

Vortex is an advanced Activated Sludge Process (ASP) sewage treatment plant.



Vortex is designed to receive wastewater (sewage) and process it so that only a clear effluent is discharged into the environment.

Vortex is our best “all rounder”, offering excellent performance in a low cost tank.

It has been fully tested and certified to EN 12566-3.



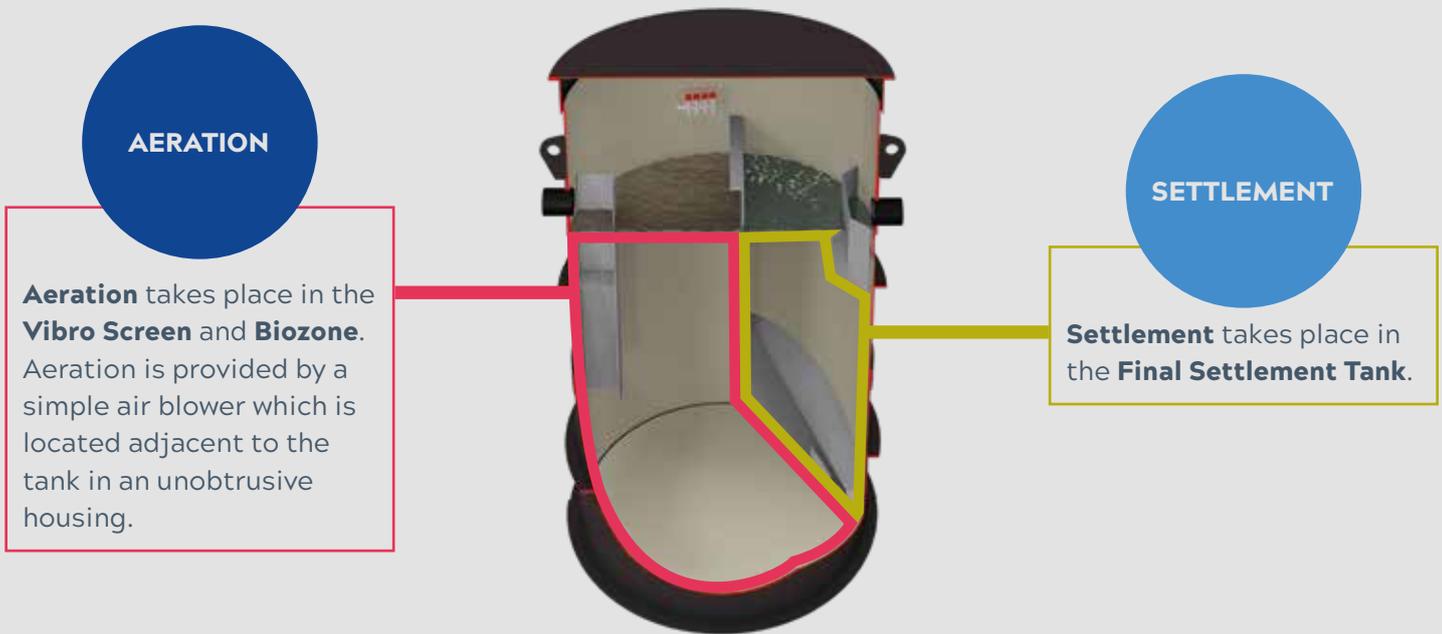
ADVANTAGES

- ✓ Simple and reliable operation
- ✓ Ultra compact tank – smallest on UK market
- ✓ Easy and low cost installation
- ✓ Excellent build quality
- ✓ No odour
- ✓ Low noise
- ✓ Low electricity demand
- ✓ Adjustable treatment process
- ✓ Excellent effluent quality
- ✓ CE marked
- ✓ EN 12566-3 certified
- ✓ Excellent value for money

Treatment Process Overview

The Vortex treatment process has been refined over several years to create a simple and reliable system that has no internal moving parts.

There are two principal stages to the treatments process:



Performance

Vortex has been designed to meet the UK Royal Commission Standard for effluent. Due to its unique design, it far exceeded this standard during EN testing.

