



compressed gas  
mixing system

## about us

**1990**  
FOUNDED

**2** Slatiňany / Hranice  
BRANCHES

**3** Czech Republic / Slovakia / Poland  
PRESENCE

**2** water management structures  
technological construction equipment  
ČKAIT AUTHORIZATION

## our team

**3** TECHNOLOGISTS  
including 2× Ph.D. + SW GPS-X and SUMODynamics

**2** DESIGN ENGINEERS

**7** PLANNERS

**6** ASSEMBLY TEAMS

## our services

**600+**

completed constructions, reconstructions, and upgrades of wastewater treatment plants

**250+**

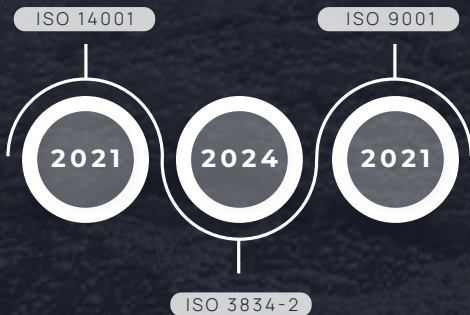
completed pumping station projects

**180+**

completed water reservoir projects

**120+**

completed constructions and reconstructions of drinking water treatment plants





# 2026

## PRESENT

We design and equip your wastewater or water treatment plant with modern technologies for both drinking and wastewater treatment. We handle the delivery of the necessary equipment and the actual implementation of the project. We provide technology solutions for both new constructions and the renovation of existing treatment plants.



An innovative American company in the field of wastewater treatment, best known for its flagship product, BioMix™—an air-powered mixing system that is significantly more energy-efficient than traditional mechanical mixers. BioMix™ is widely used in municipal and industrial wastewater treatment plants as well as in biogas facilities. It helps reduce energy consumption by 60–80% in the mixing section of treatment systems.

## how it works?

BioMix™ ensures uniform mixing of tank contents by releasing programmed, short-duration bursts of compressed gas through specially designed nozzles located near the tank floor. It is a sequential system, with a standard burst duration of 0.5 seconds and a firing frequency of once every 25 seconds. The process parameters can be adjusted to optimize mixing efficiency and energy utilization. Compared to conventional technologies, this process is up to 60% more energy-efficient.



### ENERGY EFFICIENCY

50–60% or even higher energy savings compared to mechanical mixing.



### PROCESS OPTIMIZATION

The system provides complete mixing with proven negligible oxygen transfer.



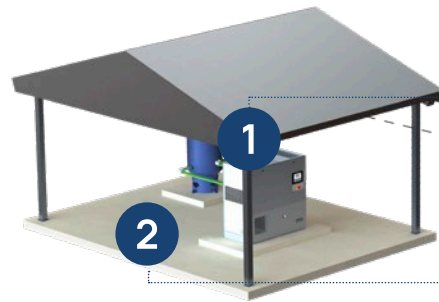
### STRAIGHTFORWARD OPERATION

All in-tank components of a BioMix system are maintenance free, non-clogging, and self-cleaning.



### FLEXIBILITY

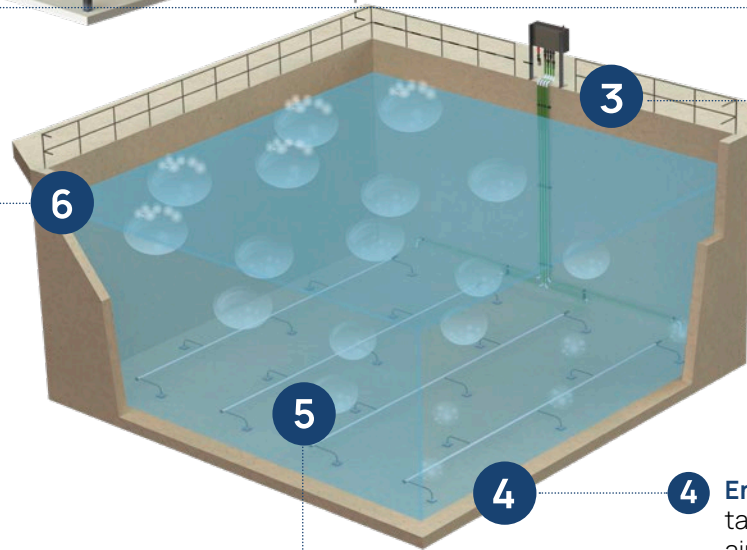
The system can be installed in anaerobic and anoxic tanks, swing zones, storage, and equalization tanks. It offers variable mixing intensity. The patented nozzles are compatible with any size and shape of the tank.



**1** A **centralized compressor** can be used for multiple applications.

**2** Charged by the compressor, the **receiver tank** supplies compressed air to the valve module.

**3** The **valve module** controls firing parameters of pressure, frequency, duration, and sequence.



**6** Bottom-up, **uniform mixing** is provided in basins of any geometry or floor slope.

**4** **Engineered nozzles** near the floor of the tank distribute short bursts of compressed air.

**Large air volumes** expand upward and outward without introducing measurable oxygen.

**5**

## process optimization

BioMix utilizes adjustable firing parameters (pressure, sequence, duration, and frequency) that enable ideal mixed conditions without deposition. The system provides complete mixing with proven negligible oxygen transfer. BioMix easily integrates with aeration equipment for swing zone applications. The technology is able to operate concurrent with or independent from aeration for optimized process conditions.

