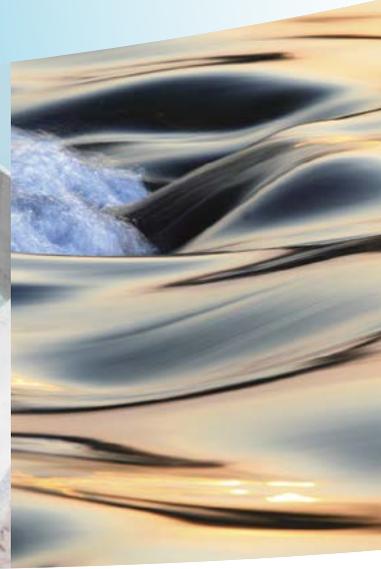




evoqua
WATER TECHNOLOGIES



OMNIPAC® FIELD-ERECTED SBR PACKAGE PLANTS

JET TECH TECHNOLOGY

Jet Tech
an EVOQUA technology



OMNIPAC® FIELD-ERECTED SBR PACKAGE PLANTS

The OMNIPAC® Field-Erected SBR Plant integrates one of the industry's most advanced treatment processes into an effective and proven package system. It utilizes a steel circular tank design that includes Jet Tech technology from Evoqua, and results in a highly flexible and efficient treatment facility that can be operational in weeks instead of months.

THE OMNIFLO® SEQUENCING BATCH REACTOR (SBR) SYSTEM

Synergy happens when two inputs exceed the sum of their total. And that's what the OMNIFLO® SBR system and field-erected package plant technologies do when they are combined in a single system. These specialized Evoqua technologies — unified under the name OMNIPAC® SBR Package Plant — provide a revolutionary wastewater treatment solution for plant owners and operators who need the benefits of the Sequencing Batch Reactor (SBR) process in a proven treatment plant package. The benefits of this combination are far in advance of any single product currently available. The OMNIPAC SBR Package Plant —the essence of synergy in today's wastewater industry— combines performance, efficiency, flexibility, and economy in a single, high-reliability package.

The OMNIFLO SBR system is integral to the OMNIPAC SBR Package Plant and provides maximum efficiency combined with unparalleled flexibility. Plus, the OMNIFLO SBR technology eliminates many common treatment problems.

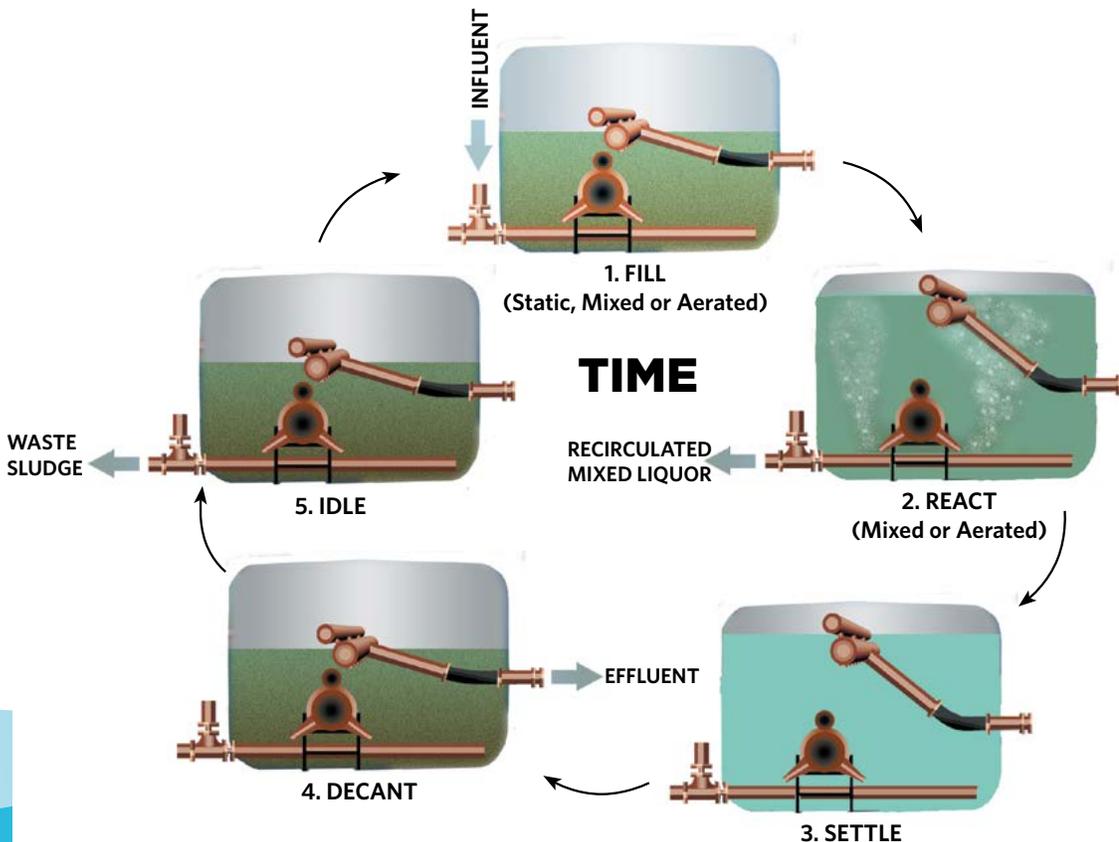
The OMNIFLO SBR system is a fill-and-draw, non-steady state activated sludge process in which one or more reactor basins are filled with wastewater—during a discrete time period—and then operated in a batch mode. In a single reactor basin the OMNIFLO SBR system accomplishes equalization, aeration, and clarification

