



BIOLOGICAL WASTEWATER TREATMENT: TECHNOLOGICAL LEADER – INTELLIGENT, COMPACT, POWERFUL

C-TECH™ CYCLIC ACTIVATED SLUDGE PROCESS

C-TECH™ is an innovative wastewater technology based on the cyclic activated sludge process. It combines carbon oxidation, nitrification, denitrification and biological phosphorus removal in a continuous cycle – without any equalization tanks, mixers or shock filling. An anaerobic selector suppresses bacteria that form bulking sludge and improves bio-P elimination. The simultaneous implementation of all biological processes in one tank enables shorter cycle times and eliminates the need for separate denitrification phases. The process is controlled via the oxygen uptake rate (OUR), which regulates aeration in an energy-efficient manner and reduces operating costs. A typical cycle (aeration – settling – decanting) only takes around four hours. The high sludge concentration with partial granulation ensures excellent settleability and exceptional cleaning performance.

With over 1,500 references worldwide, SFC Umwelttechnik has extensive expertise in the use of **C-TECH™** technology. Each system is customized to the local conditions – a decisive advantage for reliable and efficient solutions.

PROCESS

C-TECH™ is a cyclic activated sludge process in which carbon oxidation, nitrification, denitrification and bio-P removal are carried out simultaneously. The process control, based on online respirometry, allows the omission of equalization tanks, mixers and shock filling, as normally required in SBR plants. Continuous treatment is achieved with 2 or more tanks in operation.

The system has been implemented in various reference plants on all continents; the world largest plant of this type is designed for 600,000 m³/d

C-TECH™ tanks can be built in round, square or container-based form. The following equipment characterizes the process:

- Selector for simultaneous N/DN and Bio-P removal and suppression of bulking sludge
- Highly efficient decanter with a barrier against floating sludge
- Capacity of the return sludge pumps max. 30% of the daily wastewater volume
- Control via OUR (Oxygen Uptake Rate) Software
- Fine-bubble aeration systems

SIMULTANEOUS NUTRIENT REMOVAL

The relatively short cycle of approx. 2–4 hours in combination with the selector and the process control enables simultaneous N/DN. Nitrification takes place on the outside of the floc, while denitrification takes place inside the floc. The control system calculates the required aeration time and rate that allows effluent concentrations of BOD/SS/TN/TP < 10/10/10/10/1 mg/l. Phosphorus is released in the selector and absorbed in the main reactor zone during the aeration phase.

CONTINUOUS OPERATION

The installation of parallel tanks enables continuous system operation with continuous inflow and outflow. The PLC control system allows each individual tank to be taken out of operation for maintenance purposes without affecting the continuity of process operation. Our unique OUR oxygen uptake rate control software maximizes the energy efficiency of your reactor through precise, on-demand control.

CYCLE

The aeration, settling and decanting phases are repeated continuously within a cycle. This ensures that all the necessary reaction conditions for simultaneous nutrient removal and sludge settling are met. The duration of a dry weather cycle is usually only 4 hours. The phase delay between the tanks leads in a continuous process in which all installed machines and power units are used most efficiently.

PROCESS ADVANTAGES

- Less space and volume required compared to conventional systems
- Reduced use of mechanical and electrical engineering (M+E)
- Highest elimination rates for nitrogen (N) and phosphorus (P)
- Effective suppression of filamentous organisms that cause bulking sludge
- Maximum flexibility with fluctuating feed volumes and loads
- Lower operating costs due to energy-efficient process control
- Nitrification at very low temperatures

APPLICATIONS

- Municipal wastewater treatment
- Beverage and food industry
- Paper, pulp and wood industry
- Pharmaceutical and chemical industry
- Petrochemical industry
- Textile production
- Large systems and container solutions
- Above-ground and underground plant concepts

OPTIONAL PROCESS ADAPTATIONS

The plant and cycle design can be flexibly adapted to:

- Complete nutrient removal or BOD/COD reduction only
- Simultaneous sludge stabilization in the reactor
- Extended biological phosphorus elimination
- Operation with or without primary clarification
- Integration with or without anaerobic digestion of excess sludge