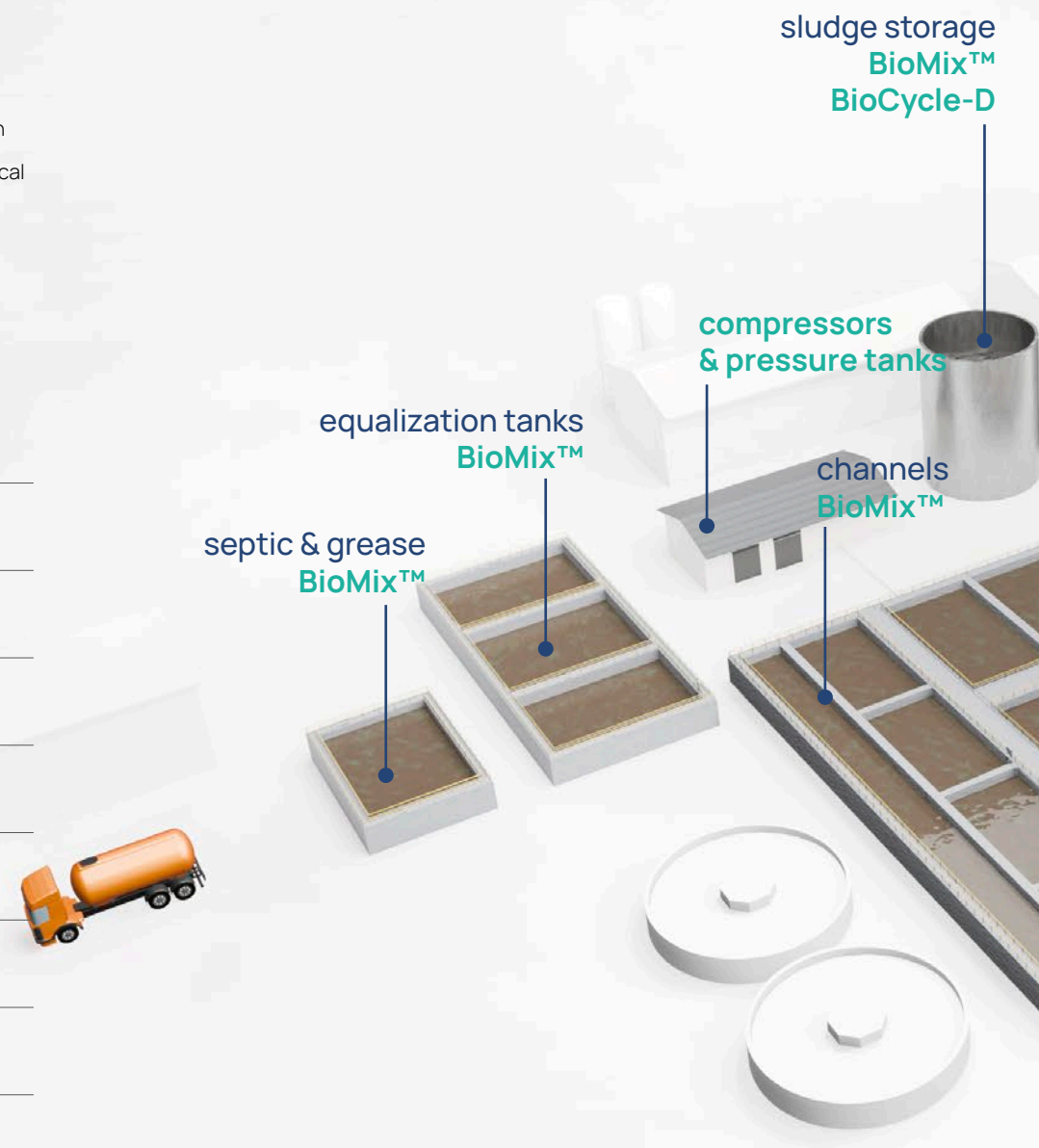
## straightforward operation

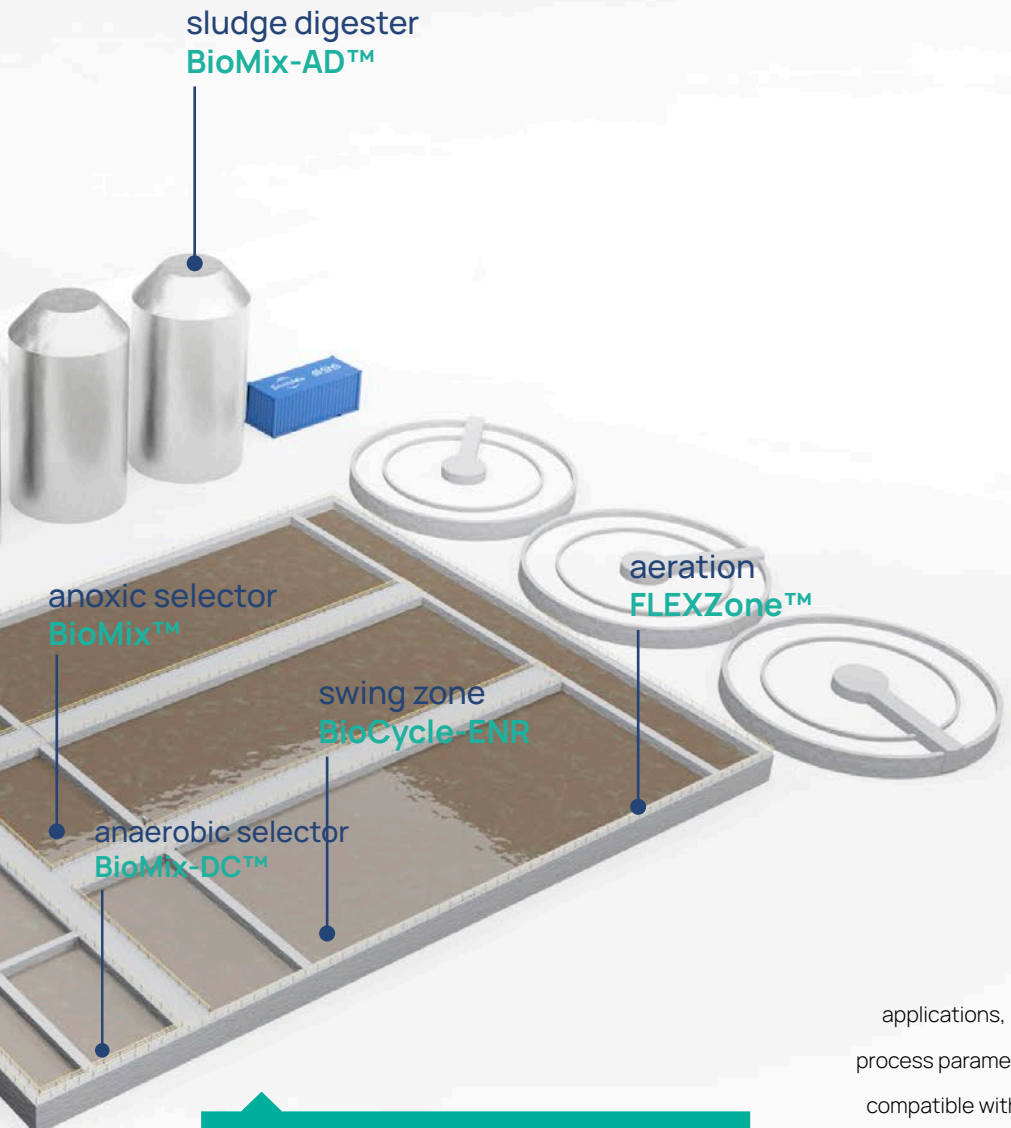
All in-tank components of a BioMix system are maintenance free, non-clogging, and self-cleaning. Systems require minimal maintenance of out-of-tank components (compressors, receivers, and air control valves) in controlled environments. Electrical requirements are limited to the power needed to operate the air compressor and the valve modules.

## energy efficiency

BioMix™ systems provide significant power savings compared to mechanical mixers by uniformly distributing mixing energy across the basin floor rather than directing it outward from a localized point in the tank. Multiple studies have documented a 60% or greater reduction in power usage versus mechanical mixers and even more versus diffused air mixing. Mechanical mixers require at least one unit per basin, while one BioMix compressor may be used to mix dozens of tanks.

application	conventional technology	energy consumption (kW/100 m <sup>3</sup> )	BioMix™ energy savings
septage receiving	diffused aeration	1.3	60%
equalization tanks	Jet mixing	1.1	70%
distribution channels	diffused aeration	3.3	60%
BNR selectors	mechanical mixers	0.7	60%
swing zone	mechanical mixers	0.7	60%
aerobic digestion	diffused aeration	4.0	50%
sludge storage	Jet mixing	2.6	60%





BioMix™ utilizes a centralized compressor system that minimizes maintenance and maximizes energy efficiency.

## unparalleled flexibility

market	municipal wastewater, industrial wastewater, process water
tanks	compatible with any geometry (rectangular, circular, hopper bottom)
configurations	single drop, straight header, rolled header, drop-in wet installation
facility sizes	small single tank, large multi-tank
water levels	variable mixing intensity based on operating depth, no low-level limitations

BioMix Compressed Gas Mixing systems are able to accommodate multiple applications, leveraging common compressors and controls. The technology enables mixing intensity adjustments based on process parameters. The system is able to mix through a range of operating depths. BioMix's patented nozzles and headers are compatible with any tank geometry on configuration. Circular headers conform to the slope of the tank floor, eliminating "dead spots." The technology is able to uniformly mix sludge at concentrations up to 8% solids.

# equalization tanks

## how it works?

BioMix provides uniform mixing of tank contents by firing programmed, short-duration bursts of compressed gas through patented, engineered nozzles located near the tank floor. The mixing parameters may be adjusted to optimize mixing and power utilization, either through operator input or automated process feedback.



### ENERGY EFFICIENCY

Unequaled mixing efficiency of less than 0.1 kW/30 m<sup>2</sup>

Proven O&M savings of more than 50% compared to jet or diffused air mixing



### STRAIGHTFORWARD OPERATION

- No in-tank moving or wearing parts.
- Non-clog, maintenance free performance.



### PROCESS OPTIMIZATION

Operator-adjustable firing parameters that enable ideal mixed conditions without deposition and minimum energy input

Promotion of optimal conditions for biological nutrient removal processes upstream of BNR selectors



### FLEXIBILITY

- Variable mixing intensity based on operating depth
- No low-level limitations – ability to mix at any liquid depth
- Compatible with any tank geometry or configuration
- Nozzle headers installed along the slope of the floor, eliminating “dead spots” in cone bottom tanks

# distribution channels

## key BioMix™ advantage for distribution channels



### ENERGY EFFICIENCY

Energy savings of 70-80% or greater in channel applications versus diffused aeration.



The nozzle design is ideal for channel applications

- non-clog nozzle
- minimal in-tank maintenance
- easily adaptable to any channel configuration or depth
- retrievable configuration available for wet installations with channels online

comparison for a distribution channel at:  
130×1.8×4.6 meters

	diffused aeration	BioMix™	
mixing	5 m <sup>3</sup> /m <sup>2</sup> /h		
process	continuous low-pressure air	intermittent high-pressure air	84%
operating power	1 blower: 80 kW	1 compressor: 13 kW	energy savings



# BioMix-DC

## how it works?

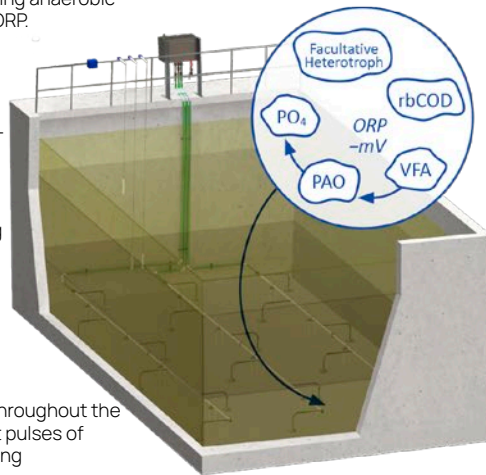
optimize biological phosphorus removal by transforming a traditional anaerobic selector into an intensified fermentation tank by alternating a short mixing cycle with a long deep cycle. The system is designed to adapt to changing process conditions to maximize volatile fatty acid (VFA) formation and biological phosphorus removal. The deep cycle stratifies the reactor in order to increase anaerobic solids retention time (SRT), minimize oxidation-reduction potential (ORP), and maximize VFA formation.

