Typical Applications

Biological Nutrient Removal
- 1.65 MGD Avg. Daily Flow
- Replaced flow-through activated sludge system for enhanced biological nutrient removal (EBNR) to meet Chesapeake Bay Initiative.

Phosphorus Removal
- 0.8 MGD Avg. Daily Flow
- Dual basin system. Utilizes process control via IntelliPro® system.

Nitrification
- 0.075 MGD Avg. Daily Flow
- Treating high strength dairy waste since 1991.

Reuse
- 2.0 MGD Avg. Daily Flow
- 3-basin system followed by (2) AquaDisk® cloth media filters produces reuse quality water.

Industrial Pretreatment
- 2.7 MGD Avg. Daily Flow
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Retrofit
- 0.88 MGD Avg. Daily Flow
- Dual basin retrofit uses existing oxidation ditch to provide treatment flexibility and power savings.

Providing TOTAL Water Management Solutions

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Aeration & Mixing

Biological Processes

Oxidation & Disinfection

Membranes

Controls & Monitoring Systems

Aftermarket Products and Services
**AquaSBR® Sequencing Batch Reactor**

For over 35 years, Aqua-Aerobic Systems has led the industry in sequencing batch reactor technology with performance proven and cost effective systems capable of effectively removing nutrients and reducing phosphorus with the flexibility of process control that adapts to changing demands.

The AquaSBR® sequencing batch reactor provides true batch technology with all phases of treatment accomplished in a single reactor. All components are easily accessible and the advanced decant system ensures optimum quality effluent withdrawal. Treatment can be optimized with the IntelliPro® process monitoring and control system to further reduce operation and maintenance, energy costs and improve performance.

**System Features and Advantages**

- Independent aeration and mixing with the AquaMixAir® system provides process advantages and lower energy consumption.
- A single-reactor system utilizes Mix-Fill, React, Fill, React, Settle and Decant phases within a single reactor.
- No secondary clarifiers or return activated sludge (RAS) lines.
- All components of the AquaSBR system are retrainable and easily accessible.
- Hydraulic fluctuations are easily managed through the flexibility of a time-managed process operating strategy.

**Aqua MixAir® System**

The AquaSBR sequencing batch reactor utilizes the Aqua MixAir® system by providing separate mixing with the AquaDDM® direct-drive mixer and an aeration source such as the Aqua-Jet® surface drive mixer. This system has the capability to independently operate the aeration and mixing to promote aerobic/anoxic and anaerobic environments with low energy consumption. In addition, the Aqua MixAir system can achieve and recover alkalinity through denitrification, prevent nitrogen consumption. In addition, the Aqua MixAir system can achieve and recover alkalinity through denitrification, prevent nitrogen consumption, and recover alkalinity through denitrification.

**Advanced Decanter**

The Aqua-Aerobic floating decanter follows the liquid level, maximizing the distance between the effluent withdrawal and sludge blanket. It is an integral component to the AquaSBR system and provides reliable, dual barrier subsurface withdrawal with low entrance velocities to ensure surface materials will not be drawn into the treated effluent. The decanter is easily accessible from the sides of the basin and requires minimal maintenance.

**IntelliPro® Process Monitoring and Control System**

The IntelliPro system is a personal computer (PC) based platform that interfaces with the AquaSBR® system’s programmable logic controller (PLC) via a network connection to assist operators in optimizing the treatment process of the plant and further reducing operating costs.

**System Advantages**

- **Realtime, online monitoring and control**
  - "Active Control Mode" which automatically receives, interprets and proactively adjusts in-kase instruments and process variables including biological nutrient removal, chemical alkalinity and energy.
  - Reduces the operator’s sampling time.
  - Realtime and historical graphical trending of process parameters.
- **BioAlert™ process notification** provides corrective action to eliminate operational interruptions and upsets.
- **Reduces** the risk of downtime.
- **Remote troubleshooting** provides on-demand troubleshooting assistance.

**AquaSBR® Phases of Operation**

The AquaSBR sequencing batch reactor system features time-managed operation and control of aerobic, anaerobic and anoxic processes within each reactor including equalization and clarification. The AquaSBR system utilizes five basic phases of operation to meet advanced wastewater treatment objectives. The duration of any particular phase may be based upon specific wastewater characteristics and/or effluent objectives.

