

AnoxKaldnes™ MBBR



Biological Treatment of Wastewater

**WATER TECHNOLOGIES**

AnoxKaldnes™ Moving Bed Biofilm Reactor (MBBR) technology is based on the biofilm principle, which uses microorganisms for biological treatment of wastewater. This technology is the core for several unique processes that we have developed.

High treatment capacity in a very small footprint

## Wastewater treatment with microorganisms

In the AnoxKaldnes MBBR technology, microorganisms grow on the surfaces of plastic carriers in the treatment reactor. As the carriers move through wastewater in the reactor, microorganisms utilize contaminants present in the effluent for their biological activity.

The proprietary design of the carriers ensures that a high protected surface area is provided for the development of biofilm, enabling high treatment capacity in a very

small footprint. The carriers are made of durable high density polypropylene, eliminating the need to replace the media.

The flexibility of our patented technology allows the design of very compact and efficient MBBR solutions for new installations as well as optimal upgrades of existing biological processes, often without the need for new basins.



### More than plastics

Our carriers are a vital component in AnoxKaldnes MBBR technology. On their protected surfaces, different microorganisms ranging from bacteria to ciliates and rotifers are established in a biofilm. These carriers are kept in motion either by the air injection in aerobic systems or by mixers in anoxic or anaerobic systems. The continuous motion promotes exchanges between wastewater and biofilm, allowing pollutants to be degraded to meet effluent quality requirements.



## Standard

- Pre-Screens
- MBBR Reactor
- Biocarriers (K5)
- Sieve
- Aeration grid
- Blowers (1 op + 1 stby)
- Analyzers (Temp/DO)
- Post treatment for solids removal
- PLC with starters
- Engineering/Start-up
- Shipment FOB factory
- Defoamer addition (if required)

## Add-ons

- Nutrients addition
- Foundations
- Drains and sump
- Dewatering equipment
- SCADA
- Building/winterization
- Nutrient removal
- pH control and adjustment system
- Piping 5 ft from equipment
- Utilities (compressed air, tap water, power connection)
- Pre-treatment DAF
- Equalization optional

## Stand-alone MBBR Solutions

### AnoxKaldnes stand-alone MBBR solutions

AnoxKaldnes pure MBBR systems are compact, simple to operate and very efficient for removal of BOD, ammonia and nitrates. Today, stand-alone MBBR solutions are used in hundreds of installations around the world.

### Packaged solutions

The MBBR modular packaged plant is a pre-engineered application of the AnoxKaldnes technology provided in a steel tank. The standard sizing and simplified connections provided in this modular unit serve to reduce the cost of supply and installation of the technology. This system is designed for ease of installation. Provisions are made to enable easy inclusion of ancillary equipment items in the design, such as the chemical feed systems typically required.

## BAS™ combination process

The BAS biological wastewater treatment process is the optimally designed combination of the MBBR and activated sludge processes. The stable and robust biofilm stage can cope with large variations in load and acts as a guard for the more sensitive activated sludge system.

The volumetric loading capacity of the BAS treatment process is 2 to 3 times higher than a conventional activated sludge system due to the dramatically reduced load on the activated sludge by the MBBR. The result is a much smaller footprint.

Advantages are dramatically increased capacity, improved process stability and improved sludge separation. Conversion to a BAS process is an ideal way of upgrading existing activated sludge plants for higher capacity of organic removal and optimized performance.



The BAS combination process consists of one or more AnoxKaldnes™ MBBRs, followed by an activated sludge system. The high-rate biofilm stage is designed to pretreat the wastewater to remove the readily bio-degradable organic matter prior to the activated sludge system.

### Nutrient-limited BAS combination process

For nutrient-limited wastewaters, the BAS process has demonstrated lower sludge production when compared to both stand-alone MBBR and activated sludge processes.

### Hybas™ combination process

The Hybas combination process is a superior Integrated Fixed-film Activated Sludge (IFAS) process from AnoxKaldnes. This compact solution requires little process volume to achieve reduction of both organic material and nitrogen. Hybas is often a cost-effective way of upgrading an existing activated sludge system to include nitrogen removal or to improve the capacity of the nitrogen removal process. Enhanced biological phosphorus removal (EBPR) can also be accomplished.



# Advantages of the MBBR

Benefits of a suspended biofilm system include increased resilience to toxicity and variable loading, simple operation and a treatment system insensitive to sludge bulking.

In an activated sludge based treatment system, the sludge has to continuously be separated from the

treated water and returned to the treatment basin. In an AnoxKaldnes MBBR, the carriers and the active biofilm are retained in the reactor by sieves over the outlet, which allow the treated water to pass to downstream units for further processing.

## AnoxKaldnes MBBR Process Guarantees

Veolia Water Technologies performs bench-scale and pilot-scale testing of the AnoxKaldnes MBBR process on your wastewater, providing confidence in the treatment process supported by a process guarantee.

