CYCLONE

The CYCLONE is a Moving Bed Biofilm Reactor (MBBR) sewage treatment plant.

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

CYCLONE can be used for domestic and commercial sites and is ideally suited for housing, hotels, restaurants, offices, schools and campsites.

The CYCLONE has been tested and certified to EN 12566-3.

ADVANTAGES

- *Excellent effluent quality*
- *No internal moving parts*
- *Small visual footprint*
- *CE marked*
- *EN 12566-3 certified*
- *Excellent value for money*
- *Simple and reliable operation*
- *Easy and low cost installation*
- *Excellent build quality*
- *Phosphate reduction (optional)*
- *Low noise*
- *Low electricity demand*

CERTIFIED EN 12566-3 CERTIFIED

CE

WTE

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CYCLONE

PERFORMANCE

CYCLONE 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.

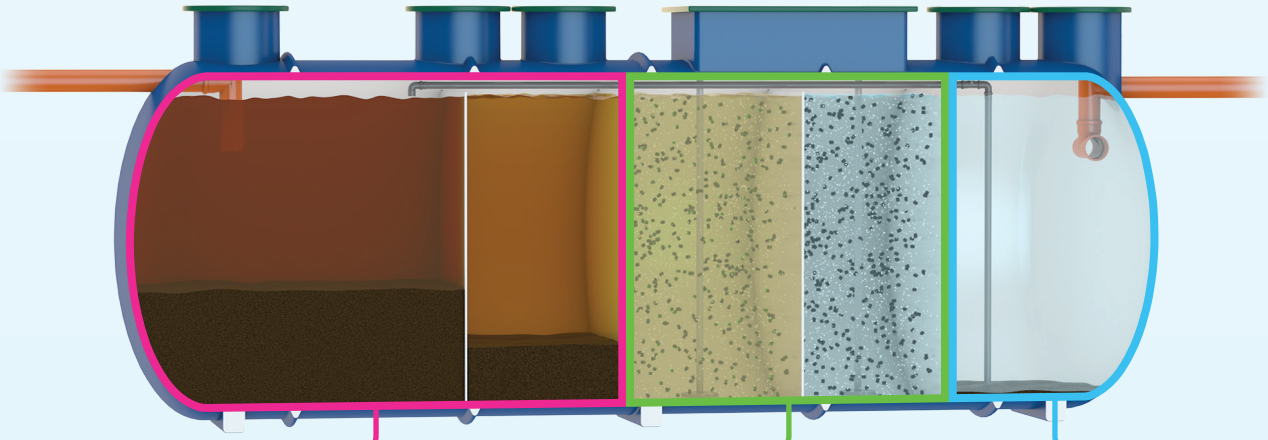
Pollutant	Design Effluent Quality (95%ile basis)	Average Effluent Quality during EN 12566-3 Testing - 100% Loading	Average Effluent Quality during EN 12566-3 Testing - 5% Loading
COD	N/A	45.9 mg/L	17.9 mg/L
BOD_5	20 mg/L	8.2 mg/L	3.0 mg/L
Suspended Solids	30 mg/L	8.5 mg/L	5.7 mg/L
Ammonia (NH_4-N)	20 mg/L	4.4 mg/L	0.1 mg/L
Phosphate*	1 mg/L	0.5 mg/L	N/A

**Additional equipment required*

TREATMENT PROCESS OVERVIEW

CYCLONE is a simple and robust system for the treatment of wastewater and has proven itself over many years. It has no internal moving parts and is a very reliable system.