1. **Mix-Fill**
   - **Influent flow enters the reactor**
   - **Mixing and aeration continue in the absence of influent flow**
   - **Stabilize/anoxic oxygen demand (BOD/COD) and ammonia nitrogen (NH3) are reduced under anoxic conditions**
   - **Anaerobic period during Mix-Fill phase to achieve low X is reduced under anoxic conditions**

2. **React**
   - **Influent flow continues under mixed and aerated conditions**
   - **Intermittent aeration may promote aerobic or anoxic conditions**
   - **Biological/thermal oxygen demand (BOD/COD) and ammonia nitrogen (NH3) are reduced under anoxic conditions**
   - **Luxury uptake of phosphorus is produced under anoxic conditions**

3. **Settle**
   - **Influent flow does not enter the reactor**
   - **Mixing and aeration are terminated**
   - **Ideal solids/liquid separation is achieved due to perfectly decantable volume is removed by subsurface withdrawal**
   - **Floating decanter follows the liquid level, maximizing distance between the withdrawal point and the sludge blanket**
   - **Small amount of sludge is wasted near the end of each cycle**

4. **Decant/Sludge Waste**
   - **Influent flow continues under mixed and aerated conditions**
   - **Decantable volume is removed by subsurface withdrawal**
   - **Floating decanter follows the liquid level, maximizing distance between the withdrawal point and the sludge blanket**
   - **Small amount of sludge is wasted near the end of each cycle**
AquaSBR® Sequencing Batch Reactor

For over 35 years, Aqua-Aerobic Systems has led the industry in sequencing batch reactor technology with performance proven and cost effective treatment systems capable of effectively removing nutrients and reducing phosphorus with the flexibility of process control that adapts to changing demands.

The AquaSBR sequencing batch reactor provides true batch technology with all phases of treatment accomplished in a single reactor. All components are easily accessible and the advanced decant system promotes optimum quality effluent withdrawal. Treatment can be optimized with the IntelliPro® process monitoring and control system to further reduce operation and maintenance energy costs and improve performance.

System Features and Advantages

- Independent aeration and mixing with the Aqua MixAir® system provides process advantages and lower energy consumption
- A true batch system utilizes Mix-Fill, React-Fill, React, Settle and Decant phases within a single reactor
- The Mix-Fill phase is essential for effective phosphorus removal
- All components of the AquaSBR system are retrievalable and easily accessible

Aqua MixAir® System

The AquaSBR sequencing batch reactor utilizes the Aqua MixAir® system for separating mixing with the AquaSBR® clarifier and an aerator source such as the Aqua-Aerobic diffuse aerator. This system has the capability to cyclically operate the aeration and mixing to promote aerobic/anaerobic and anoxic/aerobic environments with low energy consumption. In addition, the Aqua MixAir® system can achieve and recover a consistency through de-aeration, prevent nitrogen gas disruption in the aeration phase, promote biological phosphorus removal, and control certain forms of filamentous bacteria.

Advanced Decanter

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1. **Mix-Fill**
   - Influent flow enters the reactor
   - Mixing is initiated with the AquaDWM mixer to achieve complete mixing of the reactor contents in the absence of aeration
   - Anaerobic conditions are created which facilitate removal of any residual endogenous O2 following process initialization
   - In systems requiring phosphorus removal, the Mix-Fill phase is extended to create anoxic conditions where phosphorus accumulating organisms (PAO) release phosphorus they have stored under anaerobic conditions
   - Anaerobic conditions exist in the control of same types of filamentous organisms

2. **React-Fill**
   - Influent flow continues under mixed and anaerobic conditions
   - Intermittent aeration may promote aerobic or anaerobic conditions
   - Biological/thermal oxygen demand (BOD/OD) and ammonia nitrogen (NH3) are reduced under anaerobic conditions
   - Luxury uptake of phosphorus is produced under anaerobic conditions

3. **React**
   - Influent flow does not enter the reactor
   - Mixing and aeration are terminated
   - Ideal solids/flocculation separation is achieved due to partially quiescent conditions
   - Adjustable time values allow settling time to match prevailing process conditions

4. **Settle**
   - Influent flow does not enter the reactor
   - Mixing and aeration remain off
   - Decantable volume is removed by subsurface withdrawal
   - Floating decanter follows the liquid level, maximizing distance between the withdrawl port and the sludge blanket
   - Small amount of sludge is wasted near the end of each cycle

AquaSBR System Advantages

- Remote, online monitoring and control
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**Sequencing Batch Reactor**

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