### DEEP CYCLE

Long periods without mixing allow solids to accumulate, increasing anaerobic SRT and driving down ORP.

A longer anaerobic SRT combined with a lower ORP environment increases VFA production, enhancing biological phosphorus removal.

VFAs are transported throughout the reactor via intermittent pulses of mixing without disrupting the fermentation layer.

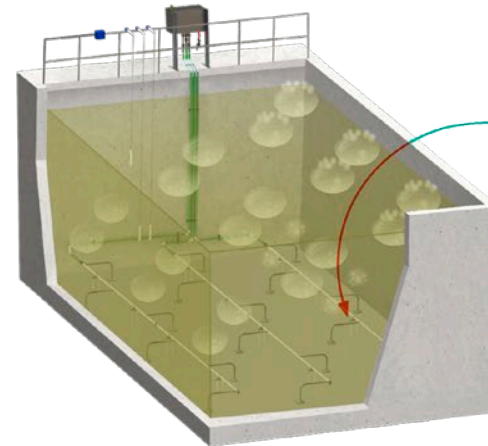


### MIXING CYCLE

Mixing destratifies the selector and quickly resuspends solids.

Nozzles near the floor of the tank release short bursts of compressed air, providing effective mixing.

Periods of mixing are important to homogenize the substrate and microorganisms.





## ENERGY EFFICIENCY

A combination of EnviroMix's efficient, patented technology and comprehensive understanding of anaerobic process requirements, BioMix-DC dramatically reduces mixing energy in anaerobic and fermentation zones. The core BioMix Compressed Gas Mixing technology uses 40-60% less energy than conventional mechanical mixers. This means that during the mixing cycle, BioMix-DC is actively using less energy. Purposefully creating deep anaerobic states and conserving energy during the deep cycle, BioMix-DC creates net energy savings of 90% or greater compared to continuous mechanical mixing in anaerobic zones.



## PROCESS OPTIMIZATION

Regulatory changes throughout the United States drive the need to implement biological phosphorus removal. Enhanced biological phosphorus removal (EBPR) is the biological uptake of phosphorus by selected microorganisms called phosphorus-accumulating organisms (PAOs). While the actual uptake of phosphorus occurs in an aerobic environment, PAOs must first be conditioned by exposure to VFAs in an anaerobic environment. PAOs store food under anaerobic conditions and then process the stored food once under aerobic conditions. The preferred food for PAOs are VFAs.

## STRAIGHTFORWARD OPERATION

The low maintenance BioMix-DC system provides operators ease of mind. The cycle parameters may be adjusted to optimize mixing, power utilization, and VFA generation, manually or through automated process feedback. During the mixing cycle, high-pressure floor-mounted nozzle firing provides complete mixing with no in-tank maintenance. The operating regime of BioMix-DC is site dependent since each biological phosphorus removal treatment process operates differently based on the influent characteristics and facility design.



## FLEXIBILITY

The fermentation process at an EBPR treatment facility can be accomplished multiple ways. Anaerobic fermentation is a common process for carbon augmentation and PAO conditioning. With BioMix-DC, turning mixing off during the deep cycle allows MLSS to settle, increasing the SRT in that zone and resulting in the formation of additional VFAs. If more soluble material is required, a separate return activated sludge (RAS) or sidestream MLSS fermenter will provide more efficient fermentation. BioMix-DC can be applied in the anaerobic and fermentation tank(s) for any of the following processes, and it integrates seamlessly with BioMix systems used in anoxic, swing, or post-anoxic zones.



## unparalleled flexibility

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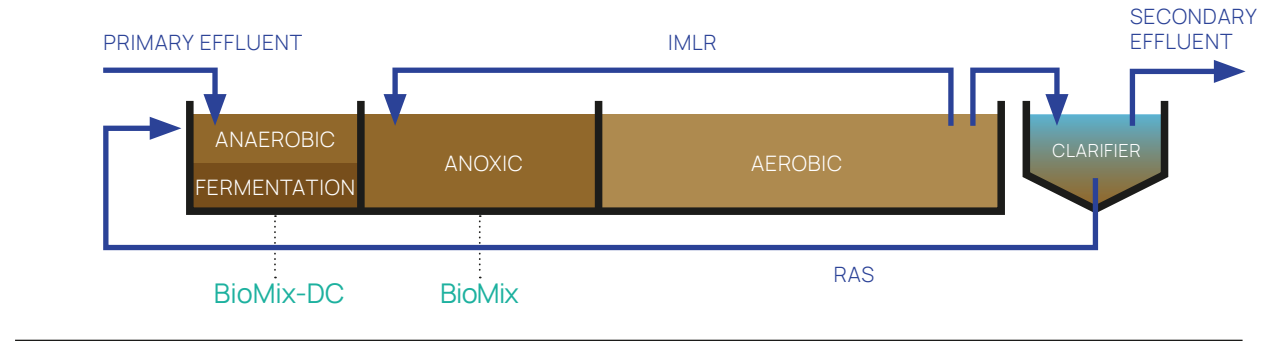
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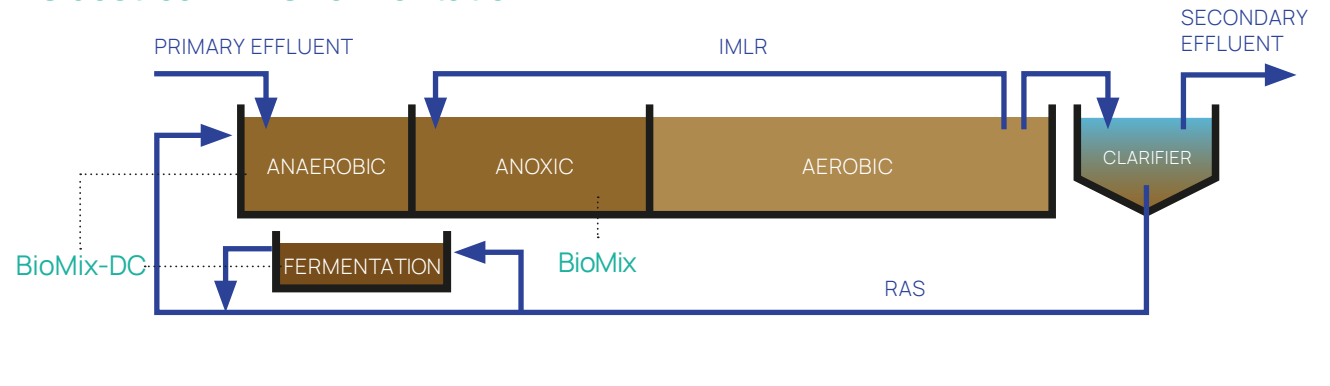
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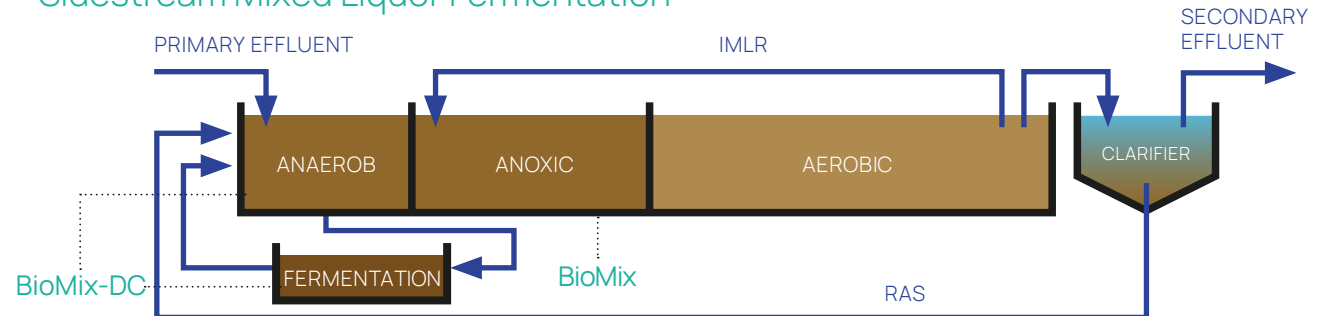
### In-Line Mixed Liquor Fermentation



### Sidestream RAS Fermentation



### Sidestream Mixed Liquor Fermentation



# BioCycle-ENR

## how it works?

BioCycle-ENR adjusts the volume of FlexZone™ to accommodate anoxic, low-DO, or aerobic treatment needs, ensuring compliance with treatment objectives. BioMix™ compressed gas mixing is integrated with fine-bubble aeration in the FlexZone™ system, allowing both technologies to operate simultaneously as needed under controlled mixing conditions. Through online feedback from process instrumentation, the main control panel automatically adjusts operational parameters to optimize biological phosphorus removal, nitrification and denitrification, alkalinity recovery, and energy savings.