Pollutant	Design Effluent Quality (95%ile Basis)	Average Effluent Quality - During EN 12566-3 Testing - 100% Loading	Average Effluent Quality 10% Loading
COD	N/A	55 mg/L	N/A
BOD ₅	20 mg/L	9 mg/L	4 mg/L
Suspended Solids	30 mg/L	17 mg/L	14.4 mg/L
Ammonia (NH ₄ -N)	20 mg/L	1.8 mg/L	0.3 mg/L

Treatment Process Detail

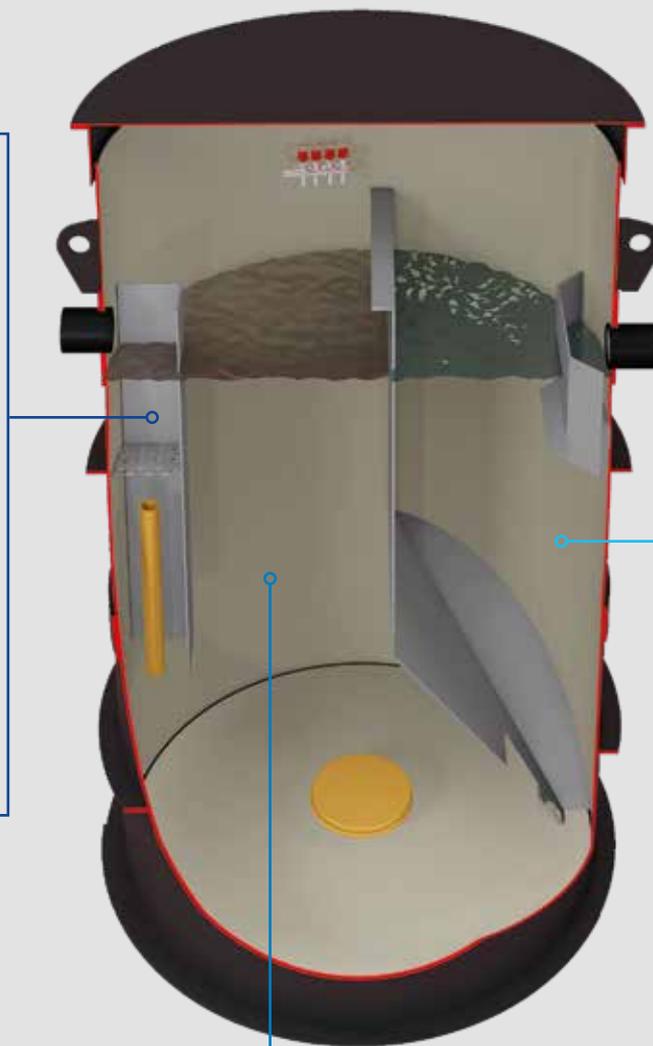
Unlike most sewage treatment plants, Vortex is designed to treat both the liquid and solid components of wastewater. It does this by using a combination of coarse and fine air bubbles.

STAGE 1

Wastewater from the building enters to **Vibro Screen**.

Course air bubbles are used to physically break down solid matter and form “soup” or mixed liquor with the water.

The Vibro Screen also provides a buffer for any non degradable material that may enter the system and prevents it from entering the Biozone.



STAGE 3

The mixed liquor then flows into the **Final Settlement Tank**.

Here the mixed liquor separates into clear, treated effluent and sludge.

The clear effluent is able to flow past the scum baffle and out of the tank.

STAGE 2

The mixed liquor flows into the **Biozone**.

The Biozone is where the majority of the treatment process occurs.

A bacterial culture is present in the Biozone which digests the pollutants in the wastewater.

Fine bubble diffusers in the base of the Biozone provide a constant oxygen supply for the bacteria and create turbulence ensuring constant circulation and treatment of the mixed liquor.

Vibro Screen

The Vibro Screen prevents any fibrous material in the wastewater from entering the main part of the system. This greatly reduces the risk of damage to the internal pipework. No other activated sludge or extended aeration sewage treatment plant provides this protection.

Coarse and fine air bubbles

Vortex uses a combination of bubbles sizes to optimise performance and reduce power consumption. Aeration in an ASP sewage treatment plants must achieve two things:

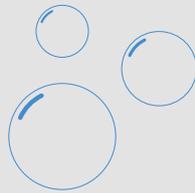
ONE

Break up solids to
create a mixed liquor

TWO

Supply oxygen to
the bacteria

Vortex uses specific air bubbles to achieve these aims:



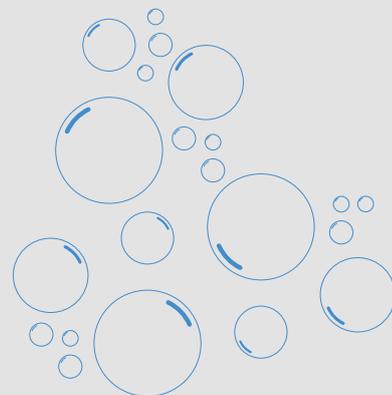
A large and powerful coarse bubble to physically smash up the solids



A very small fine bubble to oxygenate the water

Fine air bubbles are much more efficient at oxygenating water as the distance the oxygen molecule has to travel to escape from the bubble is reduced. If the efficiency of oxygen transfer can be increased, a smaller air blower is required and this reduces the power demand of the system.

