

Anaerobic Treatment Systems & Processes

Experience

Capability

Service

Guaranteed System Performance & Reliability!!

Anaerobic Process Benefits

- Less Sludge Production
- Less Land Required
- Lower Energy Cost
- Faster Shock Recovery
- Greater Loading Range
- Less Odor Problems

Do You Need Low Cost Financing to Build Your System?

AquaTec Can Design & Build Your System, and AquaTec Can Finance Your New Plant or the Upgrade Cost.

AquaTec Can Show You Designs That Pay for Themselves.

Call 800-654-1505 Now

Methane Recovery Fixed Cover, Two-Stage System

This Two-Stage system treats high-strength Dairy waste with Anaerobic Methane Recovery, and uses Activated Sludge for the second stage.

It is typical of smaller systems, where space and capital cost must be kept as low as possible. This system is located within a residential housing area, and odor control and noise limits were at the top of the list for design considerations. AquaTec designed and built this system to replace an existing competitor's system that never (ever) worked as it was proposed.



For smaller systems, covered steel or concrete tanks are used instead of lined lagoons as shown in another example. These compact systems can be built with reactor sizes up to 2.0 MG. The system above did not waste any sludge from the process in the first seven (7) years of operation, saving a considerable amount time, hauling cost, and disposal fees.

AquaTec, Inc. specializes in the Engineering Design, Construction and startup of complete treatment plants on a design/build (turnkey) basis for both industrial and municipal wastewater clients worldwide.

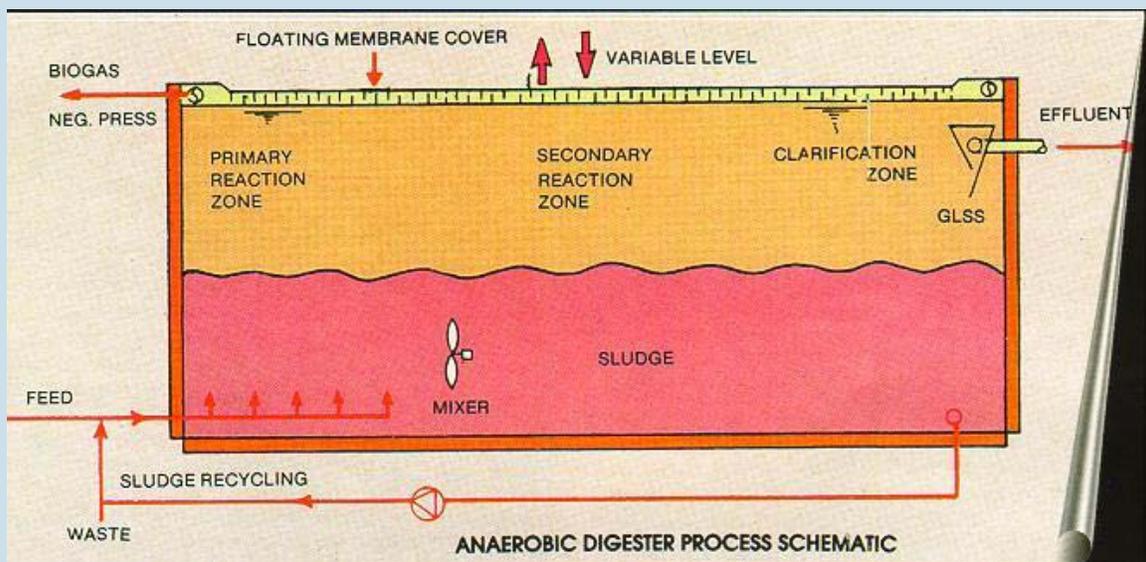
See our Website at www.aquatecinc.com

30-Years of Experience is Ready to go to Work for YOU!

Anaerobic Treatment of High Strength Wastes With Biogas Generation

Anaerobic Treatment –Suspended Growth Systems

In Anaerobic Digesters the methane generating micro-organisms are grown under anaerobic conditions. They reduce BOD and COD levels while simultaneously generating Biogas which can be utilized as an alternative source of energy. These systems offer rapid payback on investment, significantly reduced energy costs and minimal sludge disposal cost.



Vessels can be concrete, steel, or lined earthen basins. Covers on the reactor can be either floating membranes with fixed or variable levels or of fixed steel construction.

Advantages of AquaTec's Anaerobic Treatment Technology

- Better process stability to handle shock loads due to long HRT and SRT and larger Biomass inventory.
- Ability to remain dormant for weeks at a time but ready for quick start-ups.
- Ability to handle high strength wastes with out pre-dilution or equalization.
- No separate clarifier required.
- Very low suspended solids in the effluent.
- Lower sludge disposal costs due to longer storage, greater digestion and reduced waste solids quantity.
- Typically, minimal chemicals or nutrients required.
- Larger and more uniform Biogas production.
- Reduced operating requirements.

Methane Recovery Floating Cover

The Anaerobic Digester's floating cover is made of high performance reinforced Polymeric Alloy. This is totally inert to the corrosive environment of Hydrogen Sulphide contained in Biogas and is designed to have a working life of more than 20 years.

The Anaerobic Digester shown in the installation on the right was installed in 1981.

A negative pressure is maintained under the floating cover by gas blowers. Biogas first passes through a defoamer tank, where it is washed with water and demineralized. Pressurized gas is then sent to the Boiler, emergency flare or engine for power production.

High quality geo-membrane materials and AquaTec's 30 years of experience can help you build a long life, low cost, efficient wastewater treatment facility.



VDAR – Variable Depth Anaerobic Reactor

A batch variation of the suspended growth digester provides sequential aspects of treatment, namely filling, reacting, settling and decanting in a single reactor. No separate clarifier is required, no external solids recycle is involved and short-circuiting is not a problem. Batch feeding results in some important kinetic and performance advantages when compared to other reactor operation.



