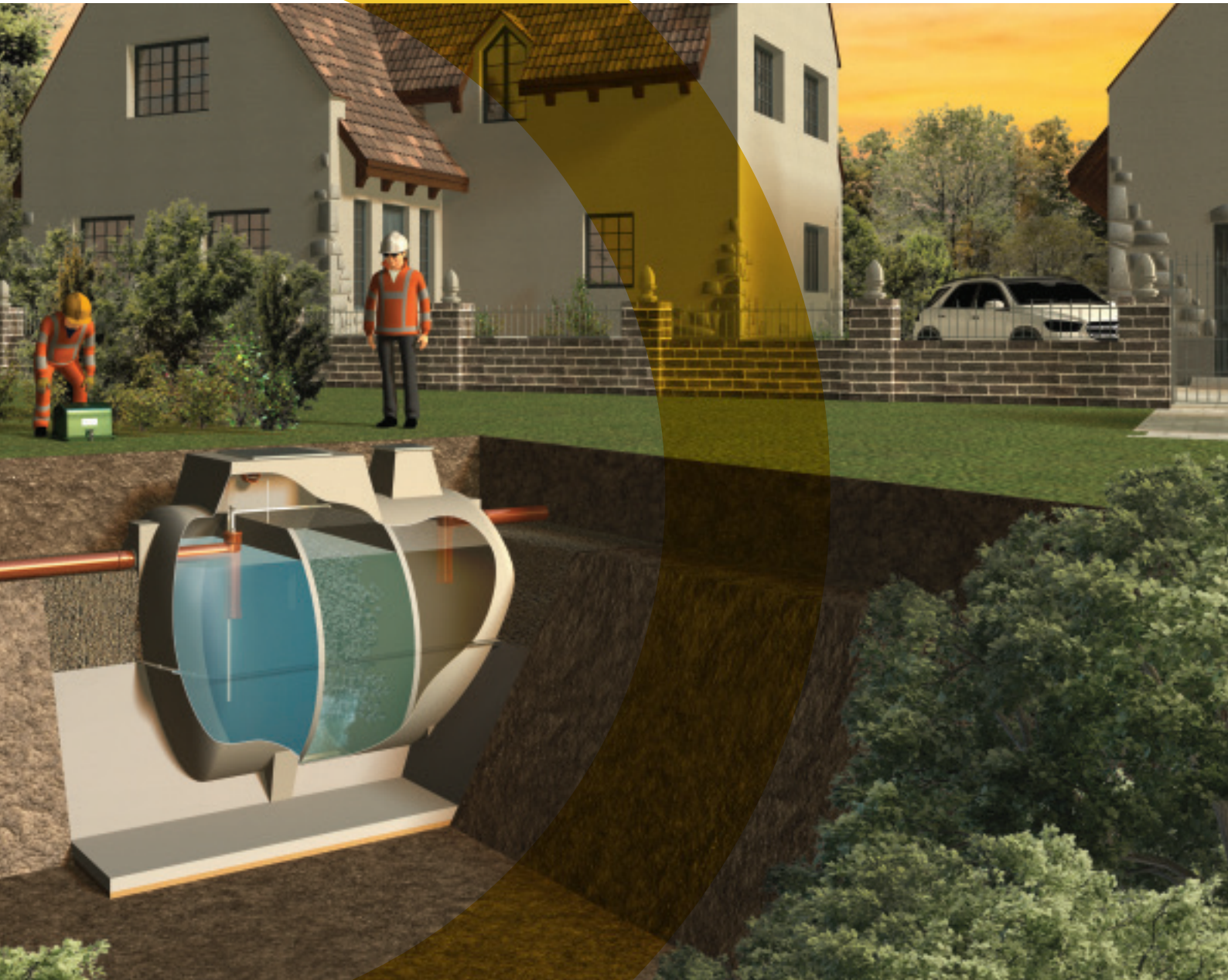


# OFF-MAINS DRAINAGE PRODUCTS



# The **innovator** in domestic, commercial and agricultural off-mains products

## Marsh Industries

Providing world-class off-mains drainage products and solutions to the domestic, commercial and agricultural sectors from our UK manufacturing plants in Kettering, Raunds and Bridgwater.

## Working smarter

Efficiently meeting the demands of our customers

We strive to be recognised as a collaborative and trusted partner for our customers, aligned to their business, and with a reputation for providing quality products that really do add value.

## Innovative thinking

Enabling technologies that deliver tangible benefits

Working across many areas of the UK and European construction sectors our specialist 'innovation' team combines 100+ years' experience of designing, manufacturing and testing wastewater treatment products that are proven to be economic, efficient and environmentally sensitive.

## Compliant products

In line with UK/EU building and environmental regulations

Our products are fully type-tested and certified to ensure compliance with relevant environmental permitting programmes and Building Regulations.

## Delivering on time

UK nationwide and overseas

With one of the largest merchant distributor networks available in Europe, customers specify Marsh products and services because they know we deliver from a solid foundation of knowledge, experience, product quality and proven performance.

## Supporting your business

Specialist services to further enhance customer requirements

There are times when our customers need a little extra support. Whether this is on-site advice, backup support, specialist testing or bespoke project solutions, we offer a range of services when and where required.



## TOGETHER we are a strategic partnership

Our core strength lies in the knowledge, experience and enthusiasm of our staff and our customers combined



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# DOMESTIC OFF-MAINS DRAINAGE PRODUCTS



# What are your options?

Choosing the right sewage treatment and disposal method for your site is essential to ensure effective long-term performance, protection of public health and the environment, and compliance with relevant legislation.

Sewage treatment and disposal can be provided by either public (foul) sewer or by a private sewage system. Use of a private system is only usually acceptable where connection to the public sewer is not possible, and as such should be discussed with your local Planning Authority at an early stage.

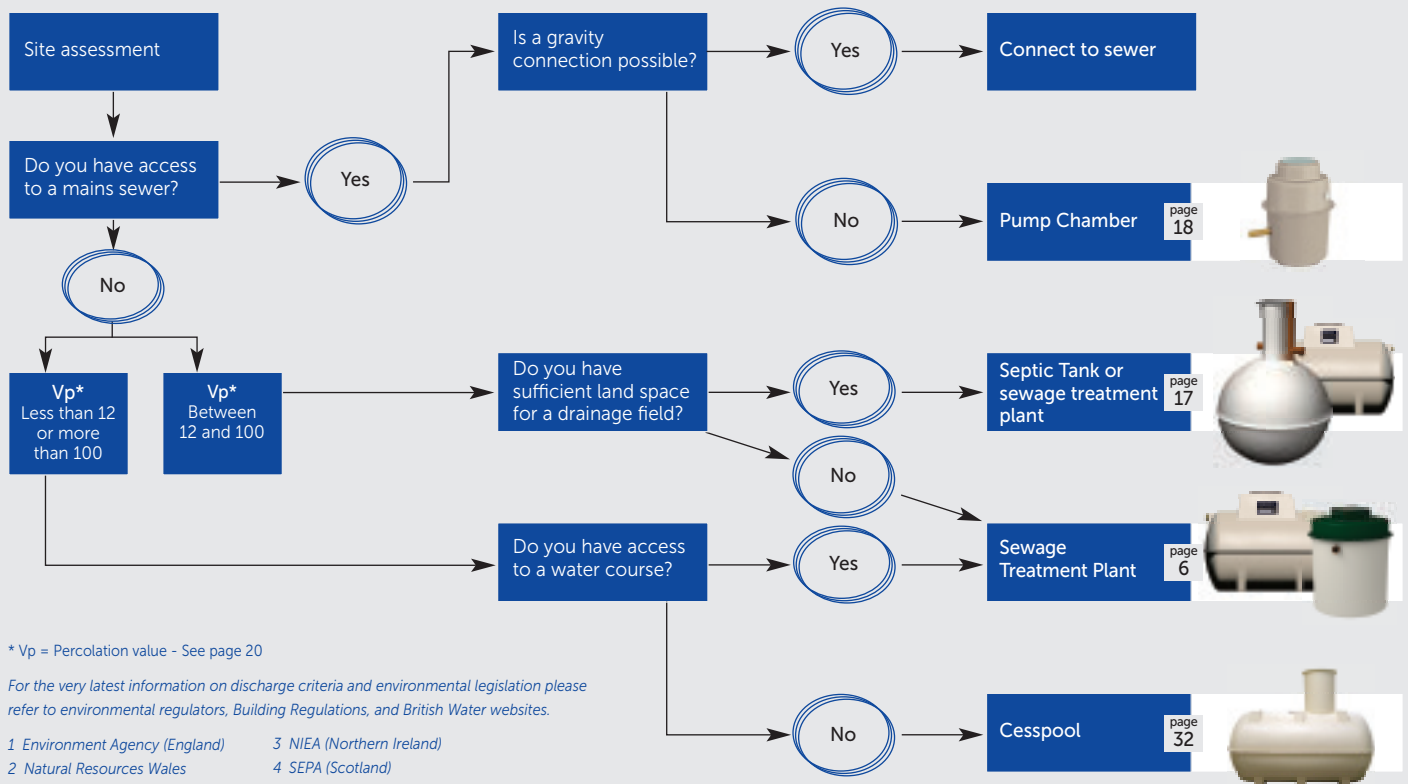
Before sewage effluent can be discharged to 'controlled waters' it must receive at least primary and secondary treatment:

- For a discharge to ground the micro-organisms in the soil provide the secondary treatment
- For a discharge to a water course the sewage treatment must be provided by a Package Sewage Treatment Plant (PSTP) or equivalent

See page 20 for further guidance on sewage treatment.

## System selection

Hierarchy of off-mains discharge routes as laid out by the environmental regulators and British Water



# Ensign®

## Sewage treatment plants

Intensive biological processing for off-mains wastewater

### Overview

The Marsh Ensign is widely regarded as one of the most efficient, reliable and economical sewage treatment plants on the market.

The standard Ensign has been adapted to improve reliability and the Ensign:Ultra now brings unique enhancements to further improve noise level, treatment efficiency and final effluent quality.

#### Class leading performance

Tested and approved to BSEN12566-3/A1:2009 all Ensign units provide treatment well within national consent requirements. Published test results of 11.5:19.2:8.4mg/ltr (BOD:suspended solids:ammonia), with influent concentrations on test higher than those chosen by most competitor plants, effectively equates to 97% pollutant removal.

#### Unrivalled choice

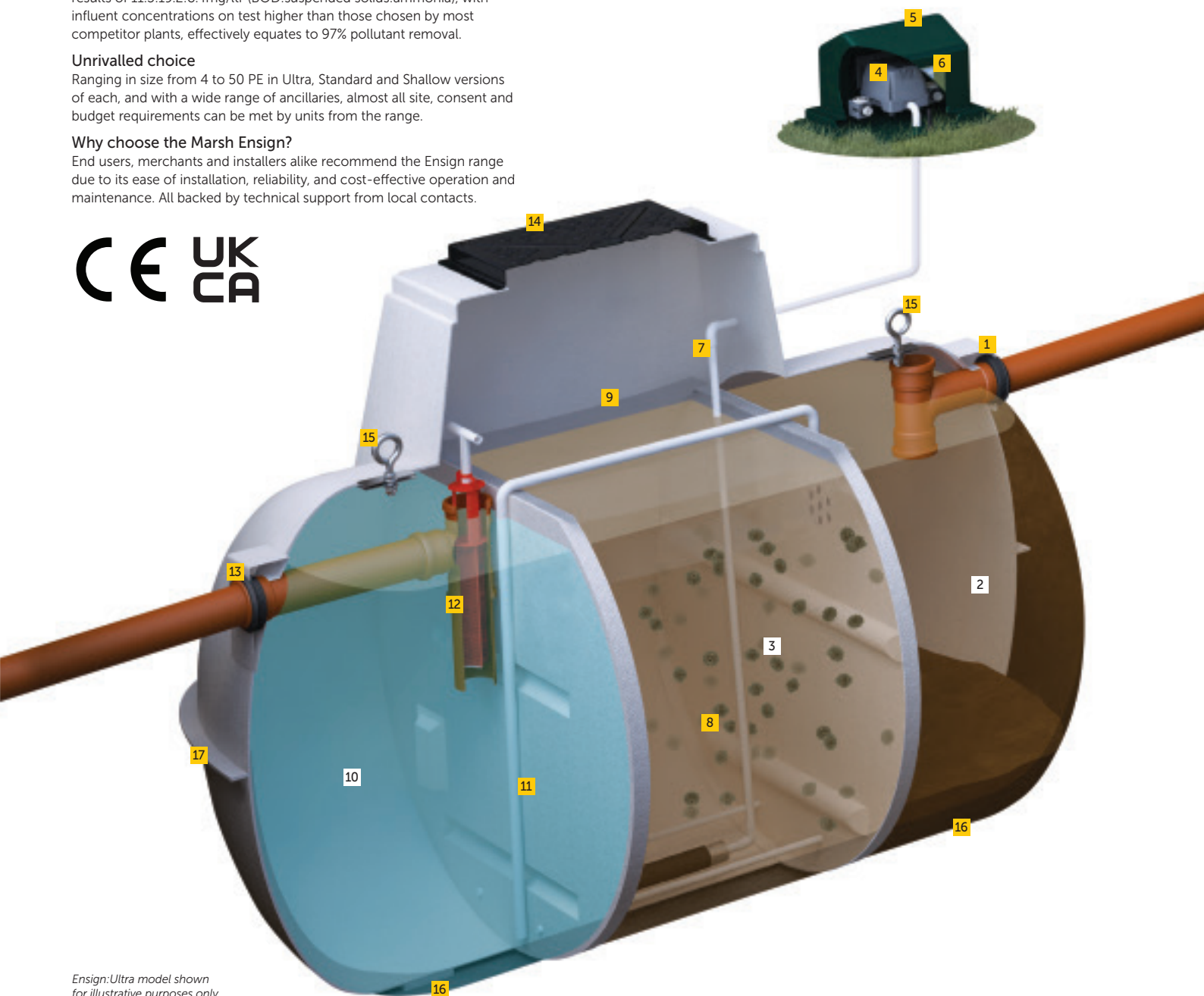
Ranging in size from 4 to 50 PE in Ultra, Standard and Shallow versions of each, and with a wide range of ancillaries, almost all site, consent and budget requirements can be met by units from the range.

#### Why choose the Marsh Ensign?

End users, merchants and installers alike recommend the Ensign range due to its ease of installation, reliability, and cost-effective operation and maintenance. All backed by technical support from local contacts.

### Operating principle

In addition to anaerobic digestion taking place in the primary settlement chamber [2] the Ensign:Ultra unit allows the clarified water to pass into a second 'aeration' chamber [3] where it is treated to remove the dissolved constituents. Here aerobic bacteria, supported by diffused air and mobile media, ensures full treatment is achieved before the treated effluent and 'sloughed off' bacteria flows to a final settlement chamber [10]. The final effluent is then discharged to the drainage field or watercourse via a Polylok filter.



Ensign:Ultra model shown  
for illustrative purposes only



## Benefits

- 1 Inlet with 'Forsheda seal'**  
Forsheda seal provides flexibility in the joint for easier installation.  
*Optional risers to increase invert depth are available.*
- 2 Primary settlement chamber**
- 3 Aeration chamber**
- 4 Advanced compressor with alarm (Ensign:Ultra units only)**  
Near silent compressor ensures minimal running, maintenance and servicing costs. Integral alarm detects low pressure in air line. (Regular Low-energy compressor on Ensign:Standard models).
- 5 Compressor housing - internal or external options available**  
The compressor can be housed internally or externally with no difference in cost.  
*External recommended to increase compressor life, and supplied as standard on 4PE, shallow and pumped outlet versions.*
- 6 RCD/Electrical connection (Ensign:Ultra units only)**  
The RCD box provides easier installation and provides a higher degree of safety. (Regular plug/socket connection on Ensign:Standard models).
- 7 PVC pressure pipe/diffuser(s)**  
Provides a protective conduit for the air diffuser line. Can be easily removed for maintenance and cleaning.
- 8 Bio-media**  
High specification bio-media (310m<sup>3</sup> per m<sup>2</sup>) and membrane diffusers ensure even circulation to eliminate 'dead spots'. The bio-media is contained by a stainless steel securing mesh to ensure no migration during handling or potential flooding.
- 9 Stainless steel mesh (Ensign:Ultra units only)**  
Retains media in aeration chamber during transportation and handling, and in the event of flooding.
- 10 Final settlement chamber**
- 11 32mm sludge return**  
Larger diameter sludge return prevents the possibility of blockages and improves system circulation. Provides higher effluent quality whilst balancing flow over a 24 hour period or periods of intermittent use.
- 12 Unique Polylok tertiary filter (Ensign:Ultra units only)**  
The Polylok tertiary filter reduces suspended solids and BOD by a further 40% helping to extend drainage field life.
- 13 Outlet with 'Forsheda seal'**  
Forsheda seal provides flexibility in the joint for easier installation.  
*Optional pumped outlets are available.*
- 14 Impermeable lid (Ensign:Ultra units only)**  
Heavy duty lid/frame improves strength and durability whilst blending into the surrounding environment. (Regular lid on Ensign:Standard models).
- 15 Integral lifting eyes**  
For steadying purposes only. Not to be used for lifting the tank.
- 16 Stabilising feet**  
Stabilising feet prevents the tank from rolling and allows safe and steady transportation and installation.
- 17 Unique 'keying-in' lip**  
Assists anchoring into granular or concrete surrounds.



**Whisspurr**  
Acoustic Vibration  
Reduction (AVR) unit  
Suitable for all types of  
diaphragm compressors.  
See page 16.

## Guidance notes

Package Sewage Treatment Plant's (or PSTP's) are often a suitable option where groundwater in the surrounding environment is vulnerable, drainage field percolation values are restrictive, or direct discharge to a water course or surface water sewer is the preferred discharge method.

- PSTP's should be sized using the latest version of British Water Flows & Loads which provides detailed information on sewage production figures and sizing calculations
- Regulatory authorities for the control of pollution in the UK normally require treatment plants conforming to BSEN12566:3 to be demonstrated as capable of producing a minimum effluent discharge quality of 20:30:20 (Biochemical Oxygen Demand; Suspended Solids; Ammoniacal Nitrogen in mg/ltr), although in certain areas more stringent site-specific qualities may be required
- No surface water should enter the system as this can reduce the system's capacity and cause solids to be flushed out which may prematurely block drainage field or cause pollution
- As with septic tanks sludge should be removed annually or in line with manufacturers instructions

Many domestic sewage treatment plants offered by "internet resellers" claim to hold EN12566-3 compliance. This does not necessarily mean compliance with the UK National Forward, May 2007.

These plants may have been tested in their country of origin but not tested to the same criteria as Marsh Industries, where we strictly adhere to the UK National Forward. Contact [contracts@marshindustries.co.uk](mailto:contracts@marshindustries.co.uk) for more information.

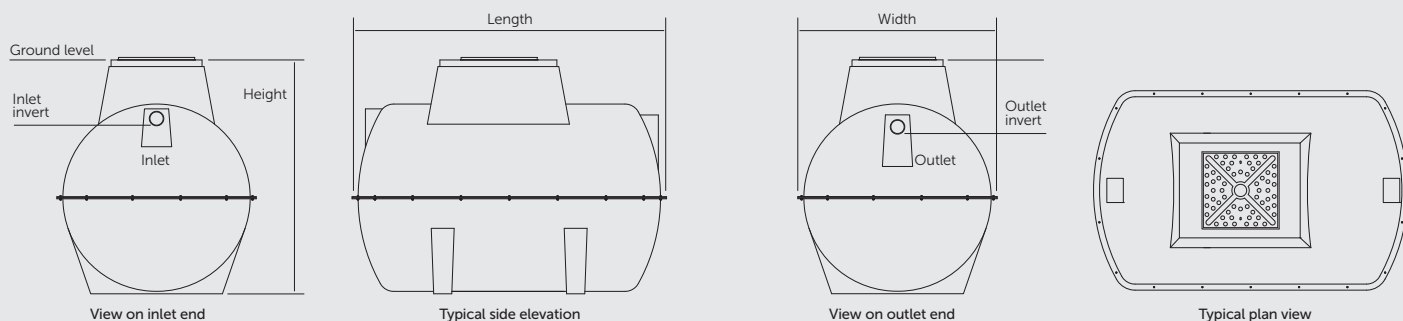




“

The Marsh Ensign is widely regarded as one of the most efficient, reliable and economical sewage treatment plants on the market

## Specifications



### Ensign:Ultra and Ensign:Standard

Model	Plant sizing examples (Approximate)		Length +/-50mm	Width +/-50mm	Height +/-50mm	Inlet		Outlet	
	Residential	Workplace (no canteen)				Invert	Ø	Invert	Ø
4	NA	6 people	1620	1352	1575	540	110	600	110
6	4-bed / 6 people	9 people	2602	1650	1935	550	110	625	110
8	5-bed / 8 people	12 people	2602	1650	1935	550	110	625	110
10	2 x 3-bed / 10 people	15 people	2602	1650	1935	550	110	625	110
12	2 x 4-bed / 12 people	18 people	2860	1912	2139	550	110	625	110
16	2 x 4-bed & 1 x 3-bed / 16 people	25 people	2860	1912	2284	720	110	800	110
20	3 x 4-bed / 18 people	32 people	3650	1912	2284	720	160	800	160
25	4 x 4-bed & 1 x 3-bed / 24 people	38 people	3650	1912	2284	770	160	850	160
30	5 x 4-bed or 6 x 3-bed / 30 people	48 people	4200	1912	2284	770	160	850	160
35	7 x 3-bed / 35 people	56 people	4200	1912	2284	770	160	850	160
40	8 x 3-bed / 40 people	72 people	5200	1912	2284	770	160	850	160
45	9 x 3-bed / 45 people	80 people	5200	1912	2284	770	160	850	160
50	9 x 3-bed / 45-50 people	80-90 people	5200	1912	2284	770	160	850	160

#### Notes:

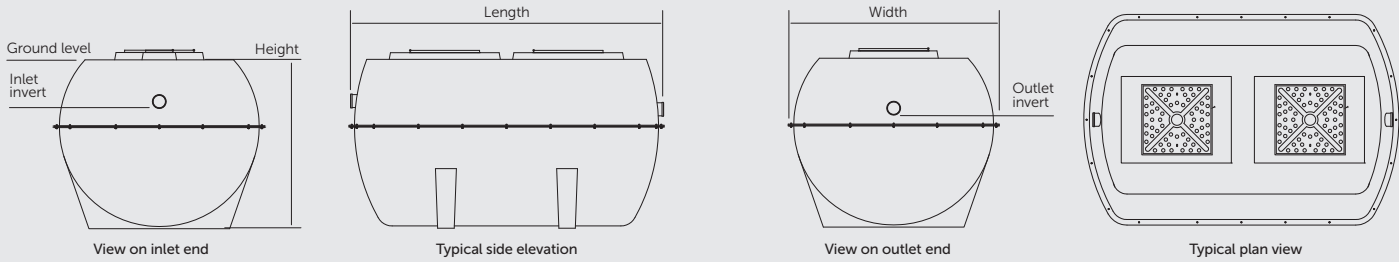
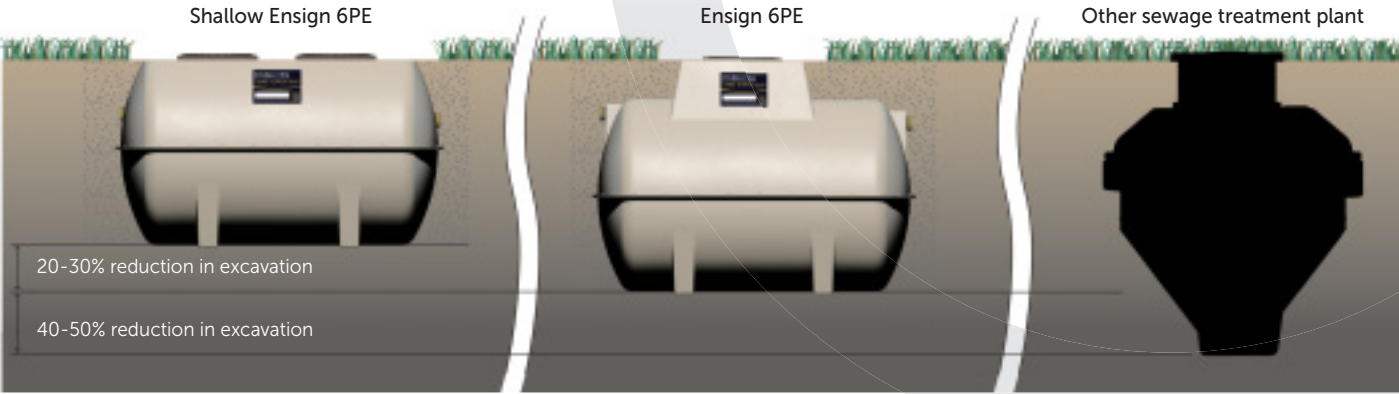
- > Larger population sewage treatment plants may be supplied as multiple tank configurations.
- > For plant sizing, precise tank sizes and configurations, please contact Marsh Industries
- > All dimensions in mm



# Shallow units

Common sewage treatment plants on the market often exceed 2.3m high. Marsh Industries offer a range of shallow plants from 4-35PE that are only 1.6m in height, meaning installation is not only possible\*, but easier and safer too.

*\*Shallow Ensign's are often favoured when hard rock site conditions mean deeper alternatives, involving costly and time-consuming excavation.*



## Shallow Ensign:Ultra and Shallow Ensign:Standard

Model	Plant sizing examples (Approximate)		Length	Width	Height	Inlet		Outlet	
	Residential	Workplace (no canteen)	+/-50mm	+/-50mm	+/-50mm	Invert	Ø	Invert	Ø
6	4-bed / 6 people	9 people	2860	1912	1600	500	110	575	110
8	5-bed / 8 people	12 people	2860	1912	1600	500	110	575	110
10	2 x 3-bed / 10 people	15 people	2860	1912	1600	500	110	575	110
12	2 x 4-bed / 12 people	18 people	2860	1912	1600	500	110	575	110
16	2 x 4-bed & 1 x 3-bed / 16 people	25 people	3650	1912	1600	500	110	575	110
20	3 x 4-bed / 18 people	32 people	4200	1912	1600	500	160	575	160
25	4 x 4-bed & 1 x 3-bed / 24 people	38 people	4200	1912	1600	500	160	575	160
30	5 x 4-bed or 6 x 3-bed / 30 people	48 people	5200	1912	1600	500	160	575	160
35	7 x 3-bed / 35 people	56 people	5200	1912	1600	500	160	575	160

Notes:

- > Larger population sewage treatment plants may be supplied as multiple tank configurations.
- > For plant sizing, precise tank sizes and configurations, please contact Marsh Industries
- > All dimensions in mm

# Ultra:Polylok L™

## Sewage treatment plants

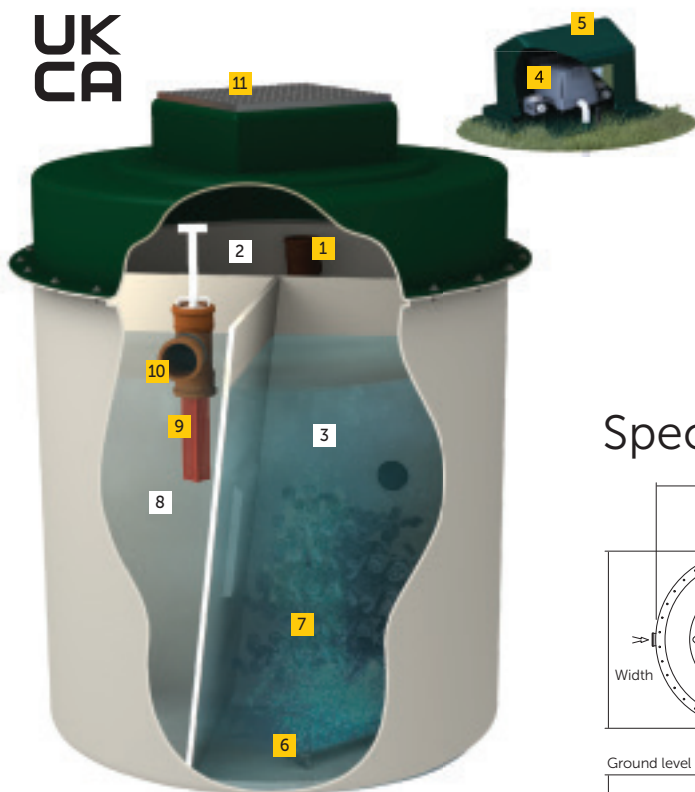
### Intensive biological processing for off-mains wastewater

## Overview

The Marsh Ultra:Polylok L (UPL) draws upon Marsh Industries' extensive experience in the industrial and commercial sewage treatment sectors bringing its outstanding performance and high-quality engineering to the domestic sector.

The UPL is available in 6PE and 12PE models, is approved to BS EN12566-3 and carries an impressive effluent quality of 20:30:20, within national consent standards.

Both models are compact and easy to install, meeting the needs of installers and specifiers alike.



### Key

- 1 Inlet
- 2 Primary settlement chamber
- 3 Aeration chamber
- 4 Compressor with alarm
- 5 Compressor housing
- 6 Air diffuser
- 7 Bio-media
- 8 Final settlement chamber
- 9 Polylok tertiary filter
- 10 Outlet
- 11 Heavy duty lid



**Whisspurr**  
Acoustic Vibration  
Reduction (AVR) unit  
Suitable for all types of  
diaphragm compressors.  
See page 16.

