BASWOOD

Baswood BioVore™

Advanced Technology for Municipal Wastewater and Biosolids Management

About Baswood

Baswood delivers innovative, technology-based solutions that provide effective wastewater treatment and biosolids management for a wide range of municipal applications. Baswood offers biological systems using patented technologies that provide a unique combination of increased solids retention and decreased hydraulic retention in a small footprint, resulting in efficient removal of organic contaminants, while minimizing biosolids production.

BioVore™ Advantages

The Baswood BioVore™ provides cost effective, reliable municipal wastewater treatment and biosolids/sludge management within a stable, fixed film biological system. Advantages of the Baswood municipal wastewater solution include the following:

- Low life-cycle costs providing a rapid return on investment
- Sequential, fixed media biotechnology provides highly efficient BOD digestion and improved effluent quality
- Patented Aerobic/Anaerobic Integrated Media System (AIMS) integrated media maintains high food to mass (F/M) ratio, resulting in a robust biomass in a system that can handle fluctuating organic loads
- Superior biosolids digestion consistently reduces sludge handling and disposal requirements
- Patented Dry Cycle Aerobic/Anaerobic Digestion (DCAD™) process manages the biomass character in the reactors
- Unique vertical configuration of treatment zones allows for system to be constructed with a reduced footprint
- No internal moving parts within the reactors reduces equipment maintenance costs and potential for equipment failure

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Baswood Innovation

Baswood's AIMS™ is a patented hybrid process incorporating aerobic and anoxic (oxygen depleted) environments that maximize biological treatment efficiency and provide optimal BOD digestion and biosolids reduction. Waste is fed sequentially through a series of mixed environment biological fixed film reactors. Within each reactor are three treatment zones that provide sequential biological treatment, resulting in accelerated BOD digestion, as well as biological nutrient removal.

The most significant innovation of AIMS technology is Baswood's proprietary DCAD™ process. During the DCAD™ process, one of the reaction vessels is taken off line for the purpose of 'pruning' the biomass. Removing the food source and altering the environment in the vessel stresses the ecosystem, causing the healthy bacteria to feed upon weaker/older bacteria, as well as retained residual biosolids. In addition to increasing the digestion capacity of the system, the pruning action of the DCAD™ process manages the hydraulic flow characteristics through the biomass-laden media. The reactor vessels are cycled through the DCAD™ process without taking the system offline, one of the reactor vessels may be in the DCAD™ process at any time.

Baswood's systems achieve treatment goals with a reduced hydraulic retention and increased solids retention. These factors, along with the efficiency of our DCAD™ technology, result in a smaller physical footprint, reduced volume requirement, and effective sludge reduction. Baswood's systems also require significantly less operational horsepower compared to other similar sized aerobic technologies.

Operational Simplicity

The following features minimize operational oversight and system maintenance requirements:

- No internal moving parts
- Internal self-buffering reduces chemical use
- Use of commercial off the shelf (COTS) components reduces costs and facilitates simplified maintenance
- Proprietary Supervisory Control and Data Acquisition (SCADA) with remote monitoring capability

The BioVore™ Process

The Baswood BioVore™ process provides for enhanced digestion of BOD and superior biosolids reduction with minimal operator oversight and low maintenance costs. The system is comprised of four reactors, each with three distinct treatment zones in a unique, vertical alignment that provides a relatively small footprint.

The verticality of the system takes advantage of air's natural tendency to rise through liquids. Air is supplied to the biomass to meet its respiratory needs, rather than as the medium to maintain the mass or the media in suspension As a result, the Baswood system uses a fraction of the energy required by competing technologies to maintain an aerobic environment.

As wastewater passes between three distinct treatment zones in each of four reactors, it is treated a total of 12 times during an 8-hour period. This repetitive exposure to different environments results in accelerated BOD digestion, as well as biological nutrient removal.