Conventionally, ASP systems rely on a single bubble size to do both functions however. This is inefficient at both tasks and increases the size of the air blower required as a result.



The Sludge Management System

All Activated Sludge Process (ASP) sewage treatment plant produce sludge as part of the treatment process. The sludge is composed of partially digested solid matter.

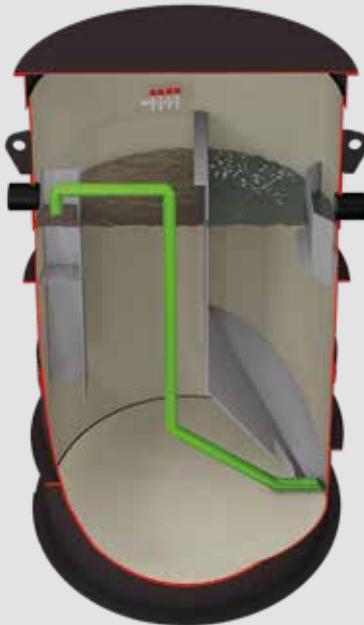
Two types of sludge are produced: **Settlement Sludge and Floating Sludge**

Vortex's ability to automatically recycle this sludge via its Sludge Management System is one of the elements that make it an advanced ASP.

Settled Sludge Return (SSR)

Settled sludge is recycled from the bottom of the Final Settlement Tank back to the Vibro Screen using a simple, non-mechanical, air lift.

The return of settled sludge back to the Vibro Screen gives the bacteria a food supply even when there is little or no wastewater coming from the building. This makes the Vortex better able to handle low occupation stress than other ASP sewage treatment plants.

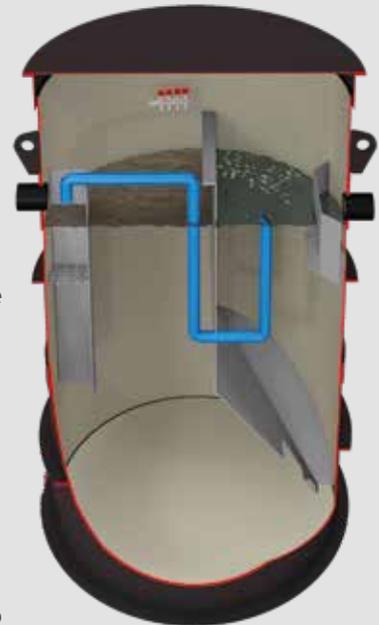


Floating Sludge Return (FSR)

On other ASP systems the floating sludge must be manually recycled back to the Biozone or removed from the tank.

Vortex's automatic FSR enables it to recycle and manage the floating sludge on an hourly basis without the use of electrical or mechanical components inside the tank.

No other ASP sewage treatment plant has this ability to manage its own floating sludge.



Adjustable Treatment Process

One of the major advantages of the Vortex design is that the aeration inside the tank can be manipulated post installation. This enables the tank to function differently depending on the amount of use it is getting.

As a rough rule, sewage treatment plants require at least 50% of their design load in order to function. It is common however for many sewage treatment plants to be underloaded and fail to produce satisfactory effluent as a result.

Vortex is adjustable so the treatment process can be altered to optimise performance for populations less than 50% of the design load.

10%

Upon completion of EN 12566-3 testing, Vortex was emptied and restarted and received only 10% of the design load.

THE SYSTEM FUNCTIONED EXCEPTIONALLY WELL WITH NO MAINTENANCE ISSUES.

EXAMPLE

A four bedroom house requires a 6PE (6 person) sewage treatment plant.

A 6PE sewage treatment plant should have at least three residents using it.

The house is only occupied by two residents and the sewage treatment plant doesn't function correctly as a result.

Odourless Operation

Unlike many sewage treatment plants, Vortex does not have a Primary Tank (similar to a septic tank) where solids in the incoming wastewater accumulate.



