

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



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

QUANTUM is an economy version of our flagship VORTEX product. It is an ideal “all rounder” for domestic properties offering a good performance in a very low cost tank.

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



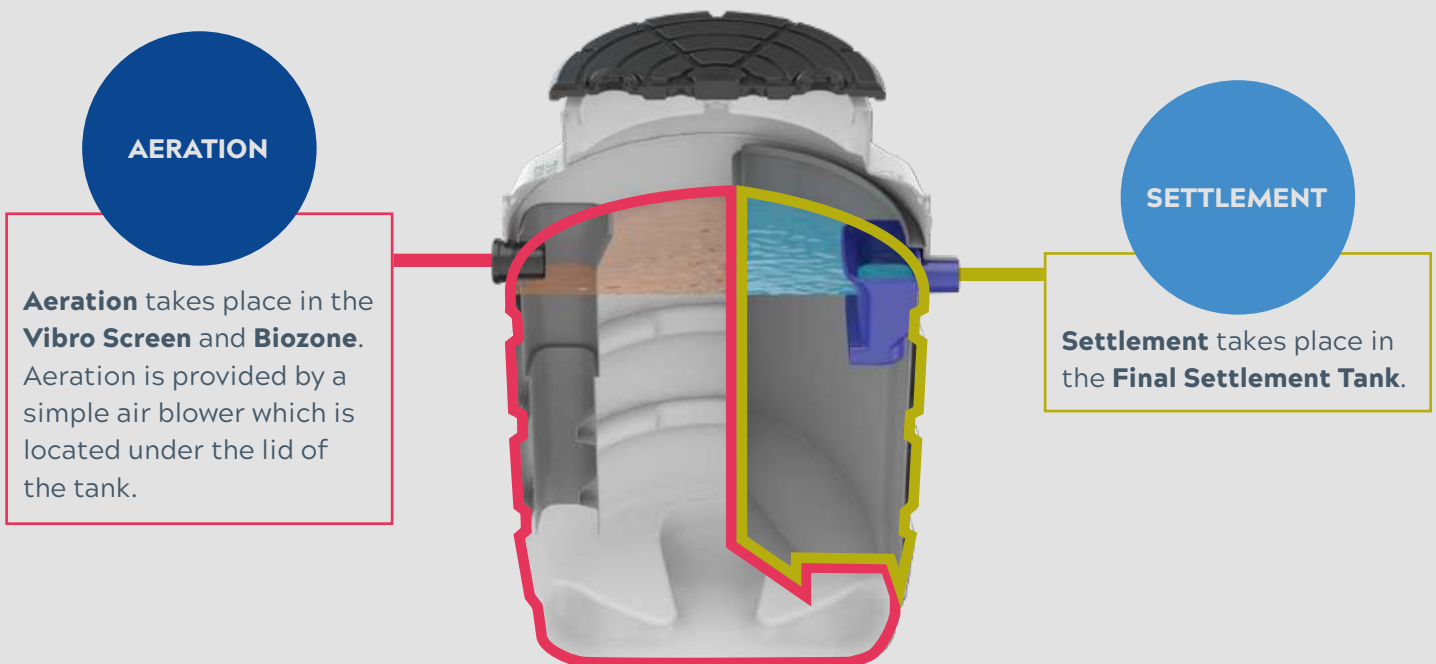
#### ADVANTAGES

- ✓ Low purchase price
- ✓ Ultra compact tank – smallest on UK market
- ✓ Low installation cost
- ✓ No odour
- ✓ Low noise
- ✓ Low electricity demand
- ✓ Adjustable treatment process
- ✓ CE marked
- ✓ EN 12566-3 certified

# Treatment Process Overview

QUANTUM uses the same treatment process as our VORTEX system. This 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:



## Performance

QUANTUM has been designed to meet the UK Royal Commission standard for effluent.

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 mg/L	N/A
BOD <sub>5</sub>	20 mg/L	9 mg/L	4 mg/L
Suspended Solids	30 mg/L	17 mg/L	14.4 mg/L
Ammonia (NH <sub>4</sub> -N)	20 mg/L	1.8 mg/L	0.3 mg/L

