



Long Sludge Age Treatment System

- Advanced, low-loaded activated sludge technology
- Exceptional treatment efficiency from moving aeration chains
- Simple, low-cost construction
- Low production of stable biosolids
- Wave-Ox[™] single basin total nitrogen removal



Long sludge age biological treatment

The Biolac® system is the first suspended growth, activated sludge process to use simple, long sludge age treatment to create an extremely stable, reliable and easily operated system.

The advanced capabilities of this unique technology far exceed ordinary extended aeration treatment. Based on the excellent treatment efficiency of its moving aeration chains, the Biolac® system's 40-60 day sludge age design maximizes process stability while delivering extremely high effluent quality. With the capability to utilize in-ground earthen basins, the Biolac system produces state-of-the-art treatment results at the lowest total plant cost. Over 800 successful installations throughout North America and around the world are a testimony to the excellent results from this proven process.

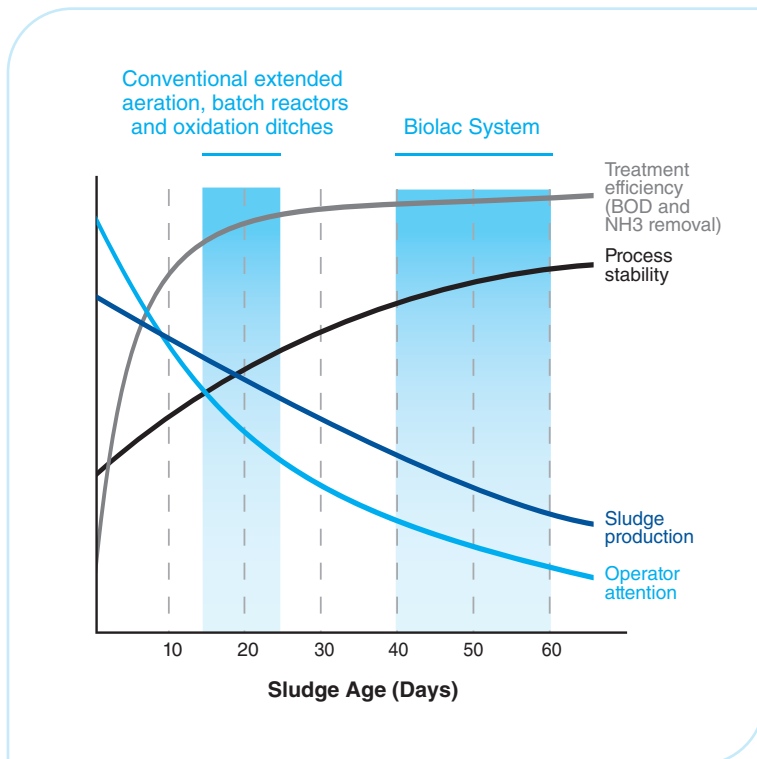
Sludge age, also known as SRT (Solids Retention Time) or MCRT (Mean Cell Residence Time) defines the operating characteristics of any aerobic biological treatment system. A longer sludge age dramatically lowers effluent BOD and ammonia levels, especially in colder climates. The Biolac long sludge age process produces BOD levels well less than 10 mg/l, and complete nitrification (less than 1 mg/l NH₃) year-round. More advanced process control



strategies using Wave-Ox™ technology (see back page) extend its capabilities to denitrification and biological phosphorus removal with no treatment basin modifications.

With the mixing efficiency of the moving aeration chains as the key building block, Parkson further enhances the Biolac system's capabilities by coupling it with the EZ Clear™ secondary clarifier. The result is a smaller plant footprint and lower total plant cost.

Operators benefit from the process stability provided by the large quantity of biomass present as the Biolac system treats widely fluctuating loads while requiring very few operational changes. With fewer process monitoring requirements and simple equipment design, both operating and maintenance requirements are greatly reduced. The extreme stability of the biomass allows sludge wasting to non-aerated sludge ponds or basins with no additional digestion, saving both capital and operating costs.



System Components

System Construction

One major advantage of the Biolac system is its low construction cost. Most treatment systems require costly concrete tanks to construct the activated sludge portion of the process. Biolac systems are typically installed in lined earthen basins, greatly simplifying and reducing the cost of construction. The Biofuser® fine bubble diffuser assemblies are suspended from the Bioflex™ floating aeration chains and require no mounting or anchoring to the basin bottom. Therefore, concrete is not required to anchor or level aeration diffusers and piping.