The optimized BioCycle-D aerobic digestion process, ideal for aerobic digesters, is well-suited for municipal wastewater as well as industrial wastewater from the food and processing industries. The process is applicable to both small, single-tank facilities and large, multi-tank installations. BioCycle-D also features variable mixing intensity based on operating depth, eliminating minimum depth requirements.





## ENERGY EFFICIENCY

Compared to conventional aerobic digestion, it provides 50% or more energy savings.

Separating aeration from mixing allows aeration to be used solely for VS destruction, rather than for maintaining tank contents in a mixed state.

Simultaneous operation of aeration and mixing enables unlimited reduction of air volume.

The mixing system operates at a fraction of the cost of aeration blowers.



## PROCESS OPTIMIZATION

The technology can evenly mix sludge with a concentration of up to 4% dry solids. Maintaining tank volume in suspension facilitates denitrification and further processing.

A fully mixed, air-free tank volume simplifies sludge dewatering, ensuring VS destruction and reducing the amount of biomass designated for disposal.

It enhances nutrient removal and sequestration, optimizing the aerobic digestion process and improving nitrogen and phosphorus treatment efficiency in the activated sludge system.

## STRAIGHTFORWARD OPERATION

The control unit automatically switches cycles based on feedback from process sensors, transitioning from aerobic operation for volatile solids destruction to an anoxic/anaerobic cycle to facilitate denitrification, alkalinity recovery, and energy savings.

By utilizing online process instrumentation to adjust the duration of aerobic and anoxic cycles in real time based on system demands, operational complexity is minimized.



## FLEXIBILITY

Patented BioMix™ nozzles and heads are compatible with any tank shape or configuration.

The hopper bottom organization adapts to the tank floor slope, eliminating "dead zones."

It can accommodate various sludge treatment requirements.

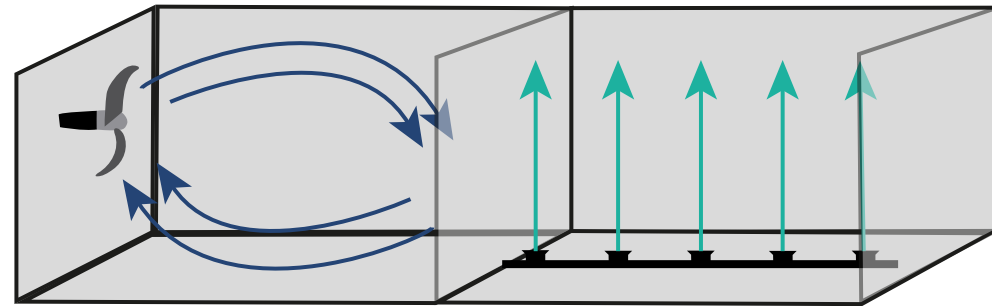


## unparalleled flexibility

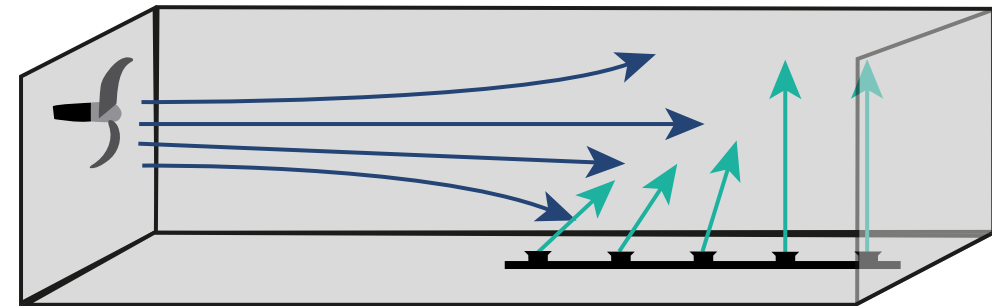
BioCycle-ENR allows overcoming the limitations of conventional activated design:

- **Restrictions of fixed process volumes and environments:** Conventional processes require fixed baffles in tanks and separate mixers, leading to limited flexibility, increased dissolved oxygen (DO) concentrations in return flows, and higher chemical consumption.
- **Limitations of Swing Zones:** While swing zones offer some versatility, they have two main limitations—they operate in only two states: aeration or mixing.
- **Mechanical Mixers:** They ensure flow and tank content mixing by generating the thrust and velocity needed for mixing, which relies on fixed walls. Bottom-up compressed gas mixing eliminates the need for baffles in the tank.

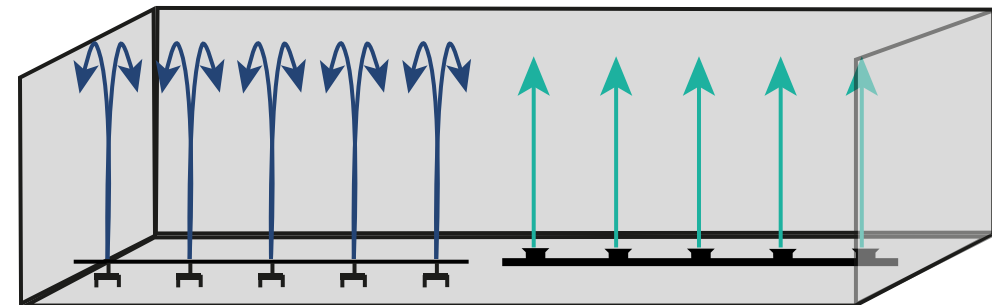
BioCycle-ENR is a highly adaptable solution that adjusts to any operating conditions without the limitations typically associated with conventional mixers.



Propeller mixer + aeration with baffle



Propeller mixer + aeration without baffle



BioMix + aeration without baffle

## how it works?

FlexZone™ is a flexible biological process control solution designed to accommodate daily and seasonal load conditions while meeting current and future water quality requirements, with a focus on optimizing energy efficiency and process management.



### ENERGY EFFICIENCY

FlexZone™ combines the BioMix™ compressed gas mixing system with diffused aeration, enabling efficient aeration, mixing, or their combination, SyncroMix. This eliminates unnecessary aeration, adjusts oxygen volume to current needs, and minimizes energy losses, achieving high efficiency and savings.



### PROCESS OPTIMIZATION

The FlexZone™ dynamics allows for a sustainable and resilient system design that adjusts the volumes of individual processes to changes in flow, load, and influent temperature, ensuring compliance with treatment limits. A wide range of possible operating settings can be managed through automated process control within biological treatment.