## Benefits

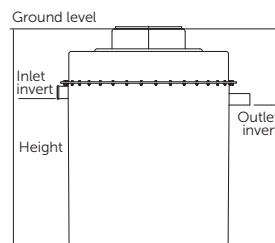
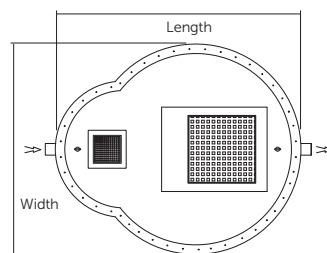
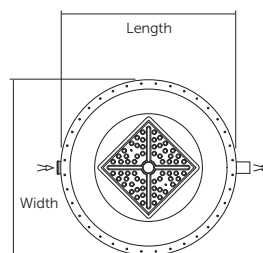
- Tested and approved to the most stringent European Standards: EN12566-3: 2005+A1:2009
- Small footprint and shallow dig for easy installation provides enhanced health and safety benefits
- Heavy duty shell as standard enables installation in all ground conditions. Unique 'keying-in' lip assists anchoring into granular or concrete surrounds
- Near silent, energy efficient compressor (located externally) with integral alarm (approximate annual running costs of £35 p/annum)
- High specification bio-media (310m<sup>3</sup> per m<sup>2</sup>) and membrane diffuser ensures even circulation and maximum treatment efficiency
- Unique Polylok tertiary filter reduces suspended solids and BOD by a further 40% helping to extend drainage field life
- Sludge return pipe improves system circulation
- Variable inverts for ease of installation at various depths – 250, 500 and 750mm risers available
- Pumped outlets available

## Operating principle

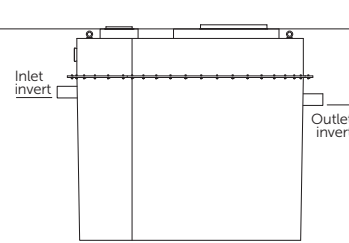
The UPL uses a similar operating principle as the Marsh:Ensign.

In addition to anaerobic digestion taking place in the primary settlement chamber [2] the UPL unit allows the clarified water to pass into a second 'aeration' chamber [3] where it is treated to remove the dissolved constituents. Here aerobic bacteria, supported by diffused air and mobile media, ensures full treatment is achieved before the treated effluent and 'sloughed off' bacteria flows to a final settlement chamber [8]. The final effluent is then discharged to the drainage field or watercourse via a Polylok filter.

## Specifications



Typical side elevation  
**UPL 6**



Typical side elevation  
**UPL 12**

Model (Pop)	Length +/-50mm	Width +/-50mm	Height +/-50mm	Inlet		Outlet	
				Invert	Ø	Invert	Ø
<b>UPL 6</b>	1700	1700	2050	650	110	725	110
<b>UPL 12</b>	2300	1992	2003	650	110	725	110

### Notes:

- > For precise tank sizes and configurations, please contact Marsh Industries
- > All dimensions in mm

# Portapura®

## Sewage treatment plants

### Compact, portable, cost-effective solution for domestic sites

## Overview

The Marsh Portapura is the most compact and efficient sewage treatment plant we've ever made.

Designed for small domestic premises, temporary accommodation and workshops, the Portapura is portable, can be installed above or below ground and treats domestic wastewater to a level that is 25 times better than the recommended EN standard.

Full Portapura tank specifications are shown on page 29.

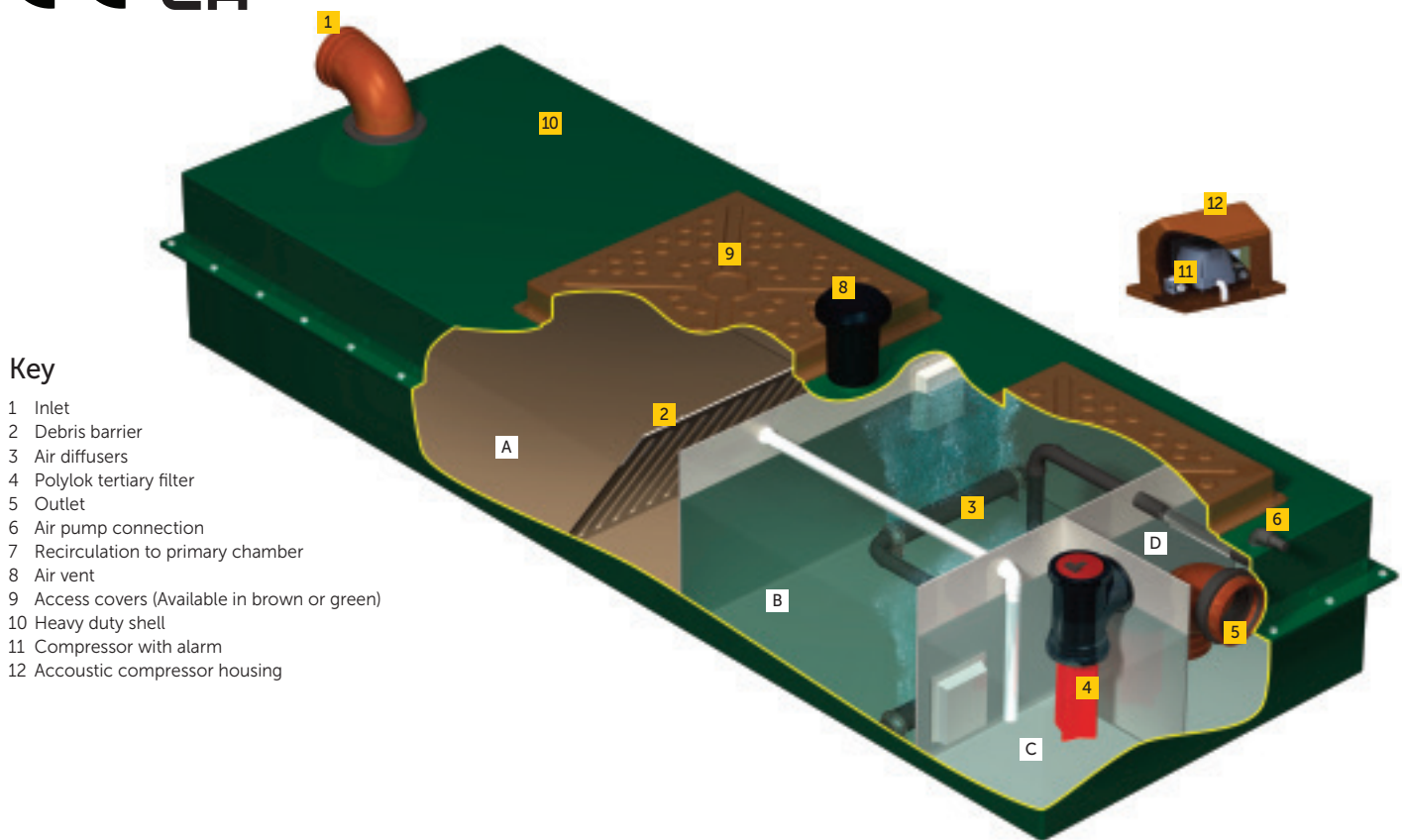


## Operating principle

Wastewater enters the primary settlement chamber [A] where large solids are removed by settlement and flotation. An accumulation forms at the base of the tank and is removed by desludging.

The clarified water is then transferred to the main aeration chamber [B]. Here it is treated to remove dissolved constituents. Aerobic bacteria, supported by diffused air, ensures full treatment is achieved before the effluent and 'sloughed off' bacteria flows to the filter chamber [C] for further solids removal.

The final effluent is then discharged to a water course via the final settlement chamber [D].



### Key

- 1 Inlet
- 2 Debris barrier
- 3 Air diffusers
- 4 Polylok tertiary filter
- 5 Outlet
- 6 Air pump connection
- 7 Recirculation to primary chamber
- 8 Air vent
- 9 Access covers (Available in brown or green)
- 10 Heavy duty shell
- 11 Compressor with alarm
- 12 Acoustic compressor housing

## Benefits

- Available in three sizes – 2, 3 or 5 person units (gravity or pumped outlet)
- Compact, lightweight construction – No heavy plant required
- Portable – Systems can be installed above ground and removed/stored when not in use
- Cost effective installation – Below ground installation can be achieved in approximately 2 hours
- Outstanding treatment efficiency – 14:19:0.7mg/ltr (BOD:Suspended solids:Ammonia)
- Near silent air compressor – Ensures minimal running, maintenance and servicing costs
- Electrical consumption: 1.8kWh/d – Equivalent to the daily use of a lightbulb
- CE approved to BS EN 12566
- Fire resistance tested in accordance with EN ISO 11925-2:210
- Tested for structural integrity in accordance with EN ISO 179-1/1eA



**Whisspurr**  
Acoustic Vibration  
Reduction (AVR) unit  
Suitable for all types of  
diaphragm compressors.  
See page 16.



# GEM-APS EN12566-7 Certified Aerated Precipitation System

Eco-friendly, economical phosphate and ammonia reduction

Introducing the latest innovation in our extensive portfolio of wastewater treatment solutions: the Marsh Gem-APS (Aerated Precipitation System)

Remote alert monitoring available for dosing. This can alert either Marsh Industries or the occupier when additional chemicals are required (including SMS/Telemetry options).

## Air blower and control panel housing

Chemical dosing process is pre-configured based upon the expected flows and loads of the sewage treatment plant

## Chemical dosing components

Controlled process involving chemical dosing and aeration

## Gem-APS

Economical, efficient, and cost-effective phosphate, ammonia and BOD reduction unit

## Package sewage treatment plant

The Gem-APS can be positioned at the outlet end of any existing sewage treatment plant (dependent on sizing)



The Gem-APS is a unique innovation for use on sites where phosphate discharge is a problem or where ammonia and BOD requirements are strict for planning consent.

## Overview

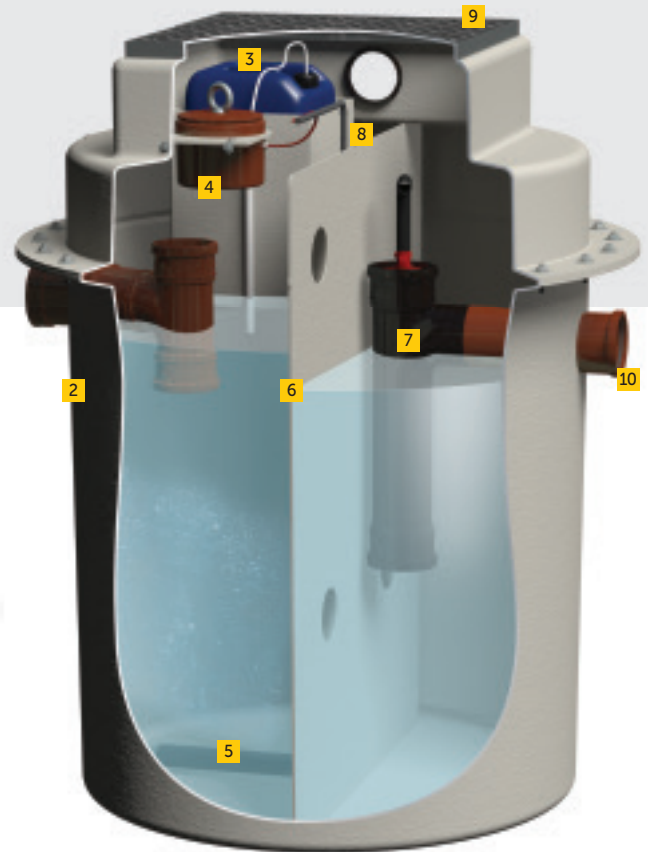
The Gem-APS is designed to further reduce phosphates, ammonia and BOD from wastewater that has been previously treated in a domestic sewage treatment plant.

Positioned at the outlet end of any existing sewage treatment plant, the Gem-APS treats the discharged wastewater in a controlled process, involving small volumes of chemical dosing and aeration, in compliance with British Water and local environmental regulations, allowing the remaining effluent to be safely discharged to a river, ditch or drainage field.

Chemical dosing amounts are pre-configured based upon the expected flows and loads of the sewage treatment plant (Full scaleable detail available). The Gem-APS can also be regulated to reduce phosphate levels further.

For precise sizing and product specification, please contact the Marsh Civils team on 01933 829470 or email [contracts@marshindustries.co.uk](mailto:contracts@marshindustries.co.uk)

**Marsh offers commissioning and servicing of the Gem-APS, it is strongly advised to use this service when setting up the unit.**



## Benefits

- Tested in accordance with BS EN 12566-7 Annex A at PIA GmbH test facility in Aachen, Germany
- Small footprint and shallow dig for easy installation provides enhanced health and safety benefits
- Heavy duty shell as standard enables installation in all ground conditions. Unique 'keying-in' lip assists anchoring into granular or concrete surrounds
- Near silent, energy efficient compressor (located externally) with integral alarm
- Unique Polylok tertiary filter reduces suspended solids helping to extend drainage field life
- Lockable lid for safety and security
- Low level chemical alarm/indicator to ensure continuous phosphorus reduction. Remote alert monitoring also available.

## Features

- 1 Inlet
- 2 GRP tank appropriately sized for the sewage treatment plant
- 3 Dosing chemical container
- 4 Dosing chemical pump in watertight housing
- 5 Aeration diffuser(s)
- 6 Separating baffle with grate to stop media migration
- 7 Polylok filter for solids and flocculent capture
- 8 Pipework and sludge return
- 9 Lockable lid for safety and security
- 10 Outlet

## Guidance notes

- The Marsh Gem-APS phosphate and ammonia reduction unit should discharge effluent into a drainage field.
- The Gem APS can dose Iron or aluminium
- Environment Agency guidance states the following in relation to aluminium discharge limits to surface water:

*"Aluminium is acutely toxic to fish. For discharges to receiving waters with a lower 95-percentile pH value greater than or equal to 6, the EQS is a maximum allowable concentration (MAC) of 1mg/l (total).*

*However, we will also apply an emission standard of 10mg/l (dissolved) as a maximum concentration in the effluent if dilution is greater than 1:10. These standards reduce the possibility of active aluminium occurring downstream of the discharge. They also minimise deposition of particulate aluminium on the bed of a watercourse. At dilutions of less than 10:1 the total aluminium standard also limits dissolved aluminium in the discharge.*

### **Aluminium limits for receiving waters with low pH**

*Aluminium in receiving waters with a low pH may remain in solution or re-dissolve. These waters are likely to already contain some dissolved aluminium, so the capacity to accept more will be limited.*

*We therefore apply different limits for aluminium in discharges to receiving waters that have a lower 95-percentile pH value of less than 6.*

*For soft waters, where the calcium carbonate concentration is less than 20mg/l annual average, the EQS is a 95-percentile limit of 75µg/l (dissolved).*

*MAC of 100µg/l (dissolved) we will apply an emission standard of 500µg/l (total) as a maximum concentration in the effluent. For hard waters, where the calcium carbonate concentration is greater than or equal to 20mg/l annual average, the EQS is a: 95-percentile limit of 500µg/l (dissolved).*

*MAC of 1mg/l (dissolved) we will apply an emission standard of 1mg/l (total) as a maximum concentration in the effluent. For receiving waters that already contain aluminium, we consider discharge limits on a detailed, site-specific basis".*

**Phosphate: 0.9mg/L**  
**Ammonia: 0.4mg/L**  
**BOD: 2mg/L**





# Uni:Gem★

## Septic conversion unit

Unique septic tank to sewage treatment plant conversion unit

### Overview

Marsh Industries' latest innovation, the Uni:Gem★, is a unique septic tank conversion unit which exceeds EN12566-3 / EN12566-6 standards and conforms with 2020 General Binding Rules (GBRs for septic tanks or small sewage treatment plants for domestic use).

Positioned behind any existing septic tank the Uni:Gem★ treats the septic tank discharge to an effluent quality of BOD 12.25:TSS 16:Ammonia 14.845 mg/l (The UK Forward is less than BOD 20:TSS 30: Ammonia 20), meaning final effluent can be discharged safely to a river, ditch or watercourse.

The Uni:Gem★ provides notable benefits for existing septic tank owners, particularly those who need to upgrade or replace their septic tanks before 1st January 2020.



### Operating principle

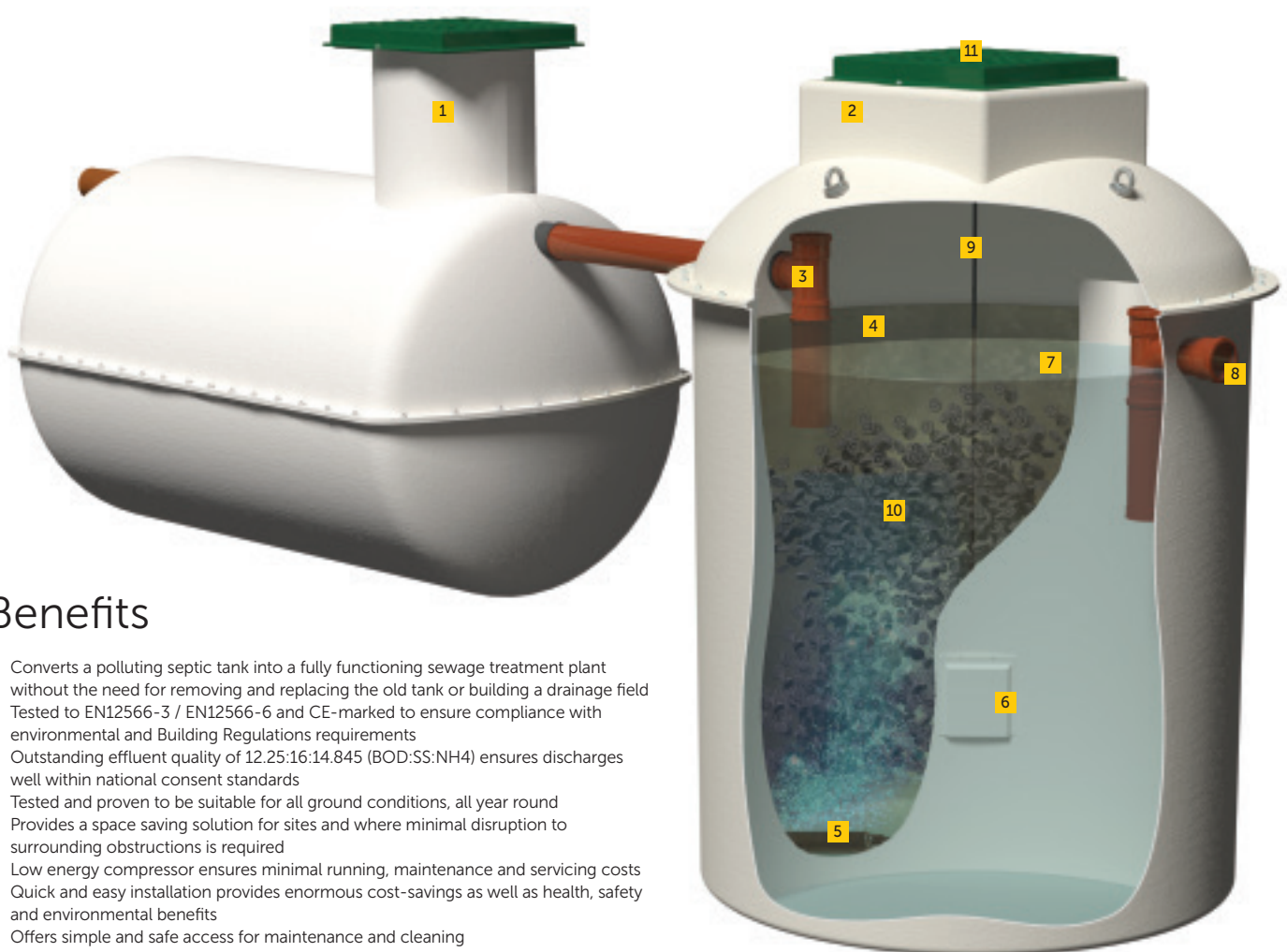
Effluent from the existing septic tank or sewage treatment plant is transferred to the Uni:Gem★ unit and enters the aeration chamber where it is treated to remove dissolved constituents. Here aerobic bacteria, supported by diffused air and mobile media, ensures full treatment is achieved before the treated effluent (and 'sloughed off' bacteria) flows to a final settlement chamber prior to discharge.

#### Key

- 1 Existing septic tank
- 2 Uni:Gem★ tank
- 3 Inlet
- 4 Aeration chamber
- 5 Air diffuser
- 6 Transfer to final settlement
- 7 Final settlement
- 8 Outlet
- 9 Air diffuser feed
- 10 Bio media
- 11 Manway access



**Whisspurr**  
Acoustic Vibration  
Reduction (AVR) unit  
Suitable for all types of  
diaphragm compressors.  
See page 16.



### Benefits

- Converts a polluting septic tank into a fully functioning sewage treatment plant without the need for removing and replacing the old tank or building a drainage field
- Tested to EN12566-3 / EN12566-6 and CE-marked to ensure compliance with environmental and Building Regulations requirements
- Outstanding effluent quality of 12.25:16:14.845 (BOD:SS:NH4) ensures discharges well within national consent standards
- Tested and proven to be suitable for all ground conditions, all year round
- Provides a space saving solution for sites and where minimal disruption to surrounding obstructions is required
- Low energy compressor ensures minimal running, maintenance and servicing costs
- Quick and easy installation provides enormous cost-savings as well as health, safety and environmental benefits
- Offers simple and safe access for maintenance and cleaning
- Horizontal and vertical models available
- Integral lifting eyes for steadying purposes only. Not to be used for lifting the tank
- Final effluent is clear and odourless

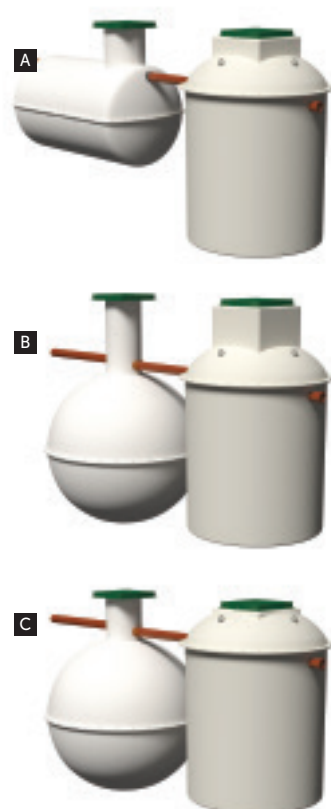




## Specifications

Model	Width Ø +/-50mm	Height +/-50mm	Inlet		Outlet	
			Invert	Ø	Invert	Ø
<b>A</b> UG-SCS Uni:Gem★ up to 6PE <i>For shallow cylindrical septic tanks</i>	1512 1652 over flanges	2300	800	110	900	110
<b>B</b> UG-SPH Uni:Gem★ up to 6PE <i>For spherical 'onion-shaped' septic tanks</i>	1512 1652 over flanges	2540	1040	110	1140	110
<b>C</b> UG-STP6 2800L septic tank Uni:Gem★ up to 6PE EN12566-6 complete package sewage treatment plant	1870	2330	550	110	590	110
	1512 1652 over flanges	2090	590	110	690	110

- > Uni:Gem★ supplied with external compressor and compressor housing
- > Check your septic tank outlet invert (ground level to the bottom of the pipe)
- > Other sizes of Uni:Gem★ are available. Contact Marsh Industries for more information
- > For precise tank sizes and configurations, please contact Marsh Industries
- > All dimensions in mm



## 2020 General Binding Rules

For decades, millions of septic tanks have been installed throughout the UK in rural and urban areas. Septic tanks are known to be ineffective at processing sewage to modern environmental standards, causing long-term damage to the country's natural water infrastructure and wildlife.

It was therefore inevitable that new rules and a code of conduct would be introduced to prevent the effects of wastewater pollution once and for all; The Environmental Permitting (England and Wales) (Amendment) (England) Regulations 2014 came into force on 1 January 2015 creating the General Binding Rules (GBRs) for septic tanks or small sewage treatment plants for domestic use. These rules are designed to reduce the level of pollution from sewage in the nation's watercourses.

The rules state that any existing septic tank discharging to surface water, ie, to a water ditch, stream or river, etc, must either be upgraded or replaced with a new package sewage treatment plant by 1st January 2020.

Marsh Industries, the leading UK manufacturer of package sewage treatment plants, produces over 3000 units per year. However the company's range of Uni:Gem★ septic conversion units is the only product available on the market which can treat wastewater from an existing septic tank without the need for a complete replacement product or drainage field upgrade.

To comply with the GBRs and current EN standards, the entire Uni:Gem range was redeveloped from the ground up and tested, not only to meet, but to exceed UK and International standards. The Uni:Gem★ was born – creating an 'industry first' 2020 compliant septic conversion unit with outstanding processing performance.

The Uni:Gem★ range was tested in accordance with BSEN12566-3/A1:2009 and EN12566-6 standards at the PIA GmbH test facility in Aachen, Germany, over the course of 38 weeks with a daily loading of:

**Flow: 900 litres/day      BOD: 360g      NH<sub>4</sub>: 48g**

Testing occurred between November 2018 and August 2019 to ensure all seasons were covered whilst minimum/maximum temperatures were tested to assure Ammonia and BOD process reduction for the UK climate. Holiday periods were also simulated during the test procedure.

Final test results yielded an output of 12.5:16:4mg/ltr (BOD:Suspended solids:Ammonia) that is well within national discharge consent requirements.

The Uni:Gem★ is an extremely cost effective solution for converting any polluting septic tank into a fully compliant sewage treatment plant ensuring homeowners, estate managers, water companies/amenities have an effective way to keep the environment clean whilst providing a quick and efficient installation process.

# Whisspurr®

## Acoustic Vibration Reduction (AVR) Unit

### Overview

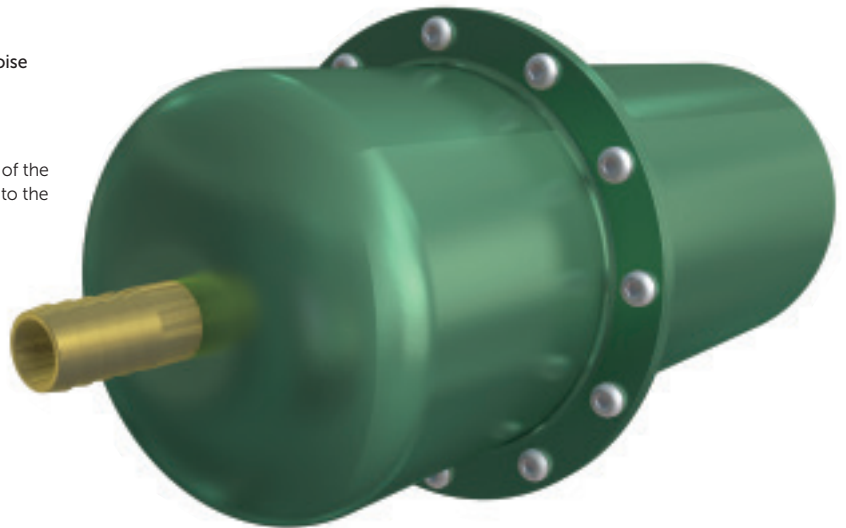
Introducing Whisspurr, the innovative AVR unit designed to reduce noise and vibration from diaphragm compressors used in the water and wastewater treatment sectors.

Fitted inline between the compressor and air diffuser, the Whisspurr significantly reduces noise and vibration generated from the pulsation of the diaphragm compressor whilst enabling a consistent, unrestricted flow to the air diffuser.

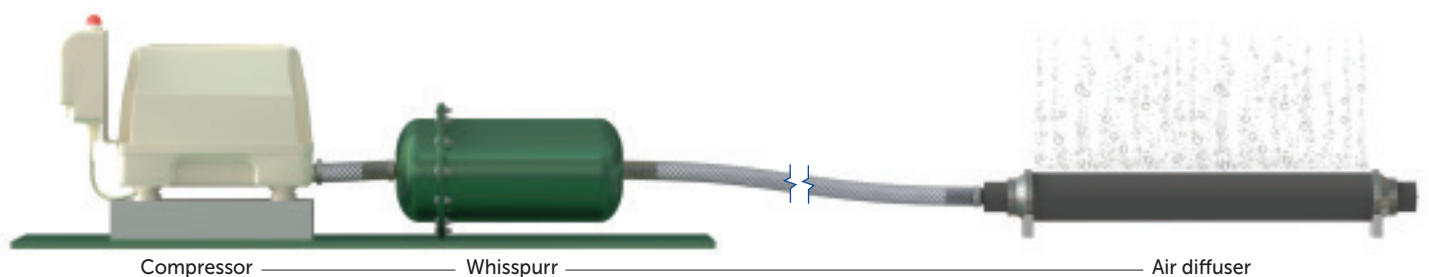
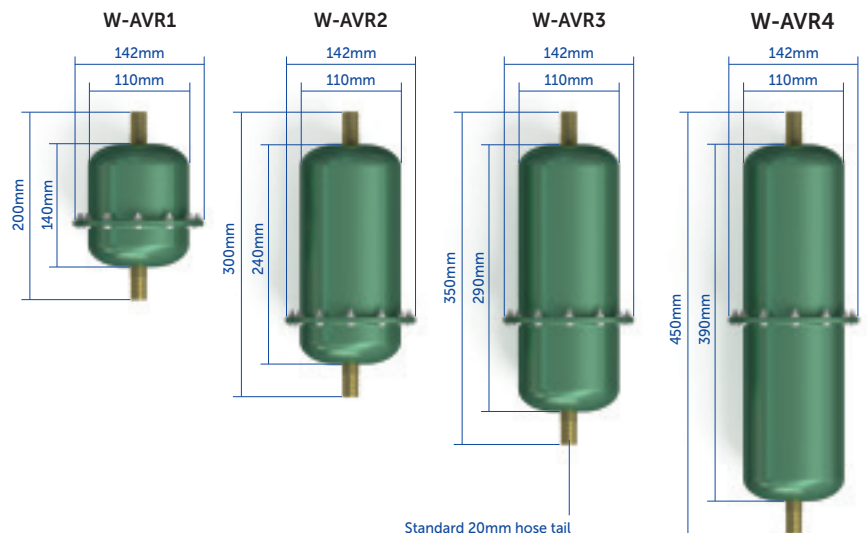
The Whisspurr is suitable for all types of compressor; Bibus Secoh, Charles Austen, Nitto, etc.

