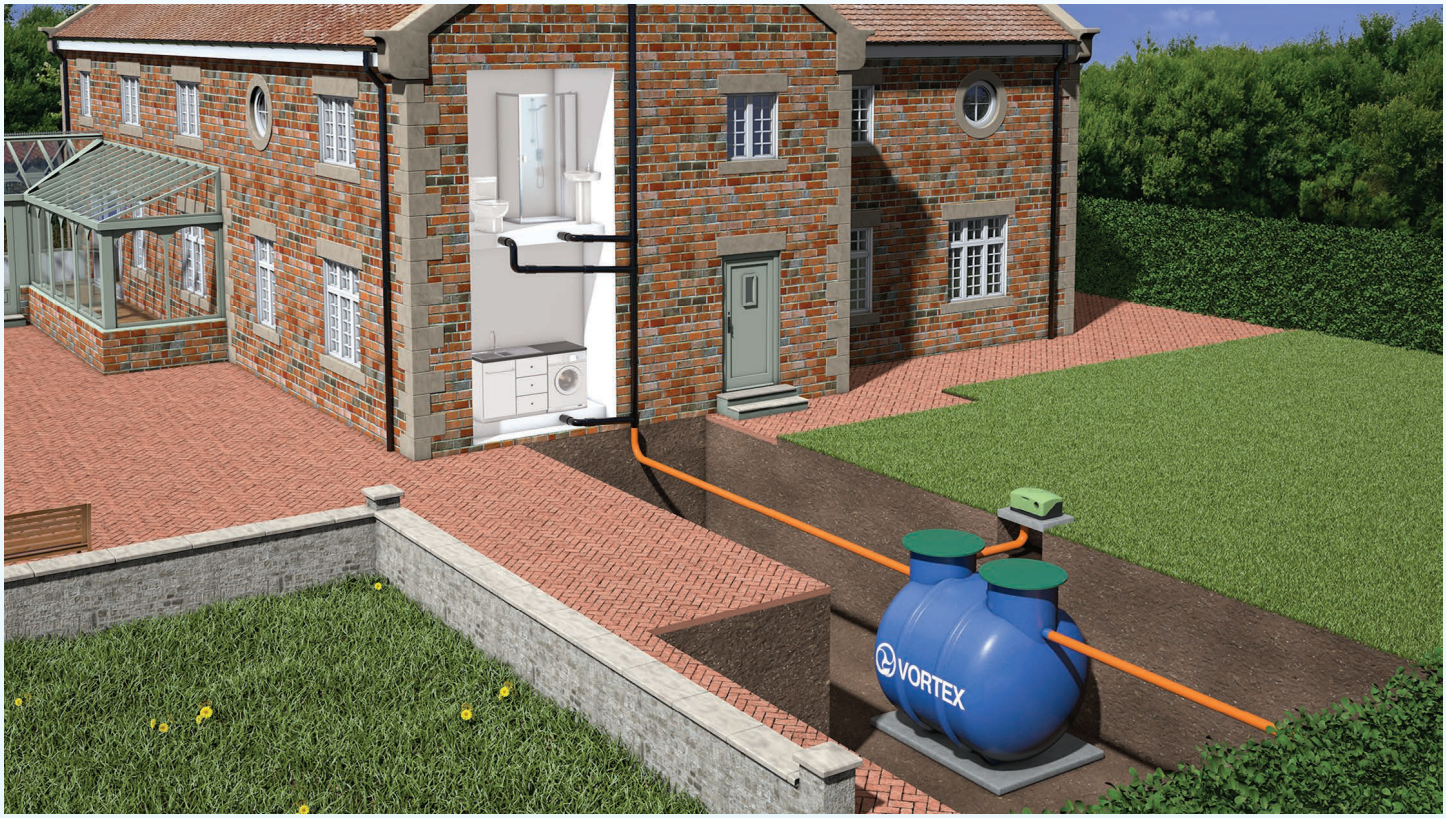
# VORTEX

## 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" for domestic properties offering excellent performance in a low cost tank.