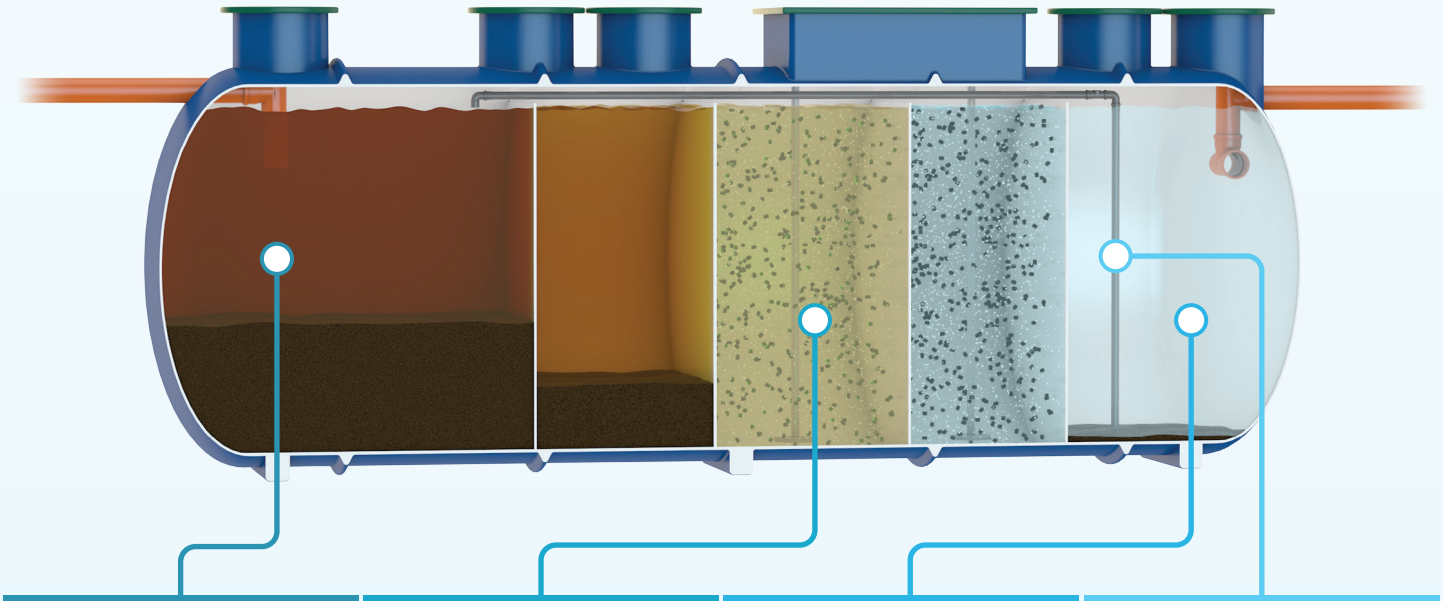
There are three principal stages to the treatments process:



PRIMARY SETTLEMENT | AERATION | FINAL SETTLEMENT

CYCLONE

TREATMENT PROCESS DETAIL



STAGE 1	STAGE 2	STAGE 3	STAGE 4
Wastewater from the building(s) enters the Primary Settlement Tank (PST). Here solids and liquids are separated with the solids being retained for periodic removal by a tanker. Liquid wastewater then flows into the Biozone.	The Biozone is the heart of the treatment process and is where the liquid effluent is biologically cleaned. The Biozone is filled with XRX media. Aerobic bacteria and microorganisms clean the wastewater by feeding on the pollutants as it flows through the XRX matrix. The bacteria must have a constant oxygen supply and this is provided by an external air blower.	The wastewater then flows into the Final Settlement Tank (FST) where any remaining fine solids settle at the base of the tank forming sludge. The clear effluent is discharged into the environment (drainage field or watercourse).	The settled sludge is returned to the Primary Tank via a non-mechanical air lift system. This keeps the bacteria in the Biozone supplied with food even when there is little or no wastewater coming from the building(s) and keeps the system working during low use and holiday periods.

