



BIOSOLIDS MANAGEMENT & RESOURCE RECOVERY GROUP

Biosolids management costs usually are in 30-60% range for capital as well as O&M expenses for a typical municipal wastewater treatment facility. With 16,000 facilities treating more than 30 billion gallons of wastewater every day in the US, biosolids management poses a serious challenge for the industry. Ovivo has developed a comprehensive biosolids management flow sheet to provide state-of-the-art, advance solutions for Resource Recovery, Nutrient Management and Sludge Stabilization.

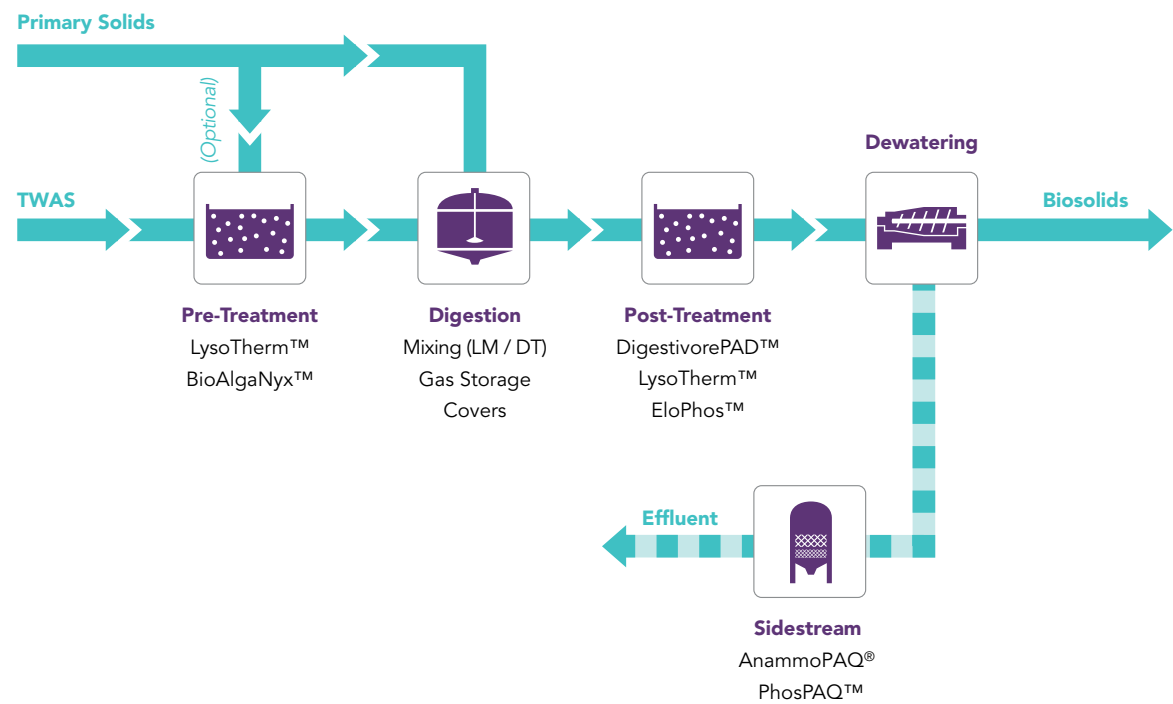


PRODUCT OFFERING

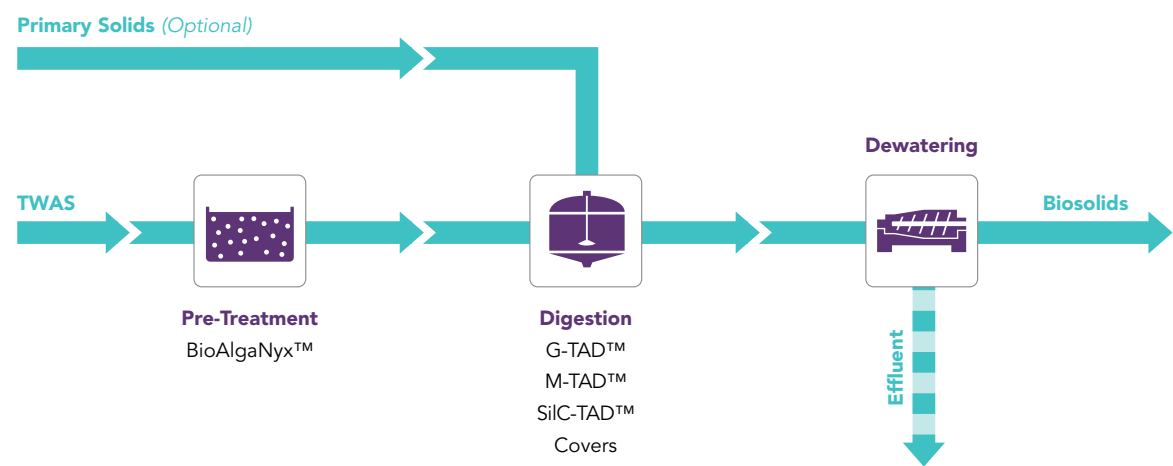
Interested in
smaller sludge volumes
& enhanced pH?

