Removing Bound Chlorine in Swimming Pools with HOD™ (Hydro-Optic Disinfection) UV

Bound chlorine, also known as chloramines, forms when free chlorine combines with organic matter such as sweat, oils, or ammonia in swimming pools. Chloramines can cause unpleasant odors, eye irritation, and respiratory issues. Atlantium's HOD UV technology offers an effective solution for the breakdown and removal of bound chlorine. This brief outlines how the Medium Pressure (MP) HOD UV system operates to achieve this and highlights its benefits for swimming pool.

Chloramines in swimming pools and their Behavior in Water

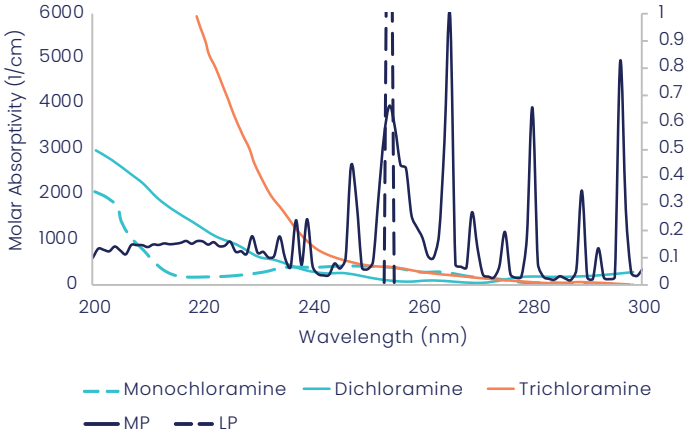
Chloramines exist in three forms: monochloramine, dichloramine, and trichloramine. Their presence in swimming pools results from interactions between free chlorine and nitrogen-containing organic compounds.

Monochloramine is the least volatile.

Dichloramine and **trichloramine** are responsible for the strong "chlorine" smell often associated with poorly maintained pools. Trichloramine is particularly volatile and irritating to swimmers.

Reducing these compounds is essential for maintaining a safe and pleasant swimming environment.

Figure 1



Mechanism of Bound Chlorine Removal by MP UV

MP UV lamps emit a broad spectrum of UV light, which is particularly effective in breaking down bound chlorine molecules in water. The process, known as photolysis, involves the absorption of UV photons by monochloramine molecules, leading to the disruption of chemical bonds within the chlorine species. MP UV technology is particularly efficient due to its broad emission spectrum, which enhances the reaction rates for chloramine destruction. (Figure 1)

HOD MP UV technology stands out as an effective method for the removal of Bound Chlorine in water, particularly for Dichloramines and Trichloramines. While it can also address monochloramine, the energy requirements are notably higher. Understanding the specific needs of your water treatment application will guide the optimal use of HOD MP UV technology for chlorine and chloramine management.

Advantages in using HOD-UV for Reducing Chloramines

1. **Improved Water Quality**
   Removing chloramines enhances the safety of pool water, ensuring a more pleasant swimming experience. In addition, corrosion potential drops.
2. **Reduced Odors and Irritation**
   The breakdown of trichloramine significantly reduces the strong chlorine smell and associated eye and respiratory irritation.
3. **Enhanced Disinfection**
   By removing bound chlorine, more free chlorine is available for effective disinfection. Eventually, less chlorine is needed.
4. **Energy Efficiency**
   While chloramine destruction requires energy, MP UV systems are optimized for high efficiency, minimizing operational costs.

Atlantium's HOD MP UV technology is an effective solution for addressing the challenges posed by chloramines in swimming pools. By leveraging advanced photolysis processes, this system enhances water quality, reduces health risks, and ensures a more enjoyable swimming environment. Understanding the specific requirements of your pool system will guide the optimal implementation of MP UV for chloramine management.

HOD™ UV Technology Overview

Real-Time Monitoring & Response to Changing Water Conditions

The UV Dose depends on three parameters: UVT, flow rate, lamp power.

Direct and accurate monitoring of each of these parameters individually is crucial for reliable and accurate UV Dose delivery.

Accurate Lamp Performance Monitoring

- Dedicated lamp output sensor per lamp provides monitoring of each individual lamp's performance
- Ensures delivery of the required UV dose at all times
- Continuous adjustment of lamp power according to changing production variables such as flow rate and water UVT parameters individually is crucial for reliable and accurate UV Dose delivery.

Integrated Water Quality Monitoring

- Integrated UV transmittance (UVT) sensor on each HOD UV system
- Continuously monitors UVT
- Optimizes system performance for actual, not estimated, UVT levels

Real-Time Performance Data

- The most advanced operation module in the market
- Elaborate information about each individual lamp
- Configure output signals, operation modes and alarms
- User-based authorization management system
- Complete integration with control SCADA system

Superior Power Efficiency

Total Internal Reflection (TIR) uses fiber-optic principles of recycling UV photons in the disinfection chamber to achieve higher UV dose levels with minimum kW consumption.

