OPTIMIZE YOUR CLARIFIER FOR BIOLOGICAL PHOSPHORUS REMOVAL

Clarifier design and operation is essential to enhanced biological phosphorus removal (EBPR). Under anaerobic conditions within a deep sludge blanket, biomass releases soluble phosphorus that affects the final effluent quality.

The Evoqua clarifier design, which features the FEDWA baffle system and Tow-Bro® Unitube Hydraulic Header, limits the release of phosphorous from settled sludge.

The FEDWA energy dissipating inlet (EDI) reduces flow velocities and improves flocculation for more efficient solids settling. The Tow-Bro unitube header quickly and effectively removes settled solids with minimal disturbance of the sludge blanket. The net result is a low sludge blanket and low sludge retention time in the clarifier, both of which are optimal for EBPR.

CONVENTIONAL SCRAPERS

Conventional plow type or spiral scraper designs are not conducive to optimized phosphorus removal, as they attempt to convey settled solids to a central sludge removal hopper. This process of sludge conveyance leads to longer sludge retention times and, with the floor slope required for scraper designs, a deep blanket at the center results. This blanket, which is often recommended to be 5 ft. or more to prevent the withdrawal of a less concentrated sludge, exposes the biomass to anaerobic conditions, which can lead to soluble phosphorus release.

EVOQUA CLARIFIER DESIGN ADVANTAGES

In contrast to scraper type designs, the Tow-Bro Clarifier ensures rapid sludge removal and does not stir up settled solids. The unitube header gently vacuums solids off the floor, with sludge removal orifices spaced at 2.5 ft. intervals along the full radius of the tank. **This minimizes the sludge blanket to less than 1 ft. and prevents the release of soluble phosphorus.**

In addition, the Tow-Bro Clarifier can handle higher concentrations of return activated sludge (RAS) and can be added to any clarifier without major structural changes. Unlike riser pipe clarifiers, the unitube header orifices do not plug under normal operating conditions, thus requiring less maintenance and down-time.

The FEDWA is an advanced EDI system that significantly reduces kinetic energy while enhancing the flocculation of solids. The FEDWA has been proven in field studies and rigorous Mass Conservative CFD Modeling studies to enhance sludge compaction in the bottom zone of the clarifier. The result is a design which can manage varied flows and settling properties, such that blanket compaction is maximized.

Enhanced settling and compaction, combined with minimal sludge disturbance and low retention time, significantly reduces the potential for denitrification and phosphorus release. The net result is a clarifier design optimized for enhanced biological phosphorus removal.

FEDWA baffle system improves flocculation for more efficient solids settling.

EVOQUA CLARIFIER HISTORY

History Of The Tow-Bro Clarifier

Evoqua Water Technologies, as Rex Chain Belt, installed the first hydraulic removal device for use in activated sludge plants in 1929. Mr. Darwin W. Townsend originally conceived the idea to eliminate the disturbance caused by scraping mechanisms. He worked with Mr. James Brower, Superintendent at Milwaukee Jones Island STP, to develop the first plans for a patented suction removal header, later known as the Tow-Bro (Townsend-Brower) Clarifier.

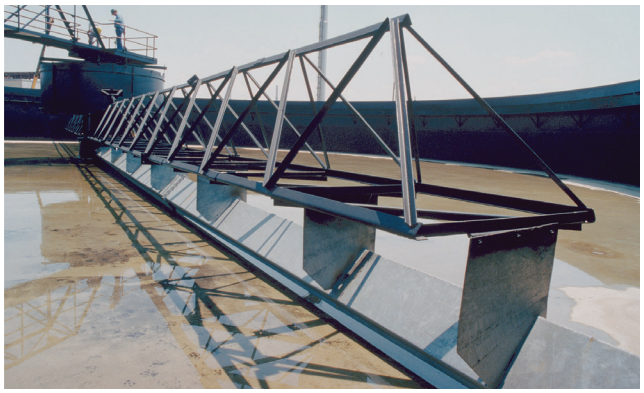
Since then, the Tow-Bro Clarifier has been improved to the current Unitube header and orifice design for optimal sludge removal and high return rates. To date more than 3,000 Tow-Bro Clarifiers have been installed across the US, primarily under the Envirex brand name.

Development of the FEDWA Baffle System

The concept for the Flocculation Energy Dissipating Well Arrangement, or FEDWA baffle system, originated in response to the need for improvement of the typical EDI tub design offered by the market. The conventional tub design consists of an enclosed bottom, which leads to several structural and performance issues including: high installation costs, significant load issues, scum retention, solids deposition and septic sludge.

The FEDWA baffle system features a unique open channel design to prevent scum retention and solids deposition. It is comprised of a series of baffles specifically arranged to create individual areas of energy dissipation and flow control. Each area consumes kinetic energy and promotes passive flocculation. As the flow moves from the initial zone at the center column, through the staged baffle zones, the open area between the baffles is increased, thus reducing velocities and absorbing energy.

The FEDWA EDI design also solves the problem of high installation costs and load issues. The simple arrangement of the baffles minimizes field erection and fit-up problems and the open design reduces the load imposed on the clarifier drive and bearings. Field studies have also shown that FEDWA equipped clarifiers can handle flows that are higher than for clarifiers which do not feature this inlet device.



Tow-Bro® Clarifier with unitube hydraulic header for rapid sludge removal.

Schedule an on-site clarifier evaluation

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