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

## ADVANTAGES

- *Excellent performance*
- *No odour*
- *Low noise*
- *Discreet installation*
- *Low purchase price*
- *Low installation cost*
- *Compact tank*
- *Low electricity demand*
- *Adjustable treatment process*
- *CE marked*
- *EN 12566-3 certified*

CERTIFIED EN 12566-3 CERTIFIED

CE

WTE

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# VORTEX

## PERFORMANCE

The VORTEX has been designed to meet the UK Royal Commission standard for eflluent.

| Pollutant | Design Effluent Quality (95%ile basis) | Average Effluent Quality during EN 12566-3 Testing - 100% Loading | Average Effluent Quality during EN 12566-3 Testing - 10% Loading |
|---|---|---|---|
| COD | N/A | 55.0 mg/L | N/A |
| $BOD_5$ | 20 mg/L | 9.0 mg/L | 4.0 mg/L |
| Suspended Solids | 30 mg/L | 17.0 mg/L | 14.4 mg/L |
| Ammonia ($NH_4$-N) | 20 mg/L | 1.8 mg/L | 0.3 mg/L |

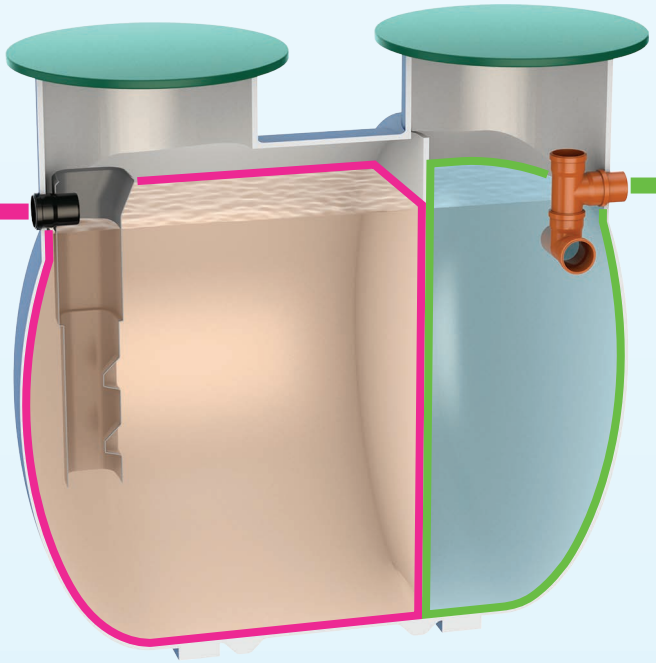
## TREATMENT PROCESS OVERVIEW

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 treatment process:*

**AERATION**

*Aeration takes place in the Vibro Screen and Biozone. Aeration is provided by a simple air blower which is located under the lid of the tank.*