For accurate unit sizing, contact Marsh Industries' technical team on 01933 654582.

- Significantly reduces compressor volume and vibration, addressing concerns of noise pollution in rural areas
- No reduction in air pressure from the compressor
- No increase in back pressure to the compressor
- Requires no electrics
- Available in four standard sizes
- Easy retrofit to existing compressors
- Hose tail is 20mm standard
- Dark green unit as standard
- Unique UK design, patent pending
- Optional extras include Marsh acoustic compressor housings (Two sizes available depending on compressor size)



Hear the difference  
for yourself at  
[marshindustries.co.uk](http://marshindustries.co.uk)



# Euro:Septic™/Septic tanks

## Basic treatment to off-mains wastewater

### Overview

The Euro:Septic offers significant technical improvements and cost-savings over current market options.

The range, available in capacities from 2800-4500 litres, is CE marked to comply with Construction Product Regulations and compliments the company's existing range of horizontal septic tanks.

The Euro:Septic is tested and certified to EN12566-1 Annex B and benefits from an outstanding hydraulic efficiency of 99.63%. Horizontal septic tanks are also tested and certified to EN12566-1.

### Benefits

- Tested to BSEN12566:1 and CE-marked to ensure compliance with latest environmental and Building Regulations requirements
- Traditional 'onion-style' tanks for standard installations
- Low profile versions for high water table or hard rock site conditions
- Unique Polylok filter improves effluent quality and prolongs drainage field life
- Heavy duty shell as standard to enable installation in all ground conditions
- Integral lifting eyes for steady purposes only. Not to be used for lifting the tank
- 'Keying-in' assists anchoring into granular or concrete surround
- Pedestrian cover included as standard

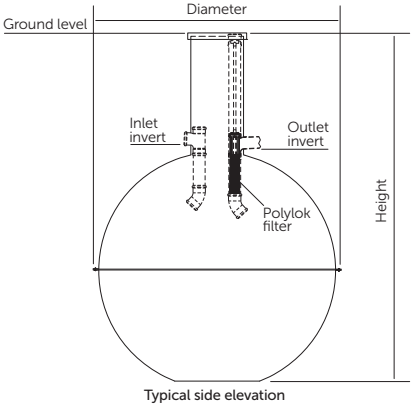
### Operating principle

Normally the simplest and most economical means of treating wastewater from small developments, a septic tank holds sewage and allows solids to settle into sludge at the bottom of the tank. Here it is naturally broken down by a process known as anaerobic digestion, which provides settlement and some biological treatment. The effluent is not fully treated and must receive additional treatment before discharge to the water environment – the most common method being to spread the effluent to land via an underground drainage field.



- Key**
- 1 Inlet
  - 2 Settlement chamber
  - 3 Polylok filter
  - 4 Outlet
  - 5 Access cover

### Euro:Septic

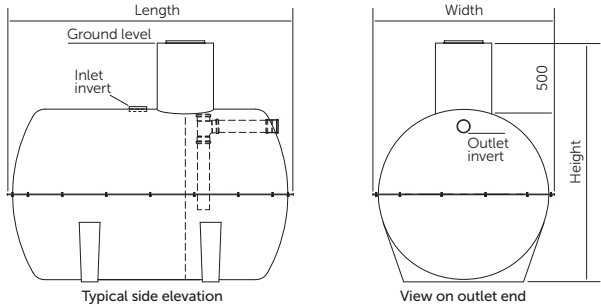


Size	Dia +/-50mm	Height +/-50mm	Inlet		Outlet	
			Invert	Ø	Invert	Ø
2800L	1870	2780	1000	110	1040	110
3800L	2075	3000	1000	110	1040	110
4500L	2196	3100	1000	110	1040	110

> For precise tank sizes and configurations, please contact Marsh Industries

> All dimensions in mm

### Horizontal septic tanks



Size	Length +/-50mm	Width +/-50mm	Height +/-50mm	Inlet		Outlet	
				Invert	Ø	Invert	Ø
2800L	3000	1250	1750	500	110	800	110
3800L	4000	1250	1750	500	110	800	110
4500L	2650	1600	2100	500	110	800	110
6000L	2950	1900	2400	500	110	800	110
8000L	3640	1900	2400	500	160	800	160
10000L	4200	1900	2400	500	160	800	160
12000L	5200	1900	2400	500	160	800	160
14000L	5840	1900	2400	500	160	800	160
16000L	6700	1900	2400	500	160	800	160
18000L	7500	1900	2400	500	160	800	160
20000L	8100	1900	2400	500	160	800	160



# Pump chambers

## For pumping sewage and water to mains

### Overview

When discharge to mains is required, but to do so by gravity is impractical, a pump chamber system will be needed. Although available as floor-mounted units for indoor applications such as basements, the vast majority are installed outdoors at levels to suit on-site conditions and topography.

The Marsh range incorporates systems for pumping surface water or domestic sewage to mains, septic/PSTP effluent to drainage fields/watercourses, and bespoke systems for larger domestic and industrial applications.



### Operating principle

Each pump chamber contains a number of float switches linked to a control panel that automatically controls flow and levels.

In a **single pump chamber** there are three float switches:

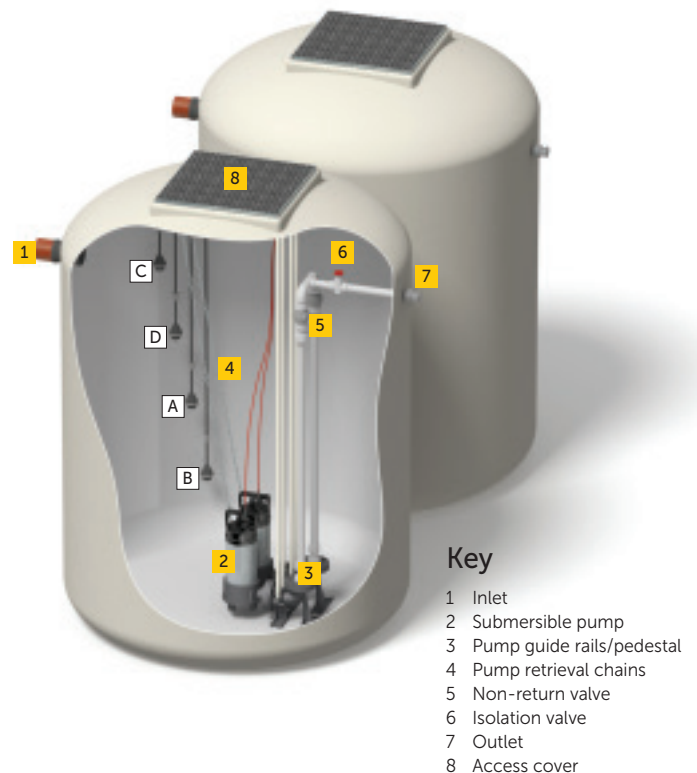
Float A: Actuates the pump cycle until level drops to low level.

Float B: Low level float stops the pump.

Float C: High level alarm – positioned above the pump actuator float (min 100mm).

For **twin pump chamber** operation there is an additional float switch (Float D) – usually positioned 150mm above first actuator (A) – which actuates the second pump in periods of higher flow.

After each cycle the pumps alternate to extend pump life and are designed to run for a minimum of 60 seconds with no more than 15 starts per hour.



### Pump chamber benefits

- Designed to BS EN12050 for structural strength and water-tightness and to BS EN752 to comply with hydrostatic and electrical requirements
- Smooth internal walls and integral pump well improves pump efficiency and eliminates 'dead spots' which can lead to odours and septicity
- Pre-assembled pipework for fully automatic operation (pump/control equipment separate)
- Heavy duty (industrial) 'peardrop' floats and Lowara (Xylem) pumps throughout ensure robust, reliable design and maximum efficiency of pump with minimal clogging or wear
- Unique 'keying-in' lip to assist anchoring into concrete surround
- Variable invert depths and orientations to suit individual site conditions

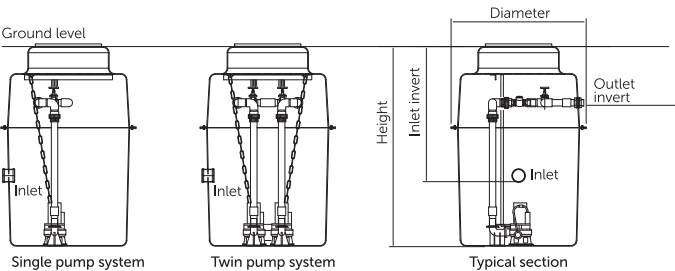
### Guidance notes

- Where foul water drainage from a domestic property is to be pumped to the mains the effluent receiving chamber should be sized to contain 24-hour inflow to allow for disruption in service, the minimum daily discharge being taken as 150 litres per person per day
- For other building types the capacity of the receiving chamber should be based on the calculated daily demand of the water intake for the building, or when only a proportion of the foul sewage is to be pumped then the capacity should be based pro-rata
- If the sewer is to be 'adopted' by a local water authority, please contact Marsh Industries as Sewers for Adoption (SFA) specification and additional local authority related criteria may apply

# Specifications

## Vertical pump stations

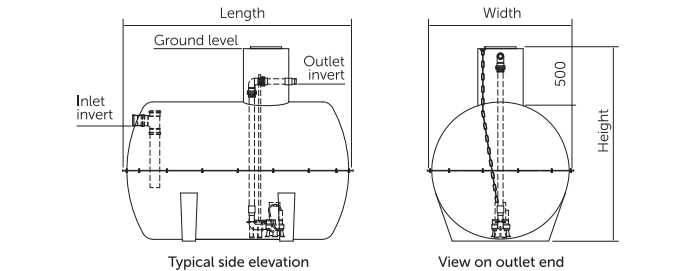
For housing projects and small commercial developments



Model	Dia +/-50mm	Height +/-50mm	Inlet		Outlet		Storage below invert	Total Storage Litres
			Invert	Ø	Invert	Ø		
Mini	600	1100	500	110	300	63	120	234
Midi	600	1500	500	110	300	63	280	421
Maxi	600	2000	500	110	300	63	421	561
CPS1	1170	1100	500	110	300	63	470	867
CPS2	1170	1500	700	110	300	63	780	1183
CPS3	1170	2200	900	110	300	63	1025	1735
CPS4	1170	2600	900	110	300	63	1340	2050
CPS5	1958	2100	900	110	300	63	2440	3700
CPS6	1958	3400	900	110	300	63	4000	6000

## Horizontal pump stations

For larger housing projects, and commercial/industrial developments



Model	Length +/-50mm	Width +/-50mm	Height +/-50mm	Inlet		Outlet		Total Storage Litres
				Invert	Ø	Invert	Ø	
AT2800	3000	1250	1750	800	110	300	63	2800
AT3800	4000	1250	1750	800	110	300	63	3800
AT4500	2650	1600	2100	800	110	300	63	4500
AT6000	2950	1900	2400	800	160	300	63	6000
AT8000	3640	1900	2400	800	160	300	63	8000
AT10000	4200	1900	2400	800	160	300	63	10000
AT12000	5200	1900	2400	800	160	300	63	12000
AT14000	5840	1900	2400	800	160	300	63	14000
AT16000	6700	1900	2400	800	160	300	63	16000
AT18000	7500	1900	2400	800	160	300	63	18000
AT20000	8100	1900	2400	800	160	300	63	20000

Notes:

- > All pump chambers are available for dirty water (DW) or sewage (SW), in single pump (SP) and twin pump (TP) configurations. Pump chambers are usually bespoke.
- The dimensions given on this page are for guidance only
- > For precise tank sizes and configurations, please contact Marsh Industries
- > All dimensions in mm

## Pump chamber maintenance packages

Pump chamber maintenance packages provide peace of mind that your pump and associated equipment will continue to work reliably and effectively, whilst at the same time considerably extending their working-life expectancy.

Pump chambers covered by Marsh maintenance packages suffer far fewer intermediate breakdowns, making scheduled maintenance an extremely cost-effective safeguard against potential failure.

For details on Marsh pump chamber maintenance packages contact 01933 654582 or email [sales@marshindustries.co.uk](mailto:sales@marshindustries.co.uk).



# Sewage treatment

## General guidance as provided by environmental regulators

As stated in this brochure, for development proposals in sewered areas it is usually a legal requirement to connect to the public sewer, either by gravity or pumping, as the sewage is conveyed to a municipal sewage treatment works.

However, if it can be demonstrated that the proposed sewage disposal system offers a more sustainable solution to the overall water management of the site, then the regulators will consider the installation of a 'private' system.

For any such proposal you should:

- Check with your regulating body to confirm current status with regard to Registration/Consent, quality and volume limits, etc
- Take account of the requirements of Building Regulations and discuss with the local planning authority at an early stage - well before any planning application is made

## Drainage fields

If you have access to a suitable area of land, discharge from your septic tank or treatment plant to a properly designed and sized drainage field is the best environmental option as the treated effluent recharges groundwater, nutrients are retained in the soil, and nutrient loads on surface waters are reduced.

The most common form of drainage field is a subsurface percolation area comprising perforated infiltration pipes laid in shingle-filled trenches – normally within 1m of ground level to allow the micro-organisms in the soil to break down the organic matter, and at least 1.2m above the winter water table.

The drainage field has two principal purposes:

- 1 To allow percolation of partially treated/treated effluent to ground at a controlled rate
- 2 To allow further treatment of partially treated effluent before it reaches the groundwater level

Before you can dispose of effluent via a drainage field you first need to assess whether such a route is appropriate, ie, you have a good depth of well-drained, well-aerated soil away from watercourses, wells/boreholes, dwellings, and avoiding sloping sites and areas prone to waterlogging.

### Trial hole and percolation test method (See figure 1)

To calculate the exact area of land required for effective disposal an 'assessment' is required, usually by performing a percolation/water table test as outlined in BS6297 (Code of Practice for the Design and Installation of Drainage Fields for use in Wastewater Treatment) and the latest version of Building Regulations: H2.

A **trial hole** should be dug to determine the position of the standing groundwater table a minimum of 1m<sup>2</sup> in area and 2m deep, or a minimum of 1.5m below the invert of the proposed drainage field pipework. The groundwater table should not rise to within 1m of the invert level of the proposed effluent distribution pipes. If the test is carried out in summer, the likely winter groundwater levels should be considered.

A **percolation test** should then be carried out to assess the further suitability of the proposed area. A hole 300mm square should be excavated to a depth 300mm below the proposed invert level of the effluent distribution pipe. Where deep drains are necessary the hole should conform to this shape at the bottom, but may be enlarged above the 300mm level to enable safe excavation to be carried out.

Fill the 300mm square section of the hole to a depth of at least 300mm with water and allow it to seep away overnight.

Next day, refill the test section with water to a depth of at least 300mm and observe the time, in seconds, for the water to seep away from 75% full to 25% full level (ie, a depth of 150mm). Divide this time by 150. The answer gives the average time in seconds (Vp) required for the water to drop 1mm.

The test should be carried out at least three times with at least two trial holes and the average figure from the tests should be taken. The test should not be carried out during abnormal weather conditions such as heavy rain, severe frost or drought.

Drainage field disposal should only be used when percolation tests indicate average values of **Vp of between 12 and 100**. This minimum value ensures that untreated effluent cannot percolate too rapidly into groundwater. Where Vp is outside these limits effective treatment is unlikely to take place in a drainage field.

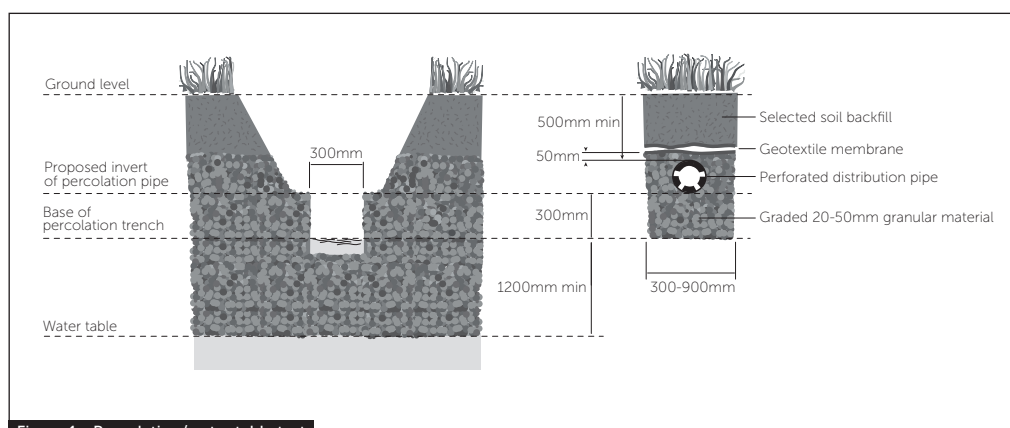


Figure 1 - Percolation/water table test

### Note:

- > The phrase 'soakaway' is often used in relation to septic/treatment plant discharges. However, the purpose of a 'soakaway' is to distribute surface water to ground as quickly as possible and does not provide the required features of a drainage field.



Drainage field construction (See figures 1 and 2)

Drainage fields should be designed and constructed to ensure aerobic contact between the liquid effluent and the subsoil using perforated pipe laid in trenches:

- Pipes should be laid on a 300mm layer of clean shingle or broken stone (graded between 20mm and 50mm) at a minimum depth of 500mm and a uniform gradient not steeper than 1:200
- Trenches should be filled to a level 50mm above the pipe and covered with a layer of geotextile to prevent the entry of silt. The remainder of the trench can be filled with soil
- Trenches should be from 300mm to 900mm wide with areas of undisturbed ground 2m wide being maintained between parallel trenches.
- An inspection chamber should be installed between the septic tank and the drainage field
- Drainage fields should be set out as a continuous loop fed from the inspection chamber

To calculate the floor area of the drainage field ( $A_t$  in  $m^2$ ), the following formulas should be used:

For septic tanks:  $A_t = p \times V_p \times 0.25$   
For treatment plants:  $A_t = p \times V_p \times 0.20$

Where  $p$  is the number of persons served by the tank and  $V_p$  is the percolation value (secs/mm) obtained.

If it is not possible to discharge to a drainage field but you can discharge to a watercourse, coastal water or surface water sewer you should consider installing a package sewage treatment plant to treat sewage to a sufficient standard as to allow direct discharge to the receiving waters.

Tank sizing

The size of sewage treatment system you will require depends on the number of people that occupy the site and their activities, and it is at this stage you should re-contact Marsh.

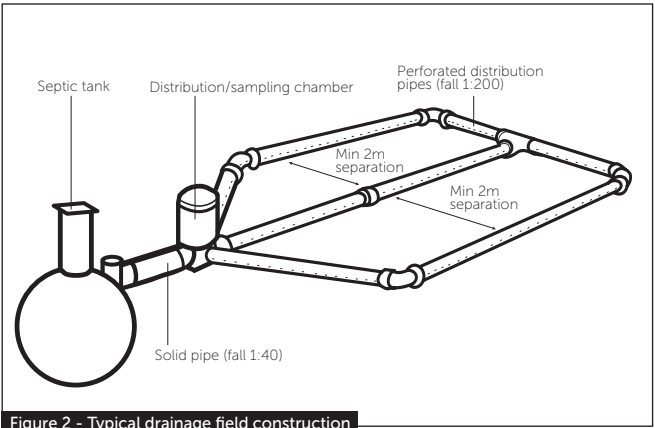


Figure 2 - Typical drainage field construction

You will need to provide detailed information about the sewage to be treated and its disposal method to enable calculation of the size of plant you will need. It is essential that you give accurate information as incorrect specification may result in the system you are provided with being inadequate and not treating the sewage effectively, leading to foul smells and possible pollution.

Distance from properties

Guidance collated from several sources recommends the following:

Distance from	Dwelling	Watercourse	Borehole/well
<b>Pump chamber:</b>			
1-5 dwellings	5m	-	-
6-20 dwellings	10m	-	-
20+ dwellings	15m	-	-
<b>Septic tank</b>	7m	10m	50m
<b>Treatment plant</b>	7m	10m	50m
<b>Cesspool</b>	7m	10m	50m
<b>Drainage field</b>	15m	10m	50m

Desludging

Sewage treatment is an ongoing process and the micro-organisms must stay healthy for the system to work. You should desludge the system regularly (usually annually or in line with manufacturer instructions) to prevent the build-up of sludge and solids to ensure sewage flows freely through the unit. It is recommended that not all sludge is removed as it can act as an anaerobic seed.

Tanks should be inspected monthly to check they are working correctly – the inlet chamber should be free-flowing and the effluent from the outlet should be free-flowing and clear.

Where emptying is by tanker, siting within 30m of suitable vehicle access point is recommended.

- Notes:
- > *Septic tanks can only discharge to ground via a drainage field – discharge to a watercourse (stream, ditch, pond) is not allowed.*
  - > *Drainage fields are not permitted in Zone 1 groundwater protection zones.*
  - > *No underground services or access roads/driveways/paved areas should be located in the disposal area.*
  - > *Discharge from a sewage treatment plant requires a smaller (20% less) drainage field than a septic tank for effective treatment.*
  - > *Elevated drainage mounds can provide an alternative to drainage fields in certain circumstances as they provide an aerated layer of soil where a conventional drainage field is inappropriate due to occasional waterlogging.*

# CIVILS/COMMERCIAL OFF-MAINS DRAINAGE PRODUCTS



# Project management

With extensive experience of managing the design, manufacture and despatch of pump stations, sewage treatment plants, attenuation tanks, rainwater harvesting systems and associated products, Marsh Industries' Civils Team works closely with clients to ensure projects are delivered on time and on budget.

The company trains its team to recognised competency standards to address the growing management requirements from order placement through to delivery and installation.

All products are backed by Marsh Industries commercial and technical support.

Post installation and commissioning visits are available, together with service and maintenance contracts if required.



## Gaia Sege<sup>©</sup>

### Process design software

Developed by Marsh Industries, the unique Gaia Sege process design software uses core information to accurately calculate and tailor key variables ensuring total optimisation for individual applications.

These precise calculations provide assurance to consultants, engineers, specifiers and contractors that the system is specifically designed to meet the appropriate standards of regulatory bodies.

### Sewage treatment plants

For sewage treatment plants, the software uses established core process equations to accurately calculate and tailor key variables ensuring total processing optimisation for Biological Oxygen Demand (BOD), Total Suspended Solids (TSS) and Ammonia (NH<sub>4</sub>) reduction and removal.

Gaia Sege software also uses 'British Water Flows & Loads' data to calculate initial flows and loadings whilst also calculating peak flows and levels.

The programme can also calculate accurate sludge generation and storage on a daily basis, dependent upon final effluent standards required, ensuring the optimisation of primary chambers, individual clarifiers, diffused oxygen feed and final settlement chamber.

### Pump chambers

Gaia Sege utilises current building regulations to calculate precise storage chamber sizes. Pump systems are determined by using friction head loss calculations based on minimum self-cleansing velocities in order to specify the best possible pump(s) for the application.

### Grease traps

Appropriate grease trap sizes are generated by accounting for the amount of grease and flow generated from the grease producing facility whilst providing adequate retention time befitting of these variables.

### Storm Dammer water attenuation tanks

Marsh Industries' rainfall storage sizing programme, Gaia Storm Dammer, can simulate the calculated flood storage required for any prolonged period within a set geographic area (ie, 1 in 5 year or 1 in 100 year rainfall).

## Structural integrity testing

Structural integrity tests, performed in accordance with EN ISO 179-1/1eA: 2010-11, were undertaken to evaluate the strength of Marsh Industries' GRP materials against similar GRP materials used by other manufacturers.

Three separate material samples were submitted for impact testing; Marsh GRP material (virgin unfilled resin), a GRP material containing calcium fillers and a GRP material containing sand filler.

The tests involved 12 samples of each material at a size of 80x10x5mm. The nominal pendulum energy was 15J at an impact velocity of 3.8m/s.

Results proved Marsh GRP material to be 40% stronger than the other materials tested.

## Fire resistance testing

Fire resistance testing was performed to assess ignitability of products subjected to direct impingement of flame. Marsh Industries' GRP material passed all practical testing to achieve EN ISO 11925-2:2010 standard.



# Ultra:Polylok™

## Sewage treatment plants

### Advanced biological processing for off-mains wastewater

## Overview

Marsh Ultra Polylok sewage treatment systems provide advanced biological treatment to off-mains wastewater on sites ranging from 50-500PE.

The units are ideally suited for large residential, commercial, industrial and leisure sites - particularly where onerous consent standards preclude the use of standard 'off the shelf' units.

Proven reliability of the simple but effective Submerged Aeration Filtration (SAF-MBBR) system offers both operating and financial benefits when compared to more complex alternatives that require frequent servicing and maintenance to sustain performance.

## Benefits

### Plant sizing

Bespoke design with optional tank sizes ranging from Ø1.9-3m satisfies the demands of site conditions. Each option is the same price.

### Class-leading effluent quality

20:30:20mg/ltr (BOD:suspended solids:ammonia) effluent quality ensures discharge is well within national consent standards. Improved effluent quality to meet tighter consent standards can be achieved by Gaia design.

### Heavy duty shell as standard

Structurally sound and built to last. Enables installation in all ground conditions.

### High media surface area

High specification bio-media (310m<sup>2</sup> per m<sup>3</sup>) and membrane diffusers provide even circulation to eliminate 'dead spots'.

### Eco-friendly process control

Energy-efficient, economical and flexible process control for minimal running, maintenance and servicing costs (see pages 26-27).

For sites that do not need the ability to regulate process control, Marsh can offer diaphragm compressors for sewage treatment plants up to 150PE

### Internal recirculation

Continues the treatment process to provide higher effluent quality whilst balancing flow over 24 hour period or periods of intermittent use.

### Polylok tertiary filter

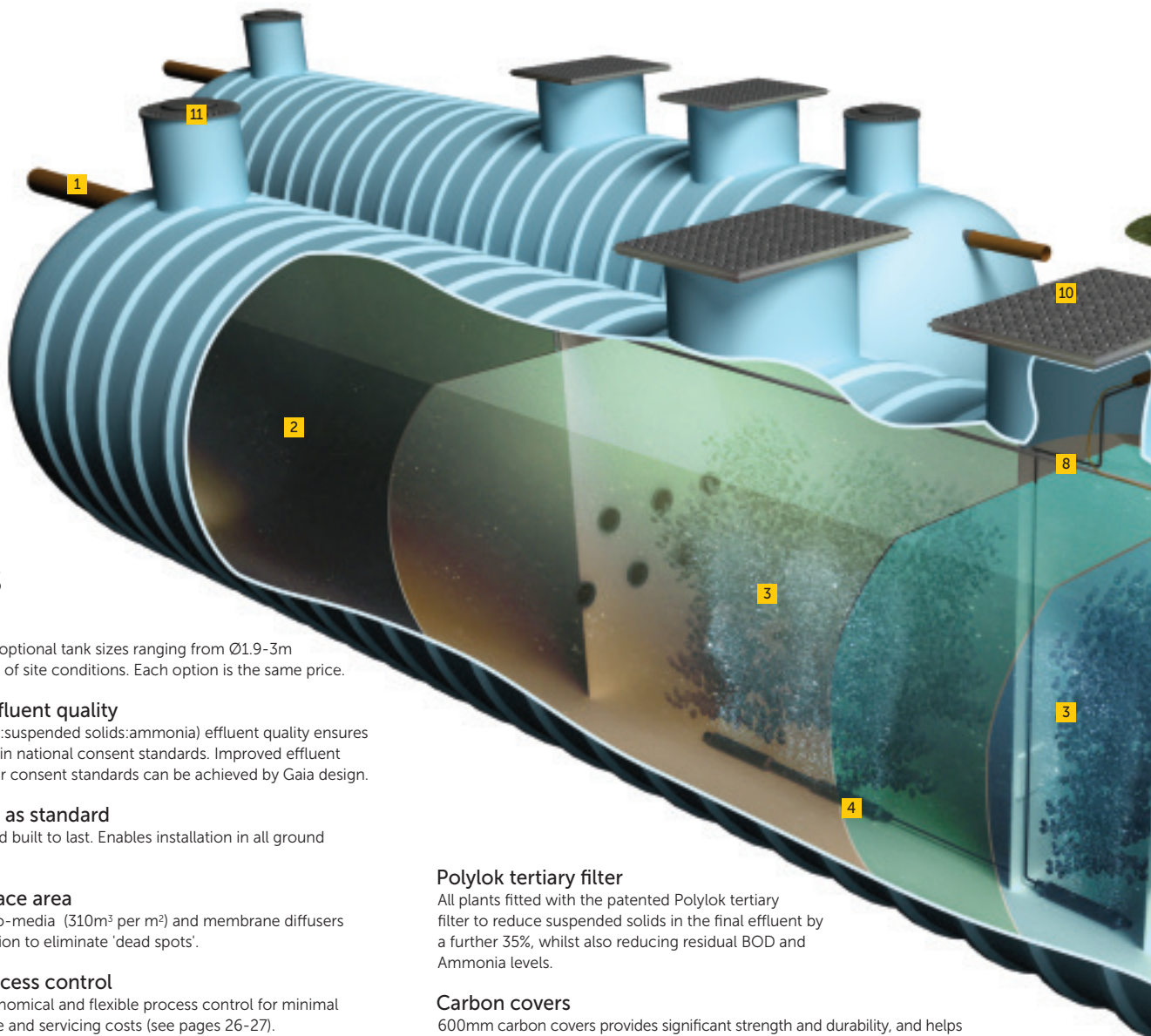
All plants fitted with the patented Polylok tertiary filter to reduce suspended solids in the final effluent by a further 35%, whilst also reducing residual BOD and Ammonia levels.

