AnoxKaldnes™ MBBR
Moving Bed Biofilm Reactor
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 starting point for several unique processes that we have developed.

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, the biological processes of the microorganisms remove contaminants.

The biofilm carriers provide high surface area and protected interior space for growth of the biofilm, enabling high treatment capacity in a very small footprint. The movement of the water keeps the biofilm coating thin and fresh, eliminating the need to remove and 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 ingredient 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. By this motion, impurities in the water come in contact with the biofilm and are reduced to meet effluent quality requirements.

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 must continuously be separated from the treated water and returned to the treatment basin. In an AnoxKaldnes™ MBBR, the carriers and the active biofilm are detained in the treatment tank by sieves over the outlet, which allow the treated water to pass to downstream units for further processing.
Research-driven innovation
We continuously conduct research and development of AnoxKaldnes™ MBBR technology. Existing processes are improved and processes for new applications are invented.

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

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
- Easy upgrade for existing system
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.

N.A. Water Systems 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.

Process Expertise and Proven Performance

- Over 20 years of experience
- Over 500 installations worldwide
- More than 60 Industrial and Municipal installations in the US
- 35 Industrial installations in the US in Food and Beverage, Chemical, Mining, Pharmaceutical, Petrochemical and Pulp & Paper applications
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 nitrogen. 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.

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The BAS™ combination 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 like 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 better performance.

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

When our carriers are added to part or to all of the aerated activated sludge volume, nitrifying bacteria grow and multiply on the carriers in this oxygen-enriched environment, significantly increasing the nitrification capacity within the existing volume. BOD removal and denitrification occur in the suspended phase.

Use of the biofilm carriers reduces the sludge age normally needed to achieve nitrification in the activated sludge. Reduction of the sludge concentration in the activated sludge system also reduces the sludge loading to the secondary clarifiers.

Another benefit is that a shorter sludge age often reduces the risk of growth of filamentous bacteria. Generally, the biological activity is higher in an activated sludge process with low sludge age than in one with a high sludge age. Therefore, denitrification activity can be increased in the system.
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Standard
- MBBR Reactor
- Biocarriers (K3)
- Sieve
- Aeration grid
- Blowers (1 op + 1 stby)
- Sludge digestion
- Analyzers (Temp/DO)
- Clarification DAF with polymer dosing system
- Pre-Screens
- PLC with starters
- Engineering/Start-up
- Shipment FOB Factory
- Defoamer addition

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
Beyond Technology - The Total Solutions Approach

N.A. Water Systems provides unique water and wastewater solutions from initial studies and process design to complete turnkey installation and start-up services. With expertise gained from 100 years of experience, our complete capabilities include:

- Treatability studies
- Process development and testing
- Detailed design
- Innovative technologies
- Project and construction management
- System start-up and operator training