



OMNIFLO[®] ISBR

The most innovative SBR yet!

Water Technologies

SIEMENS

A Powerful Approach to Wastewater Treatment

The new OMNIFLO® Interchange Sequencing Batch Reactor (ISBR) system combines two of the most efficient wastewater treatment technologies into a single powerful system, reducing costs and enhancing plant performance. This total wastewater treatment solution begins with the state-of-the-art OMNIFLO® Sequencing Batch Reactor (SBR), and integrates the revolutionary Cannibal® Solids Reduction System. As a result, the OMNIFLO® ISBR system accomplishes superior secondary wastewater treatment and provides an energy efficient solids handling solution that reduces overall operational costs. That's unparalleled synergy in wastewater treatment.

The OMNIFLO® ISBR system begins with the state-of-the-art OMNIFLO® (SBR) delivering superior performance under the most demanding conditions. It provides maximum efficiency and unparalleled operational flexibility and is ideally suited for applications where nitrification, denitrification, and biological phosphorous removal are necessary.

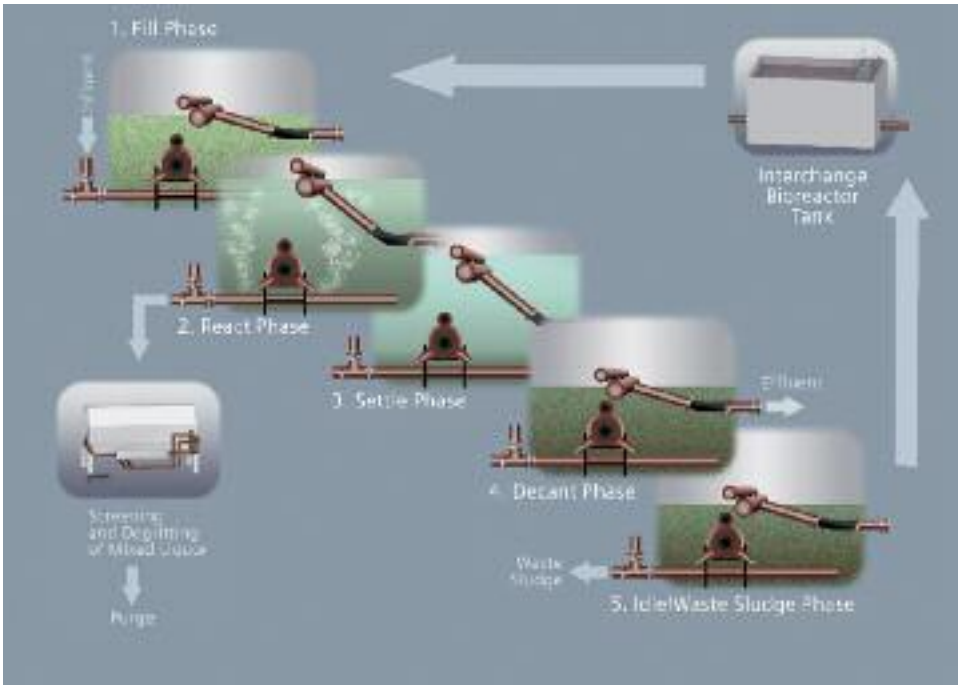
The OMNIFLO® SBR utilizes a fill-and-draw, non-steady state activated sludge process. One or more reactor basins are filled with

wastewater during a discrete time period, and then operated in a batch mode. The OMNIFLO® SBR system accomplishes equalization, aeration, and clarification in a timed sequence – all in a single reactor basin. In a conventional continuous flow process, multiple structures are required to obtain the same treatment objectives.

By combining the OMNIFLO® SBR with the Cannibal® Solids Reduction System, Siemens provides the most energy efficient process and the lowest sludge yield of any SBR on the market today.