in a timed sequence. In a conventional continuous flow process, multiple structures are required to obtain the same treatment objectives.

A single cycle for each reactor consists of these five discrete periods: Fill, React, Settle, Decant, and Idle. This approach is unique in handling influent flows, as well as a wide range of organic loads and industrial pollutants. The OMNIFLO SBR system is ideally suited for applications where nitrification, denitrification, and biological phosphorous removal are necessary.



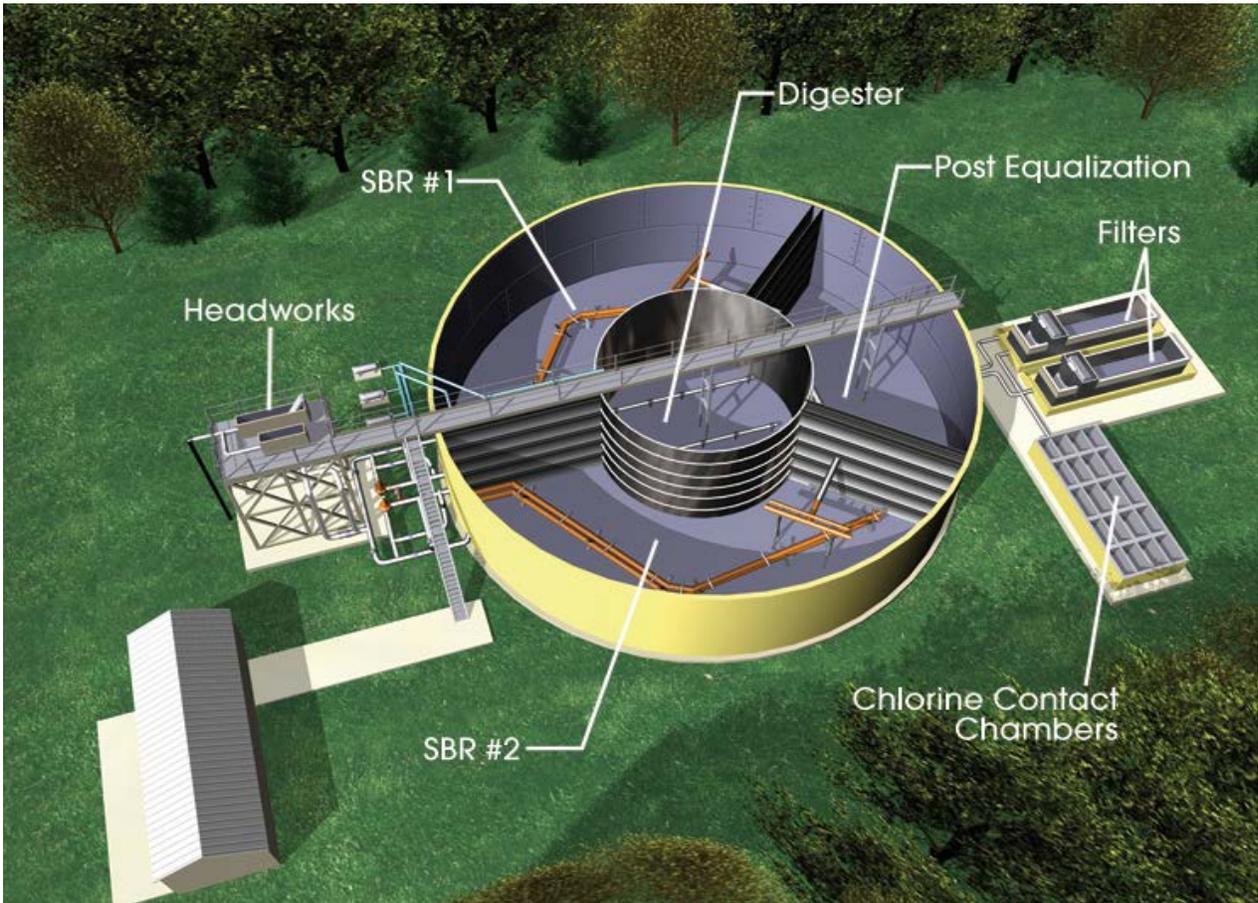
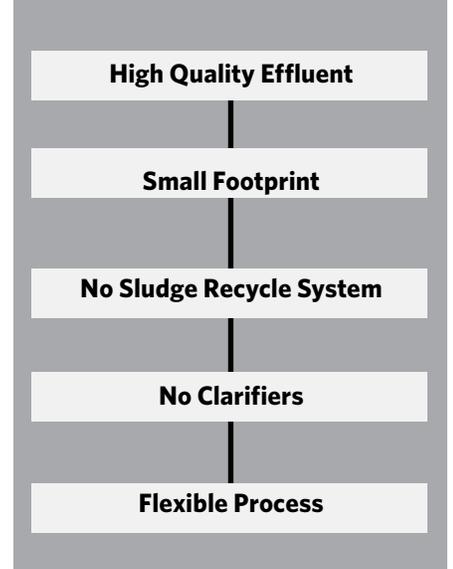
VARI-CANT® Jet Aeration System and Floating Solids Excluding Decanter from Evoqua installed in OMNIPAC® Field-Erected SBR system.



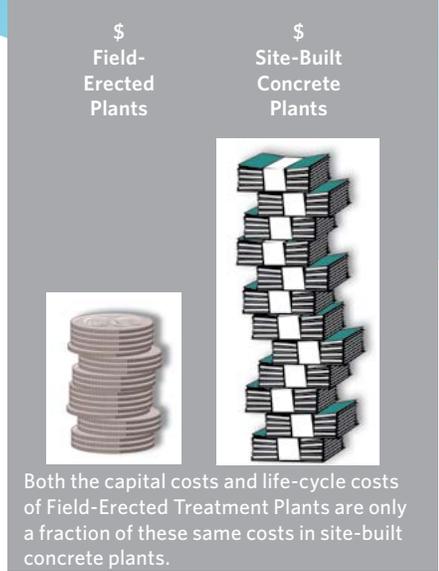
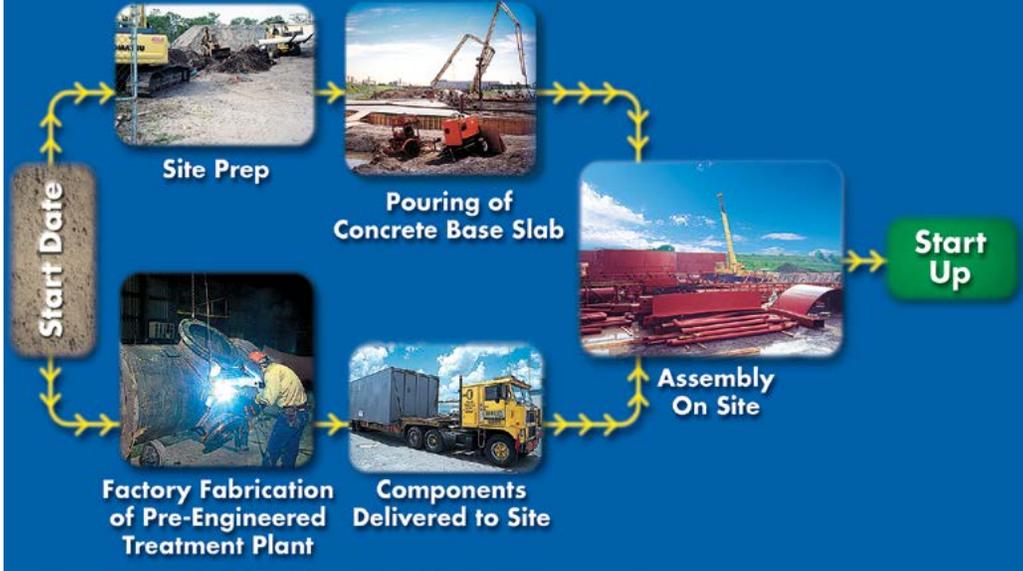
OMNIFLO® SBR system treatment cycle



