



Integrated MBR process solutions for wastewater applications

Water Technologies

SIEMENS



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What is an MBR?

At its core, the MBR process is a combination of biological waste oxidation with membrane separation utilizing a Membrane Operating System (MOS). The MOS replaces secondary clarifiers for liquid solids separation. Following the activated sludge process, membranes in the MOS are immersed in mixed liquor. Vacuum pumps create suction on the membranes, which separate treated effluent from the mixed liquor.

Depend on the world's most experienced provider of biological process and membrane technology.

Biological processes integrated with membrane separation is one of the fastest growing technologies in the wastewater industry. These integrated MBR process solutions encompass a hybrid group of industry-leading technologies combined to meet the individual requirements of each application. Count on our complete process knowledge, combining Envirex® biological processes, Memcor® membrane technology and SmartMBR™ Controls automation, for guaranteed results at your plant.

How does seamless integration benefit you?

- One combined process and membrane warranty
- Smooth cradle to grave execution
- One field service group
- Access to multiple process solutions through one source
- Process and membrane experts working together to optimize your design



What improvements can be achieved by integrating Memcor® membrane technology with Envirex® advanced biological processes?

- Reduction in energy costs by 30% to 40% over conventional MBR processes
- Increased effluent quality in a smaller footprint
- Maximum automation, minimal operator requirements and guaranteed system reliability made possible by SmartMBR™ Controls
- Low effluent turbidity
- Expert process support for design and integration
- Up to 80% biological solids reduction

Proven Memcor® membrane technology

The MOS employs Memcor membrane technology at the heart of the MBR processes. A unique two-phase jet system and fluid renewal process allows for even distribution of liquids, solids and air within the membrane module. An automated, in-place membrane cleaning process, energy-efficient design and cross-flow dynamics combine to minimize overall energy consumption.

Memcor brand products have developed, manufactured and delivered high-performance, low-pressure membranes for nearly two decades. As membrane technology continues to evolve, Memcor products remain at the forefront of the industry.

Envirex® advanced biological wastewater treatment technologies

An investment in research and development of the most forward-thinking and cutting-edge biological processes gives the Envirex brand an advantage. The Envirex brand has been a leader in treating municipalities' wastewater treatment needs for more than a century.

Envirex biological process solutions are designed to advance the science of biological treatment and are available in different configurations customized to fit your wastewater treatment needs, including:

- Biological solids reduction
- Nitrification-denitrification



The Anatomy of the Integrated MBR Process

The Aeration Process

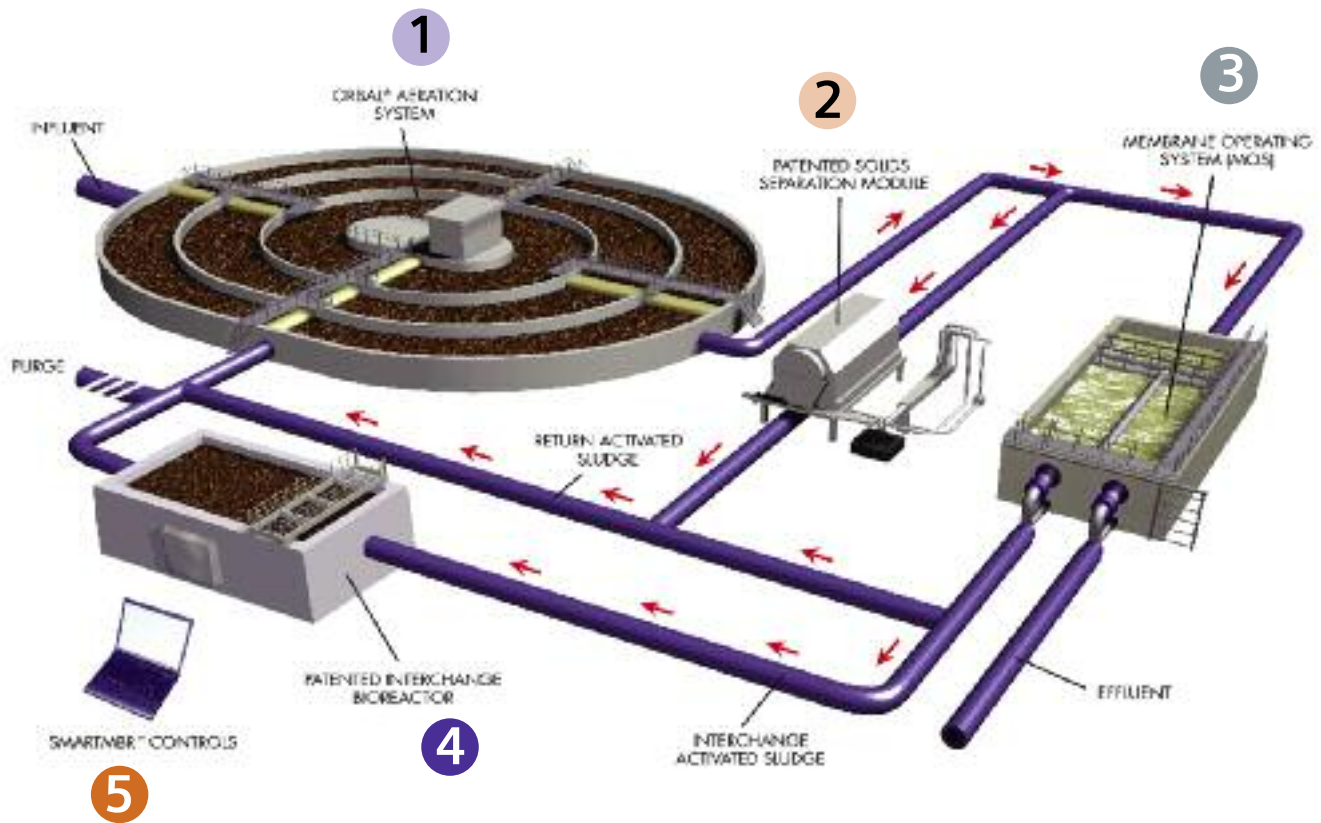
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The Orbal® or VLR® process is a multi-stage system of reactors that uses aerated-anoxic technology to achieve superior nutrient removal and to minimize power costs. Simultaneous nitrification/denitrification in the first stage ensures at least 92% total nitrogen removal in the integrated process. Much of the oxygen is transferred in the aerated-anoxic first stage. This translates to a 30% reduction in energy costs. Oxygen transfer and mixing is achieved using premium quality disc aerators.