### Carbon covers

600mm carbon covers provides significant strength and durability, and helps to reduce possible odours. Heavy duty access covers also provided.

### Optional extras

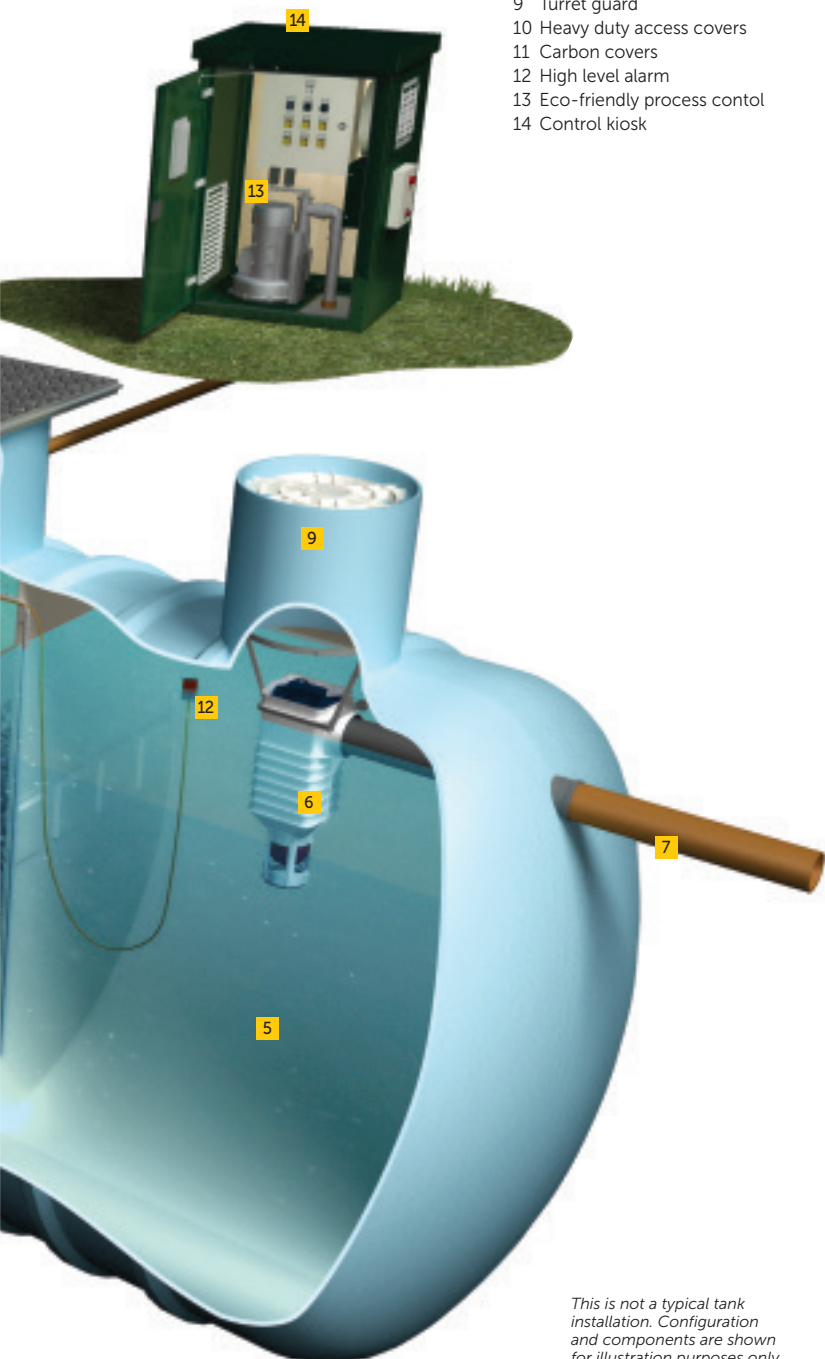
Optional extras include extensions for deep installations, pumped outlets for sites with adverse levels, sample chambers, Degreilleur trash barriers, phosphate reduction and UV treatment chambers.





## Key

- 1 Inlet
- 2 Primary chamber
- 3 Aeration chambers
- 4 Air diffusers
- 5 Final (or 'humus') chamber
- 6 Polylok filter
- 7 Outlet
- 8 Recirculation to primary chamber
- 9 Turret guard
- 10 Heavy duty access covers
- 11 Carbon covers
- 12 High level alarm
- 13 Eco-friendly process control
- 14 Control kiosk



*This is not a typical tank installation. Configuration and components are shown for illustration purposes only*

## Tank sizing

Developed by Marsh Industries, the unique Gaia Sege process design software uses core information to accurately calculate and tailor key variables ensuring total system optimisation for individual applications.

These precise calculations provide assurance to consultants, engineers, specifiers and contractors that the system is specifically designed to meet the appropriate standards of regulatory bodies.

For Ultra:Polylok sewage treatment plants, the software uses established core process equations to accurately calculate and tailor key variables ensuring total processing optimisation for Biological Oxygen Demand (BOD), Total Suspended Solids (TSS) and Ammonia ( $\text{NH}_4$ ) reduction and removal.

Gaia Sege software also uses 'British Water Flows & Loads' data to calculate initial flows and loadings whilst also calculating peak flows and levels.

The programme can also calculate accurate sludge generation and storage on a daily basis, dependent upon final effluent standards required, ensuring the optimisation of primary chambers, individual clarifiers, diffused oxygen feed and final settlement chamber.

## GRP kiosks

Marsh GRP kiosks provide safe and secure storage of electrical control panels and other tank monitoring equipment.

The kiosks are typically fitted with one or two doors, depending on kiosk size, with stainless steel vents and yale locks.



# Energy-efficient, economical and flexible process control for Ultra:Polylok™ sewage treatment plants

## Efficiency

Air blower speed/output is controlled using a variable speed 'drive' which supplies the precise amount of air required to enable the sewage treatment plant to function efficiently.

Optimisation of the air blower output results in improved running costs, meaning the end-user can be assured they have the most economical solution for their wastewater system.

This is a unique feature when it comes to overall energy-efficiency as most process control kiosks currently available within the industry have a one size fits all approach.

## Flexibility

These next-generation process control kiosks are built with flexibility in mind. Additional control options can be programmed into the 'drive' to regulate the volume of air delivered to the sewage treatment plant for different periods. This can be particularly beneficial for seasonal applications such as campsites, caravan parks, lodges or hotels where they may operate at peak capacity for short periods of the year. This functionality permits the volume of air to be increased or reduced, depending on the amount of people to be accommodated, thereby offering the end-user the ability to further reduce energy and running costs.

In addition, the process control kiosk allows for system expansion in the case of business/site growth (subject to design), thus eliminating the need to install extra tanks, pipework, air blowers, etc.

## Noise reduction

We believe these kiosks to be the quietest on the market today. They are fitted with a number of noise reduction measures as standard, making them ideal for caravan parks, campsites, etc, subject to kiosk placement/location. This can reduce the need for creating barriers or planting to restrict noise.

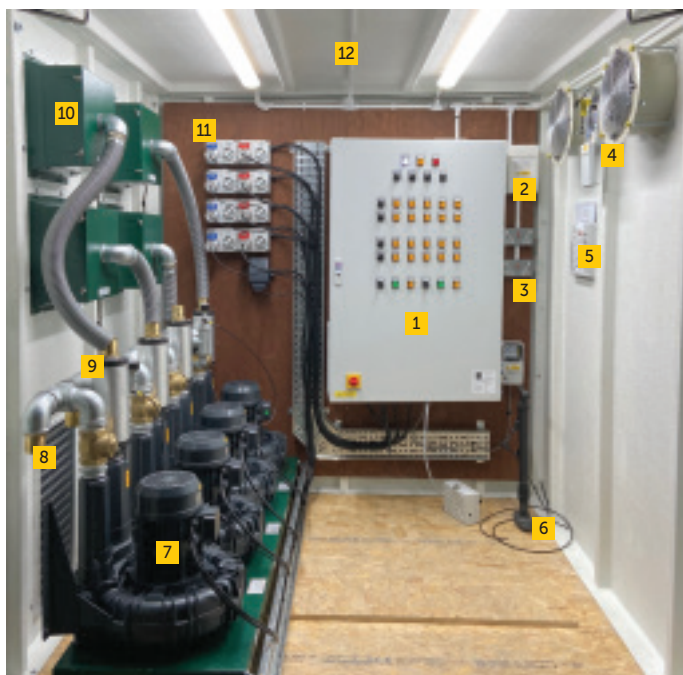
Further noise reduction measures can be added through the use of acoustic PUNF foam linings and various acoustic noise absorbing baffles. This not only reduces noise but enables the kiosk to be placed in a more convenient location on sites where space is at a premium (the recommended distance from the sewage treatment plant should be 10m).

Specification/costs of noise reduction options, including measured decibel levels at a given distance from the kiosk, can be supplied on request.



## Features

- **Powder coated, mild steel or GRP kiosk (Green - RAL6005)**  
The kiosk protects the motor and controls from the elements
- **Forced ventilation, including ambient temperature control**  
A ventilation fan/thermostat maintains the optimal ambient temperature in accordance with the air blower manufacturer's specifications
- **Thermal protection on motors**  
Protects the motor windings from overheating, increasing the reliability and lifespan of the motor
- **Electrical overload and short circuit protection**  
As required by electrical regulations
- **Air intake filter maintenance alarm**  
Alerts the end-user when the intake filter needs cleaning/replacing
- **High pressure alarm**  
Alerts the end user if the system design pressure has been exceeded, typically suggesting a blockage or restriction in the pipework
- **Low pressure alarm**  
Alerts the end user if the system design pressure is low, typically suggesting a leakage in the pipework
- **Standard acoustic attenuation including air intake silencer and external acoustic hood**  
Reduces noise from the blower motor and air intake



### Key

- 1 Electrical control panel
- 2 Kiosk lighting and power DB
- 3 230v RCD sockets
- 4 Kiosk ventilation fans/thermostat control box
- 5 Electrical panel drawings and documents
- 6 Test equipment (for use when commissioning)
- 7 Aeration blowers
- 8 Pipe manifold including 50mm outlets and return valves
- 9 Air intake silencer
- 10 Aeration blower intake filter
- 11 Blower power and control outlets
- 12 Kiosk lighting

## Specifications

Ultra:Polylok		Kiosk					
Model	People served	Height	Width	Depth	Power rating Kw	Recommended electrical supply 230v	Recommended electrical supply 400v
UP55	55	1350	850	500	0.8	230v SP&N 16A type C/D MCB	400v TP&N 10A type C/D MCB
UP75	75	1350	850	500	0.8	230v SP&N 16A type C/D MCB	400v TP&N 10A type C/D MCB
UP100	100	1350	850	500	1.1	230v SP&N 20A type C/D MCB	400v TP&N 16A type C/D MCB
UP125	125	1350	850	500	1.1	230v SP&N 20A type C/D MCB	400v TP&N 16A type C/D MCB
UP150	150	1350	850	500	1.1	230v SP&N 20A type C/D MCB	400v TP&N 16A type C/D MCB
UP175	175	1350	850	500	1.1	230v SP&N 16A type C/D MCB	400v TP&N 16A type C/D MCB
UP200	200	1350	850	500	1.5	230v SP&N 25A type C/D MCB	400v TP&N 20A type C/D MCB
UP225	225	1350	850	500	1.5	230v SP&N 25A type C/D MCB	400v TP&N 20A type C/D MCB
UP250	250	1350	850	500	2.2	230v SP&N 40A type C/D MCB	400v TP&N 32A type C/D MCB
UP275	275	1350	850	500	2.2	230v SP&N 40A type C/D MCB	400v TP&N 32A type C/D MCB
UP300	300	1350	850	500	3.0	230v SP&N 50A type C/D MCB	400v TP&N 40A type C/D MCB
UP325	325	1450	950	500	3.0	230v SP&N 50A type C/D MCB	400v TP&N 40A type C/D MCB
UP350	350	1450	950	500	3.0	230v SP&N 50A type C/D MCB	400v TP&N 40A type C/D MCB
UP375	375	1450	950	500	3.0	230v SP&N 50A type C/D MCB	400v TP&N 40A type C/D MCB

#### Notes:

- > The dimensions given on this page are for guidance only
- > For precise kiosk and Ultra:Polylok sewage treatment plant sizes and configurations, please contact Marsh Industries
- > All dimensions in mm

## Maintenance

Our engineers will advise of the appropriate maintenance plan once the site installation has been completed, however the process controls installed within the kiosk are designed to alert you to any imminent maintenance required on the system.

## Installation

All kiosks are supplied fully assembled, tested and ready for installation. An electrical supply/connection to the kiosk should be all that is required on site (electrical supply requirements will be supplied upon kiosk specification).

# Marsh:Standard

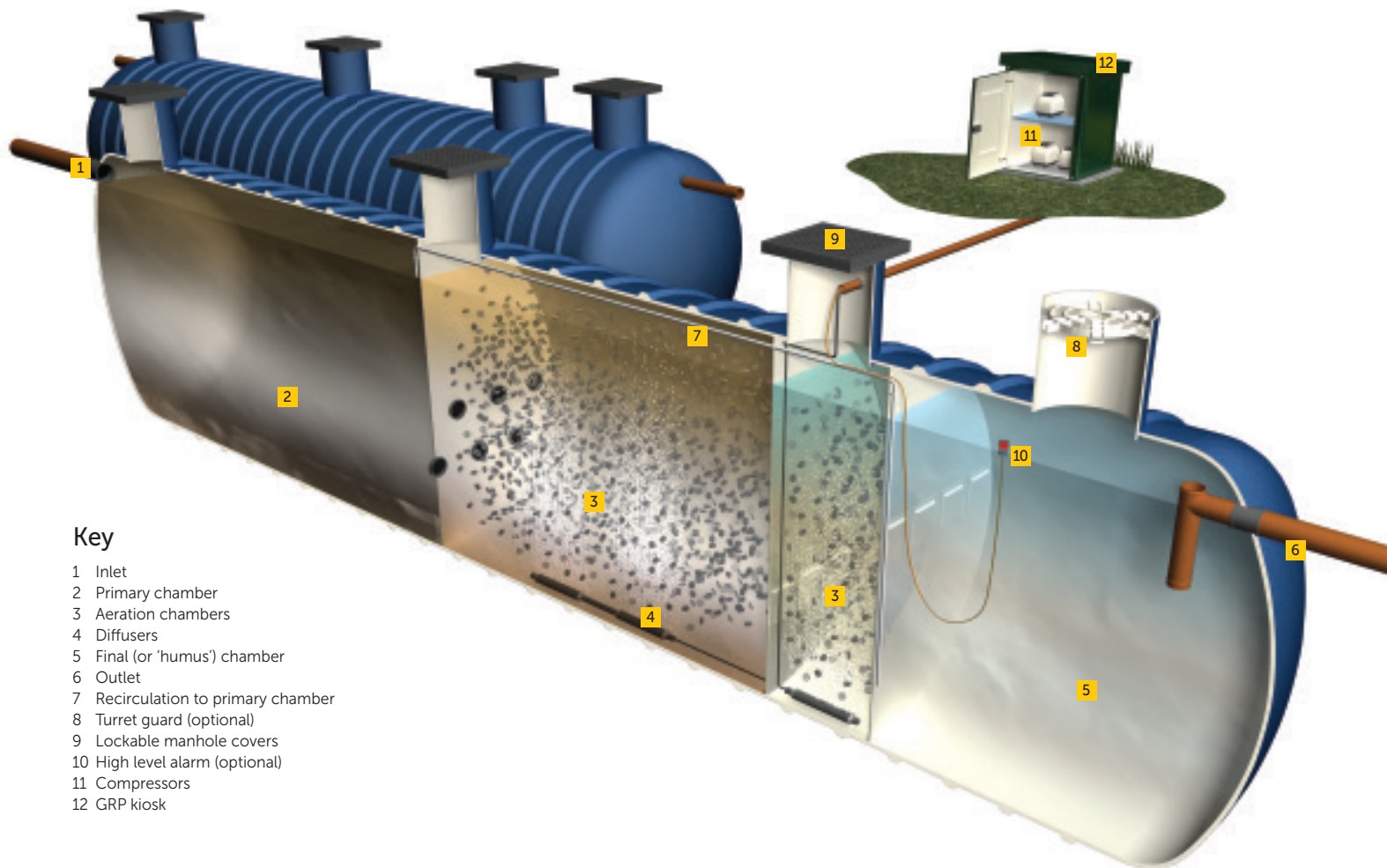
## Cost-effective sewage treatment

### Biological processing for off-mains wastewater

## Overview

Marsh:Standard cost-effective sewage treatment systems provide biological treatment to off-mains wastewater on large residential, commercial, industrial and leisure sites ranging from 50-300+PE.

Proven reliability of the simple but effective Submerged Aeration Filtration (SAF-MBBR) system offers both operating and financial benefits when compared to more complex and expensive alternatives that require frequent servicing and maintenance to sustain performance.



### Key

- 1 Inlet
- 2 Primary chamber
- 3 Aeration chambers
- 4 Diffusers
- 5 Final (or 'humus') chamber
- 6 Outlet
- 7 Recirculation to primary chamber
- 8 Turret guard (optional)
- 9 Lockable manhole covers
- 10 High level alarm (optional)
- 11 Compressors
- 12 GRP kiosk

*This is not a typical tank installation. Configuration and components are shown for illustration purposes only*



## Benefits

### Plant sizing

Designed to BS12255, systems are available from 50-300+ PE in sizes ranging from Ø2.5-3m satisfying the demands of virtually all site conditions.

### Class-leading effluent quality

Designed to British Water loadings (150litres per person, 60mg BOD litre and 8mg/litre Ammonia) ensures effluent discharge is well within national consent standards.

### Cost-effective operation and maintenance

Systems have no internal moving parts and require minimal ongoing maintenance.

### Heavy duty shell as standard

Structurally sound and built to last. Enables easy installation in all ground conditions.

### High media surface area

High specification bio-media (310m<sup>2</sup> per m<sup>3</sup>) and membrane diffusers provide even circulation to eliminate 'dead spots'.

### Low energy compressor(s)

Easily accessible low energy compressor for minimal running, maintenance and servicing costs. Integral alarm detects low pressure in air line.

### Internal recirculation

Continues the treatment process to provide higher effluent quality whilst balancing flow over 24 hour period or periods of intermittent use.

### Lockable manhole covers

600mm lockable manhole covers provide significant strength and durability, and helps to reduce possible odours.

### Health and Safety considerations

The Marsh:Standard is fitted with many safety features including turret guards, failure alarms for compressor components and high level alarms.

### Optional extras

Optional extras include carbon covers for odour control, turret guards for additional safety, polylok filters to further reduce suspended solids, high level alarms and telemetry for monitoring, and risers/pumped outlets for deeper installations.

### Manufactured in the UK

All units are manufactured in our twin manufacturing plants at Kettering and Bridgwater. The tanks are constructed using GRP (virgin unfilled resin – no 'fillers' such as chalk) providing consistent wall thickness ensuring superior structural strength and durability.

## Specifications

Model	Population served	Width +/-50mm	Length +/-50mm	Height +/-50mm	Inlet		Outlet		Turrets x 4 Ø	Desludge Days
					Invert	Ø	Invert	Ø		
MS55	50-55	2500	4160	2950	600	160	800	160	600	90
MS60	60	2500	4470	2950	600	160	800	160	600	90
MS70	70	2500	5350	2950	600	160	800	160	600	90
MS85	85	2500	6000	2950	600	160	800	160	600	90
MS100	100	2500	6950	2950	600	160	800	160	600	90
MS125	125	2500	8550	2950	600	160	800	160	600	90
MS150	150	2500	10200	2950	600	160	800	160	600	90
MS200	200	2500	13400	2950	600	160	800	160	600	90
MS250	250	3000	9650	3450	600	160	800	160	600	60
MS300	300	3000	9650	3450	600	160	800	160	600	45

- > Pumped outlets are available
- > The dimensions given on this page are for guidance only
- > For precise tank sizes and configurations, please contact Marsh Industries
- > All dimensions in mm

# Portapura<sup>®</sup>

## Sewage treatment plants

### Portable sewage treatment solutions for temporary buildings

## Overview

The Portapura is the most compact and efficient sewage treatment plant we've ever made.

Designed for temporary accommodation, site offices, site toilets and workshops, the Portapura is portable, can be installed above or below ground and treats domestic wastewater to a level that is 25 times better than the recommended EN standard.

## Portapura benefits

- Available in three sizes – 2, 3 or 5 person units (gravity or pumped outlet)
- Compact, lightweight construction – No heavy plant required
- Portable – Systems can be installed above ground and removed/stored when not in use
- Cost effective installation – Below ground installation can be achieved in approximately 2 hours
- Outstanding treatment efficiency – 14:19:0.7mg/ltr (BOD:Suspended solids:Ammonia)
- Near silent air compressor – Ensures minimal running, maintenance and servicing costs
- Electrical consumption: 1.8kWh/d – Equivalent to the daily use of a lightbulb
- CE approved to BS EN 12566
- Fire resistance tested in accordance with EN ISO 11925-2:210
- Tested for structural integrity in accordance with EN ISO 179-1/1eA



## Operating principle

Wastewater enters the primary settlement chamber [A] where large solids are removed by settlement and flotation. An accumulation forms at the base of the tank and is removed by desludging

The clarified water is then transferred to the main aeration chamber [B]. Here it is treated to remove dissolved constituents. Aerobic bacteria, supported by diffused air, ensures full treatment is achieved before the effluent and 'sloughed off' bacteria flows to the filter chamber [C] for further solids removal.

The final effluent is then discharged to a water course via the final settlement chamber [D].

## Why choose Portapura?

**It's more efficient than other sewage treatment options...** And more portable than all of them.

**It's a space-saving solution...** Its compact design provides quick and easy installation with minimum visual impact on the surrounding landscape as well as simple and safe access for maintenance and cleaning.

**It's cost-effective...** The cost of installing and running the Portapura is minimal when compared to larger, commercial systems.

**It's environmentally sensitive...** CE approved to BS EN 12566 with an ammonia result that is 25 times better than the recommended EN standard means the Portapura is well within discharge consent requirements.

**It's designed specifically for temporary buildings...** Design objectives included performance, running costs, installation, transport and storage, making the Portapura the logical choice for sites where temporary buildings are required.



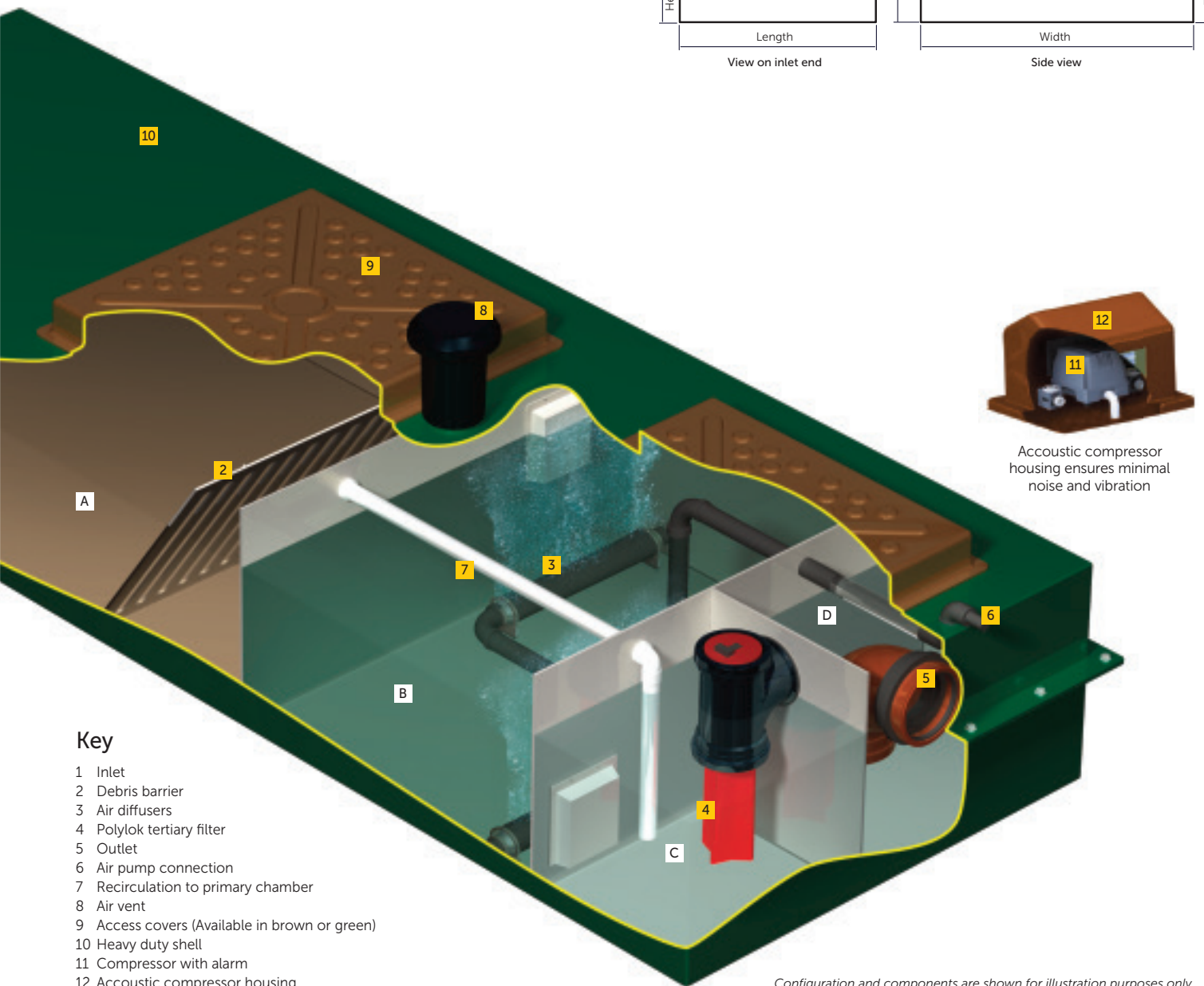
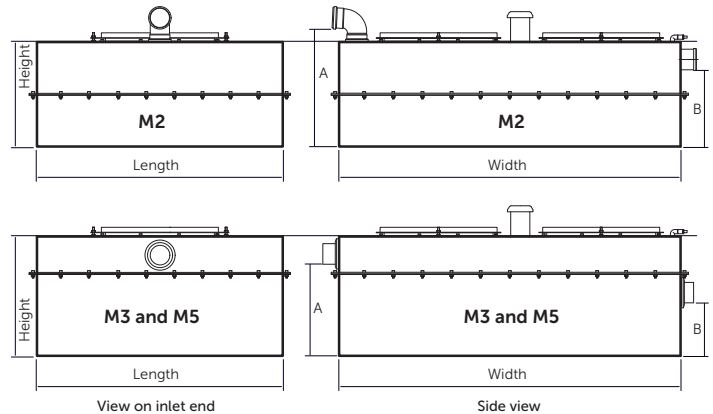


## Specifications

Model	People served	Length +/-50mm	Width +/-50mm	Height +/-50mm	Inlet Invert (A)	Outlet Invert (B)	In/out Ø
M2	Up to 2	2750	980	415	445	270	Ø110
M3	Up to 3	2050	1500	600	450	245	Ø110
M5	Up to 5	2640	1500	800	650	345	Ø110

### Notes:

- > For precise tank sizes and configurations, please contact Marsh Industries
- > Larger population plants can be supplied
- > All dimensions in mm



### Key

- 1 Inlet
- 2 Debris barrier
- 3 Air diffusers
- 4 Polylok tertiary filter
- 5 Outlet
- 6 Air pump connection
- 7 Recirculation to primary chamber
- 8 Air vent
- 9 Access covers (Available in brown or green)
- 10 Heavy duty shell
- 11 Compressor with alarm
- 12 Acoustic compressor housing

Configuration and components are shown for illustration purposes only



# Cesspools

For firewater, Elsan waste, silage and aviation fuel storage

## Overview

Designed and manufactured in accordance with BS4994/ BSEN976, the Marsh range of cesspools provides environmentally safe storage of firewater, Elsan waste, silage and aviation fuel.

Available in capacities up to 100,000 litres in Ø2.5m and Ø3m diameters, the tanks are manufactured using GRP (virgin unfilled resin - no 'fillers' such as chalk) providing consistent wall thickness ensuring superior structural strength and durability. This also enables the tank to be significantly lighter for on-site handling/positioning and better suited to withstand greater hydrostatic pressures when in use.

The tanks are supplied with a chemically resistant gel-coat that protects the fibres in the laminates and provides excellent water and chemical resistance. This inherent integrity allows Marsh to offer an unrivalled 50 year design life, backed by a 25 year structural guarantee.