# Treatment Process Detail

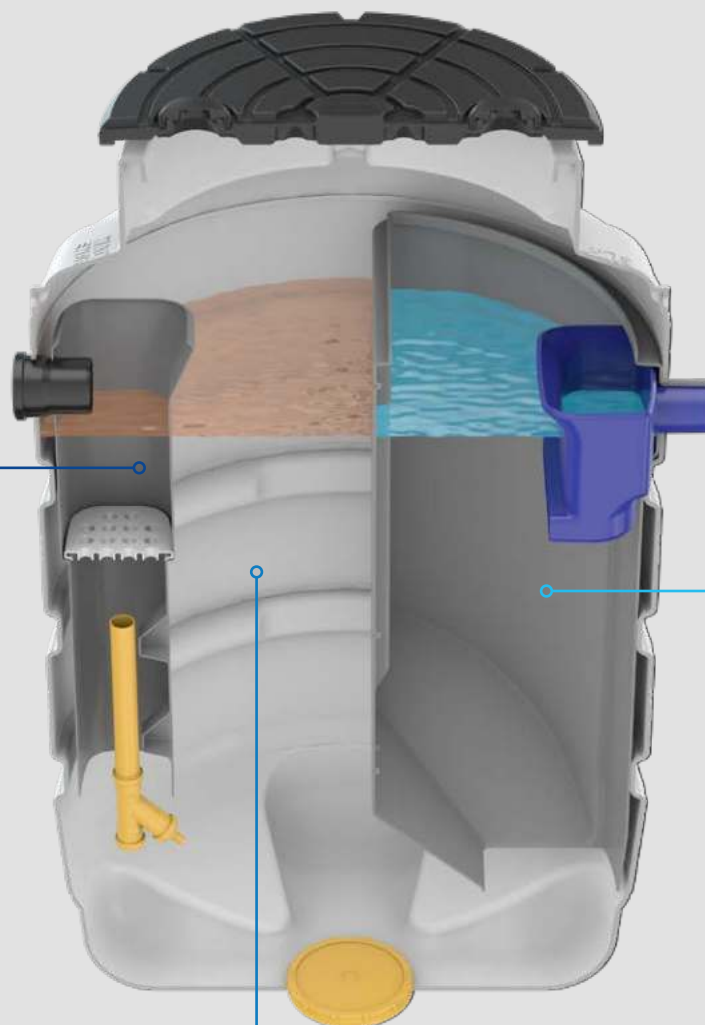
Unlike most sewage treatment plants, QUANTUM is designed to treat both the liquid and solid components of wastewater. It does this by using a combination of coarse and fine air bubbles.

## STAGE 1

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

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 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

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

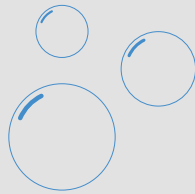
### ONE

Break up solids to  
create a mixed liquor

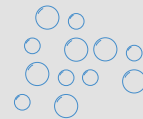
### TWO

Supply oxygen to  
the bacteria

QUANTUM uses specific air bubbles to achieve these aims:



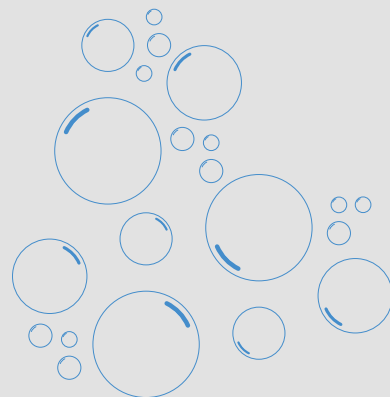
A large and powerful coarse bubble to physically smash up the solids



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. 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.

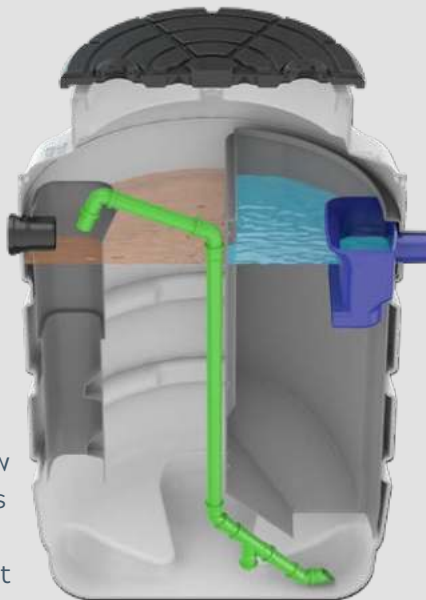
Two types of sludge are produced: **Settled Sludge and Floating Sludge**

QUANTUM'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 QUANTUM better able to handle low occupation stress than other ASP sewage treatment plants.

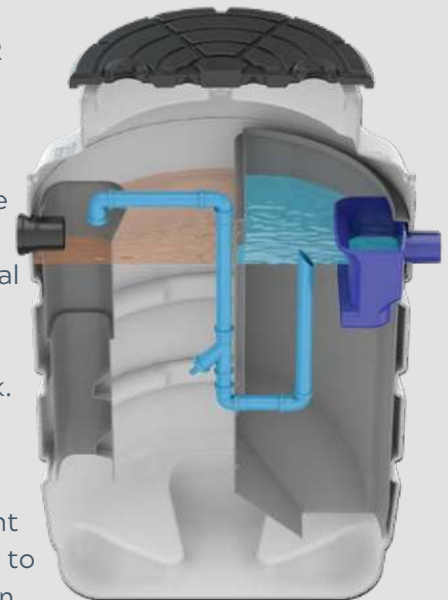


## Floating Sludge Return (FSR)

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

QUANTUM'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.