OMNIPAC® Field-Erected SBR system installed at municipal wastewater treatment plant



OMNIPAC® Field - Erected SBR system layout



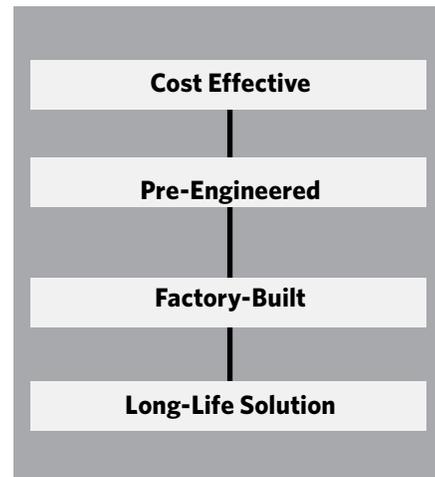
THE OMNIPAC® FIELD-ERECTED SBR TREATMENT PLANT

The OMNIPAC® Field-Erected SBR Plant from Evoqua provides a cost-effective and long-life solution to treatment plant construction. This package plant approach is considerably less capital-intensive than form-built, concrete-basin type treatment plants. This is because the field-erected package plants from the Davco™ product line of Evoqua, are pre-engineered and factory-built, which avoids the weather-related delays and labor-intensive conditions associated with built-in-place approaches.

Davco field-erected plants are simpler and faster to install because they require less physical space, less yard piping and electrical conduit, less maintenance, and significantly less site preparation.

Installing a OMNIPAC Field-Erected SBR Plant primarily requires assembling and welding together the components, then cleaning and coating the entire system as needed. Coatings will vary according to the application and the locale.

Davco field-erected plants have proven their long-life functionality and durability over decades and in all types of climatic extremes. They provide an immediate solution that outlasts other options—options which often cost many times more and take far longer to construct.





The Sequencing Batch Reactor (SBR) treatment process is ideally suited for biological nutrient removal applications, and those applications requiring high quality effluent at widely varying flows and loadings. The OMNIPAC® field-erected SBR system is ideal for tight budget constraints and critical scheduling pressures.

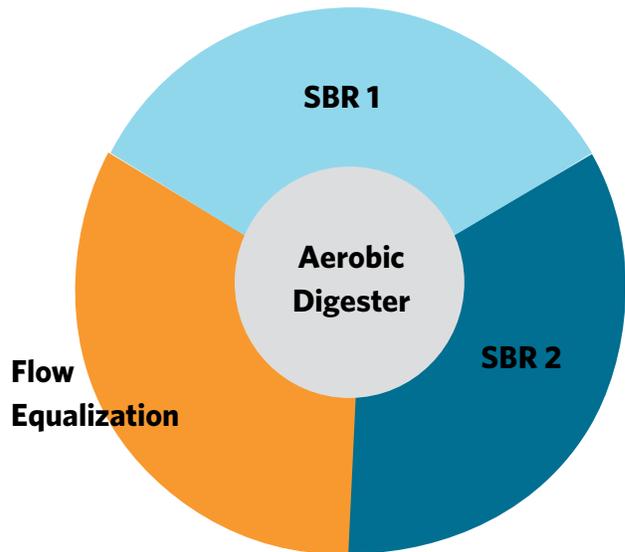
EFFICIENCY AND ECONOMY IN A SINGLE PACKAGE

POTENTIAL PLANT CONFIGURATIONS

OMNIPAC® Field-Erected SBR plants integrate one of the industry’s most advanced treatment processes into an effective and proven package system. The result is a highly flexible and efficient treatment facility that can be operational in weeks, instead of months.

