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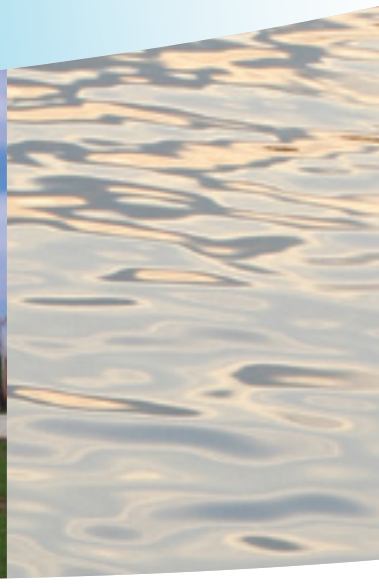
WATER TECHNOLOGIES



ADI-BVF® REACTOR

ROBUST LOW-RATE ANAEROBIC DIGESTION SOLUTION

THE TECHNOLOGY

The ADI-BVF® reactor is an anaerobic digestion system that offers very stable, effective wastewater treatment and biogas generation under a wide range of operating conditions. ADI Systems is the inventor and exclusive provider of this technology, which has been installed in 140 full-scale applications around the world. It is sized to work at low volumetric loading rate conditions, and designed to handle variations in wastewater flows and characteristics while maximizing biogas production.

The BVF® reactor treats wastewater streams with moderate to high concentrations of organics (chemical oxygen demand [COD], biochemical oxygen demand [BOD]), total suspended solids (TSS), and degradable fat, oil, and grease (FOG)—typically without the need for primary treatment. The technology requires considerably less pretreatment than other anaerobic alternatives because raw solids can be digested in the reactor; they require only coarse screening. A dissolved air flotation (DAF) unit is not required ahead of the reactor, nor is the removal of suspended solids in most cases.

UNPARALLELED EXPERTISE

ADI Systems' experience with low-rate anaerobic digestion is unmatched in the wastewater treatment industry.

THE PROCESS

This low-rate anaerobic process has a lower volumetric loading rate than high-rate technologies. It offers a longer hydraulic retention time and greater biomass inventory, resulting in a significantly more robust treatment process. The reactor operates well in a varied temperature range (86-104 °F, 20-40 °C) and is stable against shock loadings.

The reactor size, construction, and internal piping provide conditions where the biological solids settle into a sludge bed. Depending on project requirements, the reactor may also include internal gas-liquid-solids separators to produce low effluent TSS concentrations. Equalization is built-in for downstream aerobic polishing, if needed.

KEY INDUSTRIAL MARKETS

- Food Processing
- Beverage Processing
- Organic Food Waste
- Breweries
- Distilleries
- Biofuels
- Pulp & Paper
- Pharmaceutical

INFLUENT DISTRIBUTION

Wastewater (as well as supernatant recycle/sludge recycle) enters the reactor through an influent distribution system beneath the sludge bed. Recycled sludge mixes with the feed according to an adjustable pumping schedule. Wastewater passes upward through the sludge blanket, promoting contact between the wastewater and biomass. Microorganisms attack the feed, effectively converting the BOD, COD, TSS, and FOG into valuable biogas.

BIOGAS COLLECTION

Biogas produced during the anaerobic digestion process rises through the liquid, emerging at the gas-liquid interface near the top of the reactor. Biogas then flows to the tank perimeter where it is captured underneath a gastight cover.*

The floating cover is insulated to minimize heat loss and maintain ideal conditions for anaerobic digestion and biogas production. The material is UV-resistant and provides superior corrosion resistance compared to concrete or steel cover options. The cover features allow operators to easily perform maintenance and sampling, and also offers built-in systems for rainwater/snowmelt drainage. External blowers apply a negative pressure, facilitating extraction of the biogas and preventing the escape of foul odors and greenhouse gas emissions.

SLUDGE RECYCLE/WASTING

The BVF® reactor operates at a very long solids retention time, which provides greater digestion and stability than other anaerobic processes. A sludge recycle system compromised of internal header-laterals, external piping, and pumps return sludge from the effluent end of the reactor to the influent side. The same system is used to waste sludge once the sludge bed occupies 50-70% of the reactor volume. This allows sludge wasting times to be varied and flexible. The BVF reactor produces ~90% less waste sludge than aerobic systems, which typically only needs to be wasted once or twice per year. The stabilized sludge has excellent fertilizer value and can be directly applied to land.

THE WORKHORSE FOR YOUR WASTEWATER TREATMENT PLANT

The BVF® reactor offers many benefits for industrial processors worldwide.

COST SAVINGS

- Minimize sludge handling and disposal costs
- Save on energy costs:
    - Low energy consumption design
    - Significantly less energy-intensive than aerobic systems
    - Energy recovery from biogas can reduce use of fossil fuels
- Eliminate wastewater surcharges and pollution taxes
- Reduce or eliminate chemical usage
- Potential payback on investment in as little as 3-5 years
- Possibility of government grants

PROCESS ADVANTAGES

- Stability during peak flows and loads
- No up-front solids and FOG removal required
- Operates at a wide temperature range
- Offers ability to digest and store waste activated sludge (flexible sludge wasting)

ENVIRONMENTAL BENEFITS

- Continuously meet discharge requirements
    - Consistent effluent quality
- Convert organic waste to recoverable green energy (heat and power)
- Waste sludge suitable for land application as liquid fertilizer (high nutrient content)
- Improve local and global water security

OPERATION & MAINTENANCE

- Easier to operate and maintain than conventional anaerobic systems and high-rate anaerobic processes
- Simplified maintenance requirements
    - Minimal equipment and moving parts
- Requires less operator attention
- Data trending for process control
- Cover provides easy access for sampling and maintenance

PROJECT DELIVERY

ADI Systems completely customizes each BVF® reactor depending on the unique application. Based on space availability, the system can be configured as a partially in-ground concrete earthen basin (Type L) or as an above-ground concrete or steel tank (Type S).

ADI Systems' design/build project delivery offers a number of benefits, including a single point of contact and responsibility, and consistency in design and construction quality throughout the entire project. Technology-only packages are also available. ADI Systems also offers aftercare service with advice from experienced anaerobic treatment specialists.

ADI SYSTEMS

WASTEWATER TREATMENT AND WASTE-TO-ENERGY SOLUTIONS

ADI Systems, an Evoqua brand, is a world-leading wastewater treatment and waste-to-energy technology solution provider with over 35 years of experience treating industrial processing wastewater and organic waste. We understand the complex challenges and strive to engineer unique solutions for the industry. Sustainability is the foundation of our design and construction processes, and innovative clean tech research and development is the building block of our many successful projects around the world.

ADI® Systems
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