## Benefits

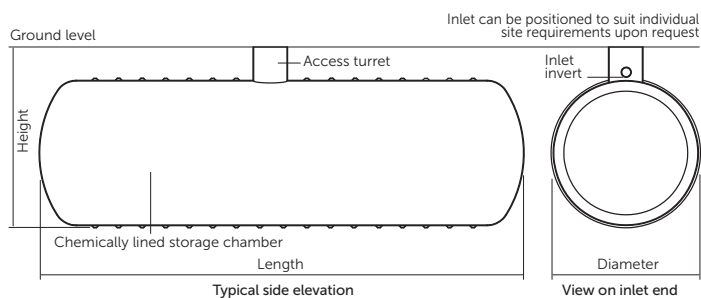
- Available in capacities from 20,000 to 100,000 litres in Ø2.5 and Ø3m diameters
- Designed to meet latest UK and European standards
- Heavy duty shells enable installation in all ground conditions
- Variable invert depths and orientations to suit individual site conditions
- Optional high-level alarm available
- Guaranteed for 25 years with a design life of 50 years

## Guidance notes

- Reference should be made to DEFRA guidance notes 'The Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations - UK' and gov.uk guidance 'Storing silage, slurry and agricultural fuel oil'

Optional Bauer fittings are available

## Specifications



### Ø2.5m tanks

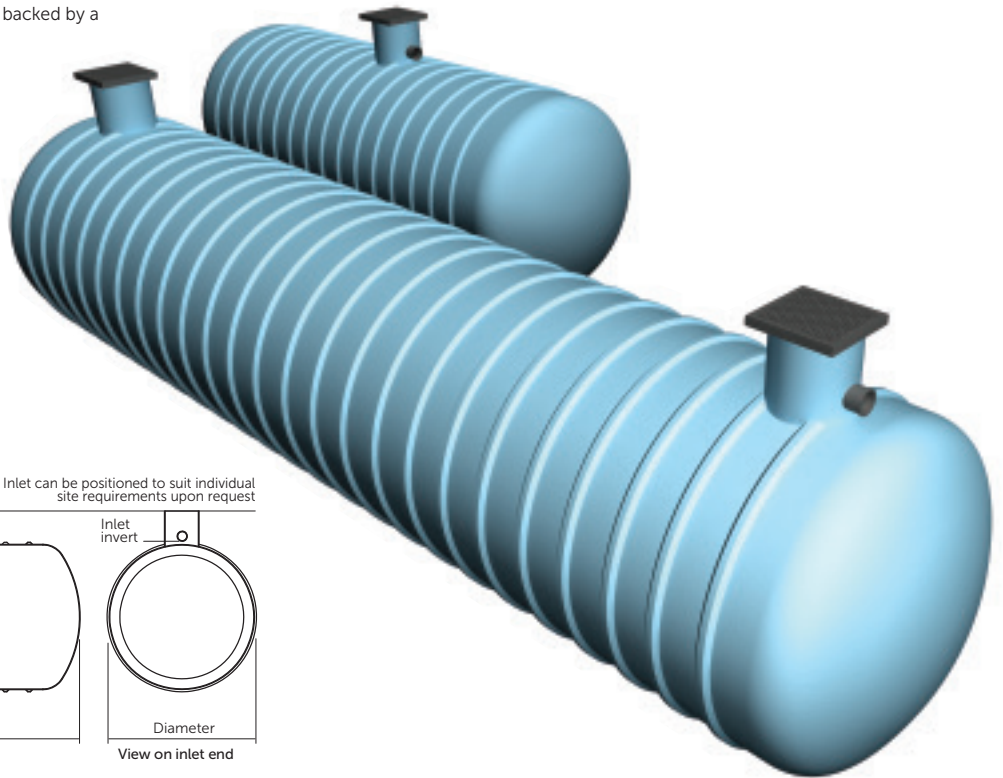
Capacity Litres	Dia Ø	Length	Height	Inlet Invert	Turret size	No. of Turrets
20,000	2500	4500	3100	500	Ø600x600	1
25,000	2500	5550	3100	500	Ø600x600	1
30,000	2500	6500	3100	500	Ø600x600	1
35,000	2500	7550	3100	500	Ø600x600	1
40,000	2500	8600	3100	500	Ø600x600	2
45,000	2500	9600	3100	500	Ø600x600	2
50,000	2500	10600	3100	500	Ø600x600	2
55,000	2500	11600	3100	500	Ø600x600	2
60,000	2500	12600	3100	500	Ø600x600	2
65,000	2500	13600	3100	500	Ø600x600	2
70,000	2500	14700	3100	500	Ø600x600	2

#### Notes:

- > The dimensions given on this page are for guidance only
- > For precise tank sizes and turret configurations, please contact Marsh Industries
- > All dimensions in mm

### Ø3m tanks

Capacity Litres	Dia Ø	Length	Height	Inlet Invert	Turret size	No. of Turrets
40,000	3000	6200	3600	500	Ø600x600	1
45,000	3000	6900	3600	500	Ø600x600	1
50,000	3000	7600	3600	500	Ø600x600	1
55,000	3000	8300	3600	500	Ø600x600	1
60,000	3000	9000	3600	500	Ø600x600	2
65,000	3000	9800	3600	500	Ø600x600	2
70,000	3000	10500	3600	500	Ø600x600	2
75,000	3000	11200	3600	500	Ø600x600	2
80,000	3000	11900	3600	500	Ø600x600	2
85,000	3000	12600	3600	500	Ø600x600	2
90,000	3000	13300	3600	500	Ø600x600	2
95,000	3000	14000	3600	500	Ø600x600	2
100,000	3000	14700	3600	500	Ø600x600	2



# Degrilleur™

## Trash barrier for sewage treatment plants and pump chambers

### Overview

When non dissolvable objects are flushed into the sewer and then into a sewage treatment plant or pump station downstream, it can lead to blockages or worse – possible plant failure.

To combat this Marsh Industries has developed the 'Degrilleur' – a bar screen which prevents any unsuitable materials from entering the system.

The unit has no moving parts and requires no electrics and is suitable for domestic, commercial and industrial installations.

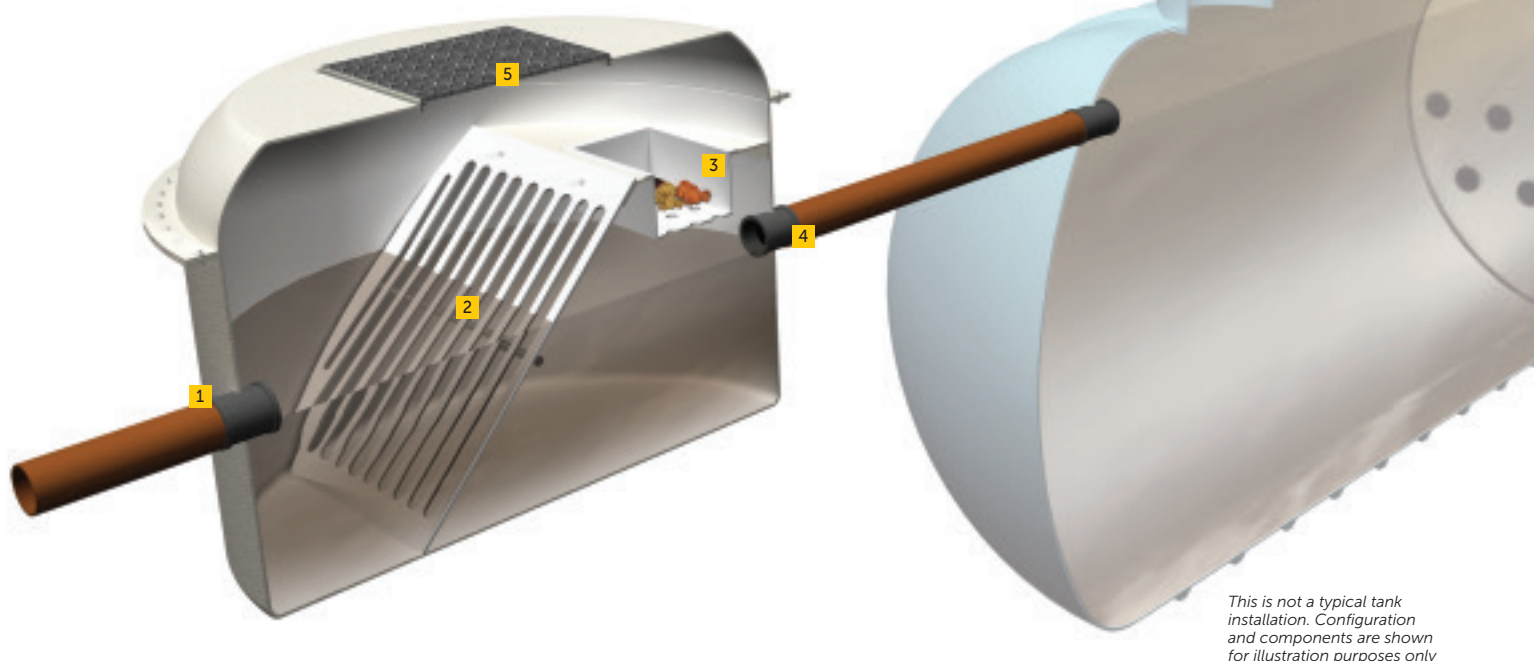
The Degrilleur can also be used as a flow splitting chamber in multi-stream sewage treatment plants or as an upstream trash screen as part of stormwater attenuation systems.

### Operating principle

The Marsh Degrilleur, positioned ahead of the system inlet, blocks the debris and forces it to rise to the top of the chamber where it is collected in a retaining trough for disposal.

#### Key

- 1 Inlet (110 or 160mm)
- 2 Grill and frame
- 3 Perforated retaining trough
- 4 Outlet (110 or 160mm)
- 5 Manhole cover



*This is not a typical tank installation. Configuration and components are shown for illustration purposes only*

### Specifications

#### Cylindrical Degrilleur

Model	Diameter over flanges +/-50mm	Height +/-50mm
MID-1	1950	1283

#### Horizontal Degrilleur

Model	Diameter over flanges +/-50mm	Height +/-50mm	Length over flanges +/-50mm
MID-2	1950	2284	2860
MID-3	1950	2284	5200

#### Notes:

- > The dimensions given on this page are for guidance only
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- > All dimensions in mm



# Marsh GMS★ Grease traps

Innovative and reliable grease management systems

## Overview

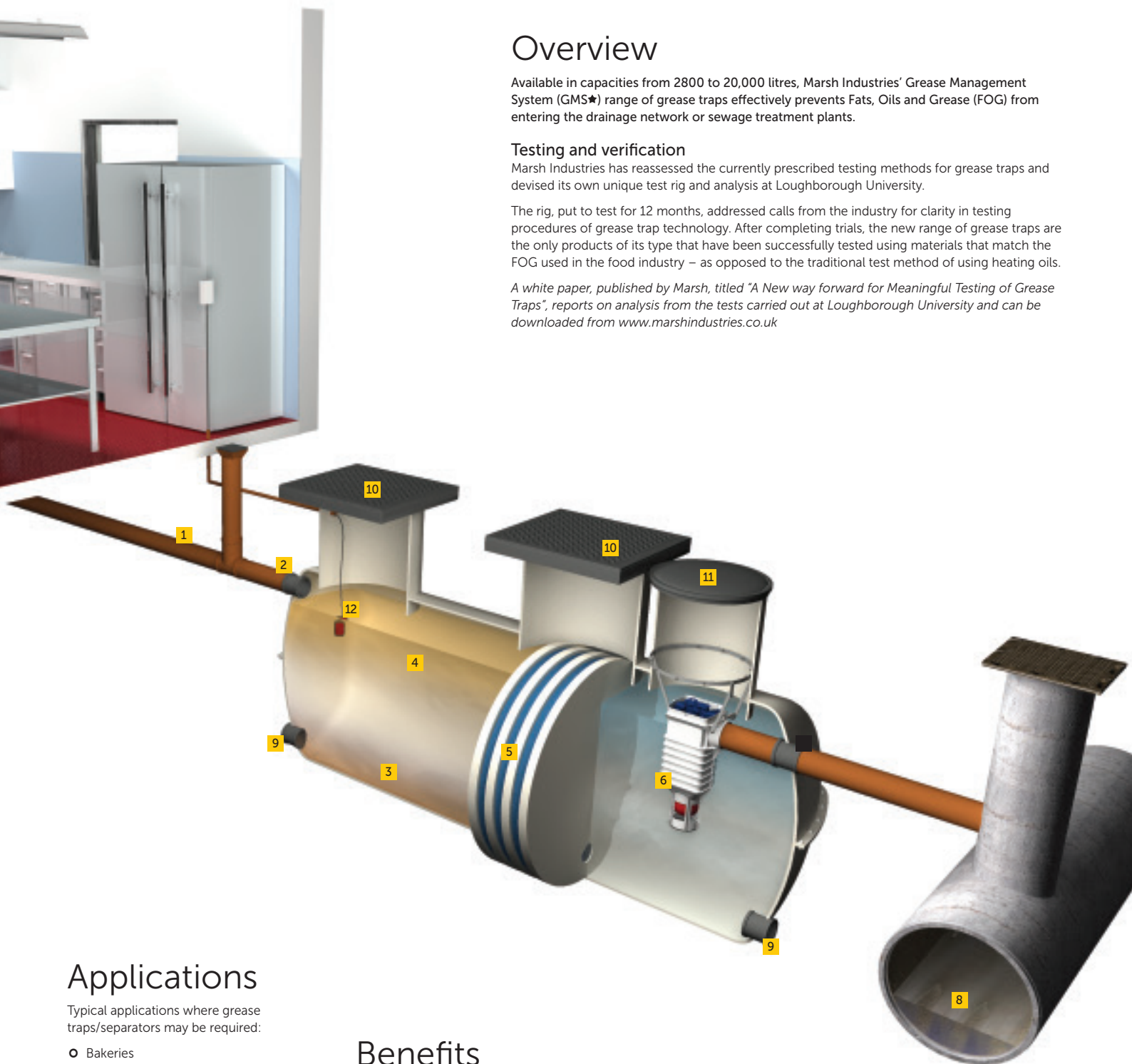
Available in capacities from 2800 to 20,000 litres, Marsh Industries' Grease Management System (GMS★) range of grease traps effectively prevents Fats, Oils and Grease (FOG) from entering the drainage network or sewage treatment plants.

### Testing and verification

Marsh Industries has reassessed the currently prescribed testing methods for grease traps and devised its own unique test rig and analysis at Loughborough University.

The rig, put to test for 12 months, addressed calls from the industry for clarity in testing procedures of grease trap technology. After completing trials, the new range of grease traps are the only products of its type that have been successfully tested using materials that match the FOG used in the food industry – as opposed to the traditional test method of using heating oils.

A white paper, published by Marsh, titled "A New way forward for Meaningful Testing of Grease Traps", reports on analysis from the tests carried out at Loughborough University and can be downloaded from [www.marshindustries.co.uk](http://www.marshindustries.co.uk)



## Applications

Typical applications where grease traps/separators may be required:

- Bakeries
- Canteens/kitchens
- Fast food restaurants
- Food processing factories
- Hotels
- Public houses
- Restaurants
- Social clubs

## Benefits

- Storage capacities ranging from 2800-20,000 litres
- Advanced coalescent filter system
- Bespoke design tailored to individual project specifications
- Adjustable turret and invert height
- Optional Polylok filter for further wastewater treatment
- Optional high level alarm

*This is not a typical tank installation. Configuration and components are shown for illustration purposes only*

# Operating principle

Marsh GMS★ grease traps provides sufficient storage in its primary chamber allowing for adequate solidification of FOG molecule structures before passing through an advanced coalescing filtration system.

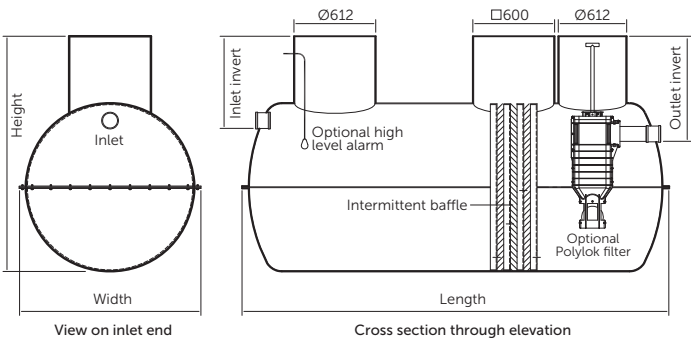
The coalescing filtration system contains different grades of filter to prevent solids and waste passing into the final settlement chamber.

In larger units, an optional Ultra Polylok UV Filter is available which can provide further treatment to residual solids and can also destroy viruses, parasites and other pathogenic bacteria.

## Key

- 1 Wastewater pipe
- 2 Tank inlet
- 3 Solids retention
- 4 Fats, oils and grease (FOG) retention
- 5 Advanced coalescing filter
- 6 Polylok filter (optional)
- 7 Tank outlet
- 8 Mains sewer system
- 9 Additional desludge points (optional)
- 10 Heavy duty manhole cover
- 11 Outlet access
- 12 High level alarm (optional)

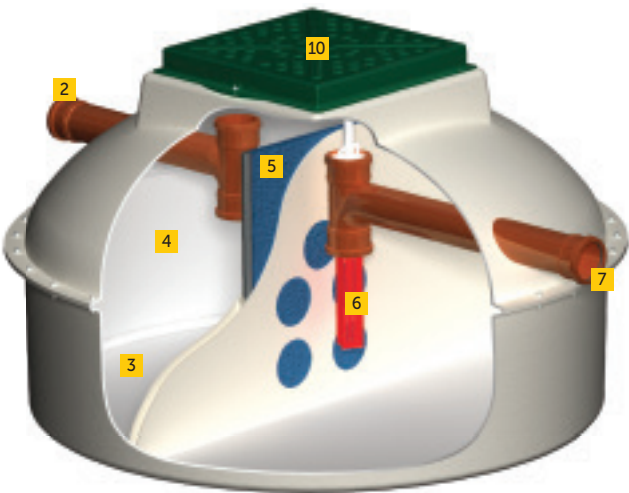
# Specifications



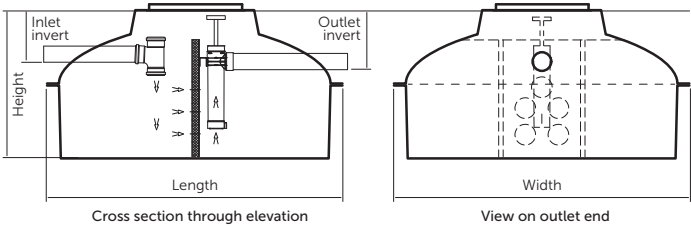
Model	Size Litres	Width +/- 50mm	Length +/- 50mm	Height +/- 50mm	Inlet		Outlet	
					Invert	Ø	Invert	Ø
MG2800	2800	1352	3040	1732	685	110	800	110
MG3800	3800	1352	4040	1732	685	110	800	110
MG4500	4500	1572	2960	2092	685	110	800	110
MG6000	6000	1952	3090	2332	685	110	800	110
MG8000	8000	1952	3780	2332	685	160	800	160
MG10000	10000	1952	4340	2332	685	160	800	160
MG12000	12000	1952	5640	2332	685	160	800	160
MG14000	14000	1952	5980	2332	685	160	800	160
MG16000	16000	1952	6840	2332	685	160	800	160
MG18000	18000	1952	7640	2332	685	160	800	160
MG20000	20000	1952	8240	2332	685	160	800	160

# Marsh GMS★Roundel

## Compact grease management system



Marsh Industries' GMS 'Roundel – Ø1812 x 1m high – is shallow, compact and provides easy installation, particularly in urban areas or sites with arduous ground conditions and reduces the risk of undermining existing structures, pipelines or cable ducts.



Model	Size Litres	Width +/- 50mm	Length +/- 50mm	Height +/- 50mm	Inlet		Outlet	
					Invert	Ø	Invert	Ø
Roundel	2000	Ø1980	Ø1980	1000	350	110	400	110

- Notes:
- > The dimensions given on this page are for guidance only
  - > For precise tank sizes and configurations, please contact Marsh Industries
  - > All dimensions in mm



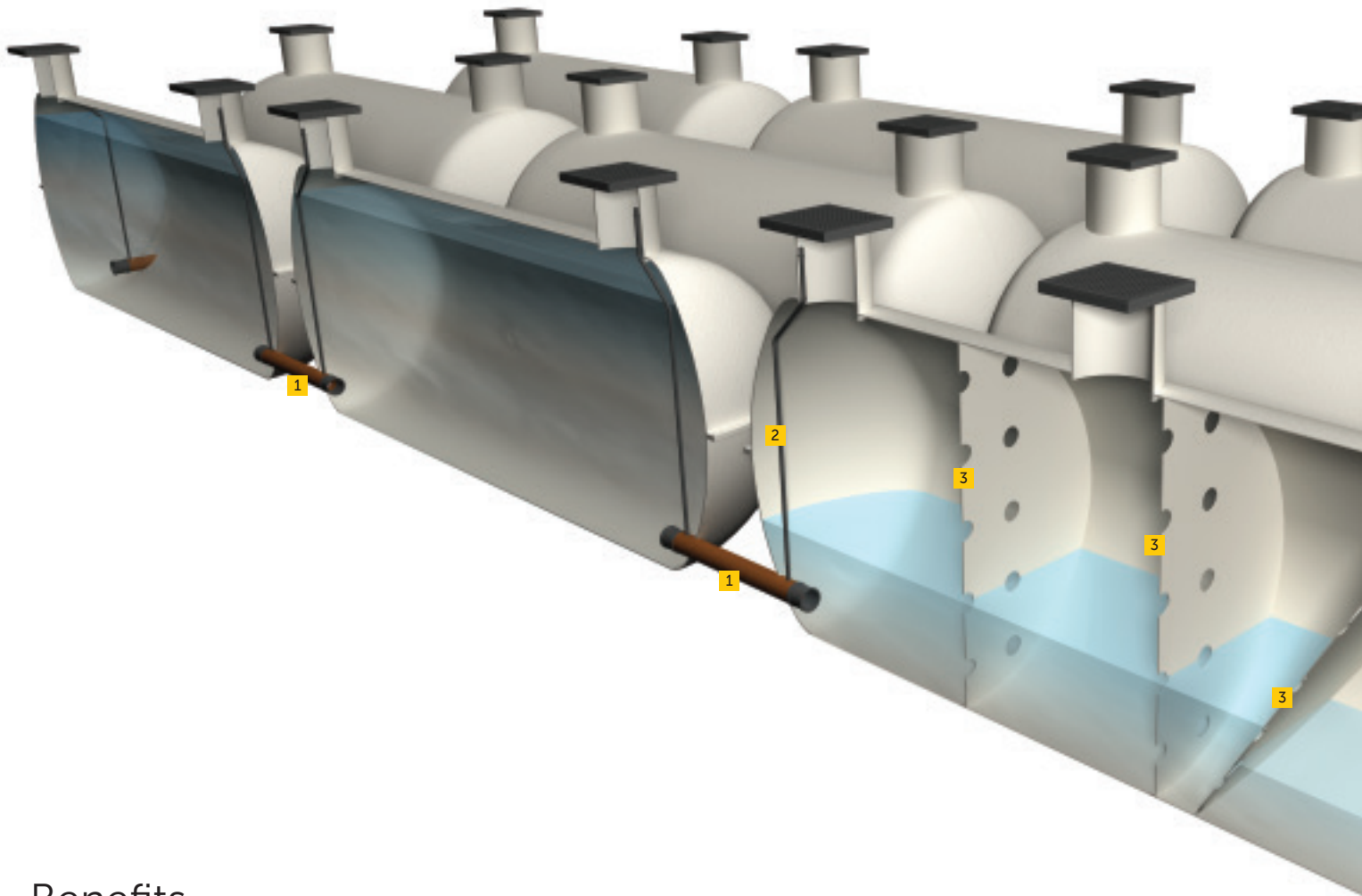
# Storm Dammer®

## Stormwater flow attenuation

### Overview

Available in capacities from 2800-110000 litres in multiple configurations with tank sizes ranging from Ø1.2m to Ø3m diameters, the Storm Dammer alleviates the risk of flooding and reduces pressure on drains/sewers by storing the excess flow of stormwater before controlled discharge downstream.

Greater capacity and ease of inspection and maintenance makes Storm Dammer the industry choice for developers, municipal planners and civil engineers.



### Benefits

- Designed to meet latest UK and European standards
- Multiple tank configurations and inlet orientations to suit storage and site layout requirements
- Tank diameters range from Ø1.2 to Ø3m with length up to 20 metres
- Heavy duty shells manufactured from virgin unfilled resin provides superior structural strength and durability. This also enables the tank to be significantly lighter for on-site handling/positioning and better suited to withstand greater hydrostatic pressures when in use
- Tank design offers easy access for inspection, maintenance and cleaning when compared to inaccessible crate systems
- Systems can be fitted with flow control devices and orifice plates to regulate storage and discharge
- Easily accessible, low energy submersible pumps ensure minimal running, maintenance and servicing costs
- Guaranteed for 25 years with a design life of 50 years

#### Key

- 1 Connecting pipework
- 2 Internal vent pipes
- 3 Flow control devices
- 4 Outlet
- 5 Access manways

## Fittings and accessories

### Orifice baffles

Utilising Marsh Industries' unique Gaia Storm Dammer program, in conjunction with the Micro Drainage Design program, the standard range of Storm Dammer tanks are designed using orifice baffles as the primary flow attenuation system.

Precise calculations from the Gaia Storm Dammer program ensures that the correct type of orifice baffles are distributed throughout the system to deliver the optimum outflow required.



### Flood and storm control valves

Storm Dammer systems can be designed to include Vortex Storm Control units which can reduce out-flow on varying scales.

Pumps can also be fitted to upline chambers allowing stored water to be distributed to other chambers that may not be in the immediate area.



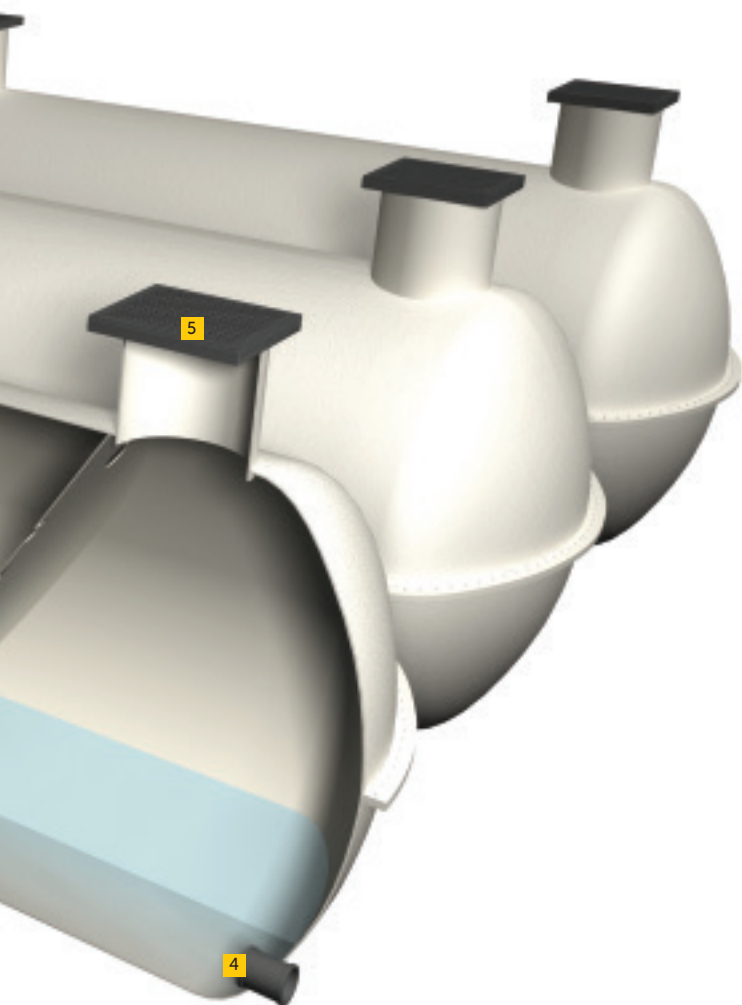
### Pumps

Marsh Industries works in partnership with major UK pump manufacturers to develop attenuation tanks and pump chambers that are designed to distribute water to the mains drainage network or to other off-site storage tanks. Pumps can be supplied as single, twin or multi-line installations in both single and three phase.



### AUTOadapt™ sump pump

Designed for a range of water and wastewater applications, the AUTOadapt pump removes the complexity of standard submersible pumps by combining all external sensors switches and cables from the pit within the pump itself. This simplifies installation and operation, and vastly increases reliability.



# Marsh:UV

## Effluent disinfection for off-mains drainage

### Overview

Marsh Industries has developed an innovative UV disinfection system which removes 99% faecal coliform bacteria levels from sewage treatment plant effluent.

The Marsh:UV Disinfection Unit can be supplied as an integral part within the Marsh Ultra:Polylok range of sewage treatment plants (50-500+PE) or as a stand-alone unit which can be installed at the outlet end of any existing sewage treatment plant.

The UV light(s) are mounted in a sub-assembly which can be easily removed for periodic servicing and bulb replacement. In stand-alone units, the light assembly is mounted in a primary chamber by an anodized aluminium frame. The frame seals against the inner surface of the primary chamber to prevent flow bypass.

When the disinfection unit is filled with waste water, the ultraviolet light source operates continuously with a lamp surface temperature range of 105-120°F providing optimum UV light output and long lamp lifetime (Power supply is via 230v Single Phase with consumption of a single UV lamp being 45 watts).

In addition to the UV disinfection assembly, microfibre tertiary filters are attached at the inlet pipe to reduce any remaining suspended solids, residual BOD and ammonia levels.