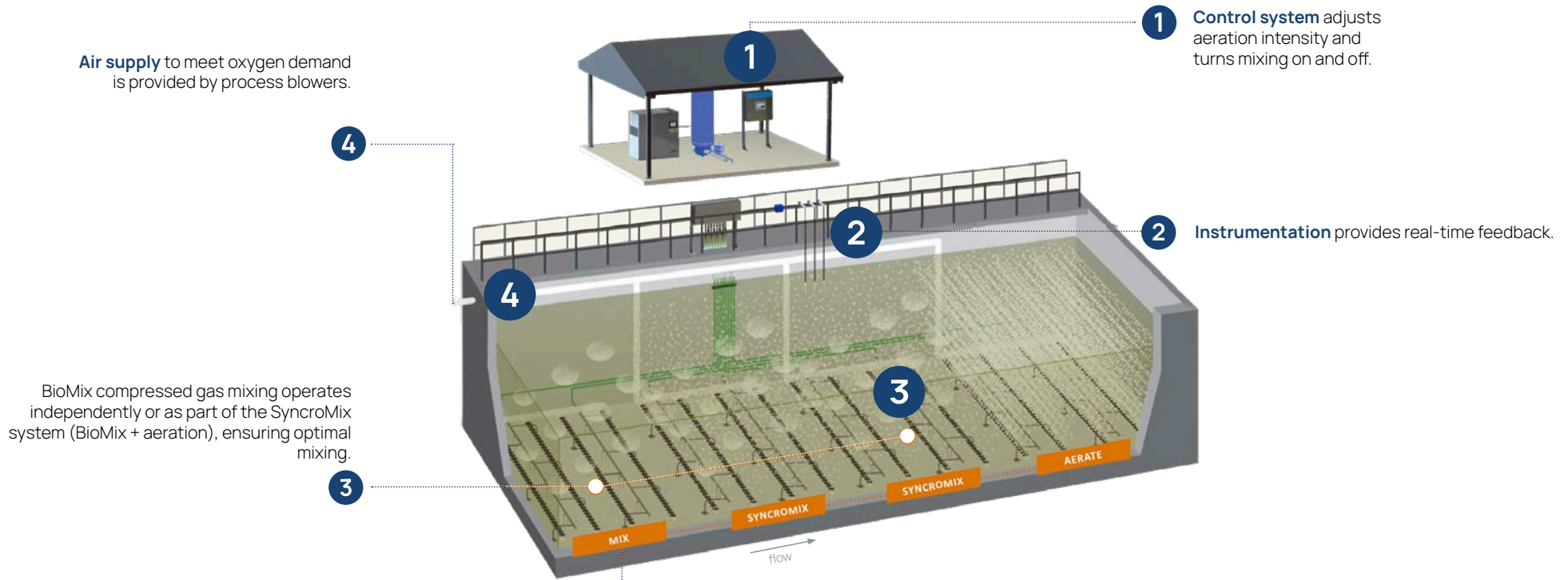
### STRAIGHTFORWARD OPERATION

FlexZone™ dynamically controls biological treatment without the need for fixed baffles, adjusting aeration and mixing for anoxic or low-oxygen aerobic environments. Maintenance is easy, with minimal equipment requirements inside the tank and easily accessible equipment outside the tank.



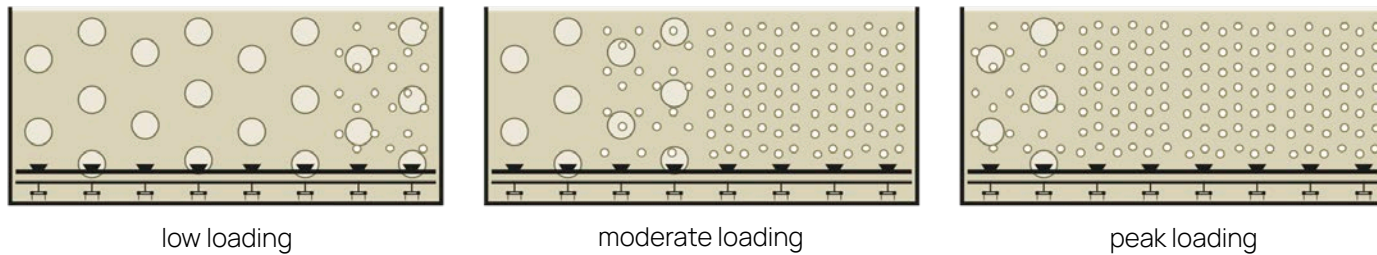
### FLEXIBILITY

Unlike conventional aeration systems with limited flow reduction capabilities, the FlexZone™ system is suitable for a wide range of operating environments that address reduced oxygen demand.



**Flexible configuration for changing conditions**

By eliminating physical barriers, FlexZone dynamically adjusts anoxic, low-aeration, and aerobic volumes to changing influent load conditions while optimizing the bioreactor environment for energy savings, nutrient removal, and carbon management.



## process optimization

The FlexZone™ system enables a sustainable and resilient system design, adjusting the volumes of individual processes to changes in flow, load, and inlet temperature to meet treatment limits. A wide range of possible operating settings can be addressed through automated process control within the biological treatment framework.

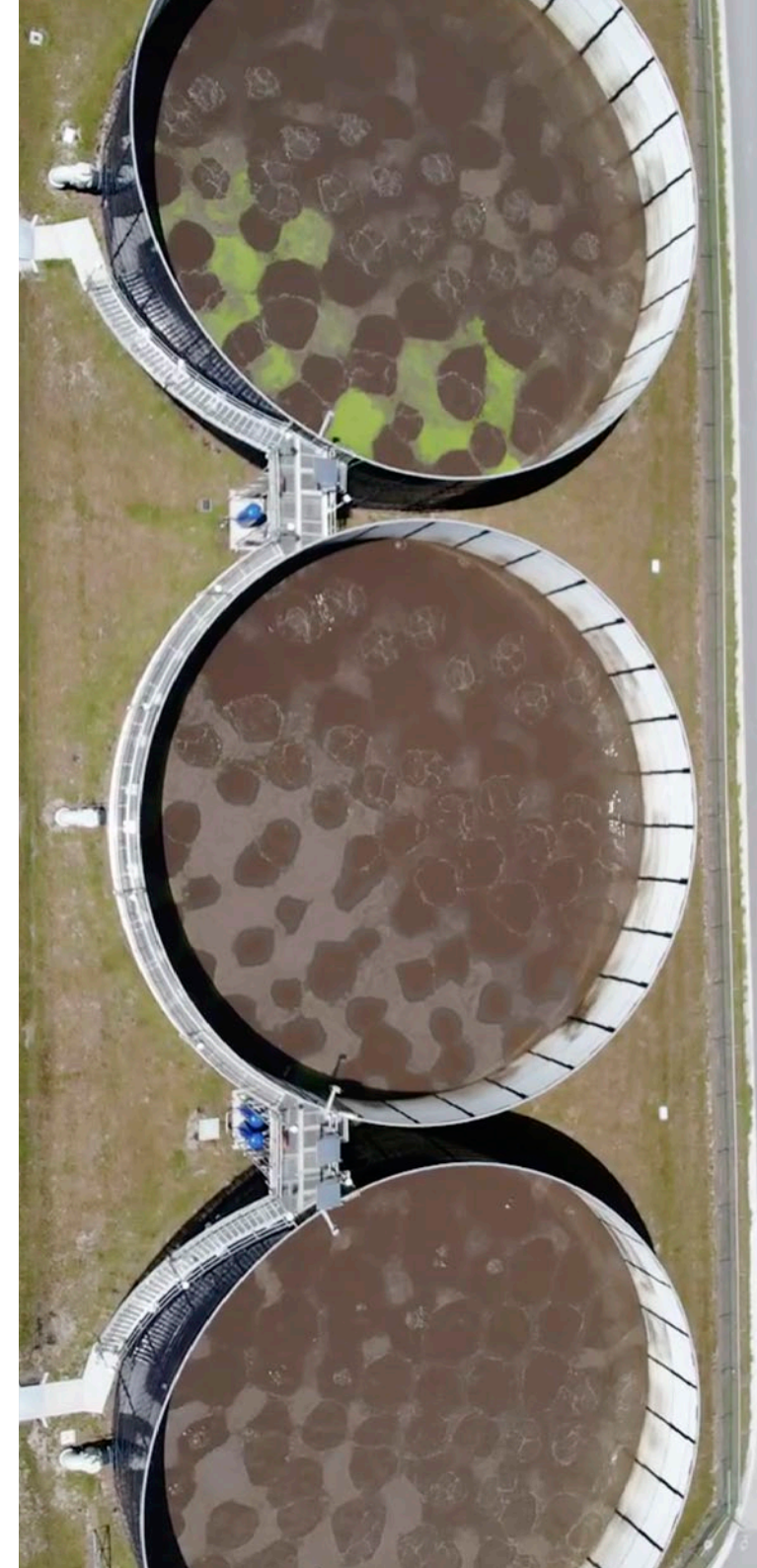
Anoxic	Low DO	Aerobic
Denitrification	Simultaneous nitrification and denitrification	BOD removal + nitrification + P absorption

The ability to change anoxic, low-aeration, and aerobic environments in the reactor in real time improves carbon management, minimizes energy consumption, and optimizes both current and future nutrient removal. The process advantages of a dynamic environment for the treatment process are as follows:

- Improved nitrogen and phosphorus removal with more efficient carbon management.
- Reduced chemical requirements for adding carbon, supplementing alkalinity, and phosphorus precipitation.
- Decreased oxygen demand in the aerobic environment with enhanced denitrification.