The benefits include:

- Low sludge production
- High quality effluent at widely varying flows and loadings
- Inherent biological nutrient removal (BNR) capability
- Removal of non bio-degradable trash from wastewater treatment plant
- Energy efficient
- Reduced space requirements
- Integrated control system for overall plant performance optimization
- Single process responsibility with plant wide performance guarantees



OMNIFLO® ISBR system

The OMNIFLO® ISBR System

A single cycle for the ISBR system consists of five discrete periods: Fill, React, Settle, Decant and Idle. When about 75% of the fill period is complete, blowers and pumps automatically are turned on providing air for a complete mix cycle that initiates the “feast” environment for the biomass. It is during the initial stages of aerated fill that both nitrification and denitrification occur. From this period, mixed liquor is sent to a solids separation module for screening and dewatering. After the mixed liquor is sent through the solids separation module, the screened mixed liquor is either returned to the SBR tanks or sent to the Interchange Bioreactor tanks which are the heart of the Cannibal® Solids Reduction system. The flow of mixed liquor from the SBR tanks to the solids separation module also occurs during the react period when influent flow is terminated and aeration and mixing continue.

The settle period occurs when the aeration and mixing are turned off, creating perfect quiescent conditions that allow the biomass to settle, leaving the treated supernatant above.

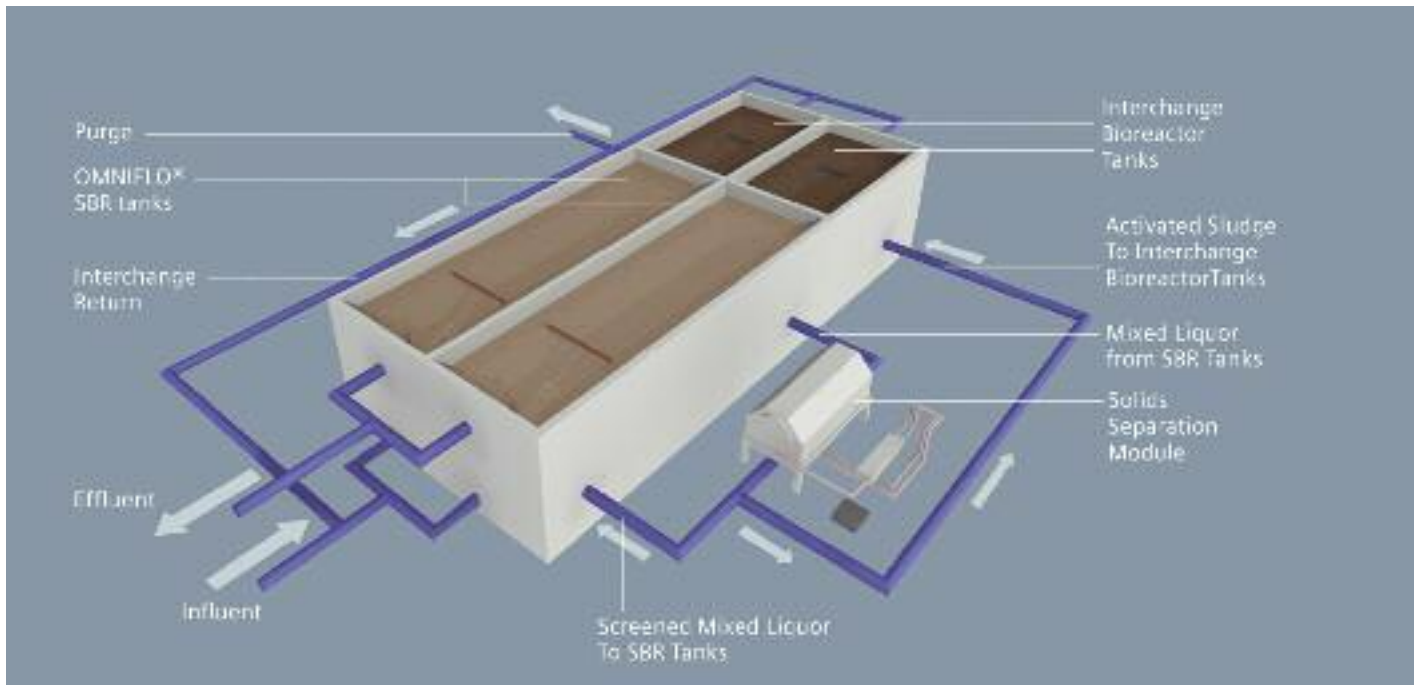
From the settle period, the decant phase occurs when effluent is removed from just below the liquid surface by the Floating Solids Excluding Decanter from Siemens Water Technologies. In the last step or Idle/Waste Sludge period, the reactor waits to receive flow. Settled sludge is drawn through the influent distribution manifold and removed from the SBR reactor. It is during this step that the interchange activated sludge (IAS) is returned to the SBR tanks with sludge periodically purged from the system.