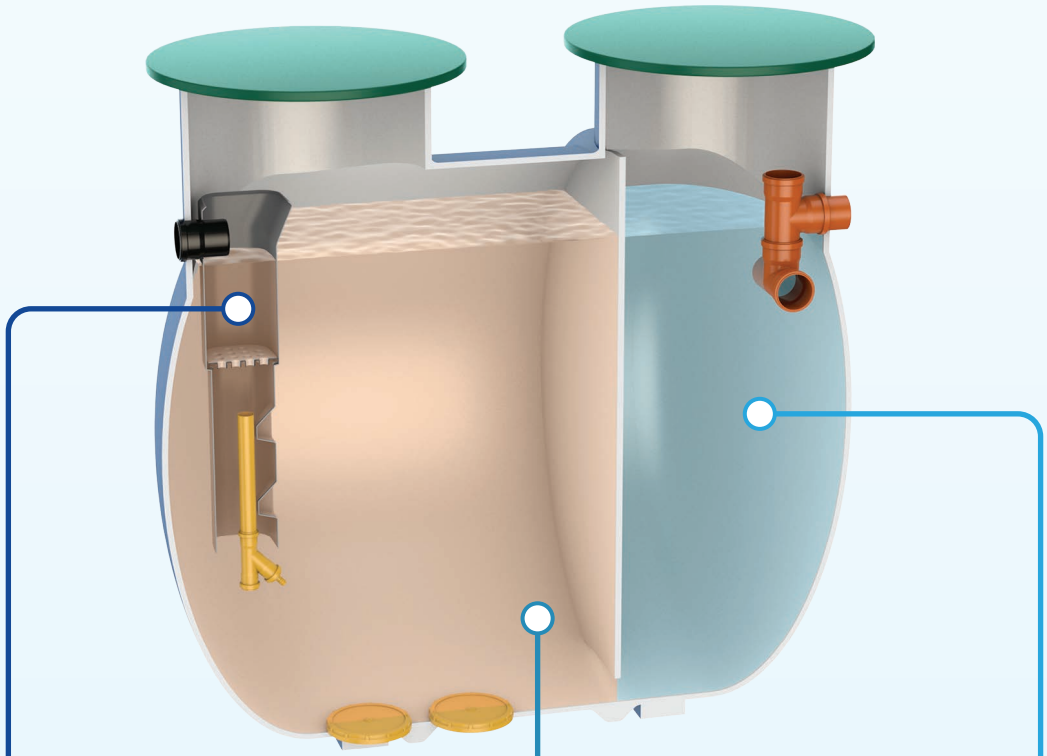


**SETTLEMENT**

*Settlement takes place in the Final Settlement Tank.*

# VORTEX

## TREATMENT PROCESS DETAIL



### STAGE 1

Wastewater from the building enters to Vibro Screen.

Coarse 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 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.

### 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.

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## 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 bubble 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

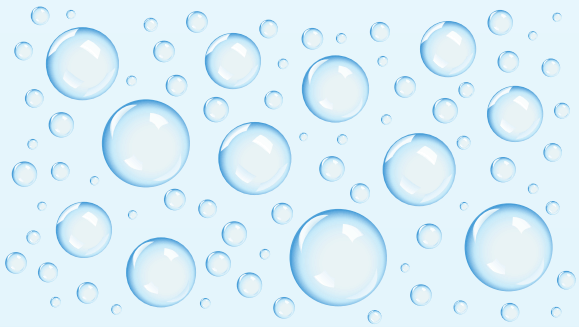
VORTEX uses specific air bubbles to acheive these aims:

*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. This is inefficient at both tasks and increases the size of the air blower required as a result.



# THE SLUDGE MANAGEMENT SYSTEM

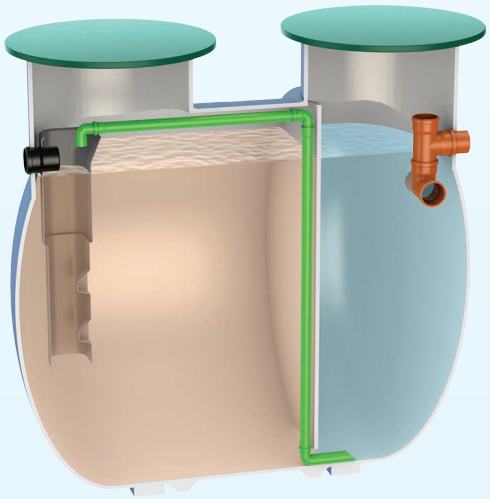
All Activated Sludge Process (ASP) sewage treatment plant produce sludge as part of the treatment process. The sludge is composed of partially digested solid matter.

Two types of sludge are produced: **Settled 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)

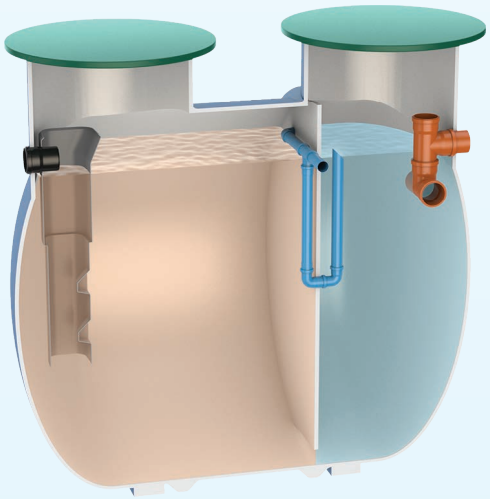
Settled sludge is recycled from the bottom of the Final Settlement Tank back to the Vibro Screen using a simple, non-mechanical, air lift.



The return of settled sludge back to the Vibro Screen gives the bacteria a food supply evenwhen there is little or no wastewater comingfrom 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 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.

