

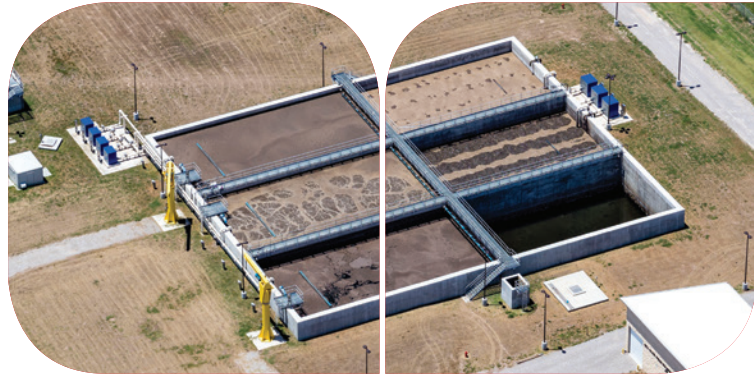


EcoCycle **SBR**TM

Sequencing Batch Reactor



The EcoCycle SBR™ from Parkson is an activated sludge secondary treatment process that operates in a batch treatment mode. All treatment steps occur within the same reactor, eliminating the need for separate clarifiers and associated yard piping. The batch process inherently creates the environments necessary for oxidation of organic material, solids separation and biological nutrient removal.



EcoCycle SBR™ Applications

Municipal Treatment

- BOD and TSS <10 mg/l
- Ammonia <1.0 mg/l
- Total nitrogen <3.0 mg/l
- Phosphorous <1.0 mg/l

*Lower limits achieved with filtration.

Industrial Pre-Treatment or Direct Discharge

- Food and beverage
- Landfill leachate
- Refinery and chemical processing
- Pulp and paper
- Manufacturing



SBR Advantages

- Deep tanks and internal clarification reduce overall footprint and yard piping
- Cyclic operation inherently provides anaerobic, anoxic and aerobic conditions for enhanced nutrient removal
- Flexibility of time based control
- Fits within any tank geometry
- Easily expandable
- Energy efficiency of batch processing

What Parkson Offers

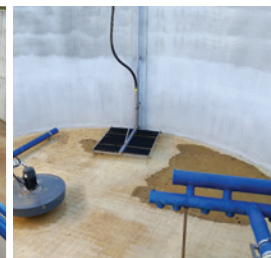
- Choices of aeration type
 - » VariOx™ jet aeration
 - » RetrieVOx™ retrievable diffusers
 - » Fixed diffusers (fine and coarse bubble)
- Decanter with no in-basin motors or drives
- Dynamic control that preserves aeration and settle steps better than systems with pre-programmed storm modes
- Choice of batch fill or continuous fill operation

Aeration System Options

Parkson offers a number of aeration system options. The VariOx™ jet aeration system is a combination aeration and mixing device. Air can be varied or turned off and the jet motive pump will continue to maintain a complete mix condition in the reactor. The jet aeration components are manufactured utilizing FRP with stainless steel supports so maintenance is minimal and operating life is >25 years without loss of aeration efficiency through the jets. Submersible or dry pit jet pumps can be utilized. Parkson also offers fine bubble aeration systems which can be either fixed or retrievable. The RetrieVOx™ system allows the operator to access the fine bubble diffusers for cleaning or replacement without taking the reactor out of service. Coarse bubble aeration is also available and can be ideal for smaller facilities where low maintenance and low capital cost are a priority. Floating or submersible mixers can be utilized with the diffusers for nitrogen and phosphorous removal applications.