Primary Tanks are anaerobic and as the solids break down it creates odour. This is why septic tanks smell. Any sewage treatment plant that has a Primary Settlement Tank (anaerobic first stage) will produce odour from time to time.

Vortex is 100% aerobic. As soon as wastewater enters the tank it is oxygenated and this prevents the formation of foul odour.

Total Wastewater Treatment

Many sewage treatment plants only treat the liquid component of wastewater and not the solids. The solids are stored in a Primary Tank (septic tank) prior to the treatment stage and simply accumulate prior to periodic removal by a suction tanker.

Vortex treats both the liquid and solid constituents in wastewater.

Because solids are actively treated and digested by the bacteria in the Vortex's Biozone, the overall size of the tank is significantly reduced.

Ultra Compact Design

Vortex is the most compact sewage treatment plant on the market and is approximately one third the size of some of its competitors.

Its compact design significantly reduces the size of the excavation and the quantity of backfill required.

Its small size make handling easy and minimises transportation costs.



Robust Construction

Vortex tanks are fabricated from high density polyethylene (HDPE) sheet.

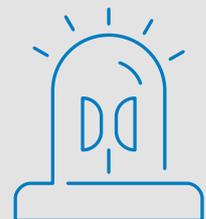
All sheets are welded, not mechanically joined, to create a one piece tank with all seams covered by the factory warranty.

Fabrication from HDPE sheet gives the tanks inherent strength as bending the sheet to create the cylindrical tank body creates internal tension within the polymer to resist external force. This is a significant advantage over a moulded method of construction.

Additional strength is given to the tanks via the external ribs. The ribs also help the tank to lock into the backfill and anchor it into the ground.

Failure Alarm

To comply with EN 12566-3, a sewage treatment plant must have an alarm to alert the user in the event of failure.



All Vortex tanks come with an audio and visual alarm as standard.

Remote and telemetry alarms are available on request.

Installation

The compact design and robust construction make installation as simple, quick and low cost as possible.

It is suitable for high groundwater sites and when installed on dry sites, there is no requirement for a concrete backfill.

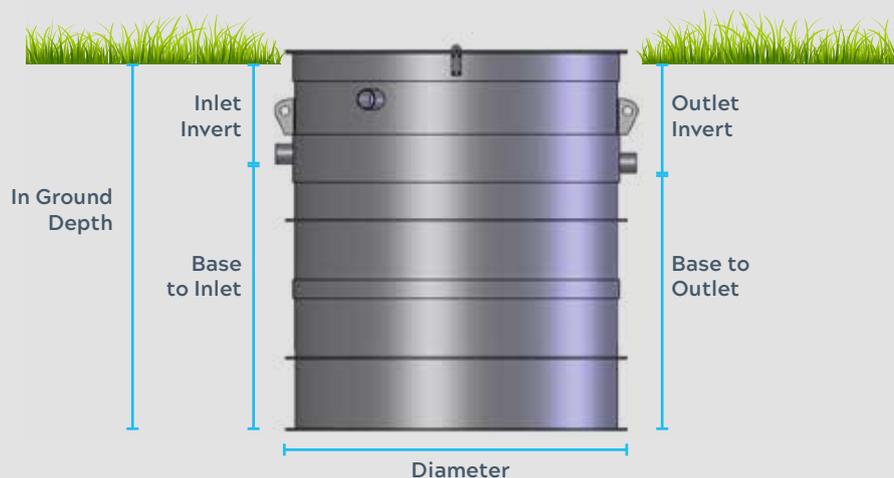
Vortex is capable of being installed above ground if required.

Shallow and deep inlet inverts are available for most tanks in the range to cater for a range of foul drain depths.

Please contact our office if you would like the details of your nearest approved installer.

Technical Details

Model	PE	Diameter (mm)	In Ground Depth (mm)	Base to Inlet (mm)	Base to Outlet (mm)	Inlet Invert* (mm)	Outlet Invert* (mm)	Power (w)
Vortex 4	4	1,121	2,000	1,450	1,400	550	600	40
Vortex 6	6	1,341	2,000	1,450	1,400	550	600	40
Vortex 9	9	1,616	2,000	1,450	1,400	550	600	75
Vortex 12	12	1,850	2,000	1,450	1,400	550	600	95
Vortex 16	16	1,870	2,650	1,900	1,850	750	800	115
Vortex 21	21	1,870	2,650	1,900	1,850	750	800	180
Vortex 30	30	2,195	2,650	1,900	1,850	750	800	230



*Alternative inverts available. Please contact for details.