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Solids Separation Module

The patented Cannibal® solids separation module removes trash, grit and inerts that make up 20% to 25% of the mixed liquor in an activated sludge plant. In a conventional plant, this material is removed with the waste sludge. In a Cannibal plant, this material builds up when routine wasting is greatly reduced. The discharge forms a clean byproduct with a solids content of 40% to 50%. The solids separation system module also provides an optimum operating environment for the membrane operating system.



Membrane Operating System (MOS)

The MOS utilizes a unique two-phase jet system that scours the membrane surface to prevent solids accumulation. Partitioned fiber bundles allow air to move up and between individual membrane fibers. This process, along with a unique cross-flow pattern, prevents fouling of the membrane surface.

Side-Stream Interchange Reactor

Some of the return sludge is directed to the patented Cannibal® interchange bioreactor. Environmental conditions are carefully controlled in the bioreactor so that aerobic bacteria are conditioned for enhanced degradation, which occurs when the mixed liquor is interchanged back into the main treatment process.

SmartMBR™ Controls

The SmartMBR™ Controls system assists in efficient operation of the integrated MBR process, regardless of varying load conditions. This technology provides plant operators with the tools needed for efficient plant control. The system can interact with existing SCADA software or can be installed as new comprehensive controls for the entire plant.



MBR technology is easy to operate

Our MBR processes are operated by SmartMBR™ Controls to ensure efficient operation and guaranteed effluent levels are reached. An operator needs only to enter a few key parameters. A computer monitors the process and provides data trends that tell the operator when routine maintenance is required. Membrane cleaning is the primary maintenance needed to keep the system operating at peak form. The MBR process can easily be observed, diagnosed and controlled from a distance by using proven, reliable remote telemetry systems that reduce operator attendance.

Our remotely monitored, automated systems are ideally suited for a variety of municipal wastewater treatment applications including water reuse, new housing developments, parks and resorts, retrofits and turnkey projects.

Easily retrofitted to your existing biological process

In many instances, the integrated MBR solution may meet your needs better than secondary effluent filtration. If space is limited at your facility, your existing biological process can be replaced or retrofitted with the MBR process. Typical MBR mixed liquor suspended solids (MLSS) concentrates are 10,000 – 15,000 mg/l, allowing the activated sludge process to treat a higher flow and load in the same tankage.

In addition, our integrated MBR solution provides higher-quality effluent than settled activated sludge followed by membrane filtration. By removing the operational constraint of sludge settleability, the activated sludge process can be operated at very high MLSS concentrations. This provides a more robust, forgiving process for enhanced nutrient removal with fewer unit operations.



Our integrated MBR process exceeds:	
Turbidity	< 0.2 NTU
BOD	< 2 mg/l
TSS	< 1mg/l
Nutrient removal as low as	3 mg/ total nitrogen and 0.1 mg/l phosphorus when required
Biological solids reduction	Up to 80%

One company, one integrated process, one guarantee

Our total system guarantee covers both the biological process and membrane performance — a guarantee unmatched in the industry.

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