BOC
A Member of The Linde Group

AXENIS™ Wastewater Treatment System

Sustainable and economical solutions from BOC

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How AXENIS™ helps your business

Based on the Oxygen Membrane Bioreactor (Oxy-MBR) from BOC, the AXENIS™ process treats wastewater to an exceptional standard which is **suitable for reuse** or discharge to a sewer or watercourse.

BOC wastewater technologists developed AXENIS™ to significantly **reduce the cost of wastewater treatment.** The system also ensures long term water cycle management and supply security.

AXENIS™ is a patented process that combines innovative oxygenation equipment with best in class cross-flow membrane technology. The **compact, reliable** and **robust** design treats water to a high quality, suitable for reuse, thereby **saving money** and helping your business **achieve its sustainability goals.**

The usual odour and foam free processing seen in pure oxygen plants has now been combined with the cleanliness of the easily maintained external cross-flow MBR. The process produces **less surplus sludge** than comparable systems, reducing costs and helping to **reduce overall environmental impacts.**

Treated water is suitable for reuse as well as river and coastal discharges, helping to meet the local Environment Agency's legal requirements.

Key benefits

- Produces high quality, reusable water
- Reduces the cost of wastewater treatment
- Low energy requirements
- Sustainable process reducing your environmental impact
- Fast, clean and trouble-free
- Assists in meeting your legal obligations

Containerised demonstration plant

The process in brief

AXENIS™ treats wastewater to an exceptional standard which is suitable for reuse or discharge to a watercourse. The process supports the high level of biomass required to biologically oxidise the Chemical Oxygen Demand (COD) without converting it to surplus biological sludge.

The biomass generates heat, raising the temperature, which accelerates the reaction rate. This leads to an increased demand for oxygen resulting in oxidation of more COD and dramatically reduces the amount of surplus sludge produced.

Confidence in the process through an on-site trial

BOC's containerised pilot plant, incorporating a small laboratory, allows detailed trials at customer sites, to determine performance and the most appropriate membrane material. We work closely with our customers to ensure that we deliver an optimal solution to meet your needs.

AXENIS™: The Full Turnkey Solution

BOC has partnered with Aquabio, who have unrivalled expertise in designing and building MBRs and water reuse schemes. A full turnkey service is available from trial work to building, training, remote monitoring and operational assistance.

The full system design is based on specific requirements, considering effluent strength and final water purity required. BOC also offers system commissioning and maintenance packages as well as oxygen supply and storage.

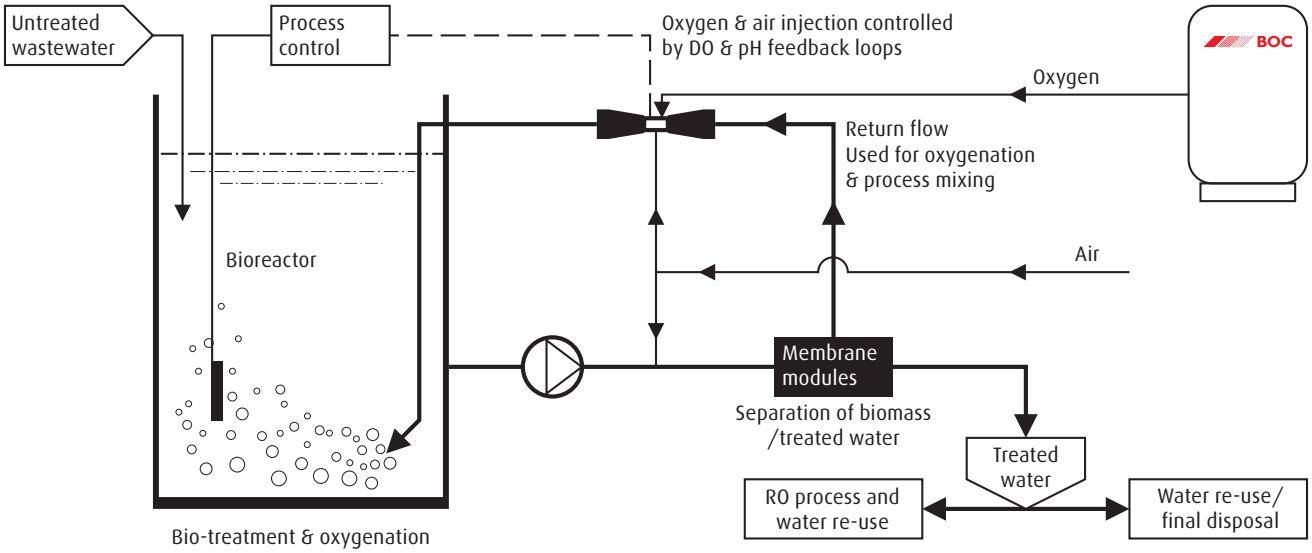
The AXENIS™ waste water treatment system: easily monitored and controlled

Which types of effluent are treatable using AXENIS™?

AXENIS™ can treat industrial wastewater from many industries such as **food, beverage, pharmaceutical or chemical.**

Final water quality with Biological Oxygen Demand (BOD) and Suspended Solids figures of <5 mg/l is readily achieved. Potable water quality for recycling provides further cost savings and is made possible by including a reverse osmosis stage.

Internal view of AXENIS™ demonstration plant



Typical layout of an AXENIS™ waste water treatment system

How AXENIS™ measures up

AXENIS™ was developed from BOC's Vairox patent which allows the injection of oxygen **and** air into a pumped sidestream to control both DO levels and pH. A cross-flow membrane is incorporated into the Vairox system enabling biomass separation to be achieved at the same time as oxygenation, aeration and mixing **without additional energy.**

Wastewater treatment occurs in bioreactor tanks using pure oxygen, enabling the process to operate at higher biomass concentrations and higher DO concentrations than air based MBRs or conventional activated sludge plants. Faster COD oxidation takes place, resulting in less COD conversion to surplus biomass which would otherwise require costly tankering off site. This means that the bioreactors can be smaller than an air based MBR, thereby reducing the unit's footprint.

Bioreactor and membrane sidestream pump

Less un-dissolved gas leaves the surface of AXENIS™ reactors (about 1/100th the volume of normal aeration systems) resulting in **minimal foaming** and less heat loss to the atmosphere leading to more active biomass.

Mixed Liquor Suspended Solids (MLSS) concentrations can be **up to 30,000mg/l** without adversely affecting flux rates. Externally located membrane banks, through which the MLSS is pumped, ensure the biomass is retained within the bioreactor and allows easy access for maintenance, eliminating the need to pump down the bioreactor to access the membranes - saving valuable time and energy.

Biomass returned to the bioreactor is used for the dissolution of oxygen and controlled by DO probes. The pH is continuously measured and a feedback system controls the addition of air to strip out dissolved carbon dioxide to maintain a neutral operating pH regime.

Precise and **independent control** of both DO levels and pH enables the biological process to be operated at performance levels far above conventional air based systems. The final effluent water quality that is produced from the Ultra Filtration (UF) membranes is of an exceptional standard.

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BOC has over 200 operating plants worldwide serving a diverse range of industries. When it comes to designing reliable and robust industrial wastewater treatment plants, BOC has the experience and expertise you can rely on.

Contact Details

Please contact us if you would like further details on AXENIS™ waste water treatment system.

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