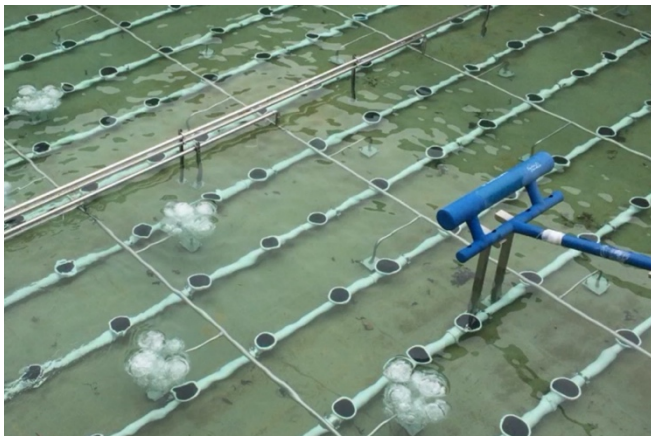
CASE STUDY:

Benton, Illinois Wastewater Treatment Facility

Application:	Aerobic Sludge Digestion
Design Flow (ADF):	1.65 MGD
Mixing Efficiency:	≈ 0.13 HP/1000 ft^3
Compressor:	One (1) 15 HP Rotary Screw
Blowers:	Three (3) 30 HP Hybrid Rotary Lobe
Design Engineer:	HMG Engineers, Inc.
Contractor:	River City Construction



De-coupling aeration from mixing optimizes efficiency and process control.

BioCycle-D™ Aerobic Digestion Process Selected for Illinois Wastewater Treatment Facility

In 2018, the City of Benton, Illinois, constructed a new wastewater treatment facility to replace the antiquated decades-old plant and to provide improved treatment that meets nutrient removal requirements. The new facility was designed to treat 1.65 million gallons of wastewater per day using an oxidation ditch which facilitates nitrification and biological phosphorus removal.

EnviroMix's BioCycle-D Optimized Aerobic Digestion Process was selected as an integral part of the new plant design because of the significant energy savings and improved sludge digestion through automated process control that the system provides.

Unlike a conventional aerobic digester that uses diffused aeration for both mixing and process oxygen demands — resulting in over-aeration which leads to uncontrolled nitrification, depletion of alkalinity, and increased energy consumption — BioCycle-D controls and optimizes the digestion process.

The Benton wastewater treatment facility is experiencing over 70% energy savings versus a conventional diffused air mixing system designed at the Ten State Standards volumetric airflow rate of 30 scfm per 1000 ft^3 of tank volume.

ENERGY EFFICIENCY

72% power savings versus traditional diffused aeration design approach

STRAIGHTFORWARD OPERATION

Automatically adjusts operation based on loading conditions

Minimal maintenance, less than one hour per week

PROCESS OPTIMIZATION

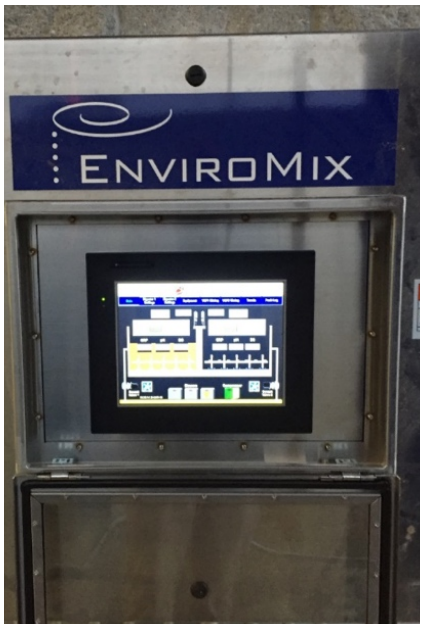
Precise process control improves volatile solids destruction and sludge dewaterability

UNPARALLELED FLEXIBILITY

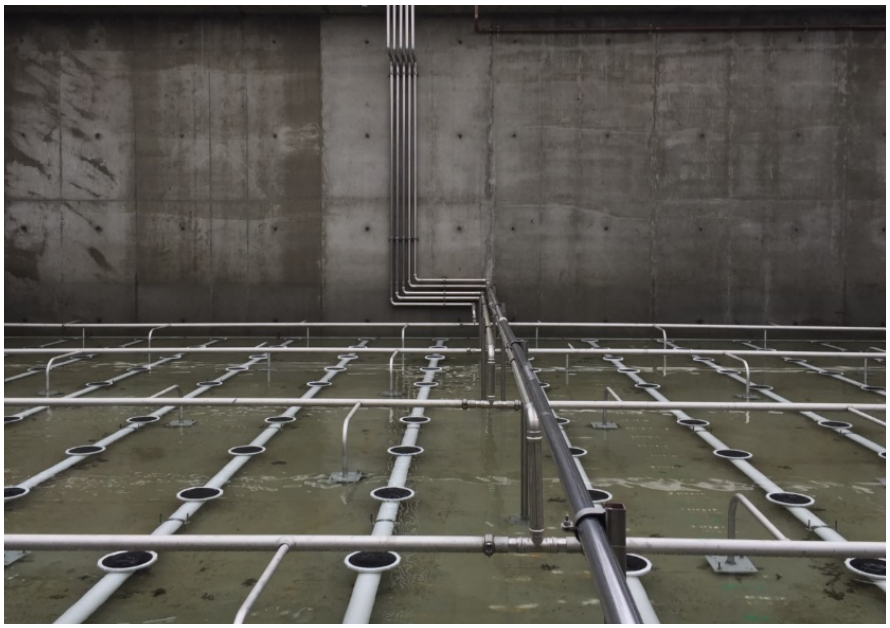
Bottom-up, uniform mixing supplements aeration

Suitable for a wide variety of applications

enviro-mix.com · 701 East Bay Street, Suite 502 · Charleston, SC 29403 · P: 843.573.7510 · sales@eniviro-mix.com



Automatic operation through instrumentation feedback and intuitive operator interface



Complete system responsibility and integration of components

BioCycle-D Optimized Aerobic Digestion Process was selected because of the energy efficiency and improved sludge digestion through automated process control that the system provides.

BioCycle-D is designed by right-sizing the diffused aeration system to satisfy process oxygen demand and applying energy efficient mixing through the use of the BioMix™ Compressed Gas Mixing System.

The conventional approach to aerobic digestion design utilizes the aeration system to provide the oxygen to the microorganisms as needed for the digestion process AND the mixing energy needed to keep the basin contents mixed at all times. Oftentimes, and especially for treatment works that have extended aeration secondary processes, the air required to mix is greater than the air required to satisfy the oxygen demand, resulting in wasted energy. When the aeration system is designed solely based on the oxygen requirements and the mixing system is designed solely based on the mixing requirements, efficiency and operational flexibility are both maximized.

BioCycle-D maximizes sludge destruction, minimizes energy consumption, and provides process control by decoupling aeration from mixing along with automated operation through instrumentation feedback.

By regulating the aerobic phase of the process through DO instrumentation feedback, optimized air delivery and effective digestion are achieved. Controlling the anoxic phase of the process through pH/ORP monitoring and efficient mixing via BioMix Compressed Gas Mixing, enables denitrification and alkalinity recovery while preventing phosphorus release in the digester supernatant. The process benefits of optimized digestion also result in improved sludge dewaterability.

Contact sales@enviro-mix.com today to discuss the ways EnviroMix can optimize your mixing solutions.