# VORTEX

## 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.

### 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.

# 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.**

# KEY FEATURES

## 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 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.

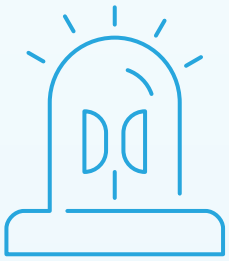
VORTEX treats both the liquid and solid constituents in wastewater.

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

## 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 alarm as standard.*



## ROBUST CONSTRUCTION

VORTEX tanks are manufactured in the UK using GRP (Glass Reinforced Plastic). The manufacturing process creates a one piece tank.

*VORTEX is not manufactured from sheets or panels.*

## ULTRA COMPACT DESIGN

VORTEX is the most compact sewage treatment plant on the market and is only one third of the size of some other tanks.

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.

## PUMPED OUTLET

For sites where the effluent cannot be discharged by gravity, VORTEX can be ordered as a pumped outlet version which has an Internal Pump Station (IPS).

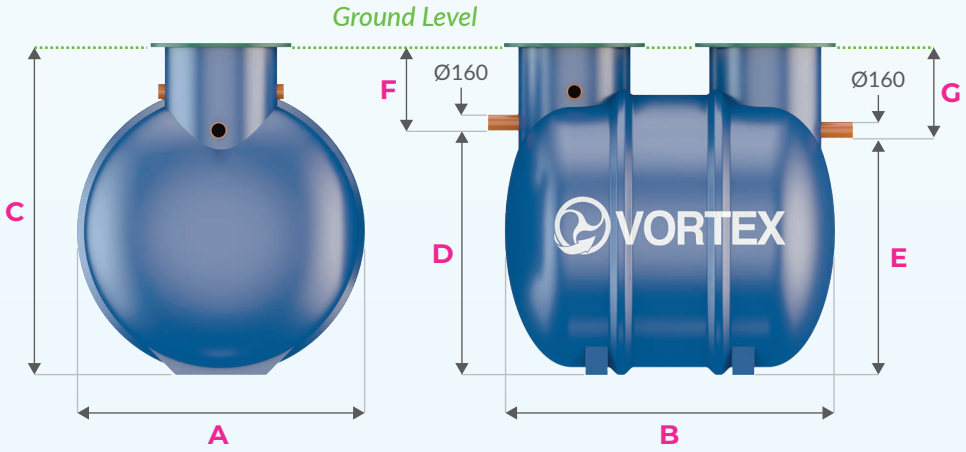
# VORTEX

## INSTALLATION

VORTEX has been designed to make installation as simple, quick and low cost as possible.

Its compact design and robust construction mean that it is suitable for installation by nearly all contractors. It does not have to be installed by an approved contractor.

VORTEX is an all-in-one sewage treatment plant and no additional equipment is required.




## TECHNICAL DETAILS

| | VORTEX 15 | VORTEX 20 | VORTEX 25 | VORTEX 30 | VORTEX 40 | VORTEX 50 |
|---|---|---|---|---|---|---|
| PE | 15 | 20 | 25 | 30 | 40 | 50 |
| DIAMETER *(A)* | 1,920 | 1,920 | 1,920 | 1,920 | 2,620 | 2,620 |
| LENGTH *(B)* | 1,800 | 2,200 | 2,500 | 3,050 | 2,230 | 2,770 |
| HEIGHT *(C)* | 2,190* | 2,190* | 2,190* | 2,190* | 2,785* | 2,785* |
| BASE TO INLET *(D)* | 1,640 | 1,640 | 1,640 | 1,640 | 2,235 | 2,235 |
| BASE TO OUTLET *(E)* | 1,590 | 1,590 | 1,590 | 1,590 | 2,185 | 2,185 |
| INLET INVERT *(F)* * | 550* | 550* | 550* | 550* | 550* | 550* |
| OUTLET INVERT *(G)* ** | 600* | 600* | 600* | 600* | 600* | 600* |
| HOURLY POWER (W) | 86 | 135 | 169 | 173 | 270 | 338 |
| FLOW (L) | 2,250 | 3,000 | 3,750 | 4,500 | 6,000 | 7,500 |
| $BOD_5$ (g) | 900 | 1,200 | 1,500 | 1,800 | 2,400 | 3,000 |
| $NH_4$-N (g) | 120 | 160 | 200 | 240 | 320 | 400 |

**Extension Turret available*

***Pumped Outlet version available*

*All units in millimetres unless stated otherwise*