In addition, OMNIPAC Field-Erected SBR plants save money in many ways—both initially and over the long haul—because they eliminate the need for multiple tankage, separate clarification systems, and sludge recycle systems. Engineering and construction costs are also dramatically reduced by the use of pre-engineered components and the precision factory-fabrication of individual assemblies. In fact, Evoqua maintains an experienced installation and construction crew dedicated to field-erected SBR projects.

Applications include: Municipal, Food and Beverage, Pulp and Paper, Petrochemical and Oil Refining, Pharmaceutical, Chemical, Landfill/ Leachate and Textile industries.





The outer diameters of all four OMNIPAC® SBR systems range from 60 to 105 feet in diameter. Each unit contains three SBR basins with jet aeration systems to mix and aerate the mixed liquor, a solids-excluding floating decanter for effluent withdrawal and an influent manifold for the even distribution of influent into the sludge blanket.

MARATHON, FLORIDA

COMMUNITY ON THE FLORIDA KEYS USES DECENTRALIZED SYSTEM TO MEET FUTURE EFFLUENT STANDARDS COST EFFECTIVELY.

The community of Marathon has had success bucking the trend to large centralized treatment plants and complex sewer networks. Under orders to improve the quality of its effluent, the community opted out of a \$181 million plan for one large treatment facility and connecting sewers, choosing instead to build five smaller decentralized plants, each treating between 200,000 and 400,000 gallons per day, at a total cost of \$91 million.

Water quality is a critical issue here. Marathon is a center for diving in the Gulf of Mexico, with Sombrero Reef just a few miles offshore, protected by the Florida Keys National Marine. According to Zully Hemeyer, Marathon utilities director, the wastewater treatment system is critical to protecting the only living coral reef system in the continental US.

KEY CITY

Like many cities in the Florida Keys, Marathon had historically used septic systems to treat wastewater. The community added secondary treatment several years ago, but the facility was unable to prevent nitrogen and phosphorus contamination of sensitive Gulf of Mexico coastal waters.

After a competitive review process, Marathon hired Weiler Engineering (Punta Gorda, FL) to design an alternative solution. "We chose a decentralized network of collection systems and small, advanced treatment plants serving various sections of the community," says Hemeyer. "That proved to be the most cost effective option." After visiting a few plants, the city decided on the OMNIPAC® SBR system to achieve a cost effective solution in a small footprint with a design to installation timeline of 12 months for each system.

THE OMNIPAC® SBR SYSTEM

The outer diameters of the four OMNIPAC® SBR units at Marathon range from 60 to 105 feet. Each unit includes three SBR basins with jet aeration systems to mix and aerate the mixed liquor. Each basin includes a solids-excluding floating decanter for effluent withdrawal, as well as an influent manifold for even distribution of influent into the sludge blanket. Waste sludge pumps for sludge withdrawal are also located in each basin. The design also includes a post equalization basin which is covered to minimize algae growth and animal waste in the effluent water, and an aerobic digester. The effluent equalization tank includes a submersible pump for pumping the SBR effluent to the filters and chlorine contact basins. The aerobic digester basin includes coarse bubble aeration and sludge transfer pumps. Incoming wastewater passes through fine screens ahead of the SBRs. A SCADA system provides remote monitoring and control of the entire treatment network.

RESULTS

- SBR plant flows range from 200,000 to 400,000 gpd.
- All SBR plants already meeting limits of 5 mg/L BOD, 5 mg/L TSS, 3 mg/L nitrogen, and 1 mg/L phosphorus (these limits will be mandated in 2016).
- SBR plant can be switched to stormflow mode during rain events.
- In dry seasons, 20-40 percent of treated water is recycled for community use.
- Remainder of treated water pumped into injection wells. No effluent discharged to Gulf of Mexico.



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