Medium Pressure Lamps

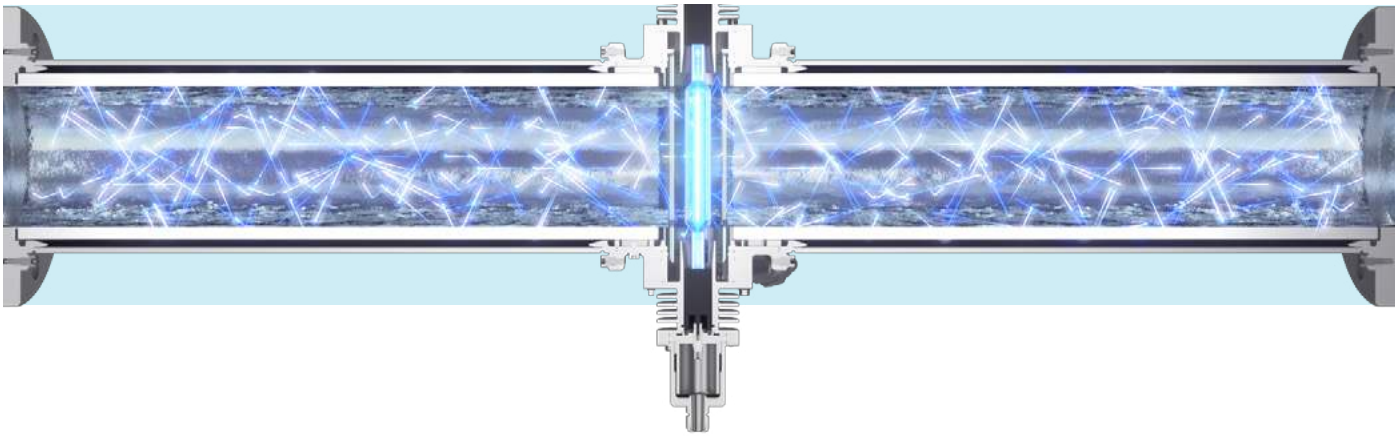
The advantage of the wide germicidal wavelength

The spectral sensitivity of microorganisms to wavelengths between 200-400nm is by now an established fact.

Medium pressure lamps emit a broad germicidal spectrum providing complete protection against a wide variety of microorganisms while using minimal amount of lamps.

Why low amount of lamps is so important?

- Accurate monitoring (enables a sensor per lamp)
- Reduced maintenance
- Recycles UV light energy using Total Internal Reflection (TIR)
- Offers most advanced system geometry with optimized hydraulic and optics
- Ensures homogenous UV dose distribution



HOD UV quartz sleeve (left) vs. conventional UV sleeve

No Quartz Sleeve Replacement

The HOD UV systems use a high grade silica quartz sleeve five times thicker than those used in conventional UV systems, and does not require periodical replacement.

Quick and Easy Lamp Replacement

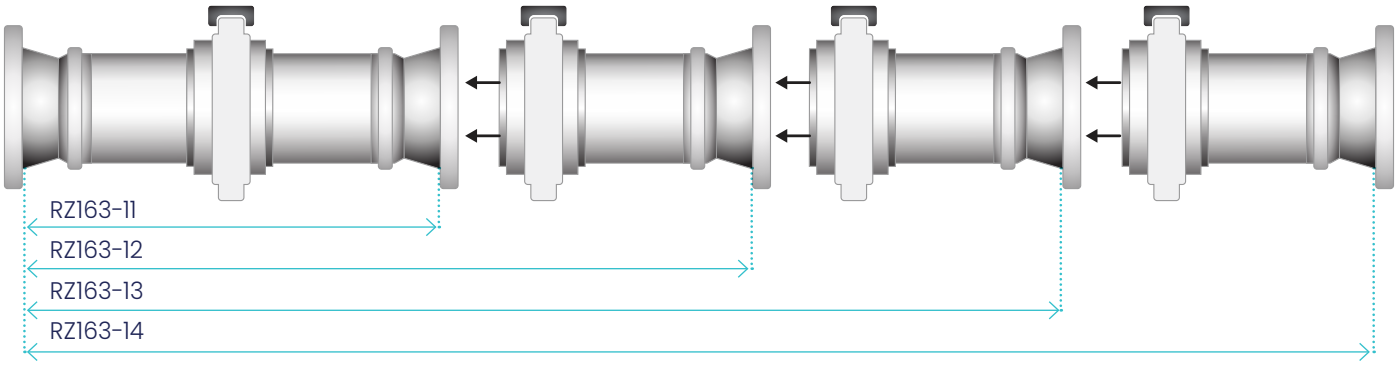
Lamp replacement does not require draining the system or depressurization and can be safely performed during system operation!

Modular Design Enables Maximum Flexibility

HOD UV systems' core "building blocks" include a lamp and pipe section and independent ballast unit. Sections are added together according to the application and desired UV dose. Each section can operate independently from the rest of the sections.

This unique configuration allows for maximum flexibility in sizing, maintenance and operation:

- Overcomes space and head-loss limitations
- Allows for lamp replacement while system is in operation
- Increase capacity by adding more sections; no need to replace entire system



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