DETAIL ON XRX MEDIA

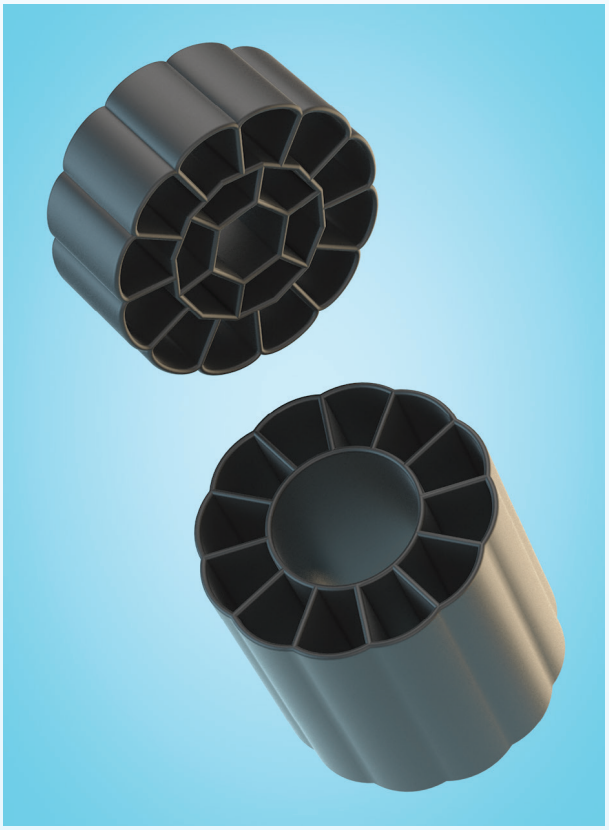
The design of the Biozone in CYCLONE tanks is the key to its performance and reliability. XRX media is a vital component in the design.

XRX has been specifically developed to provide the optimum surface area : volume ratio needed for wastewater treatment. It provides a huge surface area for bacteria to colonise, whilst providing excellent water flow pathways.

The large surface area greatly increases the number of bacteria in the Biozone. This improves the efficiency of the biological filter and reduces the volume required to a minimum.

The media requirements change during the treatment process. This is because biological treatment of wastewater is a natural process and some pollutants are broken down before others. Different strains of bacteria breakdown different pollutants in wastewater and different bacteria have different optimal conditions. CYCLONE uses different XRX media throughout the biozone to maintain optimal conditions for each strain of bacteria. This makes the system more efficient and compact.

XRX media is constantly circulated around the Biozone and is not static. The aeration at the bottom of the Biozone creates an upward current that causes the XRX to constantly circulate around the Biozone creating constant mixing of the wastewater and contact with the XRX media. The physical movement of the XRX also sloughs off sludge and dead bacteria and prevents it from clogging which is a common problem with static media.



SELF REGULATING BIOZONE

One of the major advantages of CYCLONE is that the Biozone self regulates depending on how much wastewater the system must process and is a key reason why CYCLONE is an ideal choice for sites where the daily wastewater production is not constant – hotels, restaurants, campsites, schools, etc.

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 because the bacteria are starved of food.

5%

The design of the Biozone enables CYCLONE to function at only 5% of its 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.

The Biozone is divided into multiple stages. When fully loaded, bacteria will colonise all the media in each Biozone but when the usage is reduced, bacteria will only colonise as much of the media as the incoming load requires. In this way CYCLONE is able to shut down part of the Biozone and prevent the system from becoming starved due to lack of food/use.

CYCLONE

THE SLUDGE MANAGEMENT SYSTEM

All three stage sewage treatment plants produce sludge as part of the treatment process.

There are two types of sludge:

- ***Primary Sludge*** – solids from the incoming wastewater that accumulate in the PST.
- ***Secondary Sludge*** – dead bacteria and undigested particles that accumulate in the Biozone and FST.

CYCLONE is able to automatically recycle secondary sludge to optimise performance and reduce maintenance.

SETTLED SLUDGE RETURN (SSR)

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

1. **In the Final Settlement Tank sludge accumulates in the base.**
2. **Air from the blower is spurred to the Settled Sludge Return (SSR).**
3. **As air rises up the sludge return pipe a vacuum is created that syphons the sludge back to the Primary Settlement Tank.**

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

In conjunction with the Self Regulating Biozone, the Sludge management System makes CYCLONE ideally suited for sites where there is low usage and/or a fluctuating load. i.e.:

- *Restaurants*
- *Hotels*
- *Campsites*
- *Offices*
- *Schools*
- *Industrial / Construction Sites*
- *Etc.*

CYCLONE

VARIANTS

CYCLONE is available in a range of options:

CYCLONE S
(Standard Duty)

These are standard strength tanks suitable for most site conditions.

