Atlantium
Enlightened Water Technologies

UV Water Treatment
PharmaGuard™ Hydro-Optic Solutions

Bio-Pharma Industry

Treat Your Water With Light

$$C_{out}(D) = C_{in} \cdot e^{-\beta \cdot D / D_{05}}$$

$$C_{out}(D) = C_{in} \cdot \left(\frac{1}{2}\right)^{D / D_{05}}$$

Guaranteed results...innovative solution!

Next-Generation Medium Pressure UV Technology

9 facts about Atlantium's green, clean PharmaGuard™ solution:

1. Guaranteed performance
2. Effective for hot and cold PW/WFI distribution loops
3. In-line system with small footprint
4. Measured UV dose with real-time control
5. Construction complies with cGMP
6. Sustainable Dechlorination – decomposes chlorine to undetectable levels
7. Potent broad-spectrum disinfection
8. Unprecedented power efficiency
9. Fewer lamps with easy 4-minute lamp replacement

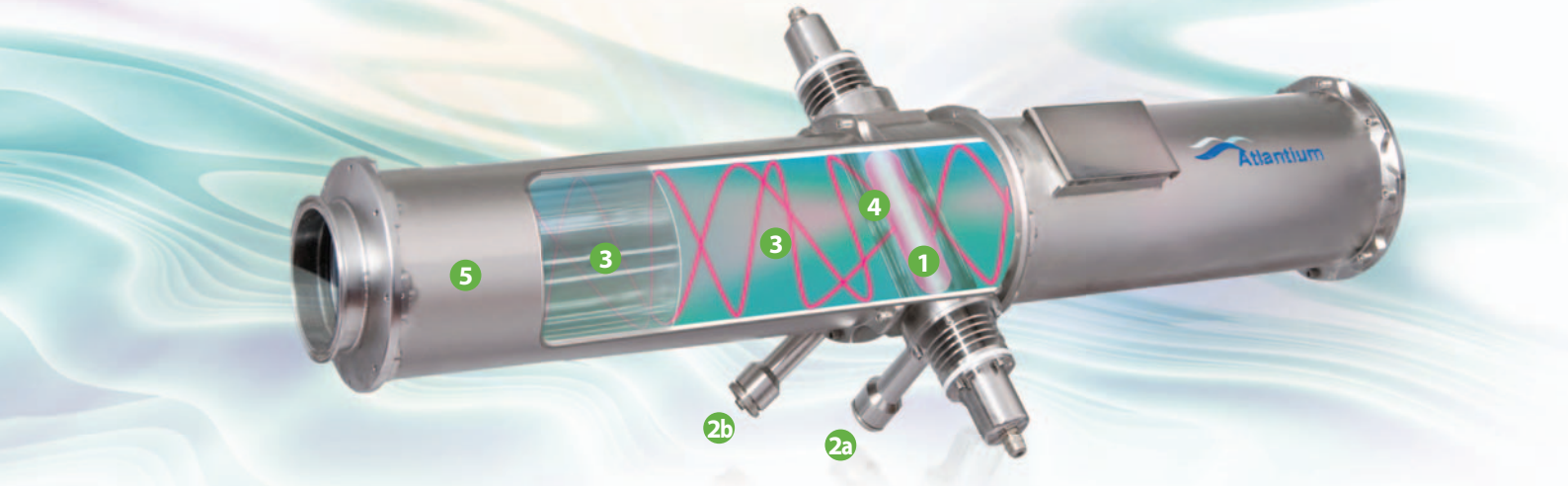
The PharmaGuard solution is equally effective with cold or hot water, making it suitable for installation anywhere along the process line. Whether used as pre-treatment to prevent RO and EDI biofouling, or disinfection barrier for the PW/WFI loop - the PharmaGuard does the job easily and efficiently.

The Atlantium Difference

Adlantium uses Medium Pressure UV light which it leverages to full potential by applying fiber optic and hydraulic principles that change the way the UV is delivered, enabling **optimized UV power efficiency** and uniform UV dose distribution.

The monitor shows the status of critical parameters in real-time

Integrated advanced software for **real time monitoring & control** of all mission-critical parameters guarantees that water purity is maintained all the time and complies with PW standards.