VariOx™
Jet Aeration

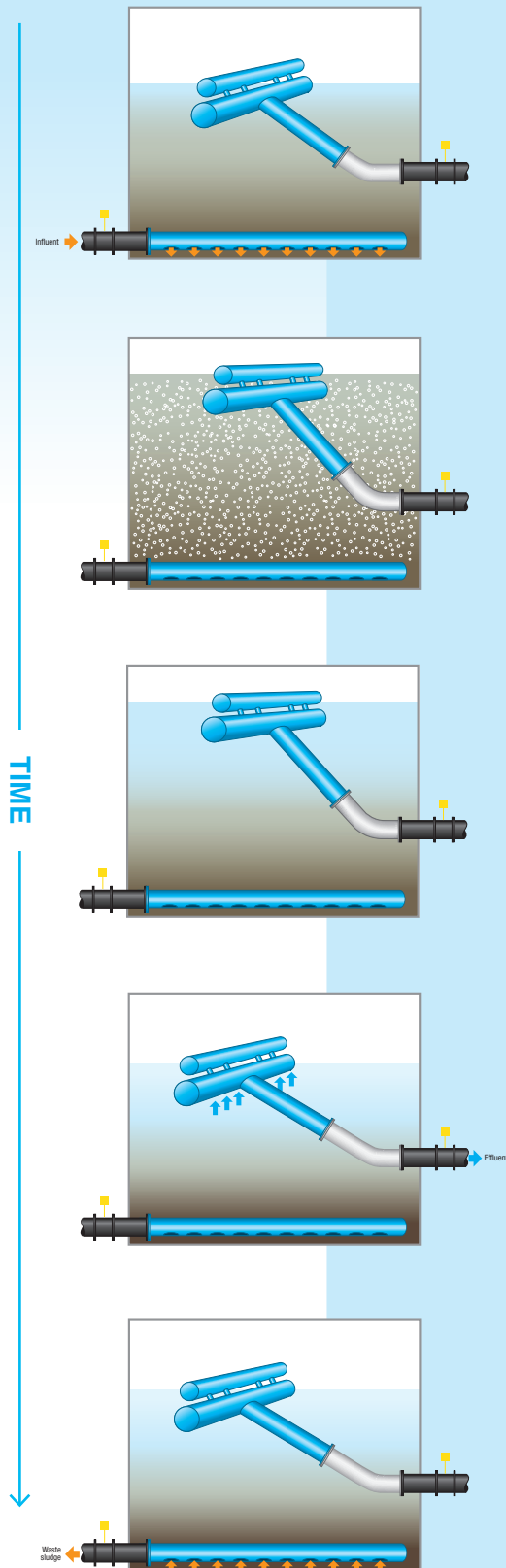


RetrieVOx™
Fine Bubble Aeration



Fixed Diffused
Aeration

The EcoCycle SBR™ Sequence of Operation



Anoxic Fill

- Influent enters the SBR basin
- No aeration occurs, creating anoxic conditions which promote the growth of well settling bacteria
- Residual nitrate is removed
- Phosphorous Accumulating Organisms (PAOs) release stored phosphorous

React

- Flow is diverted to another SBR basin
- Aeration is turned on
- High oxygen uptake rate during early part of react creates aerated anoxic condition, promoting simultaneous nitrification and denitrification
- Degradation of organic matter occurs
- Ammonia is converted to nitrate
- Aeration can be cycled on and off to drive denitrification process
- Luxury uptake of phosphorous occurs

Settle

- No influent enters the basin
- Aeration and mixing are turned off to create perfect quiescent conditions
- Entire reactor becomes a clarifier allowing solids to settle to the lower portions of the reactor

Decant

- Effluent valve is opened
- Aeration and mixing remain off
- Treated effluent is withdrawn from the upper portion of the reactor
- Floating decanter design maximizes distance between withdrawal point and settling sludge blanket

Idle

- Reactor waits for start of next cycle
- Sludge is wasted from the reactor to maintain desired microbe population



DynaCanter™ Floating Decanter

The Parkson DynaCanter™ floating solids excluding decanter was designed to provide reliable operation without utilizing electromechanical components inside the basin. The decanter utilizes a series of solids excluding check valves that withdrawal effluent from below the surface to preclude floating material from entering the unit. A standard valve is provided in the effluent piping to control decanter operation. When the valve is open, hydraulic force opens the check valves to allow treated effluent to enter the decanter. The floating design maximizes the distance between the decanter intake ports and the settling sludge blanket.



DynaPhase Controls™

The Parkson DynaPhase Controls™ use constant level measurement analysis to determine rate of influent flows and adjust treatment steps accordingly. During high flow events, this unique feature allows the system to dynamically adjust treatment steps based on actual flow rather than toggling between a normal mode and a storm mode. This maintains integrity of aeration, settle and decant steps while addressing the higher hydraulic flow through the SBR. The DynaPhase Controls™ also include a first response feature in which the control system will automatically take a tank offline in the event of a primary equipment failure. Dissolved oxygen control is a standard feature which optimizes power consumption as load conditions vary throughout each day. Blower operation is controlled by high and low D.O. setpoints so that D.O. levels are maintained within a specified band during the aeration steps. Other instrumentation packages can be incorporated for monitoring and / or control. PC based SCADA systems are also available, which incorporate graphic screens showing treatment steps, setpoints, equipment run times, alarms, and trending. Remote monitoring is also available.



Years of Experience

With over 100 years of combined experience, the SBR team at Parkson is an ideal partner with a strong focus on providing reliable and responsive support throughout the project design, execution and startup phases. Parkson Corporation - a recognized worldwide leader in the wastewater industry for over 55 years and with historical and successful projects in municipal and industrial applications - is dedicated to the development, design, installation, service and management of a wide array of innovative biological solutions.



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