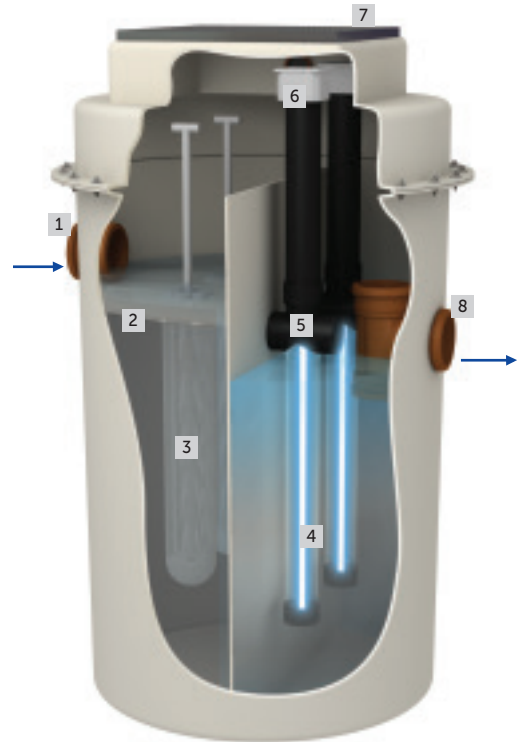
### UV treatment performance

A single UV maximum flow through the unit is rated at 16m<sup>3</sup> per day or a peak flow rate .056 litres per second under the following conditions:

- UV dosage is greater than 5mJ/cm<sup>2</sup>
- Suspended Solids – less than 30 mg/litre
- BOD (5 days) – less than 30 mg/litre
- If the effluent is cleaner than the above figures the level of treatment is greater

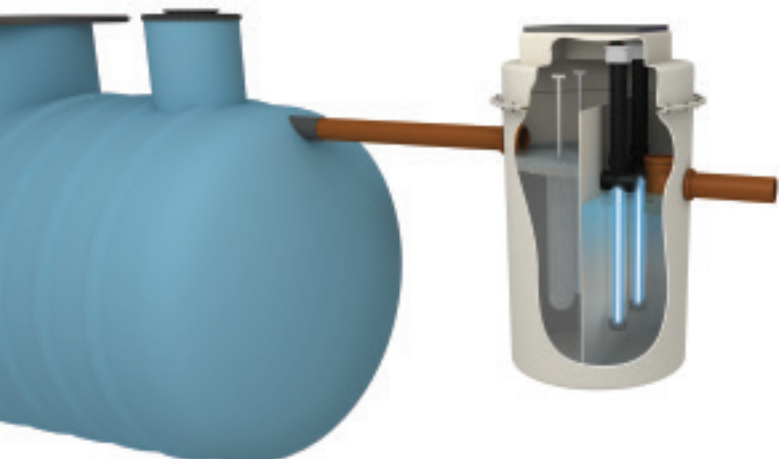
From the above conditions, the faecal coliform reduction by the Marsh:UV Disinfection Unit exceeds 99.9% or 3-logs, at the end of UV lamp life, which is two years of continuous operation.

Figure 2 below provides an indication of the UV dosage requirements in order to provide a 90-99% reduction in different strains of coronavirus.



#### Key

- 1 Inlet
- 2 Filter shelf
- 3 Quick-release microfibre tertiary filters
- 4 UV lamps
- 5 Disinfection chamber
- 6 Control box
- 7 Maintenance access cover
- 8 Outlet



### Benefits

- Removes 99% faecal coliform bacteria levels from sewage treatment plant effluent
- Optimum UV light distribution assembly for maximum disinfection (UV dosage requirements to provide a 90-99% reduction in different strains of coronavirus)
- Can be supplied as an integral part within the Marsh Ultra:Polylok range of sewage treatment plants (50-500+PE) or as a stand-alone unit
- Unique microfibre tertiary filters further reduce remaining suspended solids, residual biological oxygen demands and ammonia levels
- Optimised for minimal running costs
- Heavy duty shell as standard to enable installation in all ground conditions
- Integral eye bolts for improved on-site handling
- 'Keying-in flange' assists anchoring into granular or concrete surround
- Pedestrian cover included as standard

Modern sewage treatment plants are efficient systems used to process waste water from domestic or commercial premises to a standard that allows outflowing effluent to be discharged into natural bodies of water, such as drainage fields, streams, rivers or lakes.

The sewage treatment plant removes toxic constituents, such as suspended solids, nitrogen and ammonia, etc, however microscopic pathogens can remain undetected within the outflowing effluent. These pathogens are typically harmless, but the risk remains that some hazardous pathogens, such as coronaviruses, could survive and prosper in the natural environment.

As Covid-19 marches across the globe, public health, personal hygiene and sanitation is at the forefront of everyone's mind. Biologists, public health experts and researchers are exploring all possible routes of virus transmission, including the possibility of contamination from water and sewage.

## Covid-19

Although it is not yet proven that Covid-19 can survive or spread through contact with water and sewage, environmental biologists at the University of Stirling have warned that the potential spread of Covid-19 via sewage "must not be neglected" in the battle to protect human health<sup>1</sup>.

Richard Quilliam, Professor of Biological and Environmental Sciences at the University of Stirling, who is currently leading a £1.85m study into the transport of pathogens and viruses in marine environments, said "We know that Covid-19 is spread through droplets from coughs and sneezes, or via objects or materials that carry infection. However, it has recently been confirmed that the virus can also be found in human faeces up to 33 days after the patient has tested negative for symptoms of Covid-19."

"It is not yet known whether the virus can be transmitted via the faecal-oral route, however, we know that viral shedding from the digestive system can last longer than shedding from the respiratory tract. Therefore, this could be an important, but as yet unquantified, pathway for increased exposure."

The authors of the peer-reviewed paper presented the example of the severe acute respiratory syndrome (SARS) outbreak in 2002-2003 when SARS, closely linked to the Covid-19 virus strain, was detected in sewage discharged by two hospitals in China.

Professor Quilliam highlights that, as most Covid-19 patients are asymptomatic or experience just mild symptoms and remain at home (not in hospital), there is significant risk of "widespread" distribution through sewers.

### UV dosage requirements to provide a 90-99% reduction in different strains of coronavirus (where historical data exists)

Organism	90% (1 log reduction) mJ/cm <sup>2</sup>	99% (2 log reduction) mJ/cm <sup>2</sup>	Source
Coronavirus	0.7	2.1	Walker 2007
Berne virus (Coronaviridae)	0.7	2.1	Weiss 1986
Murine Coronavirus (MHV)	1.5	4.5	Hirano 1978
Canine Coronavirus (CCV)	2.9	8.7	Saknimit 1988
Murine Coronavirus (MHV)	2.9	8.7	Saknimit 1988
SARS Coronavirus CoV-P9	4.0	12.0	Duan 2003
Murine Coronavirus (MHV)	10.3	30.9	Liu 2003
SARS Coronavirus (Hanoi)	13.4	40.2	Kariwa 2004
SARS Coronavirus (Urbani)	24.1	72.3	Walker 2007
<b>Average</b>	<b>6.7</b>	<b>20.1</b>	

### In principle - The effects of UV light on bacteria

Bacteria, which causes some of our most common illnesses, are single cell organisms.



When looking inside a bacterium, the simplicity of the cell is evident; the cell contains DNA, ribosome and other basic proteins – this simplicity increases its susceptibility to UV light.

UV-induced DNA damage can affect how proteins and enzymes are produced. UV can also increase reactive oxygen species production, which can react with the cell wall. The cell wall and other components of the cell can become severely damaged, thus halting cell growth.

## Effluent disinfection

For over a century scientists have known about the ability of ultraviolet light (UV) to disinfect and, for many years, UV-C2 lamps have been used for disinfection in medical settings, food production and a number of other places.

Effluent disinfection using UV light is the decontamination of outflowing water from sewage treatment plants, sewer pipes or industrial outfall into natural bodies of water.

Without UV disinfection, effluent can retain a mass of hazardous pathogens that could infect the natural water, causing potentially serious environmental health issues.

UV light deactivates pathogens so that they cannot survive in clean water, meaning they cannot replicate and infect future waterways.

UV light is one of the safest disinfectants available due to the lack of chemicals used and produced by the device.

The most common method of effluent disinfection used in off-mains sewage treatment plants is to install and connect a separate UV disinfection unit to the outlet of the sewage treatment plant.

The UV disinfection unit contains the necessary UV light system to match the volume of outflow from the sewage treatment plant.

It should be noted that when introducing a UV disinfection unit to a sewage treatment plant, it is necessary to ensure that the flow of water does not exceed the depth the UV light can travel. UV light can only pass through a certain amount of water before it becomes ineffective. Making sure that the water flow is uniform with the UV light means that the effluent will receive the best disinfection possible.

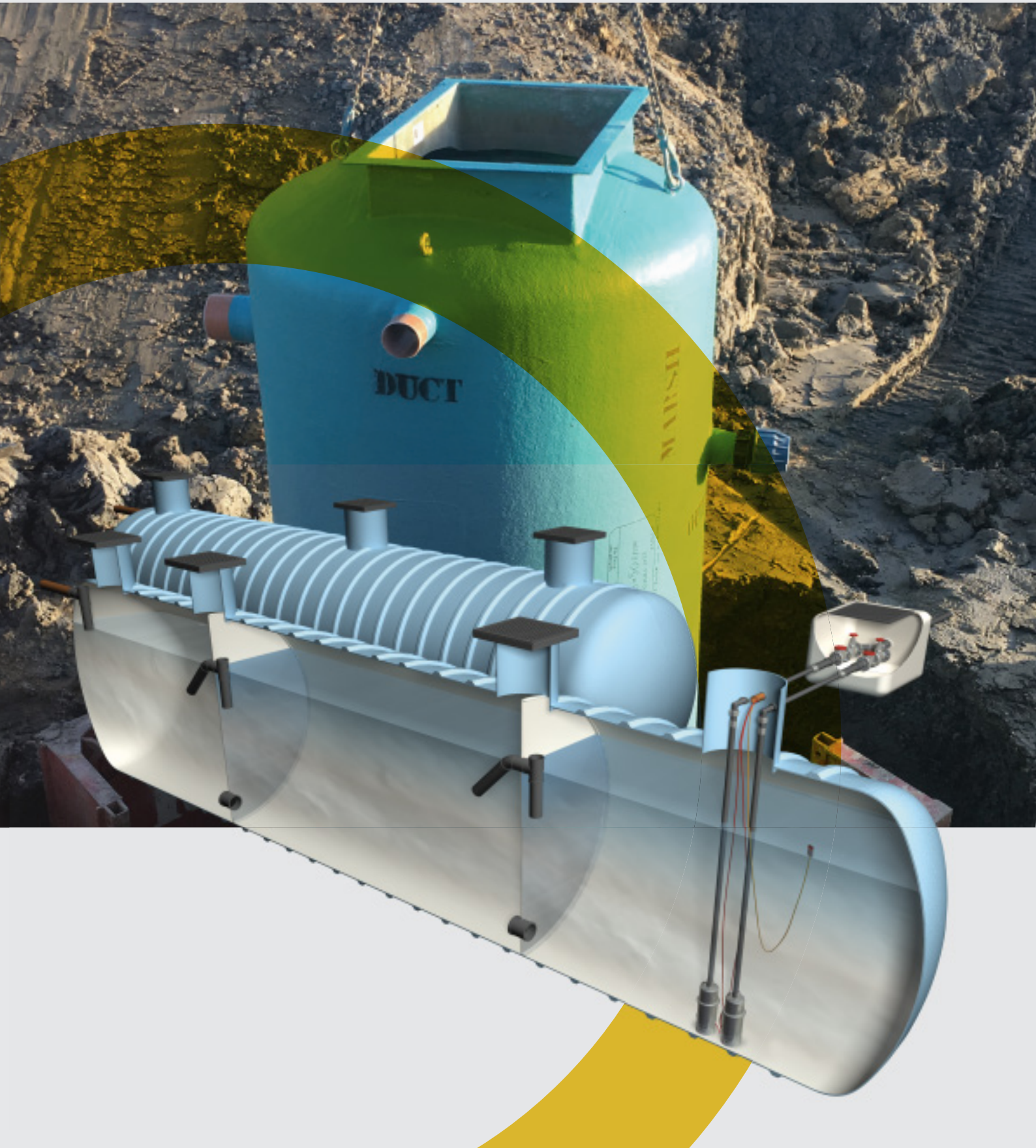
#### Notes:

<sup>1</sup> <https://www.stir.ac.uk/news/2020/05/sewage-poses-potential-covid-19-transmission-risk-experts-warn>

<sup>2</sup> UV-C refers to ultraviolet light with wavelengths between 200–280 nanometers (nm). Light in the UV-C wavelength can be used for disinfecting water, sterilizing surfaces, destroying harmful micro-organisms in food products and in air.



# PUMP STATIONS



# Marsh WellWater™

The most comprehensive range of pump stations available in the UK

Pump stations available in capacities ranging from 141 to 100,000 litres

When discharge to mains is required, but to do so by gravity is impractical, a WellWater™ pump station will be needed.

All Marsh pump station systems are bespoke, however there are several factors that play a role in identifying precisely the right tank sizes and type that are required for your project.

Marsh Industries' system designers can work closely with you to identify all key requirements in accompaniment with Marsh Industries' unique process design software, Gaia Sege.

Pump station systems are available as vertical or horizontal units in various sizes.

## Why specify a Marsh pump station?

- Designed to British Standard European Norm's:  
*BSEN12050 for structural strength and water-tightness*  
*BSEN752 to comply with hydrostatic and electrical requirements*  
*BSEN752-6 for drain and sewer systems in outside buildings*
- Smooth internal walls and integral pump well improves pump efficiency and eliminates 'dead spots' which can lead to odours and septicity
- Variable invert depths and orientations to suit individual site conditions
- Pre-assembled pipework for fully automatic operation
- Unique 'keying-in' lip on WellWater:Seine range assists anchoring into concrete surround

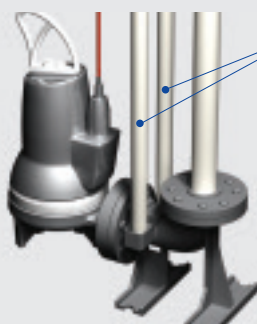
## Pump options

Marsh uses market-leading submersible pumps throughout its WellWater range of pump stations to ensure maximum reliability and efficiency with minimal clogging or wear. Pump stations can be specified with a single free-standing pump or single and twin pumps with guide rails as illustrated below.

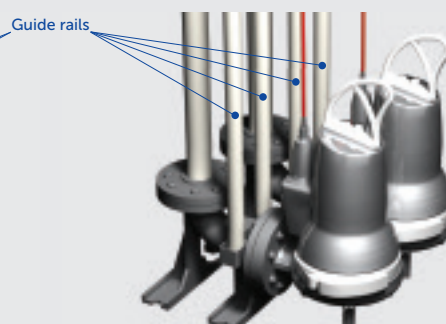
*Note: Floats can be fitted directly to specific pump systems. Please contact Marsh Industries to discuss your project requirements.*



Single free-standing pump



Single pump with guide rails



Twin pumps with guide rails

## Applications

The WellWater range of pump stations are suitable for sewage, final effluent, grinders and surface water (twin/single) applications in all domestic, commercial and industrial sites:

- Agricultural water and wastewater
- Biofuel systems
- Commercial buildings
- Domestic buildings
- Food processing
- Industrial boilers
- Industrial wastewater
- Industrial water treatment
- Marine
- Mining
- Pharmaceuticals
- Wastewater transport
- Wastewater treatment
- Water distribution
- Water intake
- Water treatment

## Pump station maintenance packages

Pump station maintenance packages provide peace of mind that your pump and associated equipment will continue to work reliably and effectively, whilst at the same time considerably extending their working-life expectancy.

Pump stations covered by Marsh maintenance packages suffer far fewer intermediate breakdowns, making scheduled maintenance an extremely cost-effective safeguard against potential failure.

For details on Marsh pump station maintenance packages contact 01933 654582 or email [sales@marshindustries.co.uk](mailto:sales@marshindustries.co.uk).

## Guidance notes

- Where foul water drainage from a domestic property is to be pumped to mains the effluent receiving chamber should be sized to contain 24-hour inflow to allow for disruption in service, the minimum daily discharge being taken as 150 litres per person per day
- For other building types the capacity of the receiving chamber should be based on the calculated daily demand of the water intake for the building, or when only a proportion of the foul sewage is to be pumped then the capacity should be based pro-rata
- If the sewer is to be 'adopted' by a local water authority, please contact Marsh Industries as Sewers for Adoption (SFA) specification and additional local authority related criteria may apply

# WellWater:Seine

## Standard pump stations

Marsh WellWater:Seine pump stations are available in storage capacities ranging from 141 to 5675 litres.

Each system is supplied as a complete unit with either single or twin free-standing submersible pumps and high quality internal pipework/fittings as standard.

These pump stations are typically used in smaller domestic or commercial applications for pumping foul water or sewage to mains sewer.

### Key

- 1 Inlet
- 2 Submersible pump(s)
- 3 Pump retrieval chain
- 4 Non-return valve(s)
- 5 Gate valve
- 6 Outlet connection
- 7 Ducting and cable entry points
- 8 Vent
- 9 Manway access
- 10 Float bracket

### Float configuration options

- A Pump 'OFF' float switch
- B Pump 1 'ON' float switch
- C Pump 2 'ON' float switch
- D High water float switch



### WellWater:Seine range

Model	Single/Twin pump	Pump duty See table below	Application mm	Diameter mm	Depth mm	Total storage Litres	Invert mm	Pipework dia
SE0610	Single	A	Effluent	600	1000	141	500	32
SE0615	Single	A	Effluent	600	1500	282	500	32
SE0620	Single	A	Effluent	600	2000	424	500	32
SE1111	Single	A	Effluent	1100	1100	570	500	32
TE1111	Twin	A	Effluent	1100	1100	570	500	32
SE1115	Single	A	Effluent	1100	1500	950	500	32
TE1115	Twin	A	Effluent	1100	1500	950	500	32
SE1122	Single	A	Effluent	1100	2200	1616	500	32
TE1122	Twin	A	Effluent	1100	2200	1616	500	32
SE1126	Single	A	Effluent	1100	2600	1996	500	32
TE1126	Twin	A	Effluent	1100	2600	1996	500	32
SS0610	Single	B	Sewage	600	1000	141	500	63
SS0615	Single	B	Sewage	600	1500	282	500	63
SS0620	Single	B	Sewage	600	2000	424	500	63
SS1111	Single	B	Sewage	1100	1100	570	500	63
TS1111	Twin	B	Sewage	1100	1100	570	500	63
SS1115	Single	B	Sewage	1100	1500	950	500	63
TS1115	Twin	B	Sewage	1100	1500	950	500	63
SS1122	Single	B	Sewage	1100	2200	1616	500	63
TS1122	Twin	B	Sewage	1100	2200	1616	500	63
SS1126	Single	B	Sewage	1100	2600	1996	500	63
TS1126	Twin	B	Sewage	1100	2600	1996	500	63
TS1721	Twin	C	Sewage	1700	2100	2724	500	63/90
TS1734	Twin	D	Sewage	1700	3400	5675	500	90

Pump duties	Total lift m	1	2	3	4	5	6	7	8
A Effluent pumping stations	Distance m	54	43	30	20	8	-	-	-
B Up to TS1126 - 6m total head	Distance m	160	120	90	40	10	-	-	-
C TS1721 - 10m Total Head	Distance m	-	700	620	530	430	340	250	160
D TS1734 - 7.4m Total Head	Distance m	-	-	180	120	90	50	5	-

#### Notes:

- > Floats can be fitted directly to specific pump systems. Please contact Marsh Industries to discuss your project requirements
- > All pump stations are available for dirty water (DW) or sewage (SW), in single pump (SP) and twin pump (TP) configurations
- > The dimensions given on this page are for guidance only
- > For precise tank sizes and configurations, please contact Marsh Industries
- > All dimensions in mm

Tank configurations and components are shown for illustration purposes only



# WellWater:Hudson

## Ø1.2m pump stations

Marsh WellWater:Hudson pump stations are Ø1.2m vertical units, available from 2000mm to 3500mm heights with storage capacities ranging from 2170 litres to 3860 litres.

Each system is supplied as a complete unit with either single or twin submersible pumps with guide rails and high quality internal pipework/fittings as standard.

These pump stations are typically used in medium to large domestic or commercial applications for pumping foul water or sewage to mains sewer.

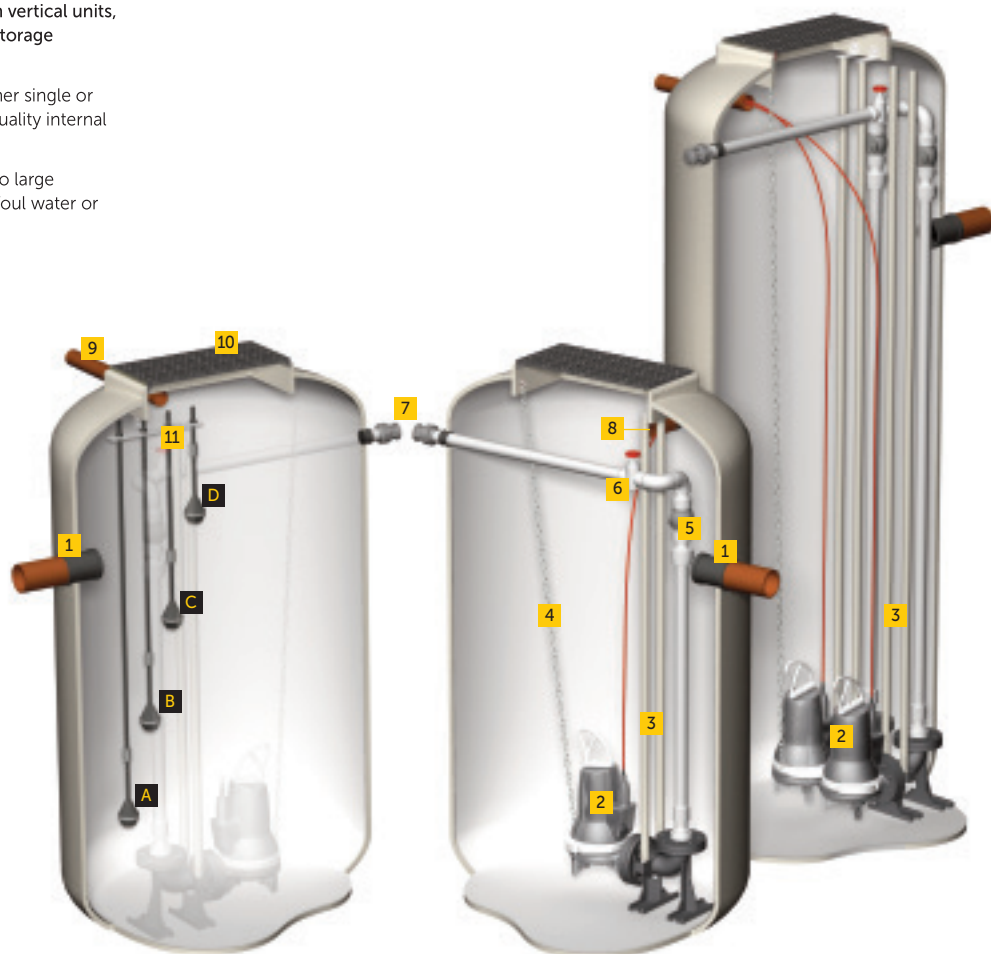
### Key

- 1 Inlet
- 2 Submersible pump(s)  
*Single or twin pumps with guide rails*
- 3 Guide rails
- 4 Pump retrieval chain
- 5 Non-return valve(s)
- 6 Gate valve
- 7 Outlet connection
- 8 Ducting and cable entry points
- 9 Vent
- 10 Manway access
- 11 Float bracket

### Float configuration options

- A Pump 'OFF' float switch
  - B Pump 1 'ON' float switch
  - C Pump 2 'ON' float switch
  - D High water float switch
- On twin pump configurations*

*Note: Floats can be fitted directly to specific pump systems. Please contact Marsh Industries to discuss your project requirements.*



### WellWater:Hudson range

Model	Single/Twin pump	Application	Diameter mm	Depth mm	Total storage Litres	Invert mm	Pipework dia mm
SS1220	Single	Sewage	1200	2000	2170	minimum 500	110 or 160
TS1220	Twin	Sewage	1200	2000	2170	minimum 500	110 or 160
SS1230	Single	Sewage	1200	3000	3300	minimum 500	110 or 160
TS1230	Twin	Sewage	1200	3000	3300	minimum 500	110 or 160
SS1235	Single	Sewage	1200	3500	3860	minimum 500	110 or 160
TS1235	Twin	Sewage	1200	3500	3860	minimum 500	110 or 160
SG1220	Single	Grinders	1200	2000	2170	minimum 500	110 or 160
TG1220	Twin	Grinders	1200	2000	2170	minimum 500	110 or 160
SG1230	Single	Grinders	1200	3000	3300	minimum 500	110 or 160
TG1230	Twin	Grinders	1200	3000	3300	minimum 500	110 or 160
SG1235	Single	Grinders	1200	3500	3860	minimum 500	110 or 160
TG1235	Twin	Grinders	1200	3500	3860	minimum 500	110 or 160

#### Notes:

- > All pump stations are available for dirty water (DW) or sewage (SW), in single pump (SP) and twin pump (TP) configurations
- > The dimensions given on this page are for guidance only
- > For precise tank sizes and configurations, please contact Marsh Industries
- > All dimensions in mm

*Tank configurations and components are shown for illustration purposes only*



# WellWater:Nile

## Ø1.8m pump stations

Marsh WellWater:Nile pump stations are Ø1.8m vertical units, available in 3000mm and 4000mm heights with storage capacities of 7250 litres and 9800 litres respectively.

Each system is supplied as a complete unit with either single or twin submersible pumps with guide rails and high quality internal pipework/fittings as standard.

These pump stations are typically used in large domestic or commercial applications for pumping foul water or sewage to mains sewer.

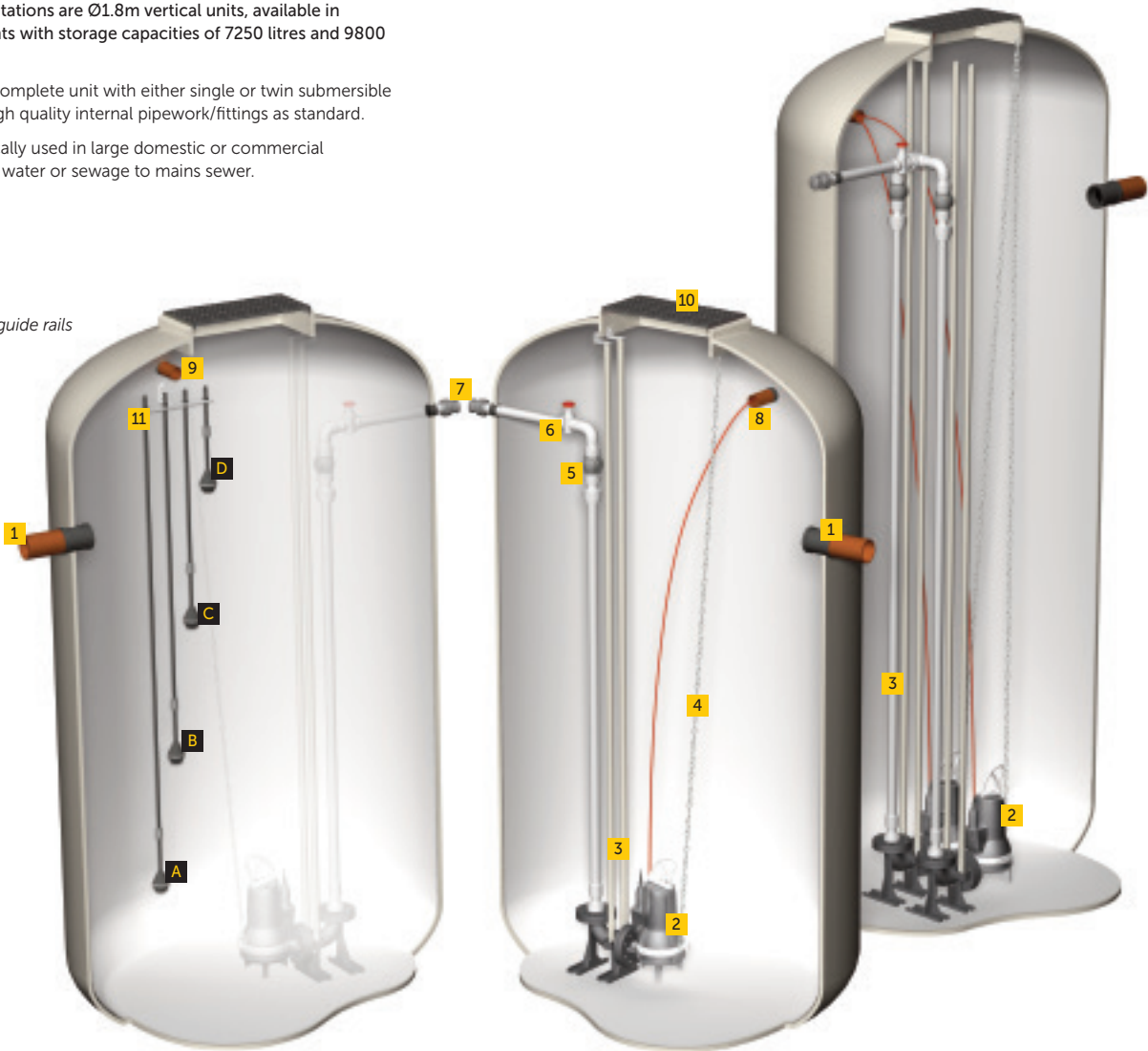
### Key

- 1 Inlet
- 2 Submersible pump(s)  
*Single or twin pumps with guide rails*
- 3 Guide rails
- 4 Pump retrieval chain
- 5 Non-return valve(s)
- 6 Gate valve
- 7 Outlet connection
- 8 Ducting and cable entry points
- 9 Vent
- 10 Manway access
- 11 Float bracket

### Float configuration options

- A Pump 'OFF' float switch
- B Pump 1 'ON' float switch
- C Pump 2 'ON' float switch
- On twin pump config's*
- D High water float switch

*Note: Floats can be fitted directly to specific pump systems. Please contact Marsh Industries to discuss your project requirements.*



### WellWater:Nile range

Model	Single/Twin pump	Application	Diameter mm	Depth mm	Total storage Litres	Invert mm	Pipework dia mm
SS1830	Single	Sewage	1800	3000	7250	minimum 500	110 or 160
TS1830	Twin	Sewage	1800	3000	7250	minimum 500	110 or 160
SS1840	Single	Sewage	1800	4000	9800	minimum 500	110 or 160
TS1840	Twin	Sewage	1800	4000	9800	minimum 500	110 or 160
SG1830	Single	Grinders	1800	3000	7250	minimum 500	110 or 160
TG1830	Twin	Grinders	1800	3000	7250	minimum 500	110 or 160
SG1840	Single	Grinders	1800	4000	9800	minimum 500	110 or 160
TG1840	Twin	Grinders	1800	4000	9800	minimum 500	110 or 160

- Notes:
- > All pump stations are available for dirty water (DW) or sewage (SW), in single pump (SP) and twin pump (TP) configurations
  - > The dimensions given on this page are for guidance only
  - > For precise tank sizes and configurations, please contact Marsh Industries
  - > All dimensions in mm

*Tank configurations and components are shown for illustration purposes only*

# WellWater:Amazon

## Ø2.5m pump stations

Marsh WellWaterAmazon pump stations are Ø2.5m horizontal units, available in storage capacities ranging from 7710 litres to 100,000 litres.

