ENVIROMIX
Sustainable Solutions for a Cleaner Environment

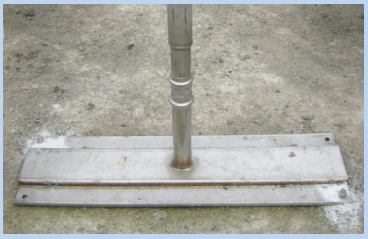
INTELLIGENT MIXING SYSTEMS FOR THE WASTEWATER INDUSTRY

BioMix™-AD Anaerobic Digester Gas Mixing

Energy-Saving, Superior-Mixing Technology

Key Benefits

- BioMix™-AD provides complete tank mixing with 90%+ active volume
- Distributed, sequential "large bubble" mixing
- Bottom-up mixing in digesters of any geometry
- Lower energy requirements
- PLC-controlled with customizable operating parameters to meet varying mixing requirements
- Mixing energy distribution overcomes non-Newtonian sludge characteristics
- Greater volatile solids destruction and digester gas production
- Deep tank mixing of high-viscosity sludges
- Minimization of solids and scum buildup
- Uniform temperature
- Zero maintenance of non-clogging, self-cleaning in-tank components



BioMix Nozzle

Applications

- Mesophilic High-Rate Digestion
- Acid Phase Hydrolysis
- Enzymatic Hydrolysis
- Thermal Hydrolysis
- Pasteurization
- Thermophilic Digestion

Traditionally, anaerobic digesters operate within 2% to 2.5% sludge concentration, with fluid characteristics similar to water. However, recent trends towards thickened feed sludges (up to 14% dry solids) have led to problematic digester mixing, resulting in short circuiting, solids deposition and foaming. As dry solids increase, the sludge becomes more viscous, behaving as a non-Newtonian shear-thinning fluid.

BioMix-AD differs from piston bubble, draft tube, lance, and other anaerobic digester gas mixing systems. BioMix-AD fires large (e.g., 4"Ø) digester gas bubbles freely through nozzles distributed across the tank floor. High localized mixing energies in many more locations overcome non-Newtonian sludge characteristics, enable shorter blend times and produce 90%+ active volumes.

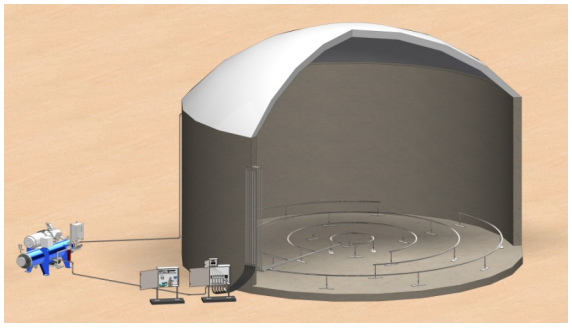
The BioMix-AD control system utilizes four parameters (pressure, sequence, duration, and frequency) to control the firing of the gas injection valves in order to mix a specific sludge and tank geometry. Compressed digester gas is intermittently and sequentially fired in fractional second durations to mix the digester both vertically and horizontally.

The gas firing parameters in combination with the many nozzle locations address differing feed positions, feed duration, recirculation locations and outlet positions as well as increased sludge viscosity.

This integrated approach to gas mixing results in superior volatile solids destruction, gas production, and temperature uniformity, all with lower energy requirements.

Once the BioMix-AD system is "charged" and firing parameters maintained, the system operates as a loop, with no further gas consumption required. A two-stage, liquid-ring compressor provides reliable gas delivery to gas valve panels, which are controlled by intrinsically-safe pilot valve panels and the BioMix-AD PLC-based valve control panel.

Stainless steel in-tank piping and nozzles are durable, non-clogging and self-cleaning. Nozzles and respective headers may be oriented in level rings up the floor slide slope to ensure effective bottom-to-top mixing.



BioMix-AD Configuration Example

Environmental Stewardship

Renewable energy, legislation, sludge disposal, carbon footprint reduction, and costs of alternative treatment have renewed interest in anaerobic digestion and its optimization. BioMix-AD responds as part of an effective solution to these trends.