



# Sequencing Batch Reactor (SBR)



Single Basin Complete  
Biological Treatment and  
Sedimentation Process



Cleaner Water for a Brighter Future®



# Sequencing Batch Reactor (SBR)

## Superior Process Enables Superior Results

Lakeside Equipment Corporation offers a unique selection of Sequencing Batch Reactor processes. Lakeside can provide a true batch process [Sequencing Batch Reactor (SBR)] as well as a continuous feed process [Continuous Sequencing Batch Reactor (CSBR)]. The SBR systems provide flexible options for meeting general treatment requirements as well as nutrient removal requirements for nitrogen and phosphorus. These fully automated systems successfully provide treatment from the introduction of raw influent to fully treated effluent in a single basin.

### Major Advantages of the Lakeside SBR Treatment Systems

- High level treatment capability including nutrient removal (Nitrogen and Phosphorus)
- Eliminates external clarifiers and RAS pumping
- Reduced footprint required for treatment plant
- Provides hydraulic flow and organic loading equalization
- Modular system design accommodates future expansion
- Integrated control and instrumentation system for process optimization

*SBR*



*Mixer and Decanter*



## Easy and Flexible SBR Treatment

The Lakeside SBR is a true batch system best suited for installation in concrete or field erected steel tankage. The SBR incorporates diffused aeration and blower packages for supplying the required oxygen for the aerobic biology. Floating or submersible mixers are used to provide mixing during the unaerated cycles. Decanters are available as mechanical or floating designs. The Lakeside SBR offers flexible equipment options to best fit the applications requirements.



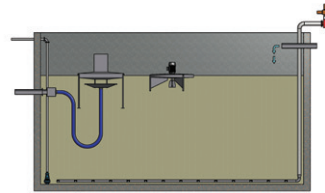
# Sequencing Batch Reactor (SBR) Operation

## Lakeside SBR Phases of Operation

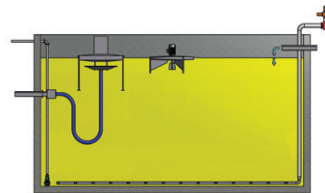
**MIX-FILL:** At the start of the mix fill phase the influent valve will open and the mixer(s) shall turn on. The aeration system will not be running. This will allow for phosphorous release and helps with filament control.

**REACT FILL:** When the react fill phase is in operation, the aeration system will cycle on and off depending on the effluent requirement. The mixers will still be running and the influent valve is still open. During this phase the BOD, COD, and Nitrogen are treated. The phosphorous uptake will occur during this phase as well.

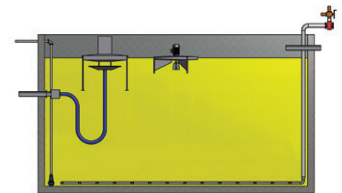
**REACT:** Raw wastewater flow is stopped from entering the basin. Aeration and mixing are controlled to provide final treatment.



MIX-FILL



REACT-FILL



REACT

*Aeration*

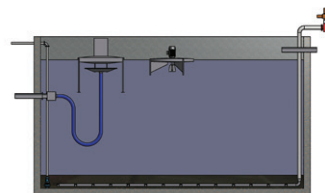


*Headworks and SBR*

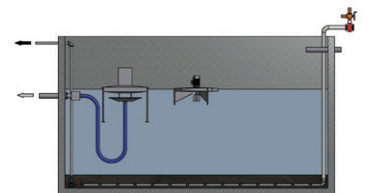


**SETTLE:** Aeration and mixing are stopped to allow separation of liquid and solids.

**DECANT AND SLUDGE WASTING:** Clear effluent is removed from the surface by the decanter. Near the end of decanting cycle, a set amount of settled sludge is wasted from the system.



SETTLE



DECANT AND  
SLUDGE WASTING

# Continuous Sequencing Batch Reactor (CSBR) Components

The Lakeside CSBR process modifies and enhances the superior technology of the conventional SBR. The CSBR system allows continuous uninterrupted inflow of wastewater into the basin during the treatment cycles including settling and decanting.