## straightforward operation

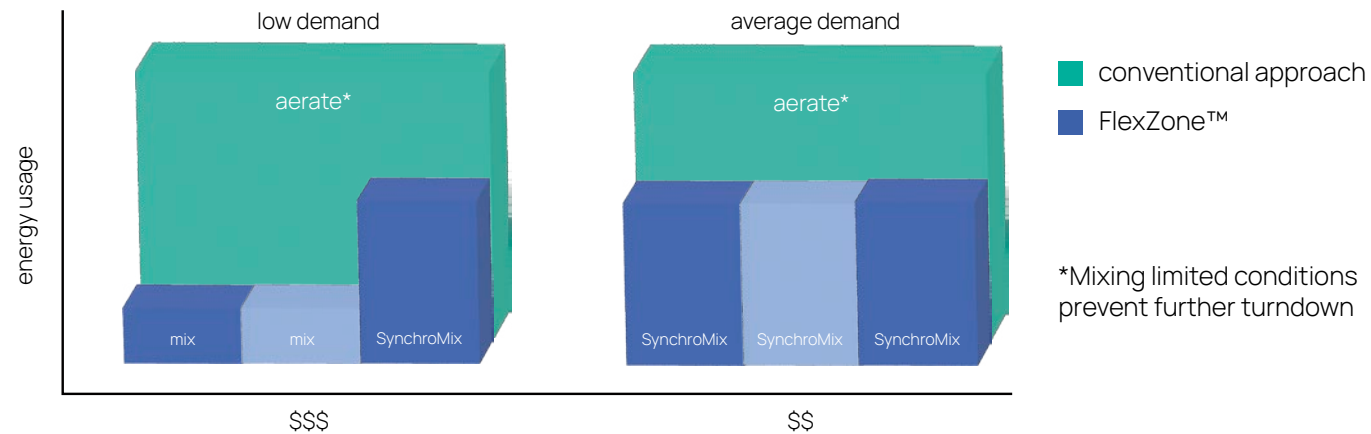
The FlexZone™ system provides dynamic control of the biological treatment process volumes, eliminating the need for separating individual zones with fixed baffles. Using instrumentation, control algorithms, and automation, it adjusts aeration and mixing settings to create anoxic, aerobic, or low dissolved oxygen (DO) environments within the bioreactor. Maintenance of FlexZone™ equipment is minimal. Equipment outside the tank is easily accessible, and in-tank maintenance requirements are minimal.



## energy efficiency

The effective operation adjusts the air supply to oxygen needs. However, due to the inherent limitations of aeration systems, it is not possible to reduce the fan speed. The best way to save energy is to eliminate unnecessary aeration, but this is often not possible in most applications, as aeration equipment serves to mix the tank, not just to supply oxygen for the process.

The FlexZone™ system eliminates unnecessary aeration by integrating the BioMix™ compressed gas mixing system with diffused aeration equipment, enabling aeration, mixing, or SyncroMix. SyncroMix – the simultaneous operation of the BioMix™ system and diffused aeration – provides the ideal combination of oxygen delivery and mixing without excessive aeration and energy wastage.



# sludge tanks

## key benefits of BioMix™ for sludge tanks



### FLEXIBILITY

- Suitable for concentrations up to 8% total solids.
- Adapts seamlessly to various WWTP designs.
- Conforms to tank floor slopes, eliminating dead zones.
- Adjusts based on operational depth for efficient performance.
- Enables mixing at any depth without limitations - no Low Water Level Restrictions.



### STRAIGHTFORWARD OPERATION

- No moving or wearable parts in the tank
- No clogging, no maintenance required
- No wall penetrations, eliminating the risk of leaks



### ENERGY EFFICIENCY

- Significant reduction in energy consumption.



sludge tank dimensions      2× ø 20 m, water depth 4 m

solids concentration      4.50%

mixing method      Submersible mixers      BioMix™ system

operational power      40 kW      17.6 kW

57%

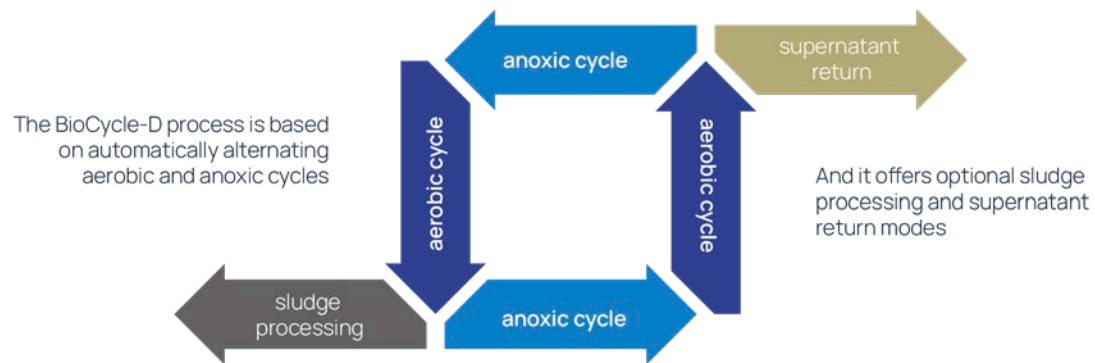
energy savings

# BioCycle-D

## how it works?

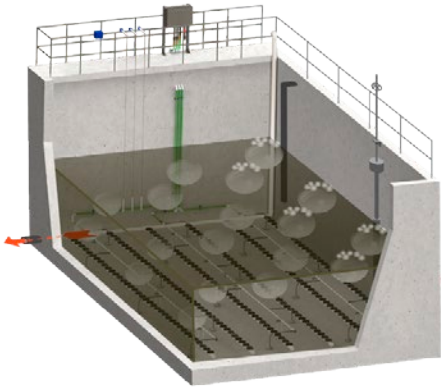
provides ideal conditions for aerobic sludge digestion and the reduction of organic matter through endogenous respiration, maximizing volatile solids (VS) destruction, pathogen reduction, and sludge conditioning at a fraction of the expense of a conventional aerobic digestion process. The process is engineered to the requirements of each application and is capable of producing Class B biosolids.

Biosolids management costs for a small to medium-sized wastewater treatment facility can account for 50% of the facilities operations and maintenance expense. Upgrading the aerobic digestion process can save both time and money, while ensuring process performance to meet disposal requirements.



If the aeration system is designed exclusively based on oxygen requirements and the mixing system is designed based on mixing requirements, energy efficiency and process flexibility are maximized.

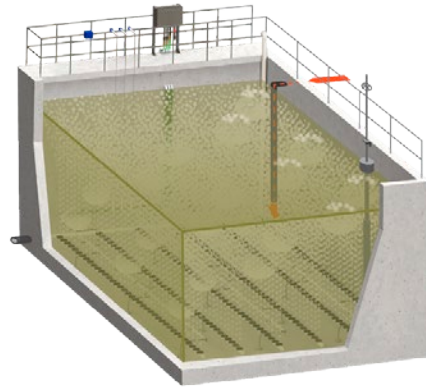
		conventional approach/ blowers only	BioCycle-D blowers + compressor	
operating power	blowers	24 hours @ 134 kW	16 hours @ 40 kW	72% energy savings
	compressors		24 hours @ 10 kW	
power consumption kWh/day		3 221	886	



### optional sludge processing mode

Ensures sludge is homogenous for downstream processing and maintains phosphorus in the sludge through low oxid states.

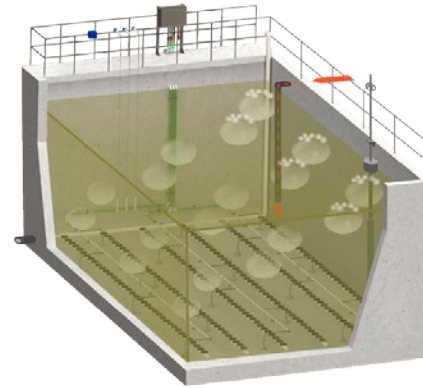
Sludge leaves the digester and goes to processing or disposal.



### aerobic cycle

Provides oxygen for volatile solids destruction as waste activated sludge (WAS) or primary sludge (PS) enters the digester for solids processing.

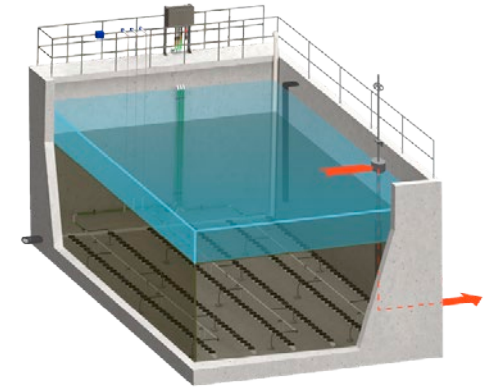
**Aeration plus mixing.**



### anoxic cycle

Provides complete mixing to facilitate denitrification, alkalinity recovery, and energy savings as WAS or PS enters the digester for solids processing.