Cannibal® Solids Separation Module



Cannibal® Side-Stream Interchange Bioreactor



Typical plant layout for OMNIFLO® ISBR system

Synergy Through Integration

The Cannibal® Solids Reduction system significantly reduces the biological solids produced by wastewater treatment plants, and decreases the costs associated with sludge wasting, stabilization, and disposal. It is designed to tackle two

main components of solids present in the mixed liquor of any conventional activated sludge plant: biological solids and non-readily degradable trash, grit, and inerts. The non-biodegradable material is removed through a series of physical

separation steps, and the production of biological solids is reduced by reconfiguring the biology of the treatment process.

By integrating the Cannibal® Solids Reduction system and the OMNIFLO® SBR, an efficient, flexible, and economic wastewater treatment system is created. The “new” OMNIFLO® ISBR system offers the lowest possible sludge production of any SBR process available and provides single integrated operational controls for overall plant performance optimization. This system is ideally suited for plants that have high solids handling costs, as well as tight effluent requirements.

- Proven technology
- A total wastewater treatment solution
- Reduced costs associated with solids handling, hauling and disposal
- Easy to use, automated controls
- Licensed plant operators available 24 hr/day, 7 days/week
- Plant wide performance guarantee

Annual OMNIFLO® ISBR System Savings – 1.5 MGD Facility

	Without Cannibal® Solids Reduction System	With Cannibal® Solids Reduction System
Power for aerobic digester (\$0.09 / kW-hour)	\$56,660	\$8,950
WAS disposal (\$37 / wet ton at 18% TS)	\$86,670	\$9,390
Screenings/inert disposal (\$37 / wet ton at 30% TS)	\$0	\$12,390
Polymer for dewatering (\$25 / dry ton)	\$10,540	\$1,140
Power for solids separation module (7 Hp total)	\$0	\$2,875
Power for mixers in the Interchange tanks (30 Hp total)	\$0	\$1,470
Net operational savings		\$117,655 per year



OMNIFLO® SBR



Biological solids purged from facility

Experience

The OMNIFLO® ISBR system is a proven, practical option for secondary wastewater treatment and solids reduction. This completely automated system is a very reliable, cost effective and efficient treatment process consistently producing high quality effluent.

In the State of California, an OMNIFLO® ISBR system has been installed at a wastewater treatment facility located near a hotel and casino.

A design/build approach was selected to build a 0.75 million gallon per day (mgd) facility with a 900 mg/ BOD load. This facility also was designed to handle not only high strength wastewater, but also weekly variations in flows and loadings due to the hotel and casino business.

Because of the limited land space and the requirement of an easy to operate wastewater treatment

plant, the OMNIFLO® ISBR system was the ideal solution. The biological treatment process includes a two-tank OMNIFLO® SBR with VARI-CANT® Jet Aeration system that is operated by a flow proportional control system from Siemens. Initial plans called for the installation of an aerobic digester and sludge drying beds for sludge handling, however because of the concern of the high energy costs associated with aerating an aerobic digester, a more energy efficient solution was needed. It was found that a significant savings could be realized with the OMNIFLO® ISBR system, which includes the Cannibal® Solids Reduction System. The Cannibal® system requires minimal aeration, which reduces energy requirements and also provides the benefit of greatly reducing the amount of solids for disposal.

The wastewater treatment plant was started up in July 2004 and has exceeded expectations. The OMNIFLO® ISBR system has consistently met all treatment performance objectives for effluent quality, energy savings and solids reduction. The facility uses less than 10 percent of the power for solids treatment than was planned with the proposed aerobic digester. Solids wasting from the plant has been minimal, with less than 0.1 pounds of biological solids wasted from the plant per pound of BOD treated. The control system from Siemens keeps the entire treatment facility operating - balancing the proper conditions in both the OMNIFLO® SBR and the interchange bioreactor. Optimal conditions are maintained for both effluent quality and minimizing solids production.

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E10001-WTBC-A28-V1-4A00
Dispo No. 216 16 K.No. 3936

JT-ISBR-BR-0308
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