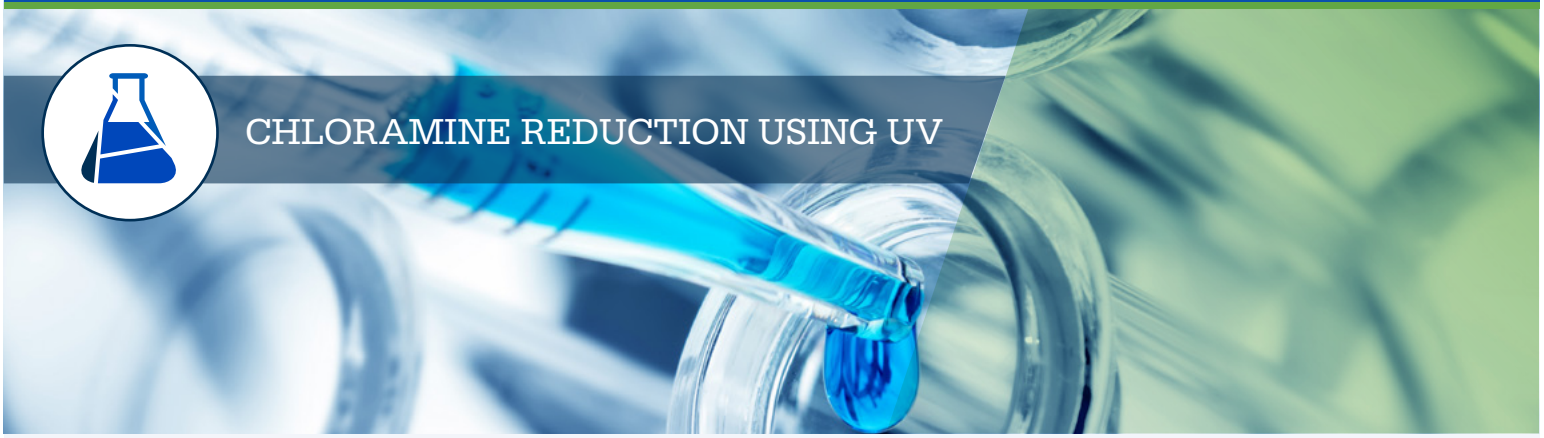
CASE STUDY



CHLORAMINE REDUCTION USING UV

APPLICATION: Chloramine Reduction | **MARKET:** Food & Beverage

Avant UV system ensures the continued quality of some of Canada's best whiskies

Project Background

For over 160 years, this distillery has produced some of the best whiskies in Canada. With legacy and product quality being extremely important, anything that could potentially affect the taste of the final product is of utmost concern.

The distillery quality team had heard that their municipality was considering making the switch from chlorine to chloramine for the primary disinfectant of the municipal water supply. Though an effective disinfectant, monochloramine is challenging to remove. While the Distillery was already using granular activated carbon (GAC) for de-chlorination, they would need to install additional carbon beds to handle the challenges of removing monochloramine. And while carbon filters are the traditional solution to chlorine in water, there are some concerns about this seemingly simple process, including:

- The need for carbon bed replacement and frequent backflushing.
- The potential for chlorine saturation, rendering the GAC ineffective, during municipal hyper-chlorination events.
- The potential for creating high biological loads (with GAC) and microbial breakthrough.
- The accelerated bio-film growth or scaling of the reverse osmosis (RO) membrane if GAC beds become a source of microbiological growth.

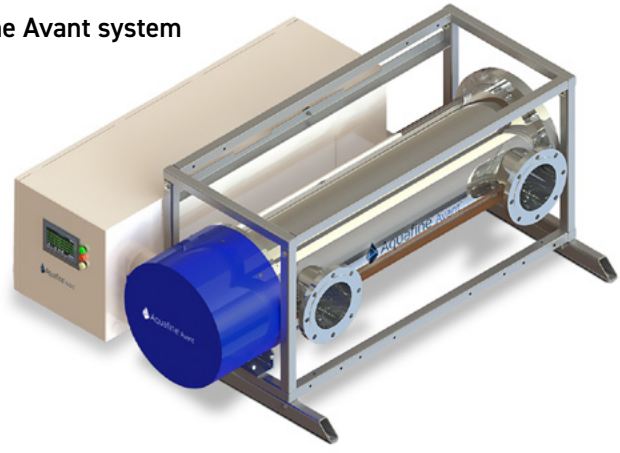
The Distillery needed a solution to address not only the chlorinated municipal water supply, but also to ensure microbiological inactivation. They had already experienced microbiological growth in existing carbon beds, resulting in periodic contamination of their RO supply. Solutions were submitted to and assessed by the Distillery's engineering firm, which then made the final recommendation: an Aquafine Avant ultraviolet (UV) treatment system from Trojan Technologies.