# Adjustable Treatment Process

One of the major advantages of the QUANTUM 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.

QUANTUM 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, QUANTUM was emptied and restarted and received only 10% of the design load.

**THE SYSTEM FUNCTIONED EXCEPTIONALLY WELL WITH NO MAINTENANCE ISSUES.**

## EXAMPLE

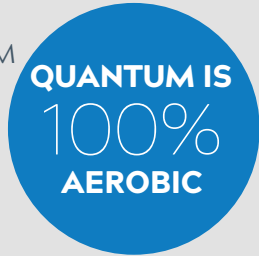
A four bedroom house requires a 6PE (6 person) sewage treatment plant.

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, QUANTUM 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.

QUANTUM 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.

QUANTUM treats both the liquid and solid constituents in wastewater.

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

## Ultra Compact Design

QUANTUM is the most compact sewage treatment plant on the market and is approximately one fifth 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

QUANTUM tanks are rotationally moulded in the UK from high density polyethylene (HDPE).

Rotational moulding creates a one piece tank. QUANTUM is not manufactured from sheets or panels.

## Pumped Outlet

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



## Integrated Air Blower Housing

To reduce the visual impact of the system, QUANTUM has integrated the air blower under the lid of the tank and does not have a separate air blower housing.

Once installed only the lid of the tank is visible.



# Installation

QUANTUM 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.

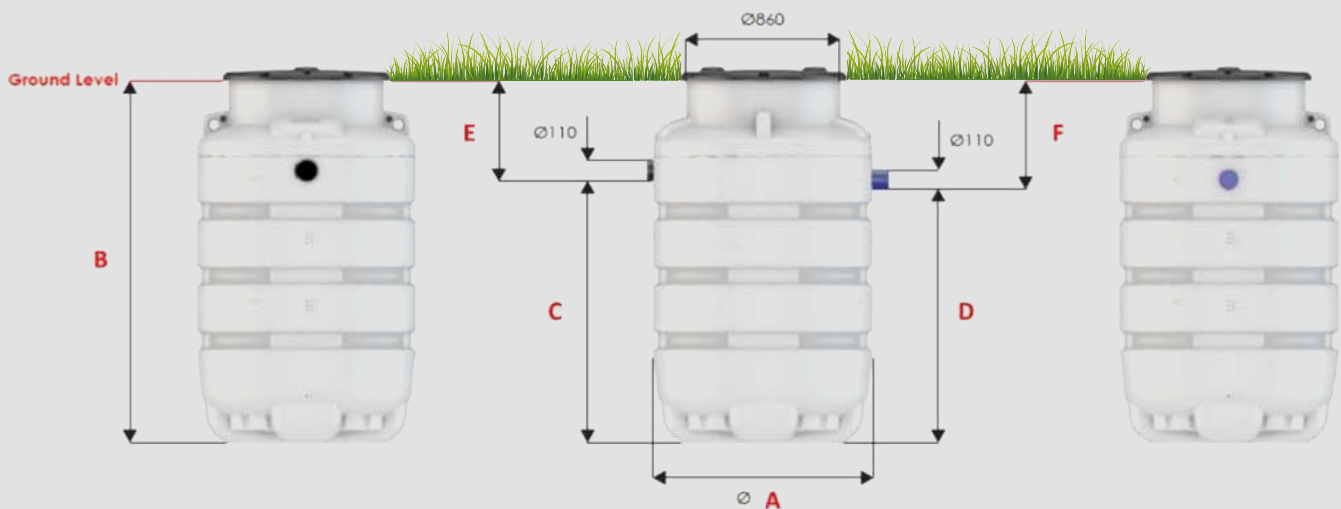
QUANTUM is an all-in-one sewage treatment plant and no additional equipment is required.

QUANTUM is designed for dry and semi wet sites only. All QUANTUM tanks can be extended to cater for foul drain depths of up to 1m.

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

# Technical Details

Model	PE	Diameter (mm) A	In Ground Depth (mm) B	Base to Inlet (mm) C	Base to Outlet (mm) D	Inlet Invert* (mm) E	Outlet Invert** (mm) F	Power (w)
QUANTUM 6	6	1,215	2,000 (standard)	1,450	1,400	550 (standard)	600 (standard)	40
QUANTUM 8	8	1,500	2,450 (maximum)*	1,450	1,400	1,000 (maximum)*	1,050 (maximum)*	50
QUANTUM 10	10	1,500		1,450	1,400			75



Model	Flow (L)	BOD <sub>5</sub> (g)	NH <sub>4</sub> - N (g)
QUANTUM 6	900	360	48
QUANTUM 8	1,200	480	64
QUANTUM 10	1,500	600	80

\*Extension Turret available.    \*\* Pumped outlet version available.