1. **Medium pressure broad spectrum UV light power enables efficient Dechlorination** and inactivates a wider range of microorganisms with multiple action mechanisms – disables proteins and inactivates DNA replication. Effective even with resistant strains. Short lamp enables easier handling.
2. **Integrated Control software automatically adjusts the UV power to continuously maintain the required UV dose.**
   - a Integrated sensor monitors UV lamp intensity.
   - b Integrated sensor monitors UV water transmittance (UVT)
3. **High-Grade Quartz chamber** surrounded by an air block traps UV light rays and reflects them back into the water, for optimized dose distribution and UV power efficiency.
4. **Thick Quartz tube separates UV lamp from water chamber** for quick & easy lamp replacement and avoids broken glass and mercury in water.
5. **Stainless steel housing** meets cGMP standards.

Sustainable Dechlorination

The PharmaGuard's Medium Pressure high-intensity UV light is extremely effective in decomposing free-chlorine to undetectable levels, and is a clean and safe alternative to activated carbon filter and sodium bisulfite.
The results are reliable and the system is sustainable.
It protects the RO filter membrane from microbial contamination, reducing the maintenance burden, while providing high-level water disinfection and on-demand availability.

Measuring free available chlorine levels in water using a manual colorimeter. The pink "in" beaker shows flow stream in which chlorine is detected. The clear "out" beaker shows water after treatment with PharmaGuard – no chlorine detected.

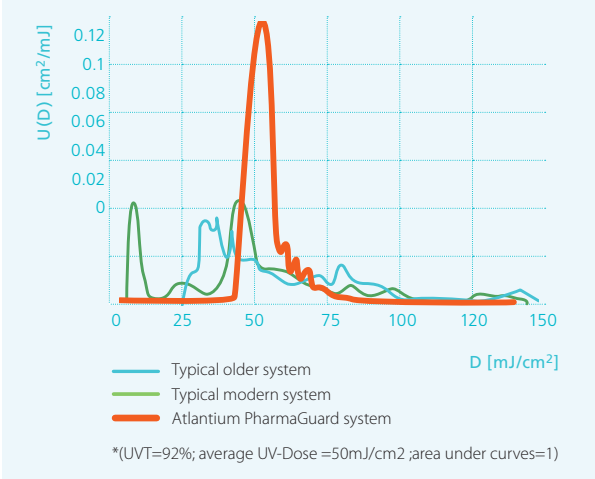
High-Level Disinfection

The PharmaGuard is fully compliant with PW and WFI standards and provides a powerful enough UV dose to use as the primary disinfectant in a purified water loop.

The system has third party validation according to the EPA (US Environmental Protective Agency) protocol for 4-log reduction of viruses, and 5-log reduction of resistant bacteria.
The Medium Pressure UV that the unit provides only needs a dose of 93mJ/cm² to achieve 4-log virus disinfection of hard-to-kill viruses like Adenovirus, while it takes over 186mJ/cm² and often much more to get the same performance from low pressure lamps.