These tanks are for underground installation only.

CYCLONE H
(Heavy Duty)

These tanks have a thicker wall to resist greater groundwater pressures.

These tanks are for underground installation only.

CYCLONE EH
(Extra Heavy Duty)

These tanks are for extremely high groundwater sites.

These tanks are for underground installation only.

CYCLONE E
(Export)

These tanks are designed to fit into shipping containers for export.

CYCLONE AG
(Above Ground)

These are reinforced tanks for installation above 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 CYCLONE tanks come with a visual alarm as standard.

UV TREATMENT

For sites where the reuse of wastewater is required, CYCLONE can be manufactured with an integral UV filter to remove 99% of pathogens in the effluent.

If you are considering effluent reuse, please contact our sales office.

COMMERCIAL USE

CYCLONE is ideally suited for commercial sites it is has been designed to handle wastewater that is stronger than that discharged from domestic properties.

Commercial sites often present the following challenges for wastewater treatment:

1. **The wastewater production has a higher concentration of pollutants or reduced wastewater volume (both create the same problem).**
2. **The wastewater contains non degradable material (sanitary items, etc.).**
3. **There are fluctuations in use. Week/weekend or summer/winter usage is not the same.**

Unlike most sewage treatment plants, CYCLONE is designed to be able to process wastewater from domestic and commercial sources. This makes it an ideal choice for the following applications:

- *Restaurants*
- *Hotels*
- *Campsites*
- *Offices*
- *Schools*
- *Industrial / Construction Sites*
- *Etc.*

CYCLONE

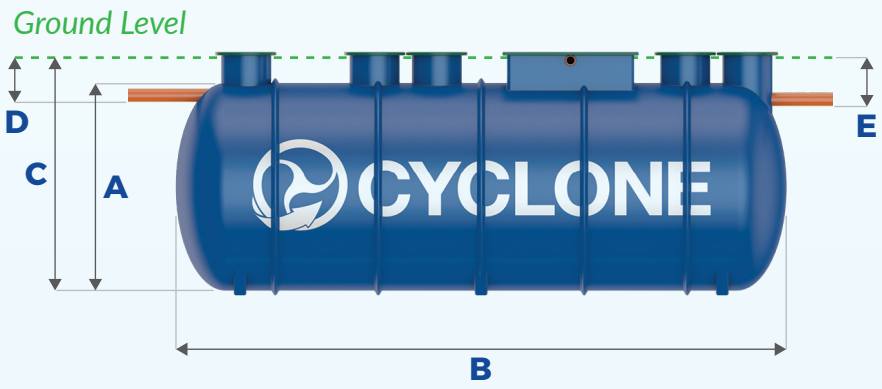
INSTALLATION

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

CYCLONE 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 [A] (mm)	Length [B] (mm)	In Ground Depth [C] (mm)*	Inlet Invert [D] (mm)*	Outlet Invert [E] (mm)**	Power (Kw)
CYCLONE S 25	25	1,910	3,820	2,240	600	650	0.18
CYCLONE S 30	30		4,510				0.225
CYCLONE S 40	40		5,860				0.23
CYCLONE S 50	50	2,610	4,240	2,880		700	0.36
CYCLONE S 75	75		5,410				2x 0.23
CYCLONE S 100	100		7,050				2x 0.36
CYCLONE S 125	125		8,690				2x 0.45
CYCLONE S 150	150		10,330				2.0
CYCLONE S 200	200		12,060				2.0
CYCLONE S 250	250		15,000				2.0
CYCLONE S 300	300	3,110	12,550	3,310			4.0

** Other inlet inverts available*

*** Pumped outlet options available*

The CYCLONE range extends up to 5,000 PE.
Please contact our sales office for details.