Each system is supplied as a complete unit with either twin submersible pumps with guide rails and high quality internal pipework/fittings as standard.

These pump stations are typically used in extra large domestic or commercial applications for pumping foul water or sewage to mains sewer.

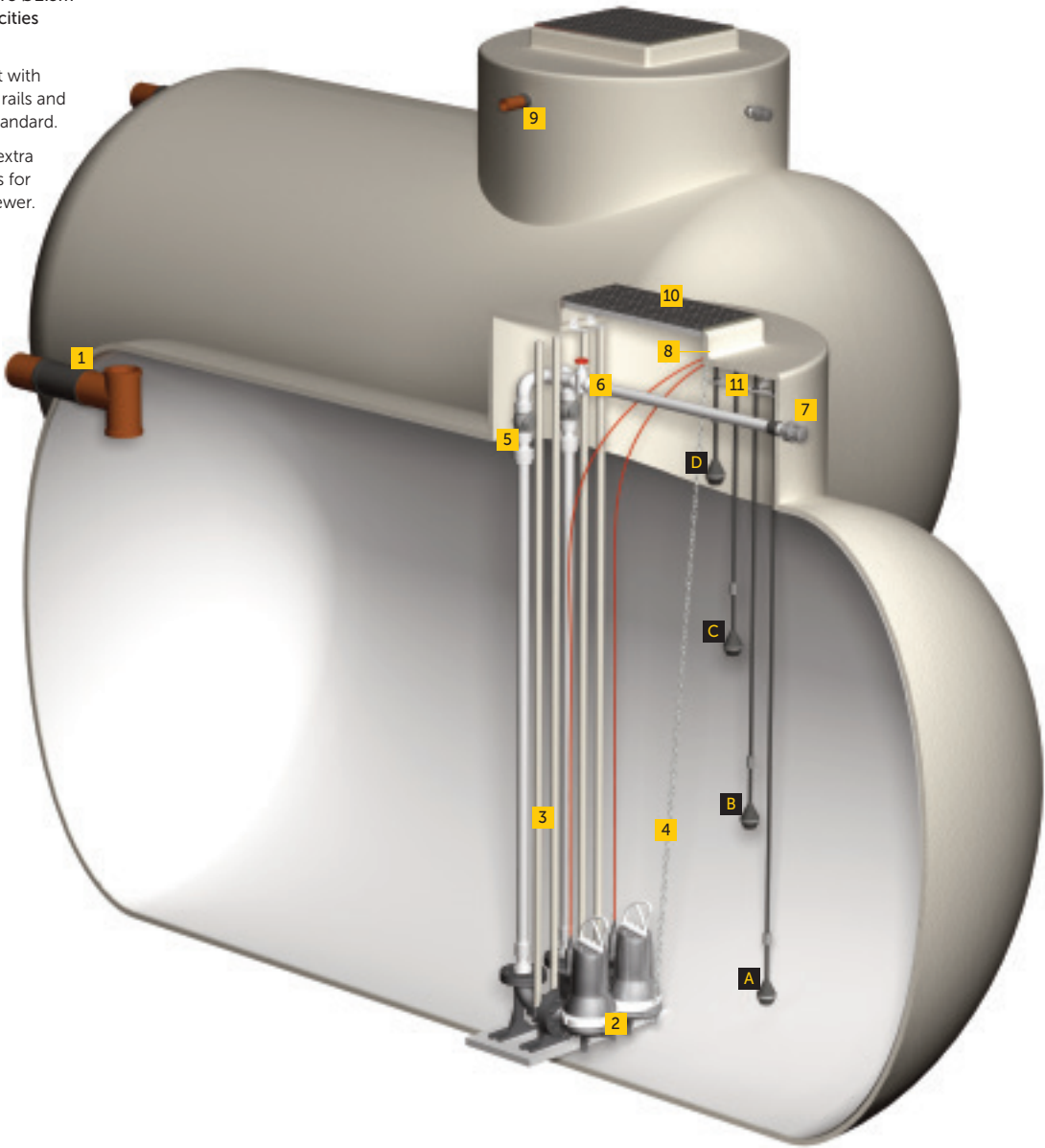
Key

- 1 Inlet
- 2 Twin pumps with guide rails
- 3 Guide rails
- 4 Pump retrieval chain
- 5 Non-return valve(s)
- 6 Gate valve
- 7 Outlet connection
- 8 Ducting and cable entry points
- 9 Vent
- 10 Manway access
- 11 Float bracket

Float configuration options

- A Pump 'OFF' float switch
- B Pump 1 'ON' float switch
- C Pump 2 'ON' float switch
- On twin pump configurations
- D High water float switch

*Note: Floats can be fitted directly to specific pump systems. Please contact Marsh Industries to discuss your project requirements.*



WellWater:Amazon range examples (Tanks with capacities up to 100,000 litres are available on request)

Model	Pump	Application	Diameter mm	Length mm	Total storage Litres	Invert mm	Pipework dia mm
TS2520	Twin	Sewage	2500	2000	7710	minimum 500	110 or 160
TS2535	Twin	Sewage	2500	3500	15050	minimum 500	110 or 160
TS2540	Twin	Sewage	2500	4000	17500	minimum 500	110 or 160

- Notes:
- > All pump stations are available for dirty water (DW) or sewage (SW), in single pump (SP) and twin pump (TP) configurations
  - > The dimensions given on this page are for guidance only
  - > For precise tank sizes and configurations, please contact Marsh Industries
  - > All dimensions in mm

*Tank configurations and components are shown for illustration purposes only*

**BASE2DRAIN**

# Basement pumps

Quality, efficiency, reliability

Introducing **BASE2DRAIN**; the safest, most reliable and efficient range of basement pumps from Marsh Industries.

Suitable for virtually all subterranean sites, Marsh **BASE2DRAIN** systems are designed in accordance with British Standard European Norms: BSEN12050, BSEN752, BSEN752-6 and also carry third party approval for material fire safety and structural integrity.

Variable invert depths and orientations to suit individual site conditions

Smooth internal walls improve pump efficiency and eliminates 'dead spots' which can lead to odours and septicity

Unique 'keying-in' lip assists anchoring into concrete surround

Structurally robust, fire tested GRP shell





Reliable product, prompt response on after sales issues, and flexible delivery schedules when required.

– Client testimonial



## Overview

A Marsh BASE2DRAIN basement pump is necessary when discharge from a subterranean site, such as an underground car park or a home basement, is required but gravity discharge is impractical.

Available in a wide range of sizes and capacities, all BASE2DRAIN systems are supplied as a complete unit with either twin or triple submersible pumps and high quality internal pipework/fittings as standard.

Marsh Civils' technical team can work closely with you to identify all key requirements in specifying the right system for your project.

## Pump options

Marsh uses market-leading submersible pumps throughout its BASE2DRAIN range to ensure maximum reliability and efficiency with minimal clogging or wear.

**Notes:**

- > In triple submersible pump applications, one pump is typically used as a backup.
- > Floats can be fitted directly to specific pump systems

## Specifications

Model	Pump options	Diameter +/-50mm	Depth +/-50mm	Total storage Litres	Outlet Ødia mm	Outlet invert	Power Kw
B2D-TP675	Twin pump	600	750	141	32	250	0.25 / 0.55
B2D-TP610	Twin pump	600	1000	169	32	400	0.25 / 0.55
B2D-TP615	Twin pump	600	1500	212	32	750	0.55
B2D-TP620	Twin pump	600	2000	226	32	1200	0.55
B2D-TRP7575/BB	Twin pump / Triple pump / UPS battery-back up options	750	750	220	32	250	0.25 / 0.55
B2D-TRP7510	Twin pump / Triple pump options	750	1000	265	32	400	0.25 / 0.55
B2D-TRP7515	Twin pump / Triple pump options	750	1500	331	32	750	0.55
B2D-TRP7520	Twin pump / Triple pump options	750	2000	353	32	1200	0.55

**Notes:**

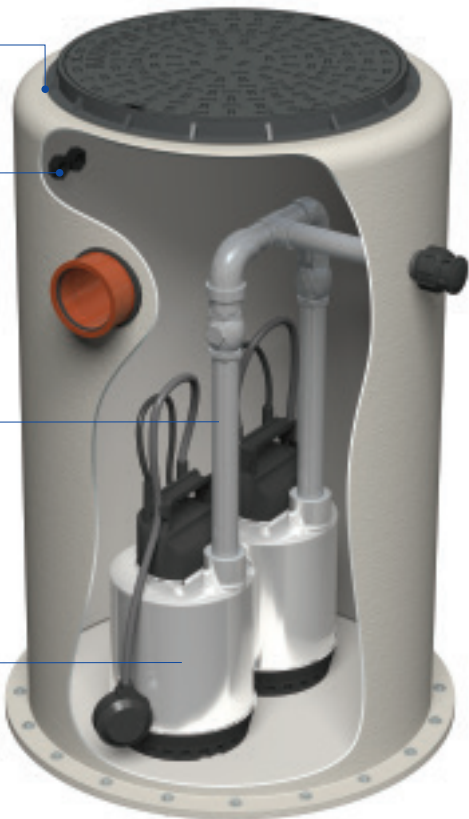
- > The dimensions given on this page are for guidance only
- > For precise tank sizes and configurations, please contact Marsh
- > All dimensions in mm

Acoustic sealant provides an effective sound barrier and prevents air and moisture from entering the tank

Pre-assembled pipework for fully automatic operation

Pre-assembled pipework for fully automatic operation

Market-leading submersible pumps ensure maximum reliability and efficiency with minimal clogging or wear



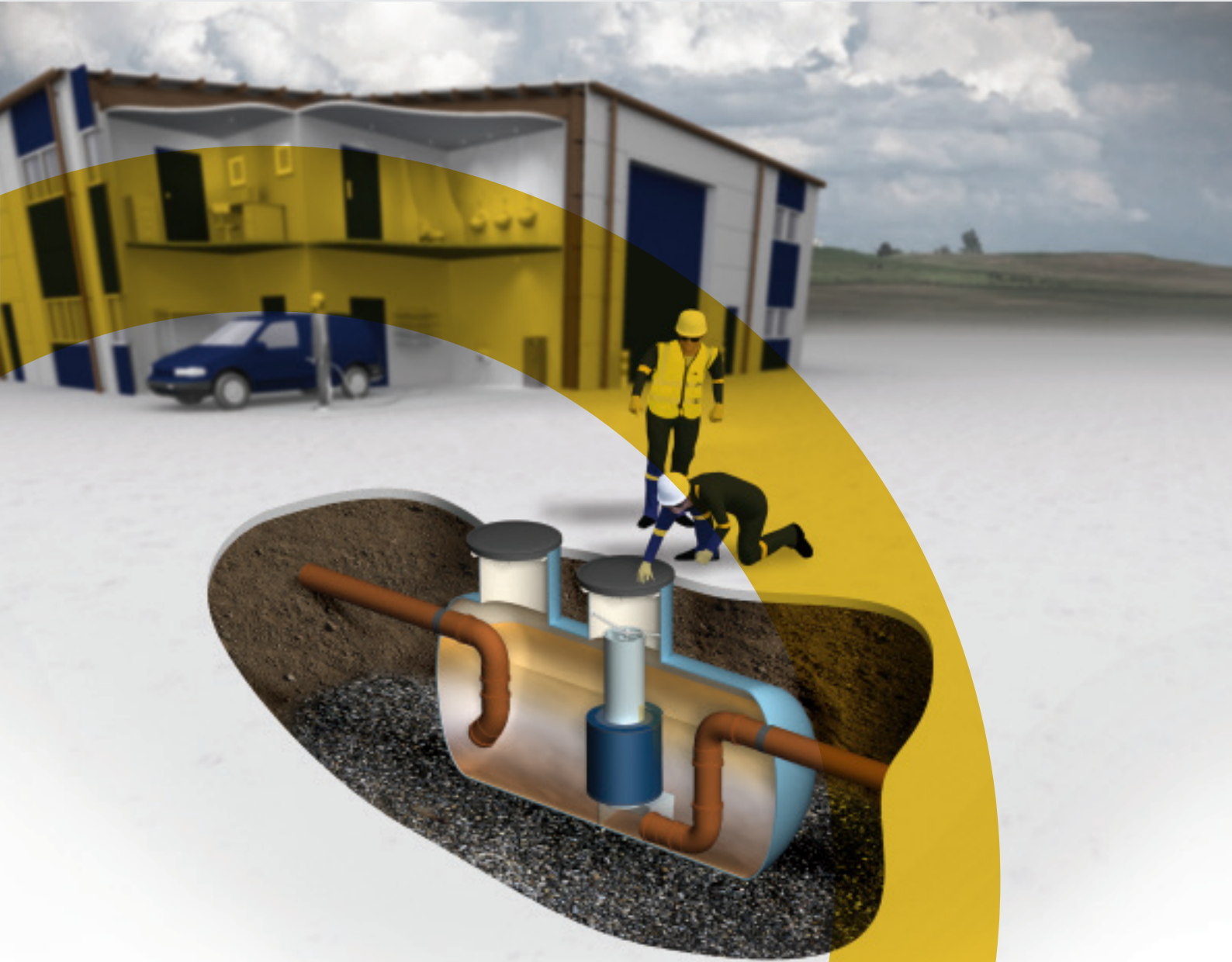
## Why specify Marsh

- Designed to British Standard European Norm's:
  - BSEN12050 for structural strength and water-tightness
  - BSEN752 to comply with hydrostatic and electrical requirements
  - BSEN752-6 for drain and sewer systems in outside buildings
- Smooth internal walls and integral pump well improve pump efficiency and eliminates 'dead spots' which can lead to odours and septicity
- Variable invert depths and orientations to suit individual site conditions
- Pre-assembled pipework for fully automatic operation
- Unique 'keying-in' lip assists anchoring into concrete surround
- GRP tank material passed all practical fire testing to achieve EN ISO 11925-2:2010 standard (see back page)
- Structural integrity tests performed in accordance with EN ISO 179-1/1eA: 2010-11 (see back page)

Note: Tank products and configurations shown for illustrative purposes only



# OIL SEPARATORS



**SuDS** SAFE  
SEPARATORS

# Separation by flotation and settlement

Oil separators are designed to prevent oil and other hydrocarbons from entering the drainage system. They separate oil from water, and safely retain the oil until it is removed.

Oil cannot be treated easily and will therefore cause severe pollution if allowed to enter mains sewers or drainage fields. Statutory controls enforce strict regulations on the discharge of such pollutants.

Separators should be used in such applications as petrol stations, industrial yards and garages; or virtually anywhere that a risk of oil contamination exists.

Discharge requirements for oil separators may vary in different areas of the country and it is therefore essential to consult the appropriate environmental controlling authority prior to specifying an oil separator. If the discharge is to a public sewer then local Building Control, the Water Authorities and water companies should also be contacted.

*Note: For larger sites, more than one type of oil separator may be required.*

## Separator types and principles of operation

### Classes

Separators are classed in two categories based on performance under standard test conditions.

**Class 1 separators** are designed to achieve a discharge concentration of less than 5mg/litre of oil. These separators are required for discharges to surface water drains and the water environment.

**Class 2 separators** are designed to achieve a discharge concentration of less than 100mg/litre of oil under standard test conditions. They are suitable for dealing with discharges where there is a lower quality requirement, such as discharges to the foul sewer.

Both classes can be produced as 'full retention', 'bypass' or 'forecourt' separators as explained below.

### Bypass separators

Bypass separators treat all flows from rainfall events of up to 6.5mm/hr. This covers over 99% of all rainfall events. Flows higher than 6.5mm/hr are designed to bypass the separator.

These separators are used in a 'low risk' environment where there is no requirement to provide full treatment for the flow; for example a car park where the risk of a significant spillage is small.

### Full retention separators

Full retention separators treat the full flow that is delivered by the drainage system, which is normally equivalent to the flow generated by a rainfall intensity of 65mm/hr.

These separators are used where there may be a 'high risk' of a significant fuel spillage, such as vehicle workshops

### Forecourt separators

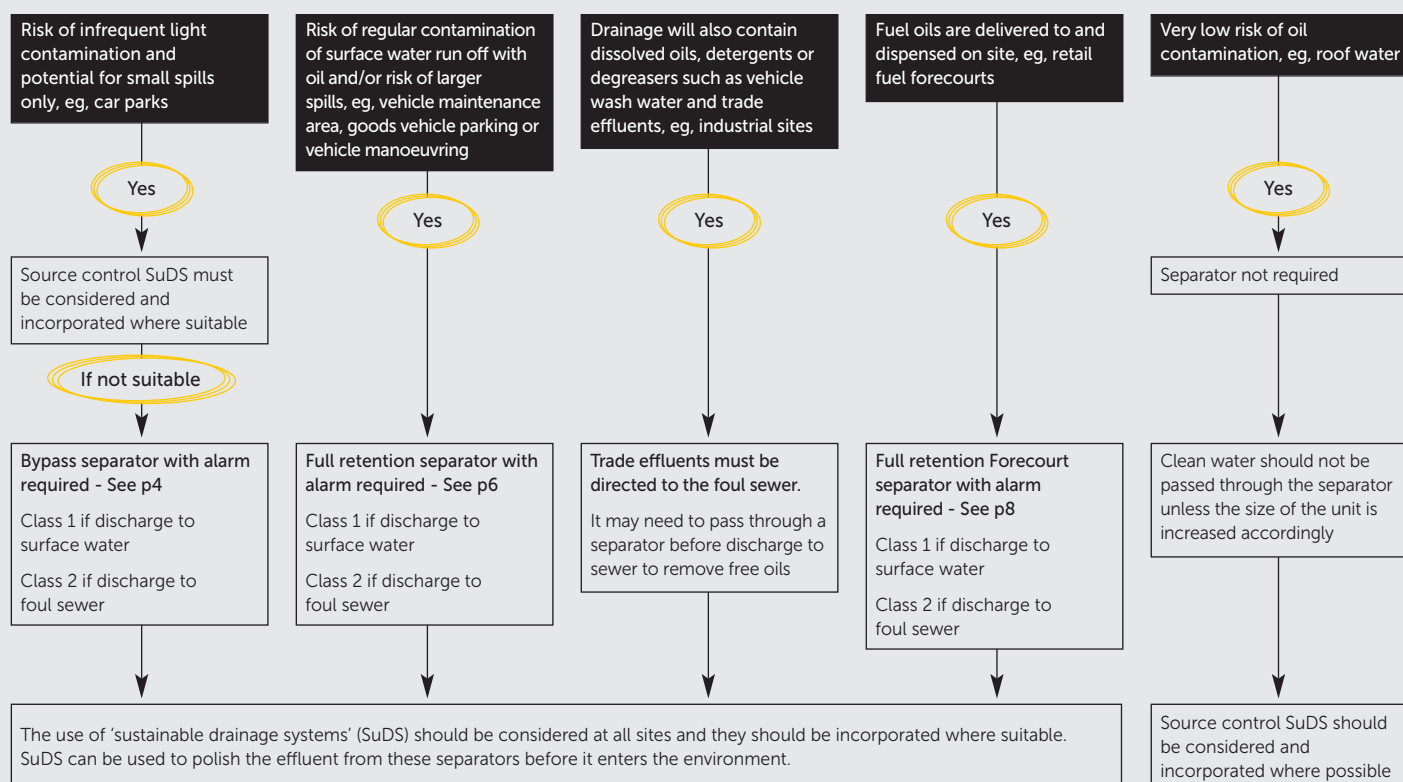
Forecourt separators are a type of full retention separator, however they are specifically designed to store the maximum spillage likely to occur on a petrol station forecourt.

These separators are manufactured to a specific size in order to retain the potential spillage from a single compartment of a road tanker – currently up to 7,600 litres in the UK.

### Wash-down separators and silt traps

It is a legal requirement to install a silt trap or wash-down separator on commercial sites, such as vehicle wash bays, where there is an environmental risk of contamination from dirt, brake dust, traffic film residue, cleaning agents, oil, etc.

## Choosing the right separator



# Marsh:Hydroil™

## Bypass separators

For areas at 'low risk' of oil contamination

### Overview

Bypass separators are used in a 'low risk' environment where there is no requirement to provide full treatment for the flow; for example a car park where the risk of a significant spillage is small.

Designed and tested to BS EN858 parts 1&2, Marsh Hydroil bypass separators are manufactured from virgin unfilled resin offering exceptional durability, impact resistance and are guaranteed to be watertight and of uniform thickness. These combined properties ensure that the full range of separators stand up to the most rigorous conditions during their service life.

Internal working components, such as coalescing filters, weirs, oil skimmer plates, and their configurations offer the most modern and efficient oil/water separation capability available to the market today.

A wide choice of inlet and outlet positions are available on the units - detailed requirements should be provided at time of order (standard inlet and outlet positions will otherwise be fitted).

### Operating principle

Marsh Hydroil bypass separators are designed to treat 10% of peak flow.

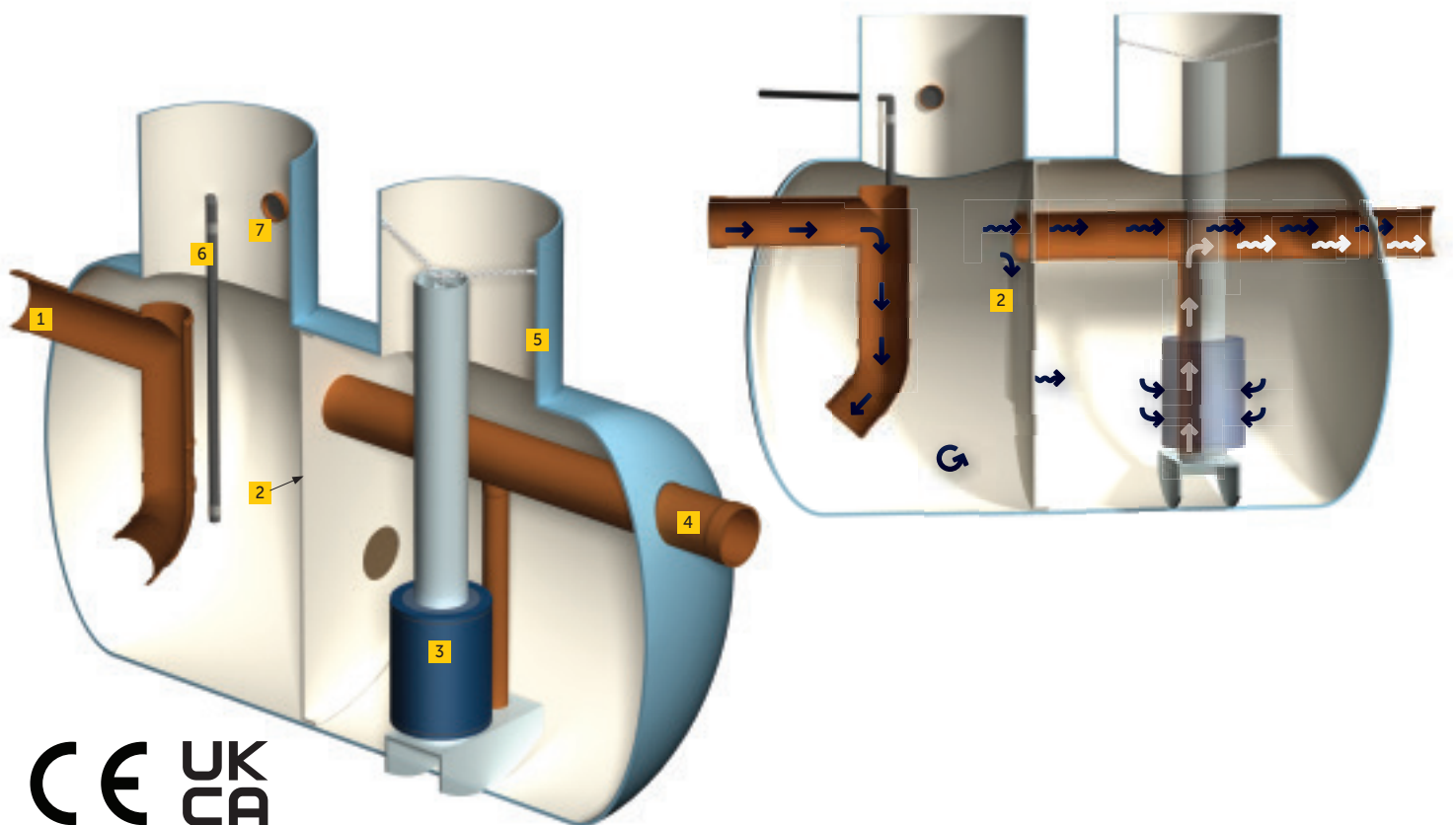
The drainage areas served by each separator are determined in accordance with both BS EN858 parts 1&2, but also with reference to a formula provided by the Environment Agency, where  $NSB=0.0018 \times A$  (catchment area in m<sup>2</sup>). Flows from higher rainfall rates are allowed to bypass the main separation chamber.

#### Key

- 1 Inlet
- 2 Oil skimmer plate
- 3 Coalescer
- 4 Outlet
- 5 Access turret
- 6 Level alarm dip pipe
- 7 Air vent

#### Flowpath

- ➡ Oil/water mixture  
➡ Water



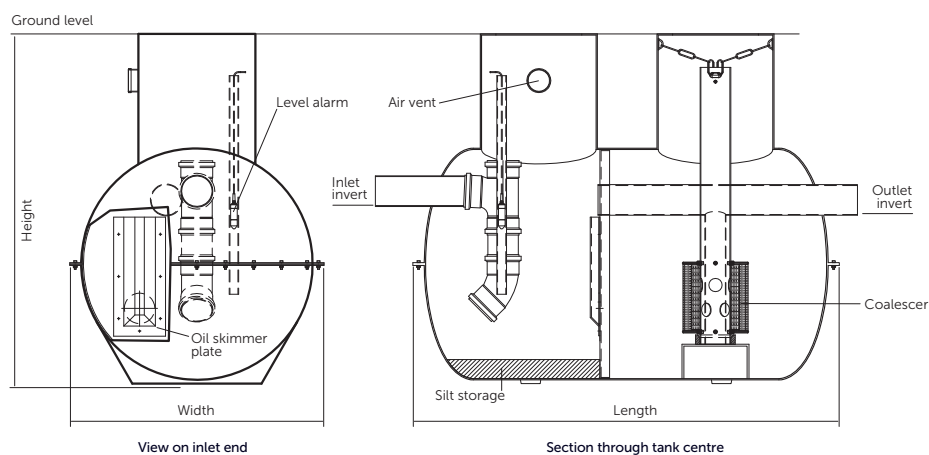
### Benefits

- Designed and tested to meet latest UK and European standards
- Corrosion resistant
- Tank shells guaranteed for 25 years with a design life of 50 years
- Heavy duty shells enable installation in all ground conditions
- Easy access turrets for maintenance and servicing (Turret guards optional)
- Various alarm types available (Required by EN858-1)
- Variable invert depths and inlet/outlet configurations to suit individual site conditions
- Vented turrets dissipate excessive fumes and vapours

### Typical applications

- Car parks
- Roadways
- Industrial estates
- SuDS

## Specifications



### Bypass separator range

00 Model	Flow litre/sec	Drainage area m <sup>2</sup>	Silt storage litres	Oil storage litres	Width +/-50mm	Length +/-50mm	Height +/-50mm	Connection size Ø	Inlet invert	Outlet invert
NSBP 3	30	1700	300	45	1354	2254	1784	160 O/D	900	950
NSBP 4	45	2550	450	67.5	1354	2254	1784	160 O/D	900	950
NSBP 6	60	3400	600	90	1354	2254	1784	200 O/D	900	950
NSBP 8	80	4530	800	120	1354	2254	1784	200 O/D	900	950
NSBP 10	100	5660	1000	150	1354	2914	1784	315 O/D	900	950
NSBP 15	150	8510	1500	225	1354	4184	1784	315 O/D	900	1000
NSBP 18	180	10198	1800	270	1818	2398	2418	400 O/D	1050	1150
NSBP 20	200	11370	2000	300	1818	2398	2418	400 O/D	1050	1150
NSBP 25	250	14185	2500	375	1818	3198	2418	400 O/D	1050	1150
NSBP 30	300	17000	3000	450	1818	3758	2418	500 O/D	1185	1285
NSBP 40	400	22650	4000	600	1818	4878	2418	500 O/D	1185	1285
NSBP 45	450	25325	4500	675	1818	5438	2418	500 O/D	1185	1285
NSBP 50	500	28330	5000	750	1818	5998	2418	500 O/D	1185	1285
NSBP 60	600	33996	6000	900	2622	4028	3172	600 I/D Twin wall	1350	1450
NSBP 65	650	36829	6500	975	2622	4303	3172	600 I/D Twin wall	1350	1450
NSBP 70	700	39620	7000	1050	2622	4578	3172	600 I/D Twin wall	1350	1450
NSBP 75	750	42495	7500	1125	2622	4908	3172	600 I/D Twin wall	1350	1450
NSBP 80	800	45330	8000	1200	2622	5415	3172	600 I/D Twin wall	1350	1450
NSBP 100	1000	56660	10000	1500	3128	4702	3678	750 I/D Twin wall	1525	1625
NSBP 125	1250	70820	12500	1875	3128	5741	3678	TBC*	TBC*	TBC*
NSBP 130	1300	73658	13000	1950	3128	6028	3678	TBC*	TBC*	TBC*
NSBP 150	1500	84990	15000	2255	3128	6780	3678	TBC*	TBC*	TBC*

Notes:

\*Pipework and inverts sized on application

- > The dimensions given on this page are for guidance only
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- > Number of access shafts will be built to suit site specifications and to maintain safe access for emptying
- > All dimensions in mm



# Marsh:Hydroil™

## Full retention separators

For areas at 'high risk' of oil contamination

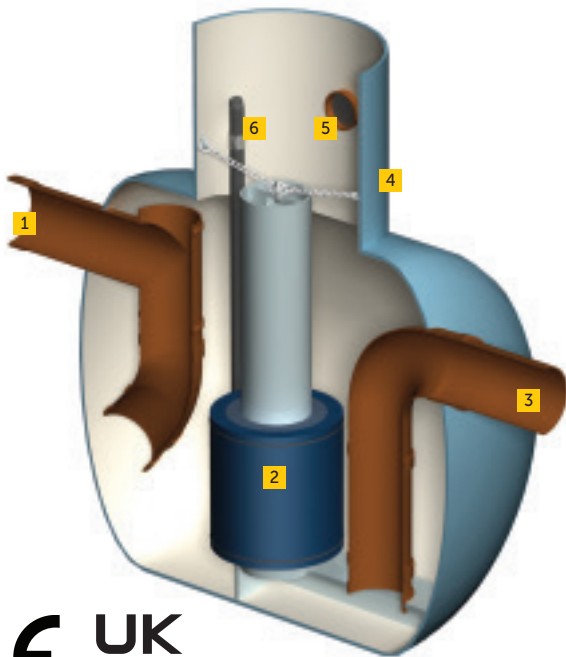
### Overview

Full retention separators are used where there may be a 'high risk' of a significant fuel spillage, such as vehicle workshops

Designed and tested to BS EN858 parts 1&2, Marsh Hydroil full retention separators are manufactured from virgin unfilled resin offering exceptional durability, impact resistance and are guaranteed to be watertight and of uniform thickness. These combined properties ensure that the full range of separators stand up to the most rigorous conditions during their service life.