**Mixing only, no aeration.**



### optional supernatant return mode

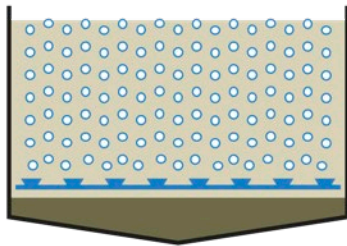
Automated settle and decant mode to thicken sludge.

Supernatant leaves the digester and returns to the head of the secondary treatment process.

## energy efficiency

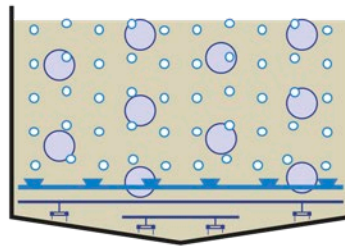
BioCycle-D solutions deliver 50% or greater energy savings over a conventional approach to aerobic digestion by decoupling aeration from mixing – in other words, the function of mixing is no longer provided by the diffused aeration system, allowing for smaller blowers and significant turndown. In most cases, the volume of air required to mix the digester's contents is far greater than the volume of air required to satisfy the oxygen demand. This condition is commonly referred to as "mixing limited."

### CONVENTIONAL APPROACH aeration only

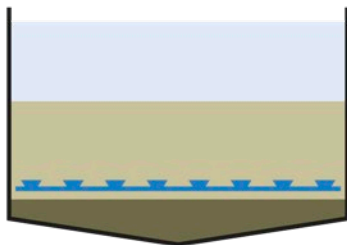


**Air on:**  
mixing limited

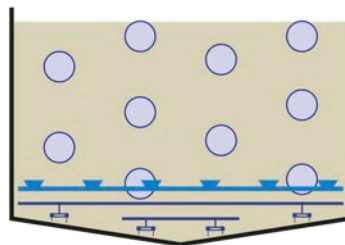
### DECOUPLED APPROACH aeration + compressed gas mixing



**Air and mixing:**  
process satisfied



**Air off:**  
unmixed



**Air off:**  
completely mixed

Aeration is designed for VS destruction only, not to keep the contents of the tank mixed.

Ability to mix and aerate below the grid eliminates dead zones in cone-bottom tanks.

Concurrent operation of aeration and mixing allows air to be turned down infinitely.

Keeping contents mixed maximizes denitrification, alkalinity recovery, and VS destruction.

BioMix Compressed Gas Mixing uses a fraction of the energy compared to conventional aerated mixing.

Completely mixed, air-off time periods allow for further conditioning of the sludge for dewatering.

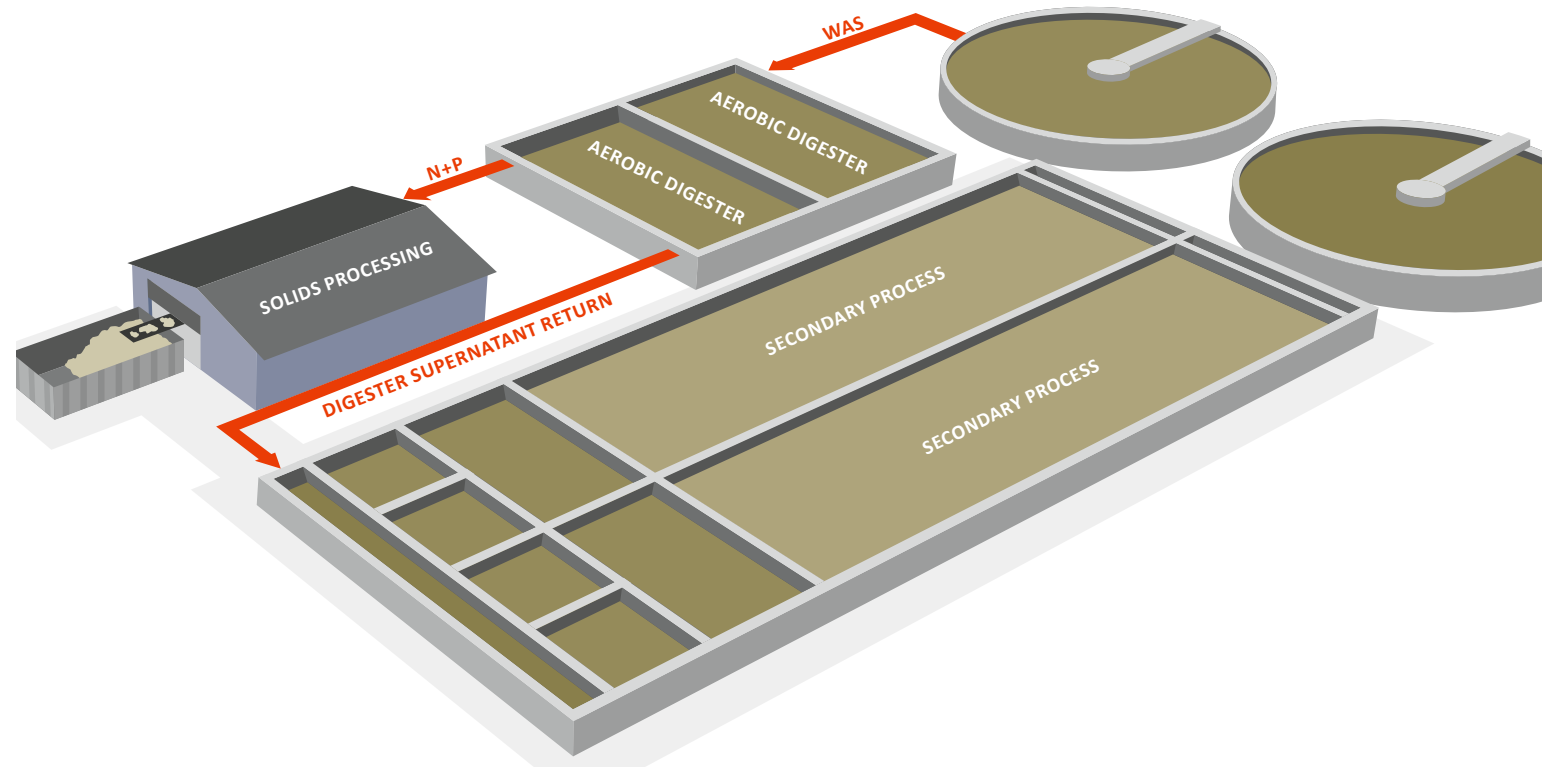
## process optimization

Nutrient removal and sequestration are important features of BioCycle-D for optimization of the aerobic digestion process, as well as improving the treatment efficiency of nitrogen and phosphorus in the activated sludge process.

BioCycle-D's automatic controls adjust the process phases for variable sludge loading rates, significantly reducing nitrogen and phosphorus in the supernatant return stream to secondary process. This minimizes side stream loads, enabling the treatment process to meet strict nutrient limits. Substantial energy and chemical savings as well as reduced operator attention can be realized by using online process instrumentation to adjust the aerobic and anoxic cycle durations based on real-time demands.

Sludge disposal costs continue to rise. BioCycle-D provides highly effective VS destruction, reducing the volume of biosolids required for disposal. Automatic aerobic and anoxic cycling stress the biomass and cause cell lysing, allowing the conditioning of the biological extracellular polymeric substances (EPS) into readily biodegradable compounds. These compounds further condition the sludge, improving sludge dewatering and reducing sludge disposal volumes.

BioCycle-D sequesters nutrients in the sludge, eliminating spikes of nutrients in the return stream to the secondary process.



## unparalleled flexibility

BioCycle-D has the flexibility to accommodate a variety of sludge treatment requirements such as tanks in parallel, series, or single tank operation, and demands to meet Class B biosolids for land application. BioMix's patented nozzles and headers are compatible with any tank geometry or configuration, and circular headers conform to the slope of the tank floor, eliminating "dead spots." BioCycle-D technology is able to uniformly mix sludge at concentrations up to 4% solids.