Bioflex™ Moving Aeration Chain

The ability to mix large basin volumes using minimal energy is a critical function of the unique Bioflex moving aeration chains. They require 50-70% less energy to completely mix activated sludge than stationary diffuser systems, which make the moving aeration chains critical for long sludge age operation. The floating Bioflex aeration chains suspend Biofuser fine bubble diffuser assemblies approximately 12" above the basin bottom. The slow, oscillating movement of the flexible aeration chains is caused by the rising air bubbles and controlled by their tension as they distribute oxygen and mixing energy evenly throughout the basin. No additional airflow or mixing equipment is required to maintain complete mixing of mixed liquor concentrations as high as 7000 – 8000 mg/l.

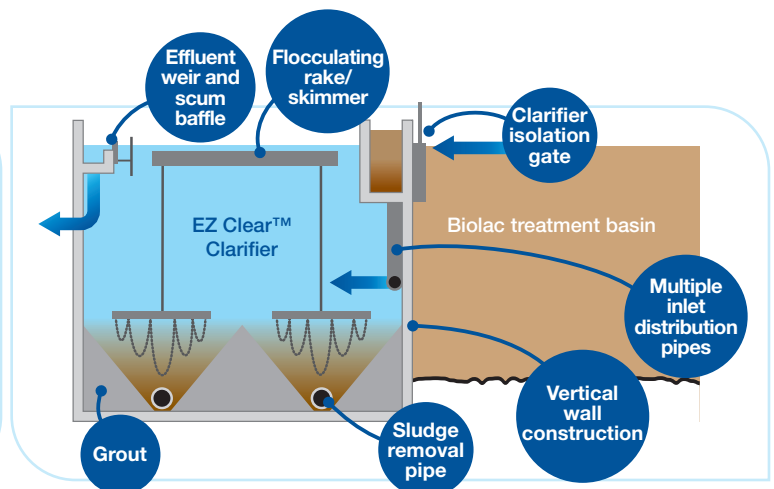
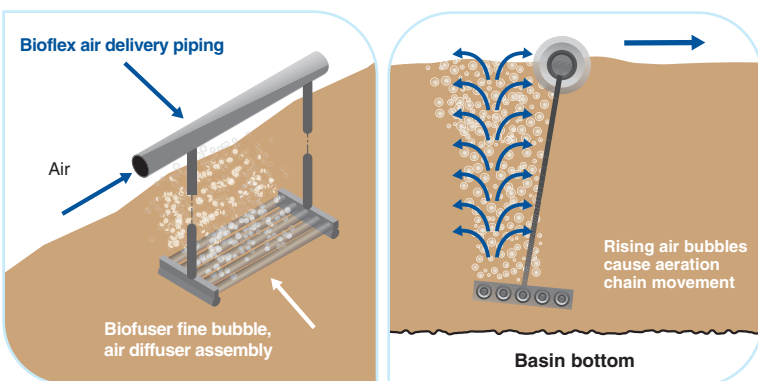
All equipment is accessible for service and maintenance without basin dewatering. Each Biofuser assembly holds up to five diffuser tubes, which provides the ability to customize each design and provide for future expansion as needed.



EZ Clear™ Clarifier

Efficient liquid-solids separation is critical to achieving high quality effluent, and the Biolac EZ Clear™ clarifier has proven to be extremely reliable. With hundreds of successful installations, many plants continue to produce effluent TSS between 5 and 10 mg/l.

