

INCREASED ENERGY SAVINGS ACHIEVED BY IMPROVED DESIGN AND RIGOROUS TESTING

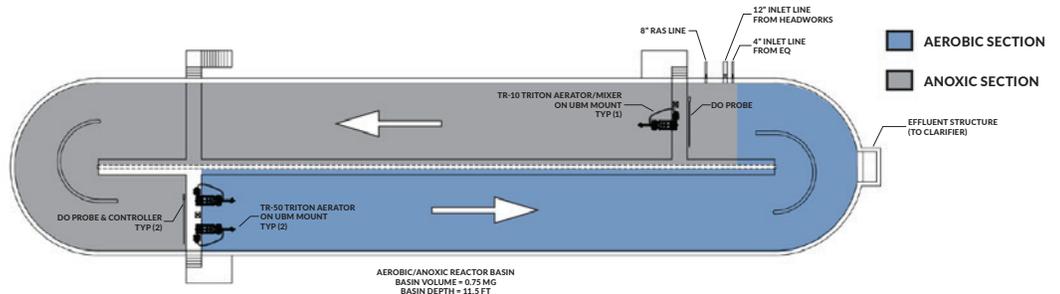


CASE STUDY

By improving design and performing rigorous testing Aeration Industries decreased energy consumption by 20% for its Flagship model.

OVERVIEW

In 2017 Aeration Industries provided its Tri-Oval system with three Triton aerator/mixers controlled by dissolved oxygen instrumentation to a municipality located in Tennessee. The retrofit system replaced existing aeration equipment and was designed to provide nitrogen removal within the existing 0.75 MG oxidation ditch. Separate aerobic and anoxic zones were established by using two TR50 Tritons to provide mixing and aeration in the aerobic zone while, one TR10 Triton aerator/mixer, used primarily for mixing, operated in the anoxic zone (*see below*).



Variable Frequency drives coupled with dissolved oxygen instrumentation automatically adjust the aeration output to target a specific DO concentration to induce denitrification near the influent zone.

Minimum DO setpoints keep the aeration zone within a nitrifying range while maintaining the anoxic zone within a denitrification range. The PLC continually logs DO & motor speeds for all motors onto a flash drive connected to the Human Machine Interface (HMI). Data is available both onsite and remotely.

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TESTING

City operators provided test data from the facility, which included influent flow and concentrations for both cBOD5 and ammonia. The data was then used to compare loading to the oxidation ditch. Based on average flow and concentrations for the test months, an average actual oxygen requirement (AOR) was calculated (summarized below).

TR Series					
Date	BOD	Ammonia	BOD O ₂ Demand	Ammonia O ₂ Demand	Total AOR
	(lb/d)	(lb/d)	(lb/d)	(lb/d)	(lb/d)
April	361	74	434	339	773
May	258	67	310	308	618

2.0 Series					
Date	BOD	Ammonia	BOD O ₂ Demand	Ammonia O ₂ Demand	Total AOR
	(lb/d)	(lb/d)	(lb/d)	(lb/d)	(lb/d)
April	423	74	507	340	847
May	305	55	366	254	620

The provided data and subsequent calculations show that the AOR for the 2.0 Series was higher for both April and May than the TR model.

RESULTS

Power consumption for the TR and 2.0 Series was calculated using motor frequency data taken at 15-minute intervals. Accounting for the difference in AOR, the **Triton 2.0 consumed 20% less energy** without the need for electrical updates or any changes to existing infrastructure.

Power Consumption		
Power Consumption (kWh)	2019	2018
April 14th	3378	4458
April 21st	3459	3491
April 28th	3741	5274
May 5th	3345	5075
May 12th	3494	5005
May 19th	4956	5165
May 26th	4922	4787
June 2nd	3179	3764
Total	30475	37019