At the top of the reactor, wastewater is distributed across the surface and travels downward through the following treatment zones:

Zone 1: Trickling Filter

Aerobic treatment using passive aeration, providing BOD reduction and denitrification

Zone 2: Facultative Zone

Anoxic treatment layer at the interface between the Trickling Filter and Submerged Zone, providing additional denitrification and overcoming the uncontrolled sloughing of the trickling filter

Zone 3: Submerged Zone

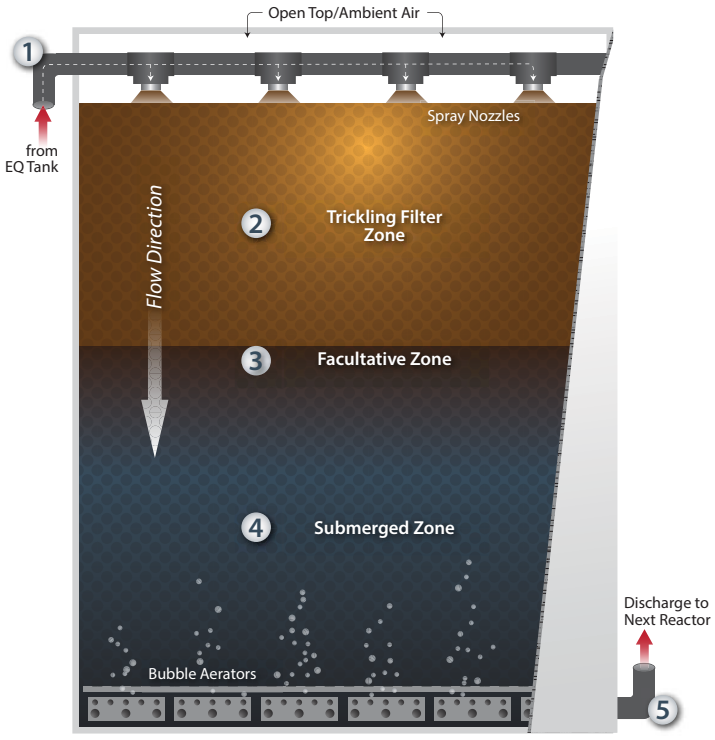
Submerged attached growth to the fixed media increases solids retention time (SRT) and provides a platform for aerobic treatment below the reactor's water line where aggressive BOD reduction occurs

Wastewater is piped from the base of the one reactor to the top of the next reactor, where the treatment process is repeated in sequence. The same treatment process is used as the water flows through each of the four reactors, then it is sent to a clarifier prior to discharge or tertiary treatment.

The Baswood BioVore™ produces an effluent that meets the requirements for discharge and reuse, while producing less residuals solids that meet Class B Criteria. The BioVore™ can be combined with proven technologies from existing partners for tertiary treatment if needed.

Baswood BioVore™ Process Utilizing Patented AIMS™ Technology

1. Wastewater enters the BioVore™ through a series of nozzles that distributes flow evenly across the top of the reactor. Wastewater flows by gravity through a series of three treatment zones.
2. Zone 1, Trickling Filter: Water cascades over biofilm-coated media using passive aeration, enhancing BOD reduction and denitrification.
3. Zone 2, Facultative Zone: As solids are sloughed off from the Trickling Filter, they collect at the interface with the Submerged Zone providing additional denitrification
4. Zone 3, Submerged Zone: The solids enter the submerged zone and the naturally occurring hydrophilic bacteria attach to the fixed media, extending the solids retention time (SRT). Respiratory oxygen is supplied to the reactor though an aeration system creating a robust treatment environment below the water line in each reactor.
5. Treated wastewater is piped out from the base of the reactor and into the next reactor in the series, where the three zone treatment process is repeated. A series of four reactors make up the BioVore™ system.



Energy Efficiency

The characteristics of the BioVore™ system that contribute to energy efficiency, as compared to other wastewater treatment systems, include:

- Efficient aeration process uses less energy than traditional aerobic systems
- As a fixed media system, no energy is required to keep either the solids or media in suspension

Efficiency comparison of Baswood BioVore™ to other technologies

Technology	Kw/Hr Annual	Baswood Benchmark	Water Reuse Opportunities
Packaged Plant High Rate Aerobic	38,108	-114%	Sometimes
MBR	20,835	-71%	Always
Activated Sludge	17,422	-43%	Rarely
MBBR	15,717	-29%	Rarely
Baswood BioVore™	**12,184**		**Always**

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