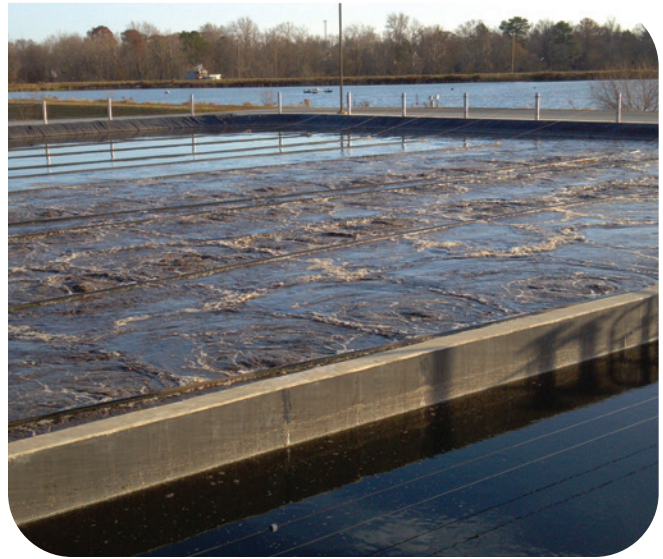
Using a common wall between the clarifier and Biolac treatment basin, the plant footprint is greatly reduced as connecting piping and splitter boxes are eliminated. A slide gate isolates the clarifier and allows mixed liquor to flow to the EZ Clear inlet distribution channel where the orifice design also provides in-basin equalization of peak flows. Using cross-flow hydraulics, the settled solids collect in the V-bottom of the clarifier and are continuously and rapidly removed all along the clarifier length. An airlift pump lifts the RAS to an elevation so that it flows by gravity back to the influent end of the treatment basin. A small amount of biomass is automatically wasted by gravity to control the MLSS concentration. Process flexibility is maintained while eliminating mechanical return and waste sludge pumps. Scum is prevented from flowing over the weir by a scum baffle, and is skimmed and automatically removed at the end of the clarifier. Mechanical RAS pump options are also available. All maintenance is performed from the surface without dewatering the clarifier.



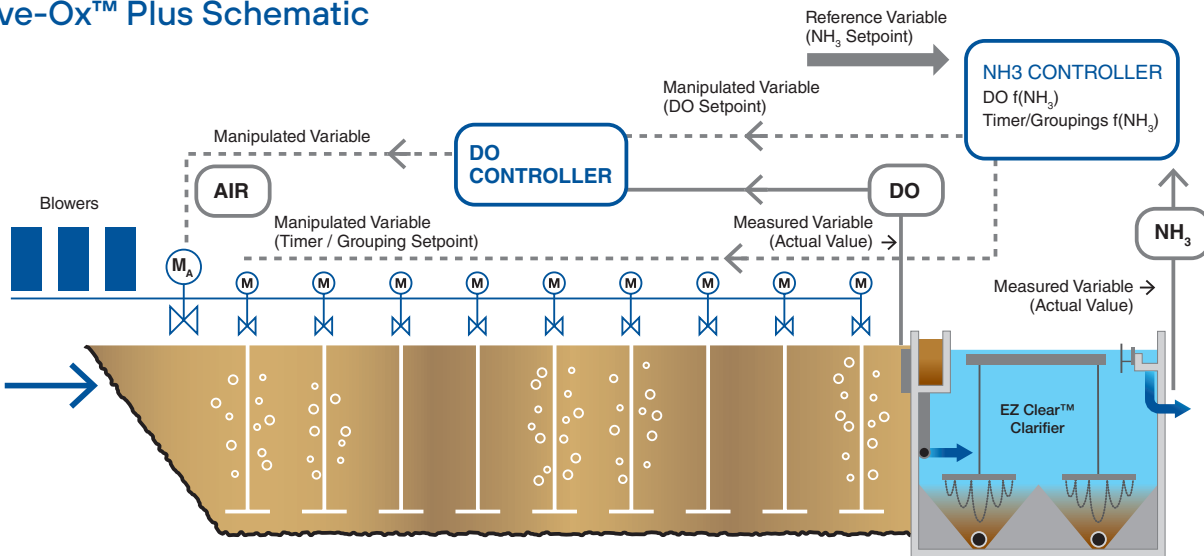
Wave-Ox™ and Wave-Ox™ Plus Biological Nutrient Removal

Biological nutrient removal (BNR) is simple and affordable with the Biolac® Wave-Ox™ and Wave-Ox™ Plus process. Proven by hundreds of successful installations, Wave-Ox and Wave-Ox Plus are simple, single basin nitrogen removal processes developed specifically for the unique Biolac system and moving aeration chain design. Automatic control of the air distribution to the Bioflex aeration chains creates moving waves of oxic and anoxic zones within the Biolac basin. This repeated cycling of environments nitrifies and denitrifies the wastewater without recycle of mixed liquor or additional treatment basins. Blower control using either aeration basin DO or secondary effluent ammonia as a continuous control signal optimizes the Biolac basin process to maximize total nitrogen removal. Effluent total nitrogen concentrations of 5 mg/l and less are typical.

Biological phosphorus removal can also be accomplished by incorporating an independent anaerobic zone at the front end of the process.



Wave-Ox™ Plus Schematic



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