### application

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#### markets

biosolids, municipal wastewater, industrial food & beverage

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#### tanks

compatible with any geometry (rectangular, circular, hopper bottom, annular, ditch, covered, or other)

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#### operational config

series, parallel, tank out of service, or ability to alternate between any of the above

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#### facility sizes

small single tank, large multi-tank

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#### water levels

variable mixing intensity based on operating depth, no minimum depth requirements

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#### thickening options

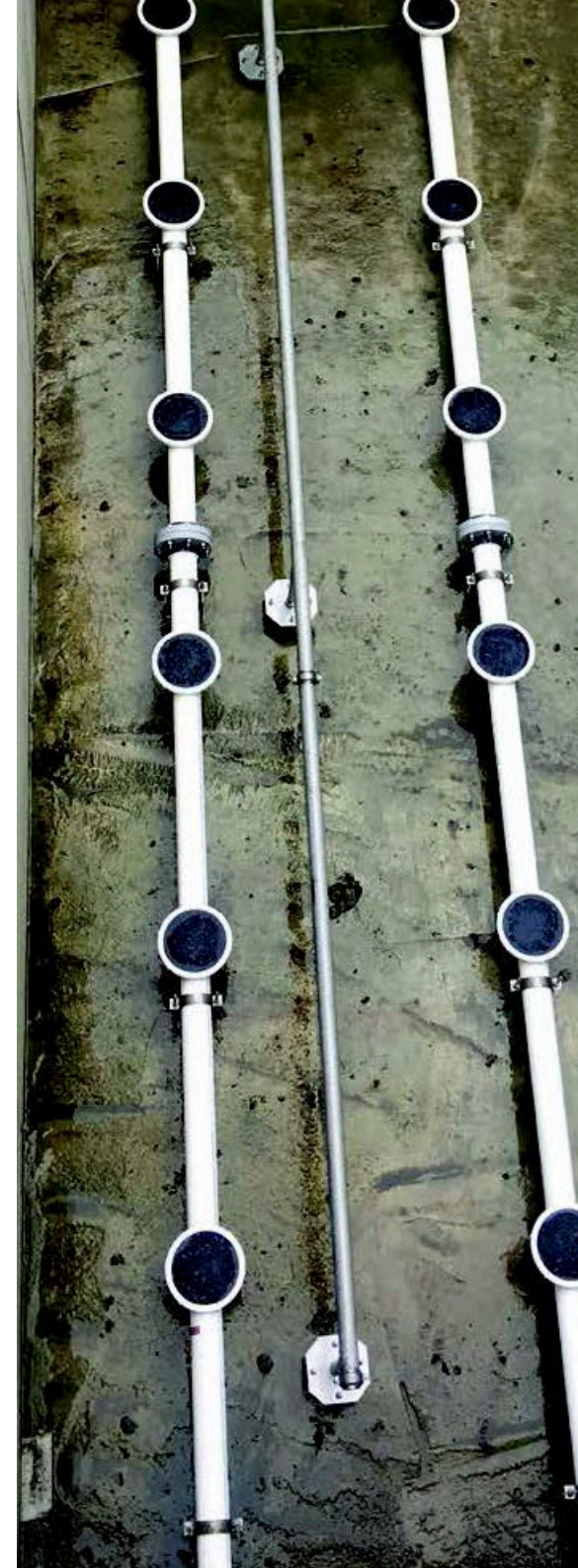
pre-thickening, manual decant, automatic decant

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#### monitoring and control options

time based cycle control, ORP control, pH control, DO control

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# BioMix-AD

## how it works?

provide uniform mixing of anaerobic digester tank contents by firing programmed, short-duration bursts of compressed biogas through patented, engineered nozzles located near the tank floor. The mixing parameters may be adjusted to optimize mixing and power utilization, either through operator input or automated process feedback. BioMix-AD enables facilities to meet sludge disposal regulations and reduce energy costs, while reducing their carbon footprint and recovering biogas as a renewable energy source.

The BioMix-AD system differs from piston bubble, tubular, and other anaerobic digestate mixing systems. The integrated approach of this technology results in excellent volatile solids destruction, increased gas production, and temperature uniformity.



### ENERGY EFFICIENCY

The system ensures a 50% or greater reduction in energy consumption compared to conventional mixing technology.



### PROCESS OPTIMIZATION

Complete mixing of the tank with more than 90% of the active volume.  
Increases biogas production.  
Maximizes the destruction of volatile solids.  
The system maintains a uniform temperature in the fermenter.



### STRAIGHTFORWARD OPERATION

All in-tank components are maintenance free, non-clogging, and self-cleaning. Systems require minimal maintenance of components that are outside of the tank.

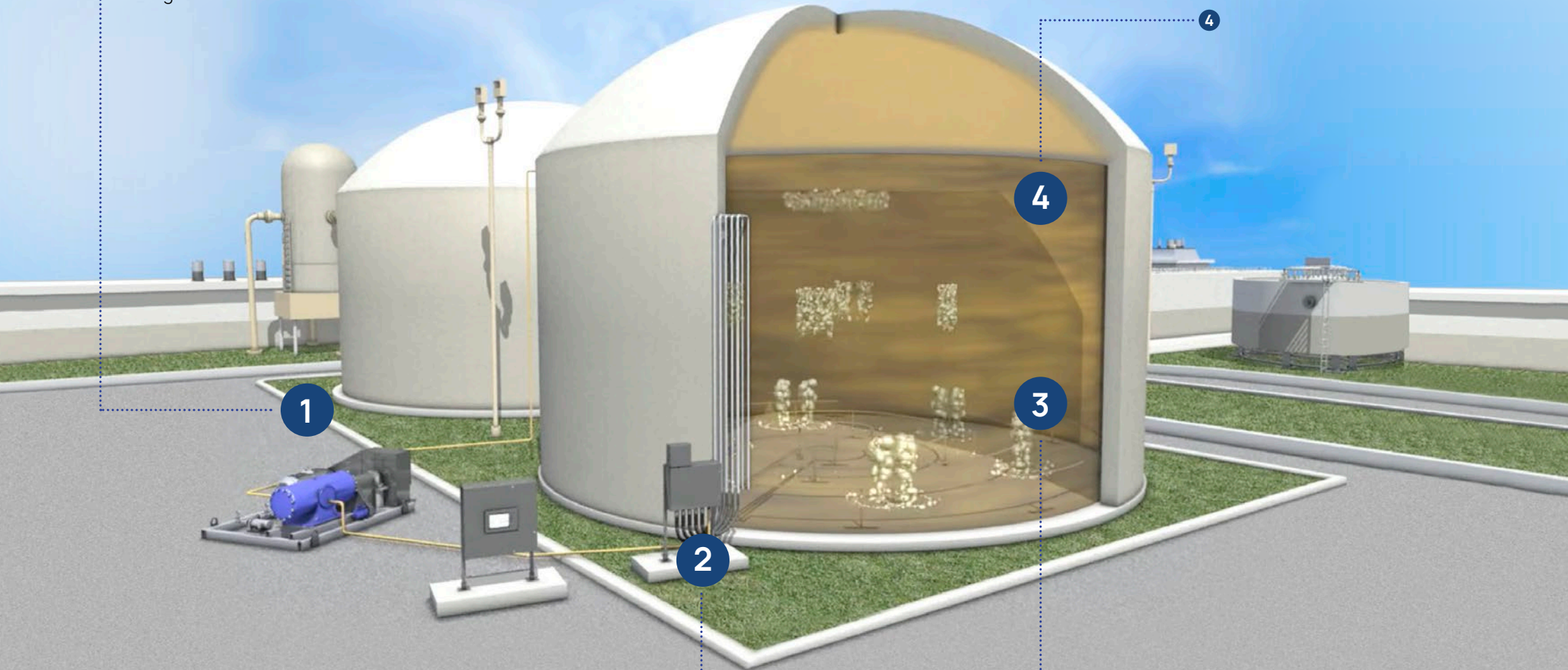


### FLEXIBILITY

Bottom-up mixing in digesters of any depth or geometry.  
Uniform mixing of sludge with concentrations up to 8% solids.  
Adaptation to the tank's slope, eliminating "dead spots."

**1** A **centralized compressor** draws biogas from the digester headspace and charges the receiver tank, which supplies compressed biogas to the valve module.

**Flexible design** accommodates varying sludge feed locations, feed duration, outlet locations and sludge viscosities.



**The valve module** controls the firing parameters of pressure, frequency, duration, and sequence, delivering biogas bursts through engineered nozzles located at the tank floor.

**Large biogas bubbles** expand upward and outward, providing uniform bottom-up mixing with 90%+ effective volume.



**Stavební huť Slatiňany, spol. s r.o.**

Sečská 570, 538 21 Slatiňany

Czech Republic

dohnal@shstech.eu | enviromix@shstech.eu

+420 728 582 363

[www.shstech.eu](http://www.shstech.eu)

[www.emx.shstech.eu](http://www.emx.shstech.eu)