## Configuration and Equipment

The CSBR basin is divided by a baffle wall into two zones designated as the pre-react zone in the front followed by the main react zone. The influent flows continuously into the pre-react zone (roughly 12 to 15% of the total basin volume) and is directed through the engineered orifice openings of the baffle wall into the main react zone. The baffle wall prevents short circuiting of the incoming flow while equally distributing the flow.

CSBR systems can be supplied in pre-engineered steel tankage for small systems or installed in field erected steel tankage as well as concrete basins.

Blowers are provided to supply aeration through either coarse, medium, or fine bubble diffusers depending on the application. Submersible mixers are provided to supply mixing in the react zone for nutrient removal or for supplemental mixing. Submersible waste sludge pumps are also provided for controlling solids inventory.

*Decanter Drive Assembly*



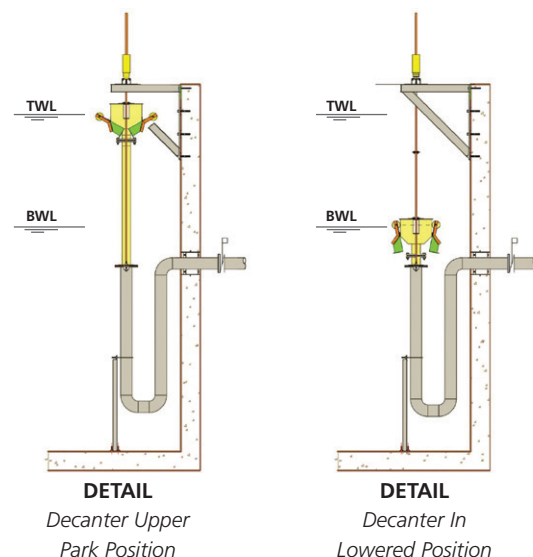
*Blower Packages*



## Decanter

Lakeside's decanter is mechanically driven and can be programmed to stop at any point in its downward travel if it encounters unexpected blanket levels. The rate of travel can also be varied by the operator to compensate for storm cycles.

The decanter's special float-drive scum blanket exclusion system of lower flaps pushes floating material away from the decanter overflow to virtually eliminate unwanted material from entering the decanted effluent. Electrical maintenance on the decanter drive mechanism is performed from the top of the plant eliminating the need to enter the tank for drive maintenance or adjustment.



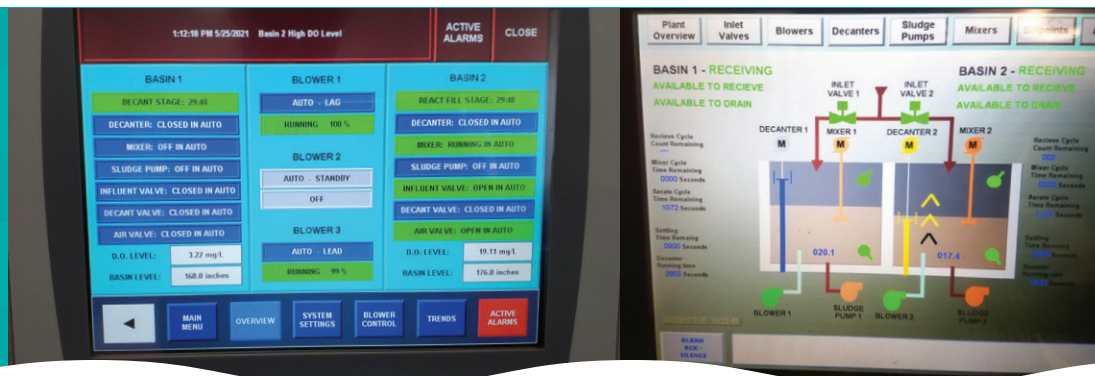
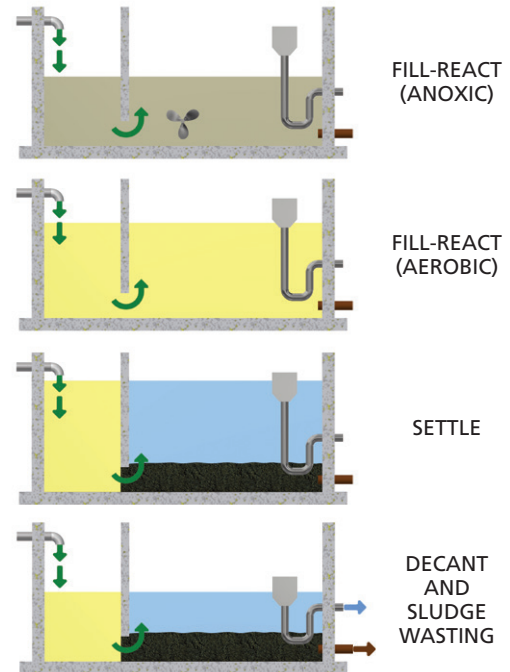
# Continuous Sequencing Batch Reactor (CSBR)