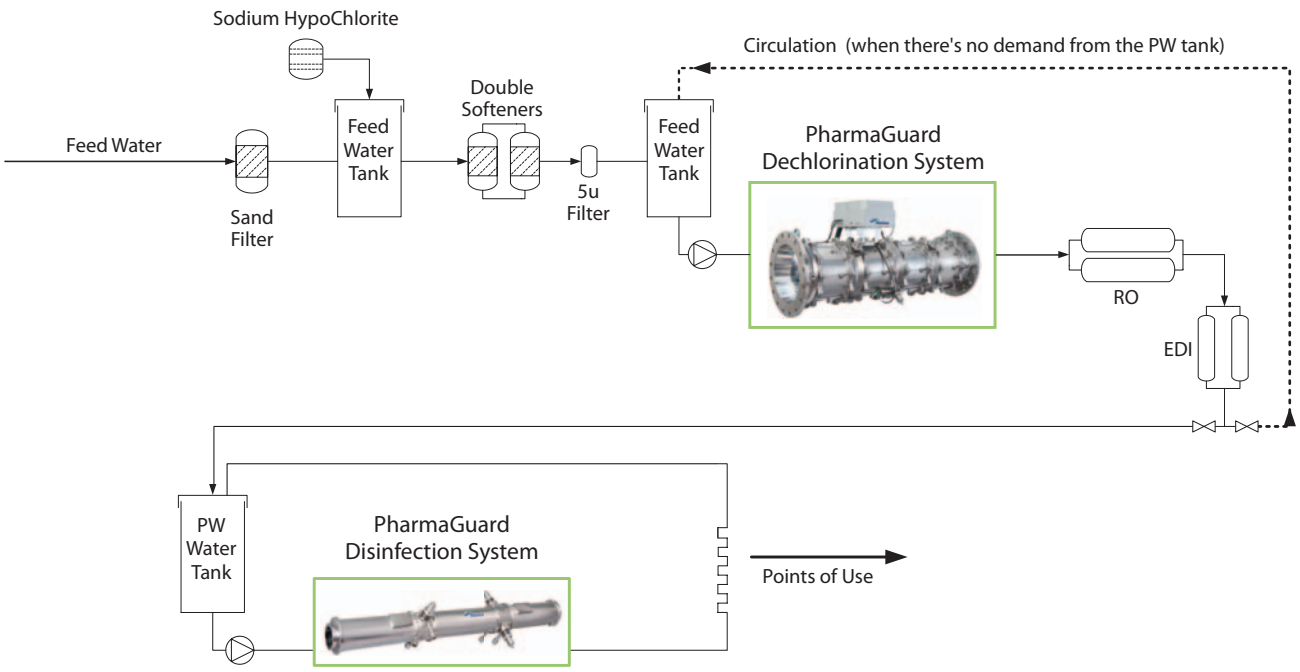
UV-Dose Density Functions

indicating UV energy efficiency



The PharmaGuard has a very narrow dose distribution. Inactivation of all targeted pathogens at the required dose is achieved with high energy efficiency, especially at high doses.
In contrast, the broad dose distribution histograms of other units indicates that many microbes are receiving a lower-than-required dose; increasing the dose to achieve higher inactivation would require greater energy expenditure

Typical Bio-Pharma Installation



The Clean, Green Solution

- No chemicals. Environmentally safe.
- Doesn't affect water chemistry.
- Reduces membrane and pipe bio-fouling. Effective with hot and cold water.
- Reduce your CIP and improve your product-water ratio.

Reliable System that Guarantees Results

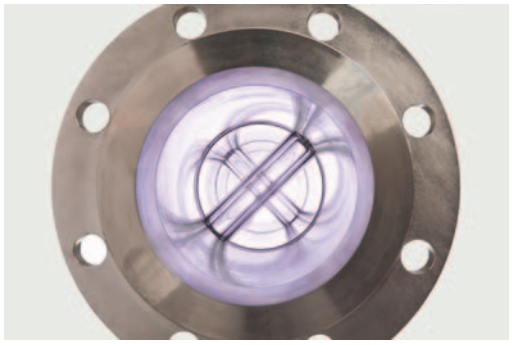
Broad-spectrum Medium Pressure UV light, optimized UV delivery and real-time control gives a sustained performance that, with easy maintenance, significantly reduces operating expenses.

Sustained Performance

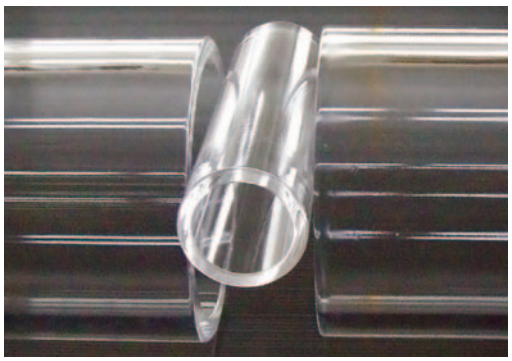
- Real-time monitoring & control
- Integrated software layer maintains required UV dose all the time
- True in-line system mounted vertically or horizontally

Reduced cost-of-compliance

- Reduced CIP heat sterilization
- Robust design with no dead legs
- Best-of-breed materials



Inside view of PharmaGuard treatment chamber. The high-grade quartz surface is chemically inert and always sterile.



Additional view of the quartz treatment chamber showing thick, short quartz UV lamp tube positioned perpendicular to the chamber for quick and easy lamp replacement.

About Atlantium

Atlantium Technologies Ltd., founded in 2003, provides water-dependent industries such as dairy, food & beverage, pharmaceutical and aquaculture, as well as municipalities, with UV (ultraviolet) based treatment to meet the growing need for safe water.

The company's cost-effective and environmentally-friendly Hydro-Optic™ solutions deliver unprecedented microbial inactivation, taking water safety to levels never before achieved with other UV systems.

Atlantium's Hydro-Optic system is field proven and validated to the highest regulatory standards including EPA, FDA and PMO. The company has an international customer base with installations all over the world.

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