

Orbal® Aeration System Dane-Iowa County WWTP

Removal Efficiency

BOD –96.7%

Phosphorus –95.0%

Design Criteria

Average Flow –0.79 MGD

BOD Load –1,423 lb/day

TKN Load –231 lb/day

P Load –39.5 lb/day

The Orbal® process was selected for this Wisconsin municipal wastewater treatment plant expansion in 1998 because of its energy efficient biological nutrient removal capabilities. The Orbal® is a series of concentric channels, with wastewater passing through the channels in series. The treatment process includes fine screens, grit removal, the Orbal® process, Tow-Bro® clarifiers, tertiary filtration, and UV disinfection.

Different combinations of aerator speed, disc immersion, and disc location were tested at Dane/Iowa to determine the optimum system configuration. Once these initial adjustments were made, the system maintains the conditions necessary for biological nutrient removal with little operator attention other than an occasional speed adjustment of one of their four (4) aerators. The disc aerators in the outer channel are operated at 29 rpm to keep the channel contents mixed while adding very little oxygen. Passing through the severe oxygen deficit in the outer channel results in absorption of phosphorus into the biological solids when the mixed liquor passes to the aerobic inner channel. Inorganic chemicals are not required to meet the effluent phosphorus limit. The majority of the system AOR is satisfied in the middle channel, but the organic load on the system is high enough that the dissolved oxygen concentration in the middle channel remains anoxic, resulting in simultaneous nitrification and denitrification with significant power savings.



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