Internal working components, such as coalescing filters, automatic closure devices, weirs, oil skimmer plates, and their configurations offer the most modern and efficient oil/water separation capability available to the market today.

A wide choice of inlet and outlet positions are available on the units - detailed requirements should be provided at time of order (standard inlet and outlet positions will otherwise be fitted).



### Operating principle

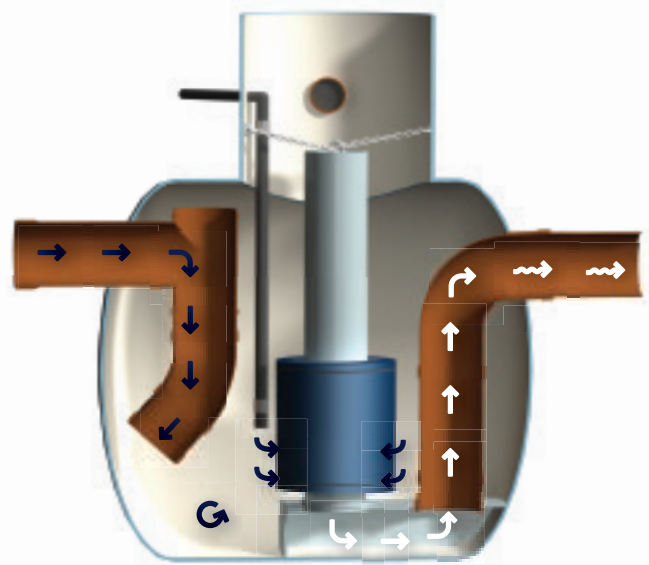
Marsh Hydroil full-retention separators treat the full flow that is delivered by the drainage system, which is normally equivalent to the flow generated by a rainfall intensity of 65mm/hr.

#### Key

- 1 Inlet
- 2 Coalescer
- 3 Outlet
- 4 Access turret
- 5 Air vent
- 6 Level alarm dip pipe

#### Flowpath

- ➡ Oil/water mixture  
➡ Water



### Benefits

- Designed and tested to meet latest UK and European standards
- Corrosion resistant
- Tank shells guaranteed for 25 years with a design life of 50 years
- Heavy duty shells enable installation in all ground conditions
- Easy access turrets for maintenance and servicing (Turret guards optional)
- Various alarm types available (Required by EN858-1)
- Variable invert depths and inlet/outlet configurations to suit individual site conditions
- Vented turrets dissipate excessive fumes and vapours

### Typical applications

- Vehicle workshops
- Refuel facilities
- Fuel storage sites

### Mitigation indices

As the world focuses on more green and environmentally friendly solutions Marsh Industries has examined how effective their separators are when incorporating them into sustainable drainage schemes.

The company tested their full retention Hydroil separator range for total suspended solids and metal mitigation indices in line with industry-approved procedures at PIA, the notified test house in Aachen, Germany. This is in addition to an existing test procedure, whereby the Hydroil has already achieved EN858-1 certification for light liquid separators.

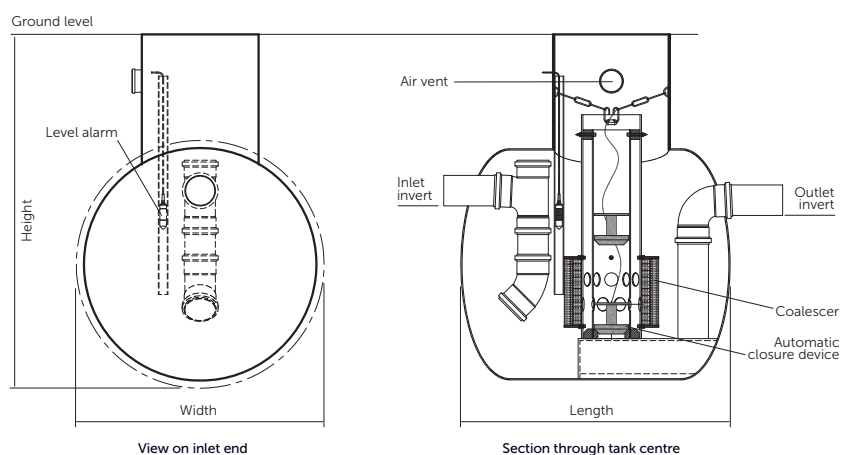
Combining these two test sets together and applying the simple index approach to proprietary/manufactured EN858 devices, the Hydroil separator range is able to achieve the following mitigation indices:

Hydrocarbons: 97.5%  
Total Suspended Solids: 84.35%  
Total Metal Reduction: 63.26%

The results will provide user confidence that the testing of this range is beyond reproach and cements these products as the complete surface water treatment solution for SuDS schemes.



## Specifications



### Full retention separator range

Model	Flow litre/sec	Drainage area m <sup>2</sup>	Silt storage litres	Oil storage litres	Width +/-50mm	Length +/-50mm	Height +/-50mm	Connection size	Inlet invert	Outlet invert
NSFR 3	3	170	300	30	1200	1400	1840	160	900	950
NSFR 4	4.5	255	450	40	1200	1700	1840	160	900	950
NSFR 6	6	340	600	60	1200	2400	1840	160	900	950
NSFR 8	8	453	800	80	1200	3200	1840	160	900	950
NSFR 10	10	566	1000	100	1200	3500	1840	160	900	950
NSFR 15	15	851	1500	150	1800	3600	2440	200	900	1000
NSFR 20	20	1137	2000	200	1800	4000	2440	200	900	1000
NSFR 30	30	1700	3000	300	1800	4800	2440	250	900	1000
NSFR 40	40	2265	4000	400	1800	6200	2440	315	900	1000
NSFR 50	50	2800	5000	500	1800	7500	2440	315	900	1000
NSFR 60	60	3233	6000	600	2622	5200	3172	315	900	1000
NSFR 65	65	3670	6500	650	2622	5600	3172	315	900	1000
NSFR 70	70	4318	7000	700	2622	6000	3172	315	900	1000
NSFR 80	80	4533	8000	800	2622	6600	3172	315	900	1000
NSFR 100	100	5666	10000	1000	2622	8600	3172	315	900	1000
NSFR 125	125	7082	12500	1250	3128	7200	3678	400	900	1100
NSFR 150	150	8500	15000	1500	3128	8400	3678	400	900	1100
NSFR 165	165	9166	16500	1650	3128	9300	3678	400	900	1100
NSFR 175	175	9800	17500	1750	3128	10000	3678	400	900	1100
NSFR 200	200	11110	20000	2000	3128	11300	3678	400	900	1100
NSFR 210	210	11898	21000	2100	3128	11500	3678	400	900	1100
NSFR 250	250	13888	25000	2500	3128	13800	3678	400	900	1100
NSFR 275	275	15582	27500	2750	3128	14500	3678	400	900	1100

#### Notes:

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- > For precise tank sizes and configurations, please contact Marsh Industries
- > Number of access shafts will be built to suit site specifications and to maintain safe access for emptying
- > All dimensions in mm



# Marsh:Hydroil™

## Forecourt separators

For areas at 'significant risk' of oil contamination

### Overview

Designed and tested to BS EN858 parts 1&2, Marsh Hydroil forecourt separators are manufactured from virgin unfilled resin offering exceptional durability, impact resistance and are guaranteed to be watertight and of uniform thickness. These combined properties ensure that the full range of separators stand up to the most rigorous conditions during their service life.

Internal working components, such as coalescing filters, weirs, oil skimmer plates, and their configurations offer the most modern and efficient oil/water separation capability available to the market today.

A wide choice of inlet and outlet positions are available on the units - detailed requirements should be provided at time of order (standard inlet and outlet positions will otherwise be fitted).

### Operating principle

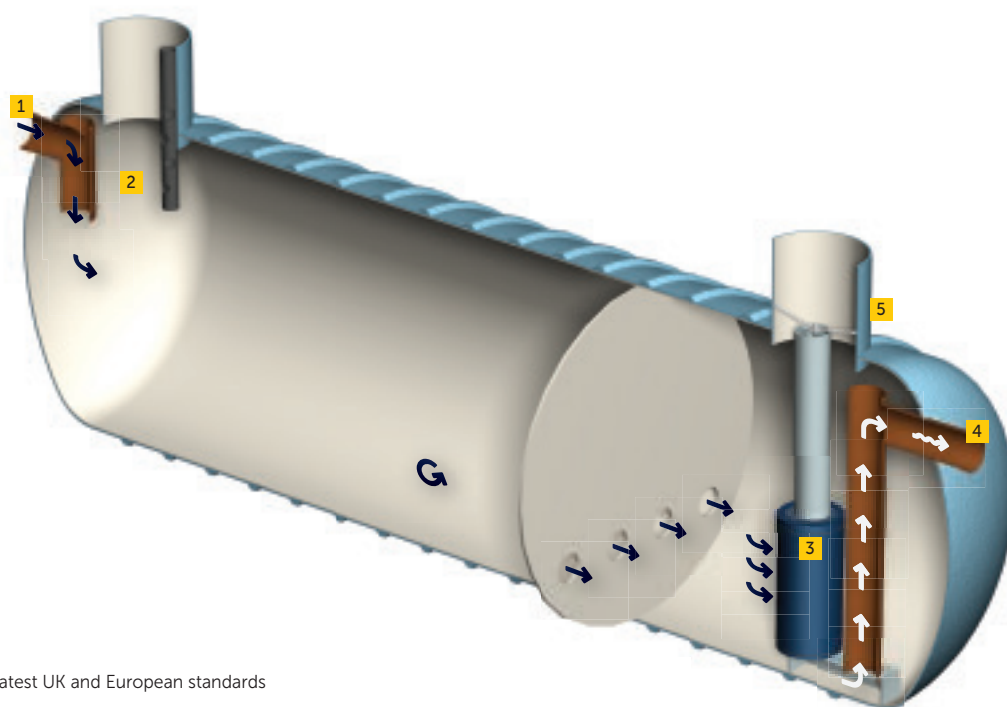
Marsh Hydroil forecourt separators are manufactured to a specific size in order to retain the potential spillage from a single compartment of a road tanker – currently up to 7,600 litres in the UK.

#### Key

- 1 Inlet
- 2 Oil level alarm (in 3" pipe)
- 3 Coalescer
- 4 Outlet
- 5 Access turrets

#### Flowpath

- ➔ Oil/water mixture
- ➔ Water



### Benefits

- Designed and tested to meet latest UK and European standards
- Corrosion resistant
- Tank shells guaranteed for 25 years with a design life of 50 years
- Heavy duty shells enable installation in all ground conditions
- Easy access turrets for maintenance and servicing (Turret guards optional)
- Various alarm types available (Required by EN858-1)
- Variable invert depths and inlet/outlet configurations to suit individual site conditions
- Vented turrets dissipate excessive fumes and vapours

### Typical applications

- Petrol stations
- Refuel facilities
- Fuel storage sites

### Forecourt separator range

Model	Capacity litres	Width +/-50mm	Length +/-50mm	Height +/-50mm	Connection size	Inlet invert	Outlet invert
<b>Class 1</b>	10000	1800	4200	2200	160	700	800
<b>Class 2</b>	10000	1800	4200	2200	160	700	800

#### Notes:

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- > Number of access shafts will be built to suit site specifications and to maintain safe access for emptying
- > All dimensions in mm

Illustrations shown for visual reference only



# Marsh:Hydroil™

## Wash-down separators / silt traps

Pollution prevention

### Wash-down separators

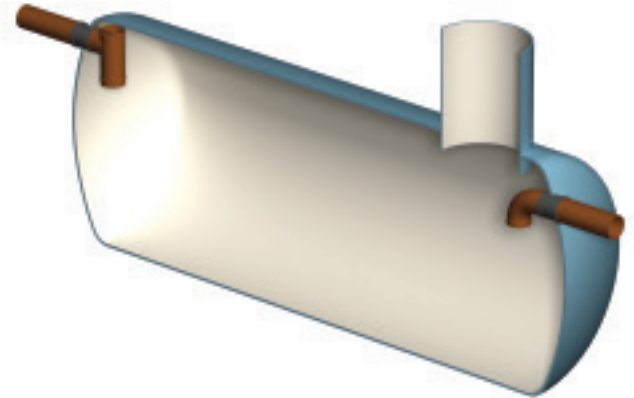
Available in capacities from 2800-20,000 litres, Marsh wash-down separators safely remove silt and debris from vehicle wash-down facilities.

These units are primarily used on car wash bays, pressure wash facilities or other cleaning facilities where the effluent must be discharged to the foul water drainage system.

It is a legal requirement to install a silt trap or wash-down separator on commercial sites, such as vehicle wash bays, where there is an environmental risk of contamination from dirt, brake dust, traffic film residue, cleaning agents, oil, etc. In all cases, you should contact your local building control or environmental agency for specific site requirements.

#### Benefits

- Heavy duty shells enable installation in all ground conditions
- Tank shells guaranteed for 25 years with a design life of 50 years
- Variable invert depths and inlet/outlet configurations to suit individual site conditions
- Easy access turrets for maintenance and servicing (Turret guards optional)
- Optional Polylok filter can further reduce pollutants from entering the drainage system
- Various alarm types available (Required by EN858-1)
- Corrosion resistant



#### Wash-down separator range

Model	Capacity litres	Width +/-50mm	Length +/-50mm	Height +/-50mm	Connection size	Inlet invert	Outlet invert
WD2800	2800	1200	3000	1715	110	700	750
WD3800	3800	1200	4000	1715	110	700	750
WD4500	4500	1500	2650	2015	110	700	750
WD6000	6000	1800	2950	2300	110	700	750
WD8000	8000	1800	3600	2300	160	700	750
WD10000	10000	1800	4200	2300	160	700	750
WD12000	12000	1800	5200	2300	160	700	750
WD15000	15000	2500	3100	3000	160	700	750
WD18000	18000	2500	4100	3000	160	700	750
WD20000	20000	2500	4500	3000	160	700	750

#### Notes:

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- > Number of access shafts will be built to suit site specifications and to maintain safe access for emptying
- > All dimensions in mm

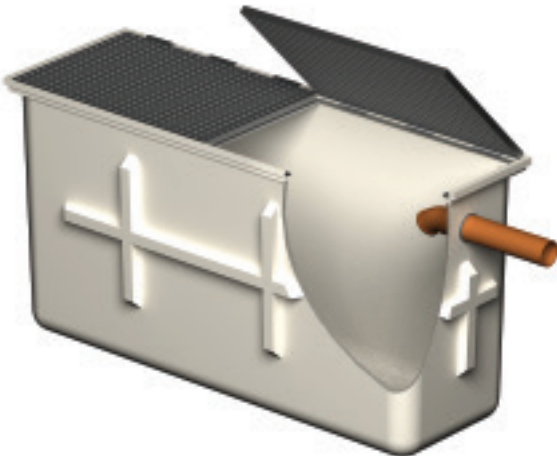
### Silt traps

With a capacity from 830-3400 litres, Marsh silt traps provide effective storage of silt and debris from vehicle wash-down facilities.

Positioned ahead of an oil separator, the silt trap gathers and stores silt and sediment, and prevents it from entering the oil separator system.

#### Benefits

- Heavy duty body enables installation in all ground conditions
- Hinged, galvanised steel grating provides structural integrity and easy emptying
- Tank body guaranteed for 25 years with a design life of 50 years



#### Silt trap

Model	Capacity litres	Length +/-50mm	Width +/-50mm	Height +/-50mm	Connection size	Outlet invert
CST1	830	1165	680	1060	110mm	240
CST2	1570	2180	680	1060	110mm	240
CST3	2300	3205	680	1060	110mm	240
CST4	3400	4230	680	1060	110mm	240



# Marsh:Marator™

High performance full retention oil separators for sites where the “industry standard” is just not good enough

## Overview

Marsh Industries has developed an innovative separator system that breaks the constraints of the current standards; the ‘Marsh:Marator’.

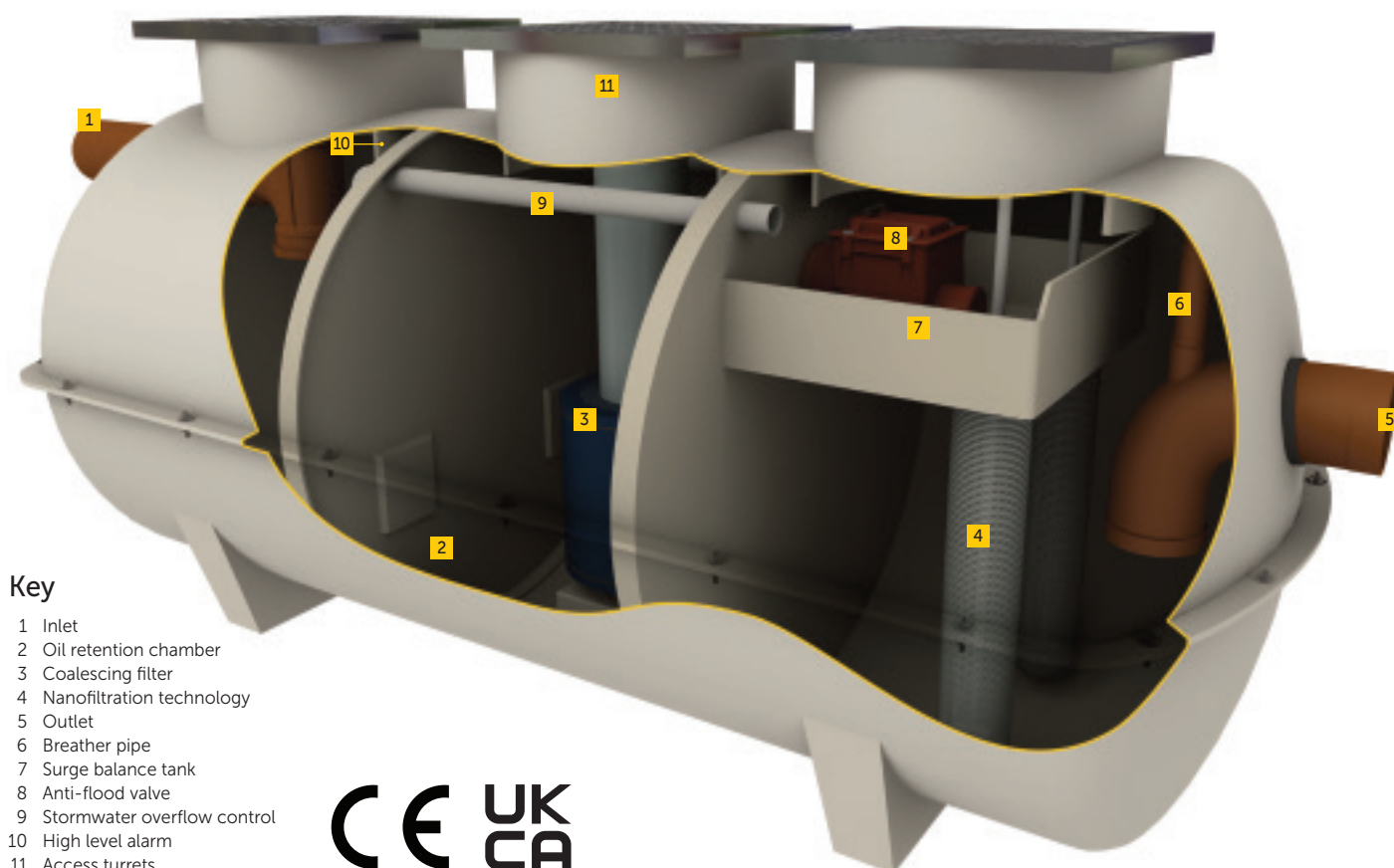
The Marator takes advantage of nanofiltration technology to produce discharge that is 50 times better than any current separator available on the market today; that is less than 0.1mg/ltr – the standard only requires less than 5mg/ltr for a ‘class 1 discharge’.

Testing was analysed for hydrocarbon content using infrared spectroscopy at GEOTAIX UMWELTECHNOLOGIE GmbH.

During the sampling period, five samples of 500ml were taken via the sampling point. The quality of discharge from the Marator exceeded the measureable level of the test equipment not to mention the current EN standard:

## Test results (NS6 model)

Sample	Result GC in mg/litre (Industry standard <5mg/litre)
NS 6-1	< 0.1
NS 6-2	< 0.1
NS 6-3	< 0.1
NS 6-4	< 0.1
NS 6-5	< 0.1
NS 6-6	< 0.1
NS 6-7	< 0.1
Average	< 0.1



### Key

- 1 Inlet
- 2 Oil retention chamber
- 3 Coalescing filter
- 4 Nanofiltration technology
- 5 Outlet
- 6 Breather pipe
- 7 Surge balance tank
- 8 Anti-flood valve
- 9 Stormwater overflow control
- 10 High level alarm
- 11 Access turrets



## Benefits

- Designed and tested to meet latest UK and European standards
- Corrosion resistant
- Tank shells guaranteed for 25 years with a design life of 50 years
- Heavy duty shells enable installation in all ground conditions
- Easy access turrets for maintenance and servicing (Turret guards optional)
- Various alarm types available (Required by EN858-1)
- Variable invert depths and inlet/outlet configurations to suit individual site conditions
- Vented turrets can dissipate excessive fumes and vapours

## Typical applications

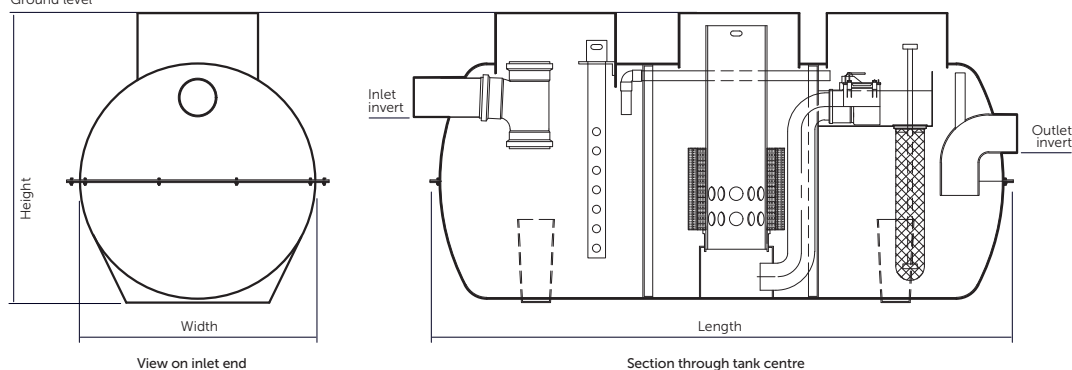
- Car parks
- Roadways
- Industrial estates
- Vehicle workshops
- Refuel facilities
- Fuel storage sites

*Illustration shown for visual reference only*



## Specifications

Ground level



Model	Max flow litre/sec	Drainage area m <sup>2</sup>	Silt storage litres	Oil storage litres	Diameter +/-50mm	Length +/-50mm	Height +/-50mm	Connection size	Inlet invert	Outlet invert
<b>Marator 6</b>	6	340	600	60	1250	3040	1862	200	900	1100
<b>Marator 10</b>	10	566	1000	100	1250	4040	1862	200	900	1100
<b>Marator 15</b>	15	851	1500	150	1812	4240	2360	315	900	1100
<b>Marator 20</b>	20	1137	2000	200	1812	4240	2360	315	900	1100

### Notes:

- > Larger systems are available, please contact Marsh Industries
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- > All dimensions in mm

## Are outmoded EN standards an environmental concern?

### Current EN standard

The European Standard, BS EN 858 parts 1&2, was introduced in 2002 to normalise design and regulate testing of products across Europe. This standard settled on a two-tier quality level – class 1 and class 2.

*Class 1 – designed to achieve a discharge concentration of less than 5mg/ltr of oil in the discharge*

*Class 2 – designed to achieve a discharge concentration of less than 100mg/ltr of oil in the discharge*

Once testing is complete and approval achieved, manufacturers are free to bring their products to market.

### The effects of current standards

A good starting point for any product is to set out relevant standards and levels of quality, both in product build and product performance. However, since the introduction of BS EN 858 in 2002, product development in gravity oil/liquid separation has remained static.

Manufacturers are only required to meet the testing standards to sell product. There has been no natural drive to improve product performance.

The current class 1 standard of less than 5mg/ltr of light liquid is only determined by test conditions. Our experience in this field tells us that this standard is rarely met once a product is installed.

### The reality of current standards

With the current level of 5mg/ltr for a Class 1 discharge – we ask “Are Class 1 separators the very best that manufacturers can offer?”

Studies have shown that the majority of hydrocarbon pollutants entering the water system stems from urban developments. Figure 2 shows the toxic effects of particular contaminants on humans and aquatic life.

Leaving aside the toxic effects of contaminants on human and aquatic life, when a hydrocarbon molecule spreads to one molecule thick and given enough surface area to spread, five litres of oil would be more than enough to contaminate five football pitches.

In addition, most hydrocarbon molecules are attached to silt particles; where Stokes law proves that these particles will sink rather than float as conventional separators require.

When mixed with other elements in real life scenarios, such as glycol, standard gravity separators become less efficient at contaminant removal.

In our view, the current testing standards covering products within the gravity separator market are outmoded and failing to protect the environment as they should. They do not reflect or address any ‘real-life’ scenario where hydrocarbon pollution is prevalent.

**The solution = the Marsh:Marator**

# Notes

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# Alarm systems

Alarms monitor the level of liquid inside sewage treatment plants, pump stations and oil separators units. An alarm signal is generated when there is an excessive level of liquid, or if the unit requires emptying.

Marsh Industries can supply various types of alarm, as well as bespoke options as required.

- Beacon alarms
- Klaxon and beacon alarms
- SMS Alarms
- Micro SMS battery alarms
- Micro SMS solar panel alarms

## GRP kiosks

Marsh GRP kiosks provide safe and secure storage of electrical control panels and other tank monitoring equipment. The kiosks are typically fitted with one or two doors, depending on kiosk size, with stainless steel vents and yale locks.

## Mild steel kiosks

Mild steel kiosks provide safe and secure storage of electrical control panels and other tank monitoring equipment. The kiosks are typically fitted with one or two doors, depending on kiosk size, with vents and yale locks.

## Commissioning and servicing

Marsh Industries offers a nationwide service to cover all aspects of commissioning and servicing on the Marsh WellWater pump station range.

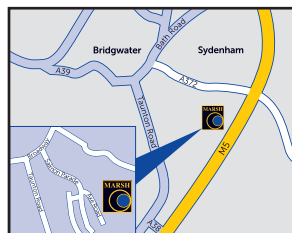
Commissioning and servicing packages can be tailored to customer requirements from basic commissioning contracts to commissioning and full service contracts, including on-going support and advice.

## Advice and guidance

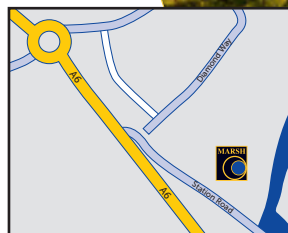
For advice and guidance on choosing the right products for your site please contact Marsh Industries on +44 (0)1933 654582 or email [contracts@marshindustries.co.uk](mailto:contracts@marshindustries.co.uk)



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