The Trojan Solution

The Aquafine Avant UV water treatment system was selected to address both the chlorine and microbiological concerns in the water treatment train. 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. It can be seen as an ideal solution for chloramine reduction, with the ability to provide robust protection against chlorine spikes/fluctuations, ensuring the long life of downstream equipment and consistent water quality.

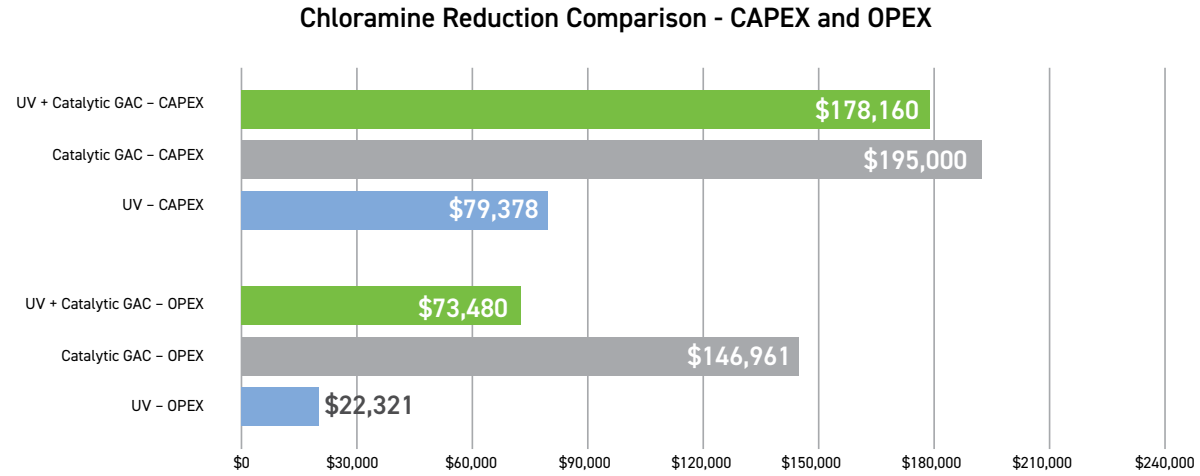
This highly advanced product line can be used for multiple applications, including the reduction of TOC (total organic carbon), chlorine and chloramines, and ozone, while also providing microbiological inactivation.

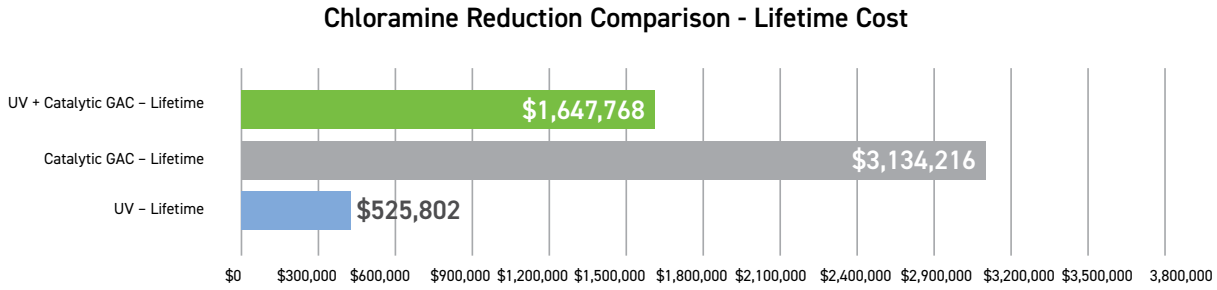
Aquafine Avant system



Economics of UV and Catalytic Activated Carbon

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





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	150gpm
Water Source	Municipal tap water
Incoming Cl^2 Concentration	1ppm inlet chlorine concentration or 0.6ppm inlet chloramine. Reduction to 0.05ppm
Operation	6–8 hrs/day - 5–6 days/week
Electrical Power Cost	$0.1022/kWh
Municipal Water Cost	$5.84/1000 gal
Sewer Charges	$8.08/1000gal
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

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