Call 1-855-GO-OVIVO to
speak with an Ovivo
Expert.

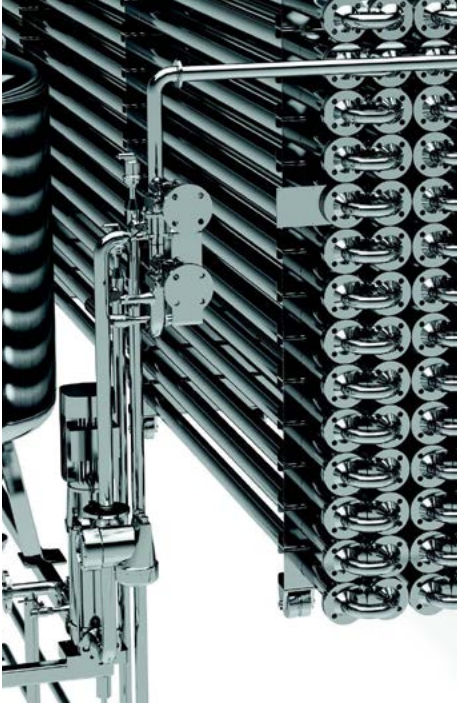
Anaerobic Digestion



Aerobic Digestion



LysoTherm™ Process



WHAT IT DOES

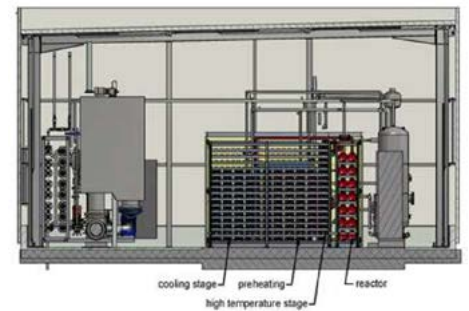
A Thermal Hydrolysis Process (THP) that allows for better solids stabilization in Anaerobic Digestion.

MAIN ADVANTAGES

- No steam required
- Lower lifecycle cost compared to other THP Technologies
- Designed for small to mid-sized plants
- Higher VSR and Gas production (Resource Recovery)
- Better dewatering of solids

INSTALLATIONS

- Two full scale installations in Europe (Amersfoort WWTP, Netherland and Lingen WWTP, Germany)
- Full scale pilot data
- Installation data since 2010



BioAlgaNyx™ Phagotrophic Algae



WHAT IT DOES

A pretreatment process using a phagotrophic algae that consumes dissolved organics and small microbial organic particulates (from TWAS and PS) which allows for improved solids stabilization at a much faster rate in both the Anaerobic and Aerobic Digestion process.

MAIN ADVANTAGES

- Very low energy requirements
- Potential for Algae harvesting (Resource Recovery)
- Decreases Aerobic digestion retention time or improves Anaerobic VSR (and gas production)
- Minimized footprint for solids stabilization
- Better dewatering of solids
- Algae does not require light source

INSTALLATIONS

- Enhancement of aerobic digestion has been successfully tested and technology is commercially marketed.
- Anaerobic testing has been performed on lab scale and is currently being performed on pilot scale. It is expected to be ready for commercialization by end of FY 2017-18.



LM™ Mixer



WHAT IT DOES

An energy efficient mixer designed for mixing sludge in Anaerobic Digesters. Unlike other mechanical mixers, the LM™ Mixer moves in an up and down motion, creating a unique flow pattern that is ideal for efficient mixing in digesters.

MAIN ADVANTAGES

- Most energy efficient mixer on the market
- Low capital cost
- Proven efficiency by way of third party CFD's and full scale tests
- Better dewatering of solids
- Designed for new or retrofit covers (fixed or floating / steel or concrete).