### Bench-scale testing

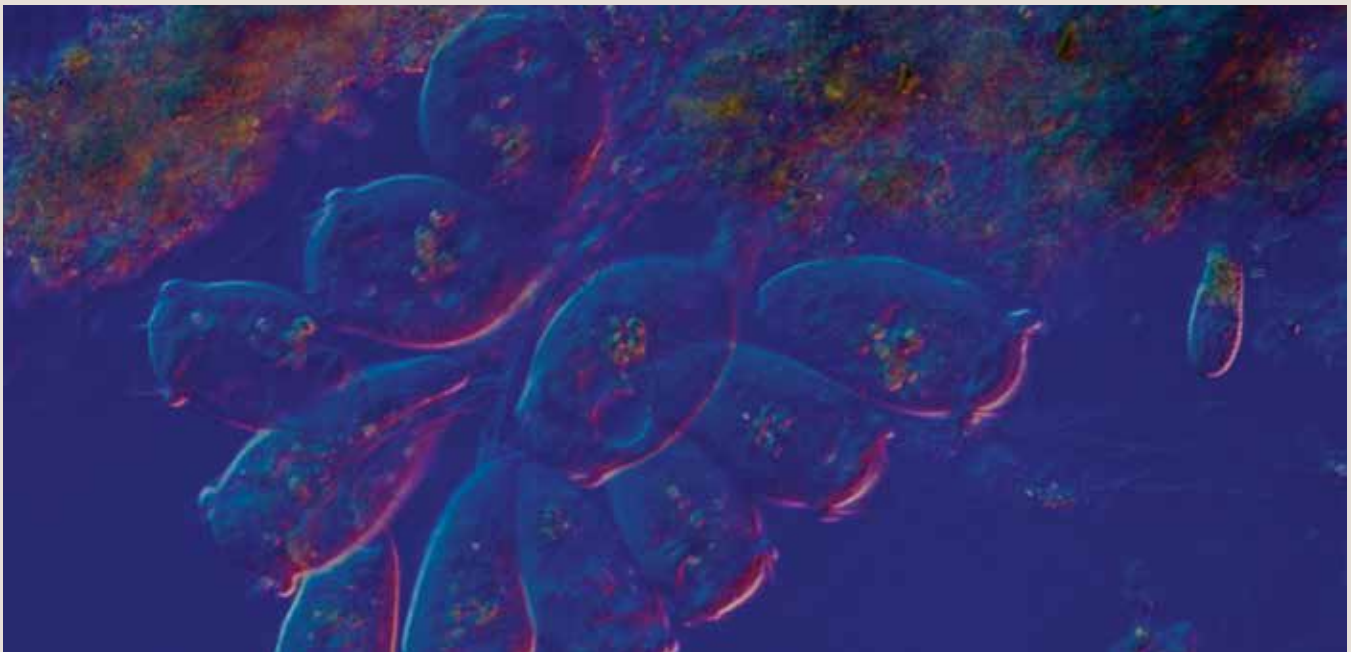
Full-scale wastewater treatment processes are simulated in the laboratory with bench-scale bioreactors. Continuous-flow laboratory systems are used to evaluate operational parameters such as efficiency, stability and economy.

### Pilot-scale testing

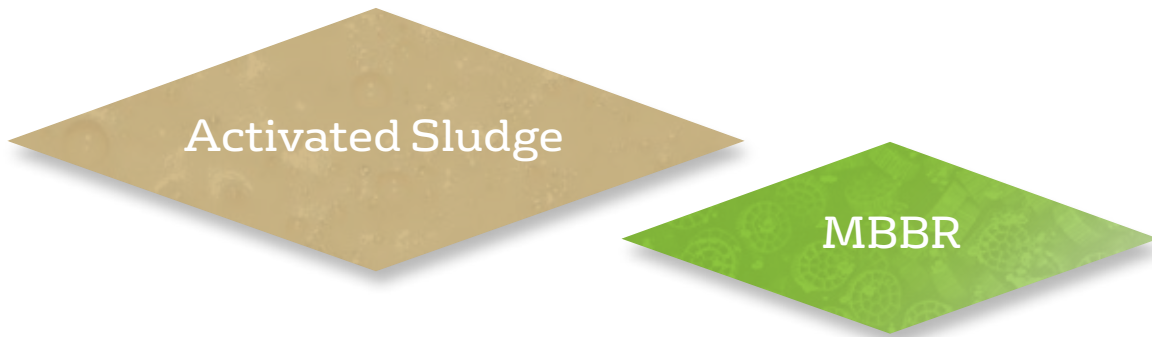
Mobile pilot treatment trailers can be deployed to your site to demonstrate the process at higher flow rates under actual site conditions. On-site demonstration enables plant personnel to become familiar with the simplicity of the system.

### Process Expertise and Proven Performance

- Over 20 years of experience
- Over 700 installations worldwide
- More than 90 Industrial and Municipal installations in the US
- 50 Industrial installations in the US on Food and Beverage, Chemical, Mining, Pharmaceutical, Petrochemical and Pulp & Paper applications



# Comparative Footprint for Readily Biodegradable Carbonaceous BOD Removal



## Research-driven innovation

We continuously conduct research and development of AnoxKaldnes MBBR technology. Existing processes are improved and processes for new applications are developed.

### Flexible solution

Our processes based on the AnoxKaldnes MBBR technology are utilized in both industrial and municipal wastewater applications for:

- Organic removal
- Nitrification
- Denitrification
- Toxicity removal
- Selenium removal
- Cyanide compounds removal
- AnitaMox™

The flexibility of our MBBR processes makes them ideal solutions for new plants, upgrades and expansions.

### Features

- Compact
- Robust
- Simple operation
- Low maintenance
- Proven technology
- Enhances nitrification
- High tolerance to TSS influent

### Food & Beverage



### Mining



### Oil & Gas



# Resourcing the world

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