

Tech Brief

The Deployment of High-Intensity UV Technology for the Elimination of Residual Chlorine Present in Water

Aquafine Corporation Technical Services Dept.

Facility/Test Site:

Surgical Products Manufacturing Facility, NC, USA

Application:

Chlorine Destruction



Before UV installation



After UV installation

Abstract:

This technical bulletin outlines a case-study involving the successful deployment of next-generation high-intensity UV technology for the elimination of residual free chlorine present in the city supply water at a surgical-products manufacturing facility located in North Carolina, USA.

It had long been known that UV light has the unique ability to eliminate chlorine present in water, as evidenced by the 'disappearance' of chlorine from open ponds and pools exposed to sunlight. Research studies have been carried out in the past to study the effectiveness of UV light for this application that reported excellent results.

In the case in point, the influent Charlotte, North Carolina City water is first pretreated by a 5 mm pre-filter, the water then passes through an Aquafine SCD-HE Series Chlorine Destruction unit. The process flowrate ranges from 40 to 50 GPM (gallons per minute). The free chlorine and total chlorine concentrations at the inlet of the UV unit

are about 0.6 ppm and 0.9 ppm respectively, while the values are below detectable limits at the outlet of the UV unit. The Aquafine UV unit is part of a fully validated, USP 23 Pharmaceutical-grade water treatment system and has been in operation since July 2nd, 1998. The UV effluent free chlorine and total chlorine concentrations are 'below detectable limits'.

Description of the UV Unit at Clinipad

The Chlorine Destruction unit installed at Clinipad is a typical UV unit system, essentially comprised of a cylindrical chamber featuring UV lamps, encased inside quartz sleeves arranged within the chamber, with the water flowing over the sleeves. During the several seconds that the water stream resides within the cylinder, the targeted contaminant present in the water (free/total chlorine) absorbs the incident UV radiation generated by the lamps.

This unit also features the Aqualogic 2000™ Control System, patented by Aquafine that monitors and displays the absolute, real-time UV intensity generated by the UV lamps.

Conclusions

Using an Aquafine disinfection unit in conjunction with a small amount of chlorine does offer the advantage that the chlorine level in the water is low enough to prevent eye and skin irritation, while providing sufficient residual for safety, bleaching of suspended particles and algae control. Specific Aquafine equipment recommendation for a swimming pool application will be based upon the recirculating water flow through the pump. An inexpensive prefilter may be employed to render the feedwater stream clearer and thereby to enhance its UV transmission capability. The equipment required would also depend on water temperature: The water temperature tolerance of Aquafine's standard UV equipment is to up to 105°F, which covers most pool and spa temperature ranges. However, if the water temperature is over 105°F but under 150°F, then the UV unit will need to incorporate the optional high - temperature modification option, which is not available on all Aquafine models.

Photos courtesy of Pure Flow, Inc., Mebane, NC.



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