INSTALLATIONS

- Over 170 units sold
- First installation in 2003 (Tucson, AZ)



Eimix® Draft Tube Mixer



WHAT IT DOES

An efficient mixer designed for mixing sludge in Anaerobic Digesters. A ragless propeller spins inside a vertical draft tube inducing either an upward or downward flow direction.

MAIN ADVANTAGES

- Ragless propeller design
- Ease of operation and maintenance
- Low capital cost
- Seal tubes allow for mixer removal without loss of digester gas
- Can be internally (RDT) or externally (EDT) mounted to a digester
- Can be integrated with a heat exchanger jacket for digester heating
- Flow rate can be adjusted by adjusting shaft speed
- Designed for new or retrofit covers (fixed or floating / steel or concrete)

INSTALLATIONS

- Over 1900 units sold



Ultrastore™ Membrane Gasholder



WHAT IT DOES

A high volume gas storage and/or cover for anaerobic digestion. The membrane gas-holder is capable of storing larger amounts of methane gas than the typical steel gasholder cover. This is an ideal solution for plants that are considering waste to energy projects.

MAIN ADVANTAGES

- A simple to install and low cost digestion cover.
- Can be installed on a digester or on a slab.
- US fabrication which allows for flexibility of delivery.
- Can be designed in any shape or size.
- A proprietary option for colder climates with the M3™ third insulating membrane.
- Open Loop operating air system that doesn't require additional gas safety equipment on the air lines.

INSTALLATIONS

- Ovivo has over 25 installations in the US and over 400 worldwide.
- First US installation in 2009.
- Smallest size -25'Ø, largest size 110'Ø.



Steel Digester Covers



WHAT IT DOES

Provides a seal on top of digester tanks to ensure the contents are kept in an anaerobic condition.

MAIN ADVANTAGES

- Extremely simple, long lasting cover for digester tanks
- Dome shape for maximum efficiency
- Minimal maintenance requirements
- Provides for storage of digester gas if required
- Can be fixed to the tank wall or float on liquid surface
- Can include a peripheral liquid seal for odor control
- Radial beams allow for quick site erection

INSTALLATIONS

- Over 1300 units sold
- Installations dating back to 1929



G-TAD™ Process



WHAT IT DOES

A controlled aerobic digestion process that integrates sludge thickening with gravity thickening

MAIN ADVANTAGES

- Class B stabilization with reduced footprint and energy
- Can be retrofit into existing tanks
- Can thicken sludge up to 2% without polymers
- Simple and robust design

INSTALLATIONS

- 50+ installations in the U.S.



M-TAD™ Process



WHAT IT DOES

A controlled aerobic digestion process that integrates sludge thickening with mechanical thickening such as a Gravity Belt Thickener, Rotary Drum Thickener, or centrifuge

MAIN ADVANTAGES

- Class B stabilization with reduced footprint and energy
- Can be retrofit into existing tanks
- Can thicken sludge up to 4%
- Ideal for retrofitting anaerobic digestion to aerobic digestion

INSTALLATIONS

- 20+ installations in the U.S.



SiC-TAD™ Process



WHAT IT DOES

A controlled aerobic digestion process that integrates sludge thickening with a Silicon Carbide (SiC) membrane unit

MAIN ADVANTAGES

- Class B stabilization with reduced footprint and energy
- Can be retrofit into existing tanks
- Can thicken sludge up to 4% without polymers
- Reuse quality permeate with minimal TN and TP

INSTALLATIONS

- One installation in the U.S. with SiC membranes (Black Butte, Oregon)
- 40+ installations in the U.S. with polymeric membranes
- Five full scale installations with SiC membranes in the U.S. expected by 2019.
- Pilot operations are currently being conducted at the South Kuefer WWTP in New Braunfels, TX



Airbeam® Cover



WHAT IT DOES

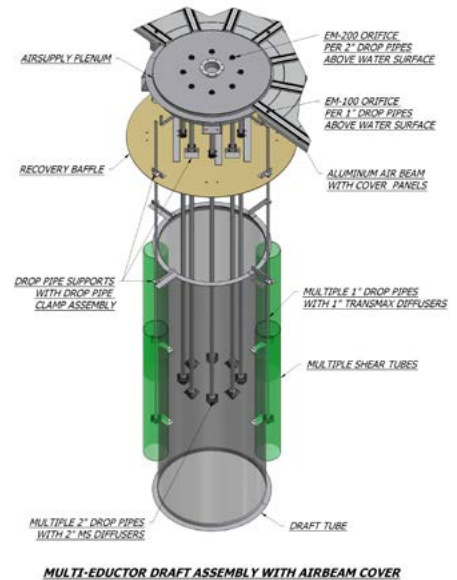
Provides temperature control optimizing VSR and nitrification performance for aerobic digestion during cold temperature operations. Also provides odor control.