Different Waste Require Many Types of Designs.....

- Fixed Film Processes
- Suspended Growth Processes
- High-Rate Loadings
- Intermittent Batch Processes
- Pre-Treatment DAF
- Neutralization (pH adj)
- Low Nutrient Discharge
- Tertiary Filtration
- Solids Disposal & Storage
- Surcharge Reduction Plants
- Modular Expandable Plants

And much more, All from YOUR one dependable source, AquaTec.

Anaerobic Treatment - The Hybrid Systems

The Hybrid Anaerobic Reactor

The hybrid reactor is a combination of the UASB (upflow anaerobic sludge bed) and the UFF (upflow fixed film) reactors. This development was an obvious evolution, as it combined the strong process attributes of each technology and minimized the shortcomings.

The lowermost 30 to 50 percent of the reactor volume is the UASB portion where a flocculant and/or granular sludge develops. Most of the organic stabilization (treatment) occurs in this sludge bed.

The uppermost 50 to 70 percent of the reactor is the UFF section. In this section, a plastic media is used which provides an extensive surface area for the fixed-film biomass to develop and grow. This media is also effective at intercepting sludge bed solids and raw influent solids, and promoting their flocculation and return to the sludge bed below. Most fixed-film sloughing is also directed to the sludge bed in a similar fashion so most solids are retained in the reactor.

Advantages of the Hybrid High-Rate System

- **Granular sludge bed is unnecessary**

It is not essential that the reactor develop a dense granular sludge - a flocculant sludge will perform satisfactorily and attain good stability and high loadings; also, it is not essential to seed with an expensive granular sludge at start-up.

- **Provides consistent performance**

The biomass developed in the fixed media section, when added to the sludge bed inventory, permits retention of greater amounts of biomass, thereby allowing higher loadings and more consistent, stable performance. Typical solids concentration in the sludge bed is 5 to 7 percent. The effective biomass concentration in the UFF section is typically 3 percent.

- **Higher SRTs promote higher removals**

The higher solids inventory in the sludge bed and on the media results in longer SRTs (60 to 70 days). Typically, 85% to 90% COD/BOD removal is accomplished at extremely low hydraulic retention times of 12 to 48 hours.

- **Stable and resilient to shock loadings**

A further benefit of longer SRTs is the reactor's ability to handle higher levels of toxic substances, shock loadings, and influent suspended solids.

- **Produces alternative source of energy**

The hybrid system produces biogas high in methane which can be utilized as supplemental fuel for in-plant energy needs or can be directed through dual-fuel generators to produce electricity that typically off-sets the power requirements of the plant.

Loading Rates and Performance

The hybrid reactor is suitable for treating almost any wastewater where the load is primarily in the form of soluble COD. As a rule of thumb, the influent TSS loading should not exceed 10 to 20 percent of the COD load, and the fats, oils and grease concentrations should not exceed 100 to 200 mg/L; these levels are affected by the nature and biodegradability of these solids/substances, and there is no substitute for pilot testing if there are questions regarding impact on the system.

The Process Description

Wastewater typically enters the hybrid through an influent distribution system located at the floor level of the reactor. Recycled effluent is mixed with raw wastewater, to various degrees, as a means of attenuating the variability of the waste, recycling alkalinity, and reducing chemical costs for pH control.

The wastewater and effluent mixture enter the sludge bed where it receives a high degree of stabilization. It is then “polished and clarified” as it passes through the UFF section. The final effluent leaves the reactor through an effluent/level control structure. There are no moving parts inside the reactor. The excess reactor sludge is wasted on a regular basis through a simple header-lateral system located on the bottom of the reactor.

The Exterior Fully Packed Solids Clarifier (FPSC)

This design uses a separate vessel(s) with plastic media external to and following the main upflow sludge blanket reactor. The FPSC insures quiescent conditions for maximum biomass capture (lower Reynolds’s number and less eddy currents from minor gas evolution). Advantages of this configuration are:

1. Plug flow performance for greater organic removal.
2. The entire gas production does not pass through the media.
3. Biomass capture is removed from the scum formation zone located at the top of the main reactor.
4. Removal of biomass from the media can be accomplished in-situ without disturbing the main reactor or stopping the process.

The Two-Stage Hybrid

For cases requiring very high removals, a two-stage hybrid system is recommended. This system consists of two equally sized hybrid reactors that operate in series and alternate lead and lag positions. The two-stage cyclic process can achieve a higher effluent quality by minimizing biomass net yield due to increased endogenous decay compared to a single-stage system and, normally, with a smaller reactive volume; this compensates, to a degree, for the added expense of two stages.

A Typical Anaerobic Hybrid Plant, as shown in this installation, can be located in a “space limited” situation. Tanks can be in ground, partially in ground, or above ground. AquaTec, Inc. can design a system to meet your needs.



AquaTec is Committed to Your Satisfaction...

Experience...

AquaTec, Inc. Since 1974, is an innovative and successful company specializing in developing energy efficient aerobic and anaerobic treatment systems. Our experience increases satisfaction for our customers.

Capability...

AquaTec is backed by a professional management staff which includes engineers, technicians, manufacturers and specialty contractors. We can assist you with selection of process, system design, equipment or even turnkey design construction if you desire.

Service...

AquaTec not only offers equipment and related applications technologies, but we can assist you with proper design and operation of your facility as well. Helping you perform effectively and efficiently is our objective.

Availability...

For information call (815) 654-1500, write AquaTec, Inc., 1235 Shappert Dr., Rockford Illinois, 61115; or, contact the representative below:

A Partial List of Clients Served By AquaTec:

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