

# ANAEROBIC



## WHAT IS ANAEROBIC TREATMENT?

It is a biological process wherein organic wastes are broken down by anaerobic microorganisms in the absence of dissolved oxygen. As BOD is removed, biogas, containing energy-rich methane, is produced, as is a small amount of agriculturally beneficial sludge.

Anaerobic technology is well suited for pretreating warm, high-strength wastewater and waste solids.

## Advantages of anaerobic treatment

- Fuel costs can be reduced by using biogas as a renewable energy source.
- Greenhouse gas emissions are reduced.
- Disposal and dewatering costs are nearly eliminated as a result of low sludge production.
- Electrical energy consumption is very low.

## Applications:

- Ethanol
- Distillery/alcohol
- Food and beverage
- Chemical
- Dairy processing
- Food waste
- Confectionery
- Biomass digestion to energy
- Meat and fish
- Pharmaceutical
- Pulp and paper
- Winery/brewery
- Yeast
- Corn, potato
- Sugar/starch

## ADI EXPERTISE

ADI has over 200 installations worldwide that were designed and constructed for a variety of industrial wastewaters. ADI's research facilities are supported by a dedicated team of engineers and scientists.

## ADI-BVF® DIGESTER

### Robust, low-rate reactor

The proprietary ADI-BVF digester, a low- to medium-rate system that combines features of the upflow sludge blanket and anaerobic contact system, treats most warm water streams of moderate to very high organic strength.

### High BOD and TSS removal

Removal rates for BOD and TSS have exceeded 90 percent for confectionery waste and up to 98 percent for dairy and apple processing wastewaters.

### Simple and stable operations

The system is simple to operate due to built-in equalization and sludge storage. It is a robust system capable of handling shock loadings and typically requires little or no nutrient addition.

### Reduces sludge production

The ADI-BVF digester produces very little waste sludge and is an excellent place for disposal of waste aerobic sludge. In turn, digestion of this sludge increases the amount of biogas produced and saves on sludge handling and disposal costs.

### Avoid primary treatment

The cost of equalization and primary treatment is often avoided, as the ADI-BVF reactor is able to treat variable wastewater with high COD, BOD, TSS and FOG concentrations.



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Success through  
satisfied customers

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### **ADI-AnMBR PROCESS**

The ADI-AnMBR system is a high-rate anaerobic treatment process that uses a submerged membrane for biomass retention and gas-liquid-solids separation. The AnMBR has a small footprint; it is reliable, easy to operate, and can be applied to a variety of high-strength wastewaters, including those with high TSS and FOG concentrations and poor settling properties.

#### **Highest-quality anaerobic effluent**

The submerged membranes in the ADI-AnMBR provide near-absolute separation of solids from the effluent, resulting in the highest-quality-possible anaerobic effluent.

When combined with an aerobic ADI-MBR system, the effluent is able to meet the strictest discharge requirements and is suitable for reuse.

#### **Stable, reliable, easy-to-operate process**

The high biomass concentration maintained by the membranes also provides additional resiliency against shock loads and changing feed characteristics. Based on Kubota's submerged membrane unit, the world's simplest and easiest-to-operate MBR technology, the ADI-AnMBR requires little maintenance and infrequent membrane cleanings. It has a long membrane life.

### **ANAEROBIC EXTERNAL CIRCULATION SLUDGE BED (ECSB)**

The ECSB reactor, developed by HydroThane STP®, is offered under license by ADI Systems Inc. The ADI-ECSB is an ultra-high-rate, two-stage, anaerobic treatment process.

#### **Highly efficient system**

Excellent biomass retention and high organic loading rates (15-30 kg COD/m<sup>3</sup>·d) can be achieved as a result of the two stages of phase (gas-liquid-solids) separation, and external recirculation. Numerous wastewater types can be treated with the ECSB process.

#### **Compact and easy to operate**

The ECSB requires a small footprint and allows for quick installation. It is easy to operate and designed to be low-maintenance.

### **ADI-HYBRID REACTOR**

#### **Space-saving, high-rate reactor**

The proprietary ADI-Hybrid reactor is a high-rate system that combines two anaerobic processes—the UASB (upflow anaerobic sludge blanket) on bottom and UFF (upflow fixed-film) on top—and retains the process advantages of each.

#### **Dense sludge bed is not necessary**

The UFF portion of the ADI-Hybrid can store a large amount of biomass in the form of a biofilm, which circumvents a shortfall of the UASB, namely, the need to generate and maintain dense granular sludge.

#### **Stable and resilient to shocks**

The advantages of combining the UASB and UFF processes are high loading rates (5-10 kg COD/m<sup>3</sup>·d) plus excellent substrate-bios contact. The additional biosolids inventory allowed by the UFF portion increases the reactor's removals, process stability, and ability to handle toxic shocks.

## **ADI SYSTEMS INC.**

ADI Systems is a technology and design-build company that offers a wide range of wastewater treatment systems to customers around the world. We offer bench- and pilot-scale testing, plus custom-designed solutions to provide the best treatment package. In addition to generic technologies, ADI Systems offers both proprietary and patented technologies for anaerobic and aerobic biological waste treatment applications. ADI Systems Inc. provides large treatment systems, as well as modular systems for small plant applications.