MAIN ADVANTAGES

- Odor control
- Temperature control to improve aerobic digestion performance
- Allows easy access to aeration equipment providing simple maintenance
- Very durable and robust

INSTALLATIONS

- 50+ installations in the U.S.



MS® and TransMAX® Diffuser System



WHAT IT DOES

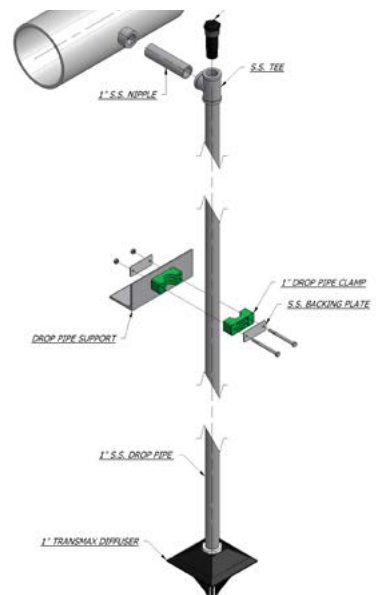
Provides excellent mixing and aerating abilities by establishing a clear roll pattern within the basins.

MAIN ADVANTAGES

- Non-clog diffuser system which requires very minimal maintenance
- Can aerate and mix solids up to 3%
- When combined with a shear tube or draft tube can aerate and mix solids up to 4%
- Very durable and robust which should last the life of a WWTP

INSTALLATIONS

- 1,000+ installations in the U.S.



AnammoPAQ® Process



WHAT IT DOES

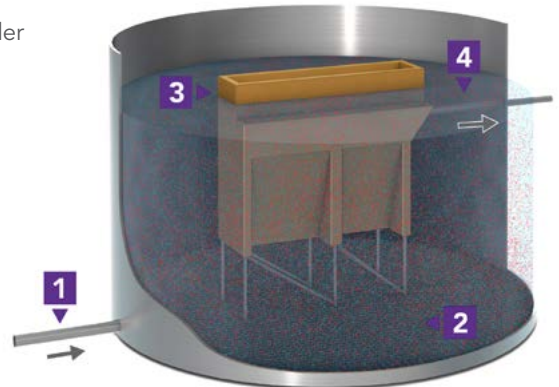
A deammonification sidestream process specifically for Ammonia removal.

MAIN ADVANTAGES

- Compact design allowing for smaller footprint
- Lowest O&M requirements
- Efficient granular process
- Extremely short start-up time
- Proven robustness

INSTALLATIONS

- Over 50 installations worldwide



1. Ammonia-rich influent
2. Aerators for mixing and ammonia removal process
3. AnammoPAQ™ separator for biomass retention
4. Effluent exits the reactor

DigestivorePAD™ Process



WHAT IT DOES

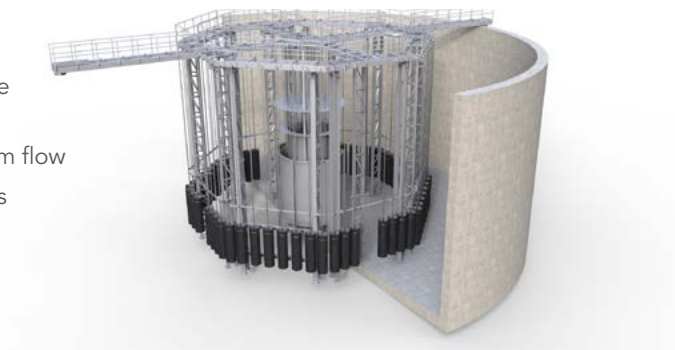
An aerobic digestion step is added after the anaerobic digestion step coupled with a recycle stream from aerobic to anaerobic. This technology is very simple but offers a very comprehensive range of solutions to common problems associated with the management of biosolids.

MAIN ADVANTAGES

- 10% to 30% additional VSR in the digestion process
- Reduced TN and TP in sidestream flow
- Improved dewaterability of solids
- Struvite stabilization
- Odor control
- Ideal for retrofits

INSTALLATIONS

- 3 plants working on similar concept. First one operational in 2011.



