ITT Sanitaire's ICEAS SBR incorporates SIPOS actuation technology to provide a fully automatic system that responds to load and flow variations.

SBR development assisted by variable speed actuators

During the late 1950s through to the early 1960s, Sequencing Batch Reactors (SBRs) became established as an effective option to conventional activated sludge systems at wastewater treatment works. Today, the SBRs' fill-and-draw' process of treating and discharging undesirable components from wastewater has been widely adopted by utility sector organisations. In this article for Valve World, the Intermittent Cyclic Extended Aeration System (ICEAS) approach to SBR technology developed by ITT Sanitaire is reviewed. The contribution of variable speed actuation technology from SIPOS Aktorik is also outlined.

Sanitaire, which operates under the Fluid Technology division of the ITT Corporation, has spearheaded the ICEAS SBR solution. The company, which specialises in a range of products and technologies for wastewater treatment and control applications, forms part of the global ITT engineering and manufacturing organisation. Dedicated R&D expertise at ITT Sanitaire has been applied to continuing advancements in the field of ICEAS SBR technology and this has led to an initiative incorporating SIPOS Aktorik actuation technology. The ABJ SBR decanter development meets the variable speed requirements of SBR decant operations at wastewater treatment plants.

Before expanding on Sanitaire's variable speed SBR enhancement it is useful to provide some background on the Sequencing Batch Reactor and the ICEAS variant version of the SBR.

In the SBR process, wastewater is added to a single batch reactor; fluid is treated to remove undesirable components and discharged. A single batch reactor will equalise, aerate and clarify wastewater: a series of reactors are used in a sequence to optimise performance. SBRs are established as a successful method of processing wastewater in a range of applications as they are ideal for

Advanced data feedback and increased detail of decanter functionality are two of the benefits afforded to ITT Sanitaire's ICEAS SBR technology by SIPOS' actuation solution.

intermittent or low flow conditions.
As long as the necessary controls are placed on the influent wastewater that is introduced into the aeration, SBRs produce sludges with excellent settling properties. A modified version of the SBR is the Intermittent Cyclic Extended Aeration System where influent wastewater flows continually into the reactor.
Sanitaire's ICEAS SBRs work on a time principle to treat the effluent. During the aeration phase air is introduced via fine bubble diffusers at the base of the tank to activate the sludge. The SBR then 'rests' to allow the biologically treated particles or flocs to settle to the bottom before the clean, treated liquid is decanted from the top of the SBR. The ICEAS process is a variant of an SBR that enables the procedure to take place in a single basin, even during the settling and decant phases of the operating cycle. The solution is a fully automatic system that responds to flow and load variations, is easily expanded and produces a high quality effluent.
An ITT Sanitaire enhancement to its ICEAS process takes the form of an SBR decanter upgrade which moves away from external componentry with the incorporation of SIPOS' '5 Flash' solution that integrates intelligent functions within the actuator.
Technological benefits afforded by the variable speed actuation solution include advanced data feedback and increased detail of decanter functionality. Additionally, with intelligence integrally and securely housed, it is a compact system that offers advantages of safety and reliability. Variable decanter movement is also provided which gives superior flow control for the SBRs fill-and-draw wastewater treatment activated sludge system.
Prior to incorporating '5 Flash' technology, a metric screw jack mechanism driven by a separate variable speed drive actuator situated in the motor control centre was used for ITT Sanitaire's SBR. With the introduction of an integral actuator inverter which replaces Variable Frequency Drive starters, the benefits of compact aesthetics and a reduction in cabling costs are afforded to the user.
SIPOS actuation technology, which offers a variable speed, multi-turn solution was also selected by ITT Sanitaire as it addressed the challenges of decant arm operation which is required to operate continually through a 24 hour period. Unlike valves, the decant arm is driven into the water over a period of one hour, at a constant vertical rate, into the settled and clarified water in order to decant it. Having reached its preset lower decanting point, it then returns to the preset parked position above the top water level until the next decant cycle.
SIPOS's actuation solution met the needs of the required fixed speed constraints as, unlike a standard actuator, the technology operates via an internal frequency converter which provides total and continuation variation in speed. The actuation technology also provides self monitoring functionality and torque/position sensing to provide accurate feedback on the position of the decant arm at any point in time. Additionally, motor temperature is monitored throughout the decant arm travel and the control system receives instruction if the temperature becomes excessive.
ITT Sanitaire report that the benefits of the ICEAS SBR initiative have been recognised on the global wastewater treatment market and that the technology has been adopted in applications across Europe, the Middle East and Asia.

ITT Sanitaire's SBR decanter upgrade incorporates the SIPOS '5 Flash' actuator with integrated intelligent functions.

With SIPOS technology enabling the integral and secure housing of intelligence, the ICEAS SBR from ITT Sanitaire is a compact system.