



## ADI-SBR (SEQUENCING BATCH REACTOR)

SBR technology offers several advantages over other activated sludge systems such as:

- **Lower capital and operating costs**  
Comparative cost analyses have shown that SBR costs are typically lower than conventional activated sludge treatment processes.
- **Greater ability to meet effluent limitations (organic and nutrient)**  
The SBR utilizes batch kinetics: process reactions approach completion under high concentration gradients with no short-circuiting.
- **Better resistance to sludge bulking**  
Cyclic feast-famine conditions have proven to produce a better-settling sludge than continuous-flow conditions.
- **No need for external clarifiers**  
Solids separation and clarification occur in the same vessel as other treatment operations.
- **Easily adaptable to nutrient removal**  
All necessary treatment operations can be imposed without requiring multiple vessels.
- **Greater system flexibility and control**  
The cycle format can be easily modified at any time to offset changes in process conditions, influent characteristics, or effluent objectives.
- **Less land required and less processing equipment maintained**  
One vessel is used for all process operations.

## Advantages of an ADI-SBR

- Optional scope of supply (supply, supply-install, or design-build).
- Proven solids-excluding, scum-excluding, low-maintenance decanter.
- Intuitive, flexible operator interface.
- Process expertise and operations assistance.

ADI Systems has completed SBR research and development on nutrient removal from high-strength industrial wastewaters containing significant concentrations of nitrogen and phosphorus. ADI-SBR technology has been proven on wastewaters from various industries including:

- Pharmaceutical
- Pulp and paper
- Corn wet-milling
- Dairy processing
- Chemical
- Food processing
- Meat processing
- Yeast
- Potato processing
- Fish processing
- Baking

The ADI-SBR is an ideal secondary process to follow the patented\* ADI-BVF® low-rate anaerobic digester. When both the ADI-BVF digester and ADI-SBR are used, the digester converts organic matter in the wastewater into useful biogas and acts as an effective equalization basin.

The ADI-SBR polishes the anaerobic effluent and can also provide nutrient removal. Waste aerobic sludge produced in the SBR is returned to the BVF® reactor for digestion.

## ADI services include:

- Ongoing support from SBR specialists.
- Laboratory, bench, and pilot-scale studies.
- Process guarantees.
- Proprietary Model ASD decanter system.
- PLC programming and proprietary software, providing easy interfacing and control of the SBR process.
- Direct communication link from the process monitoring PC to ADI for quick data exchange.
- Complete aftercare service.

## OUR MISSION:

Success through  
satisfied customers

[www.adisystemsinc.com](http://www.adisystemsinc.com)

\* US Patent Nos. 5,505,848; 5,587,080; Canada Patent Nos. 1253266; 2,096,852; Mexico Patent No. 190898; Australia Patent No. 667,184



## THE SBR PROCESS

### What is an SBR?

A sequencing batch reactor (SBR) is an activated sludge type wastewater treatment system that can carry out various treatment operations in one vessel. This is in contrast to conventional wastewater treatment where wastewater flows from one vessel to another, and each vessel performs a specific treatment operation.

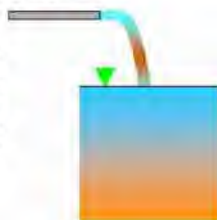
The SBR removes organic material and suspended solids, like most conventional activated sludge systems, plus it can also be used to biologically remove nutrients – nitrogen and phosphorus.

### How does an SBR work?

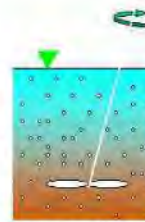
Different environments are created in the SBR by controlling process equipment such as aerators, mixers, pumps, and decanters during a cycle. By linking a programmable logic controller (PLC), the process is easily monitored and controlled on-site by plant personnel. The timing and sequencing of events in an SBR cycle depend on the influent wastewater characteristics and the treatment objectives.

There are typically four cycle events:

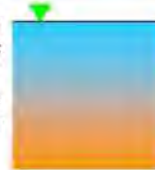
1) **Fill:** The influent wastewater is distributed into the sludge blanket. The Fill event can take place under mixed or unmixed conditions and aerated or unaerated conditions.



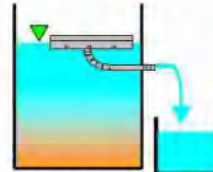
2) **React:** The React events include mixing and aeration. Aerated conditions serve to oxidize organic carbon, nitrify ammonia, and promote uptake of phosphorus in the sludge. Unaerated conditions promote denitrification and phosphorus removal.



3) **Settle:** The Settle event is when all mixing and aeration is turned off and the mixed liquor solids settle, allowing a clear supernatant to form in the upper part of the tank.



4) **Decant:** The Decant event occurs after a substantial depth of supernatant has formed. Automatic valves open, and supernatant is drawn off the upper portion of the tank. Sludge wasting can occur during this time, because the settled sludge bed will have attained a maximum concentration of solids.



The possible variations and combinations of events within the single tank allow for the removal of organic carbon, suspended solids, ammonia, total nitrogen, and total phosphorus.

The most important and fundamental advantage of the system is **flexibility**. The process events are separated by time, rather than space. In minutes, an operator can effectively add, lengthen, shorten, or alter the sequence of different cycle events to achieve a desired process modification.



## ADI SYSTEMS INC.

ADI Systems is a technology and design-build company that offers a wide range of wastewater treatment packages to customers around the world. We offer bench and pilot testing and custom-designed solutions to provide the best treatment train to suit our customers needs. In addition to generic technologies, ADI Systems offers proprietary and patented technologies in both anaerobic and aerobic biological waste treatment applications. ADI Systems provides large treatment systems as well as modular anaerobic packages for small plant applications. In addition to SBR technology, ADI offers membrane bioreactors when recyclable effluent quality is required.