Phospaq™ Process



WHAT IT DOES

A Phosphorus removal/recovery system for high Phosphorus content streams.

MAIN ADVANTAGES

- Compact design allowing for smaller footprint
- Continuously aerated single tank providing free BOD and S removal
- Controlled formation of coarse struvite crystals
- Automated control
- Flexible design - Can do just P removal or go to recovery as well
- No need for adding additional alkalinity

INSTALLATIONS

- Over 11 installations worldwide



EloPhos™



WHAT IT DOES

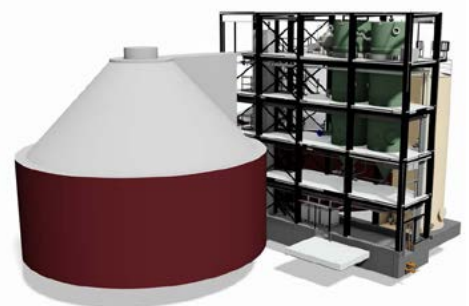
A sludge based Post Digestion phosphorous removal process that will reduce the Phosphates in the sludge by 90%.

MAIN ADVANTAGES

- Uses $MgCl_2$ which does not require additional equipment for dosing.
- Uses a proprietary vacuum degassing process
- The Vacuum Degassing unit captures methane gas which is returned to the digester. It also captures CO_2 which reduces its carbon footprint compared to other technologies.
- No gas cleaning equipment required.
- Modular set-up where the MAP separation and recovery is not needed can be removed from scope of supply.

INSTALLATIONS

- One Installation in Europe.



	BioAlgaNyx™	LysoTherm™	LM™ Mixer	Eimix® Mixer	Ultrastore™ Gasholder	Steel Covers	Airbeam Cover	G-TAD™ Process	M-TAD™ Process	SiIC-TAD™ Process	DigestivorePAD™	EloPhos™ Process	AnammoPAQ® Process	PhosPAQ™ Process
	Pre-Treatment	Equipment Supply						Thickened Aerobic Digestion			Post Treatment		Sidestream Treatment	
Aerobic	✓						✓	✓	✓	✓				
Anaerobic	✓	✓	✓	✓	✓	✓					✓	✓	✓	✓
Resource Recovery (C,P)	✓										✓			✓
Carbon Recovery	✓													
Phosphorus Recovery												✓		✓
BNR (N,P)											✓	✓	✓	✓
Nitrogen Removal											✓		✓	
Phosphorus / Struvite Removal												✓		✓
Digestion Improvement	✓	✓									✓			
Higher VSR (Less Solids)	✓	✓									✓			
Higher Gas Production	✓	✓												
Struvite Removal											✓	✓	✓	✓
Sludge Stabilisation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
Mixing			✓	✓										
Gas Storage					✓	✓								
Cover						✓	✓							
Better Dewatering	✓	✓									✓			
Thickened Aerobic Digestion								✓	✓	✓				

THE OVIVO DIFFERENCE

200+ YEARS OF HERITAGE • 100% FOCUSED ON WATER

OVIVO: AN ENGINEERING PROCESS POWERHOUSE

The Ovivo Aeration Process Team, which consists of decades of biological wastewater treatment plant design and innovation, has provided expertise and design assistance for wastewater treatment plants consisting of all shapes, sizes, and effluent permits.

CAPABILITIES

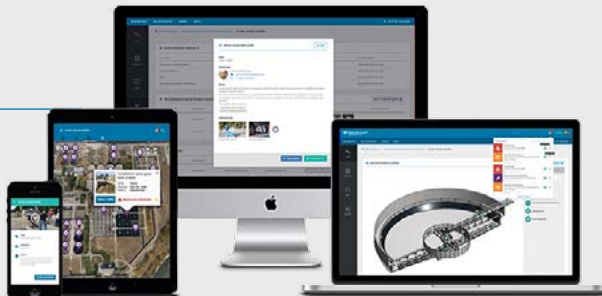
- Detailed Design Support
- Process Calculations
- Equipment Sizing
- Process Guarantees
- Extended Warranties
- Retrofit Expertise
- Process Training
- Equipment Startup
- WaterExpert™



**ALL OF YOUR MANUALS,
ALL OF YOUR KNOWLEDGE,
ALL IN ONE PLACE.**

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Create and manage service logs and
maintenance schedules.

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