## Lakeside CSBR Phases of Operation

**FILL-REACT:** Aeration is added as the basin is continuously fed with raw wastewater to create aerobic conditions for BOD and  $\text{NH}_3\text{-N}$  removal. This phase can alternate between aerobic and anoxic conditions for nutrient removal. Submersible mixers are supplied to provide mixing of the basin during the anoxic cycle.

**SETTLE:** Aeration and mixing are stopped to allow separation of liquid and solids. Raw wastewater is continuously fed to the pre-react zone during this phase. The baffle wall prevents short circuiting.

**DECANT AND SLUDGE WASTING:** Clear effluent is removed from the surface by the decanter. Raw wastewater is continuously fed to the pre-react zone during this phase. A set amount of settled sludge is wasted from the system during this phase.



Graphic Display and Parameter Setpoints

## Control and Instrumentation

PLC based control and instrumentation packages are available for fully automated process functions and system monitoring. Instrumentation would include level devices along with D.O. and ORP for process monitoring and feedback for aeration adjustment. The timer and level based system parameters for cycle times and sludge wasting can easily be adjusted through an HMI or PC along with system status and alarm functions. Control systems can be provided to easily interface with plant SCADA systems via Ethernet communication. VFD and motor starter packages are also available to complete full system responsibility.



Programmable Logic Controller (PLC)  
Based System

# Treatment equipment and process solutions from Lakeside Equipment Corporation

Lakeside offers a wide range of equipment and systems for virtually all stages of wastewater treatment from influent through final discharge. Each process and equipment item that we supply is manufactured with one goal: to reliably improve the quality of our water resources in the most cost-effective way. We have been doing just that since 1928.

## **Screw Pumps**

- Open Screw Pumps
- Enclosed Screw Pumps

## **Raptor® Screening**

- Fine Screen
- Micro Strainer
- Rotating Drum Screen
- Septage Acceptance Plant
- Septage Complete Plant
- Complete Plant
- Multi-Rake Bar Screen
- FalconRake® Bar Screen
- Rotary Strainer Screen
- Wash Press

## **Trash and Screen Rakes**

- Hydronic T Series
- Hydronic K Series
- Hydronic Multifunctional Series
- Hydronic H Series
- Catronic Series
- Monorail Series
- HY-TEC Screen
- CO-TEC Screen
- RO-TEC Screen

## **Grit Collection**

- SpiraGrit® Vortex Grit Removal System
- Aeroductor Grit Removal System
- In-Line Grit Collector
- Raptor® Grit Washer
- Grit Classifier
- H-PAC®

## **Clarification**

- Spiraflo Clarifier
- Spiravac Clarifier
- Full Surface Skimming

## **Biological Treatment**

- CLR Process
- Magna Rotor Aerators & Accessories
- Sequencing Batch Reactors
- Continuous Flow Sequencing Batch Reactors
- Package Treatment Plants
- Submersible Mixers & Recirculation Pumps

## **Hauled Waste Receiving Systems**

- Raptor® Septage Acceptance Plant
- Raptor® Septage Complete Plant
- Raptor® FOG Acceptance Plant

## **Package Headworks Systems**

- Raptor® Complete Plant
- H-PAC®

## **Biological Treatment Systems**

- CLR Process
- E.A. Aerotor Plant
- Sequencing Batch Reactors
- Continuous Flow Sequencing Batch Reactors
- SharpBNR™ Process Control



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