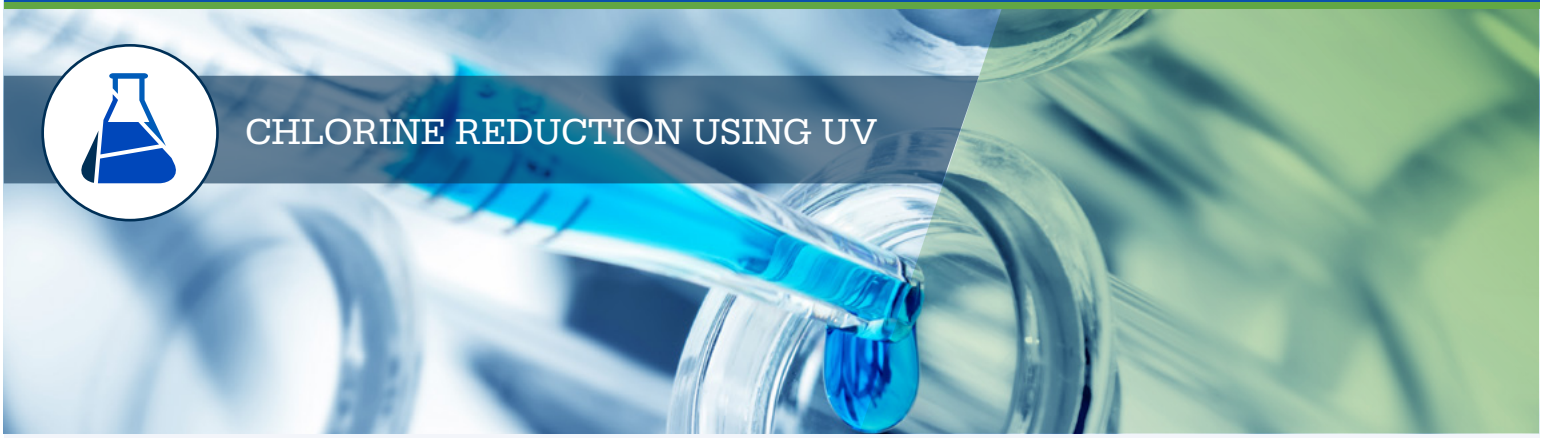
CASE STUDY



CHLORINE REDUCTION USING UV

APPLICATION: Chlorine Reduction | MARKET: Pharmaceuticals

Avant UV systems selected by baby formula manufacturer to address both chlorine and microbial concerns

Project Background

When you're the manufacturer of one of the most trusted baby formulas in the United States, quality matters. So, when this manufacturer needed a solution to address both chlorine and microorganisms in their water, they knew they needed a solution equally as trustworthy.

To ensure the quality of their product, they had installed an ultrapure water system to produce United States Pharmacopoeia (USP) grade water at their facility. The full system included water softening, ultraviolet (UV) for chlorine reduction, reverse osmosis (RO), deionization (DI), and a final filtration process. Also included in the treatment train are two Aquafine® OptiVenn® UV systems for microbiological inactivation.

Their management team was hypervigilant when it came to bacteria levels coming out of the carbon tank. Although they weren't experiencing issues with the purity of the final water, the in-house process engineering team worked with a subcontract engineering firm to identify a solution to reduce chlorine upstream from the RO system.

While carbon is an effective method for chlorine removal, the carbon can act as a medium for bacterial growth. The engineering team was tasked with finding a solution to address chlorine upstream of the RO system, that wouldn't pose a risk of bacterial growth and breakthrough.

The Trojan Solution

To meet these criteria, the Aquafine® Avant™ from Trojan Technologies was selected. This advanced water treatment system for ultrapure water (UPW) applications utilizes UV technology to break down trace chemicals such as total organic carbon (TOC), chlorine and chloramines, ozone, and provides microbial inactivation. The Avant series incorporates the latest innovations in UV technology and best-in-class components to reduce total cost of ownership and drastically simplify operation and maintenance.

Installed Avant System in the Facility

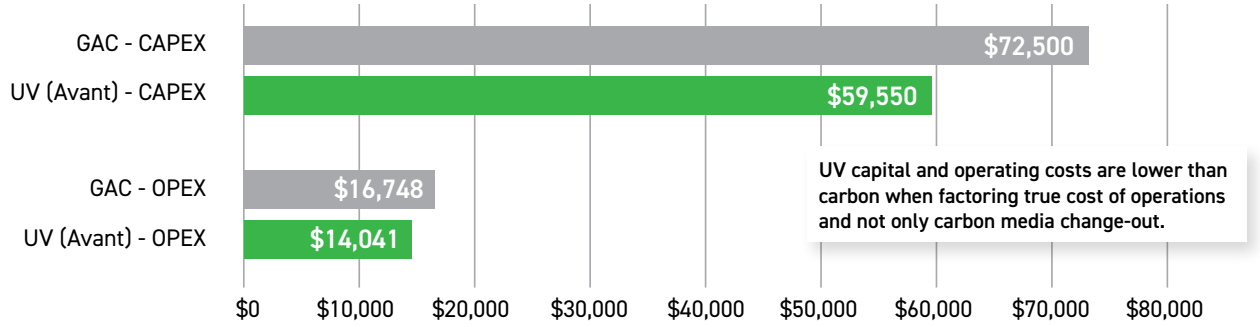
Aquafine®

CHLORINE REDUCTION

Economics of UV vs. Activated Carbon

A comparative analysis was conducted to evaluate the capital and operating costs associated with both ultraviolet (UV) treatment and activated carbon within this scenario.

Activated Carbon vs. UV for Chlorine Reduction



Note: Carbon results from third party model developed with Pharmaceutical Water Specialists, LLC (Worcester, MA).
Note: GAC opex includes backwash water, rinse-to-drain water, media changeout, labor, steam for hot water sanitization, and cool down water displacement

ASSUMPTIONS	
Flow Rate	22gpm
Water Source	Municipal tap water
Incoming Cl^2 Concentration	2ppm inlet chorine concentration. Reduction to 0.001ppm.
Operation	6–8 hrs/day - 5–6 days/week
Electrical Power Cost	$0.1022/kWh
Municipal Water Cost	$1.59 /100$ft^3$
Sewer Charges	$3.48/1000gal
Steam Cost	$4.00/1000lb (saturated)
Activated GAC Cost	$150/$ft^3$
Carbon Replacement	Every 6 months
Sanitization Frequency	1/week
Backwash Frequency	1/week

To learn more about the brands and affiliates of Trojan Technologies, please visit www.trojantechnologies.com

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