Aquafine™

TRUSTED ULTRAVIOLET SOLUTIONS
FOR INDUSTRIAL LIQUID TREATMENT APPLICATIONS

Aquafine Corporation

Aquafine provides UV solutions worldwide for TOC reduction, chlorine and chloramines destruction, ozone destruction and disinfection with the highest quality in customer support.

Established in 1949, Aquafine Corporation is a Valencia, California-based company recognized as one of the largest ultraviolet equipment manufacturers in the world. Operating as a strategic business unit of Trojan Technologies, Aquafine brings over 80 years of combined experience to the global industry, becoming the 'center of excellence' for the collective industrial/commercial base.

In 2005, Aquafine became part of the Trojan Technologies group of Businesses.

This combined entity is uniquely positioned to offer the marketplace with the best available technologies, conduct leading-edge research, develop innovative product offerings, and offer the highest quality in customer support. Trojan Technologies is part of Danaher Corporation's (DHR : NYSE) water quality platform. Danaher is a Fortune 200, global science and technology leader.

Our Vision & Mission

Global Leader in Industrial UV Treatment Solutions by Protecting the **Health** of people; Protecting the **Brands** and Improving the **Quality** of consumer goods; Protecting the earths' **Environment**

Our Ultraviolet (UV) Technology and Systems

With thousands of installations worldwide, we recognize that water impurities, compliance to state, federal and international regulations, and equipment reliability are often the most important factors, and we work with our customers to create a strategic partnership.

Our state-of-the-art facility and ultraviolet (UV) technology enables our advanced UV water treatment systems to meet the changing requirements and needs of a diverse customer base.

Industrial & Commercial Markets Served

Aquaculture: Fish hatcheries, grow-out facilities and shellfish cultures.

Food & Beverage: Bottled water industry, carbonated & non-carbonated beverages and dairy plants. Food packaging, crop irrigation and meat and poultry processors.

Life Sciences: Pharmaceuticals, biopharmaceuticals, hospitals and the prevention of nosocomial Legionalla.

Marine: Disinfection of drinking water and wastewater on marine vessels.

Microelectronics: Reducing trace organics and microbial contamination for ultrapure water.

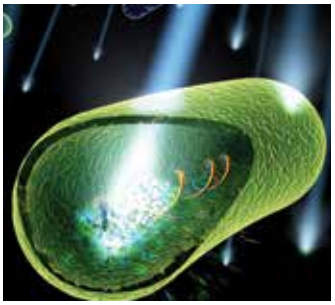
Oil & Gas: Water systems for enhanced oil recovery, natural gas well fracturing and produced water reuse or disposal.

Power Generation: Reducing trace organics and microbial contamination for Ultrapure and Cooling Water.

Recreational Water: Fountains, swimming pools, aquariums and car washes for disinfection, and disinfection by-product removal.

Ultraviolet Light in Your Treatment Processes

Ultraviolet (UV) light is a versatile, reliable, chemical-free approach to address numerous requirements in industrial water treatment – pre-treatment, process water and wastewater.

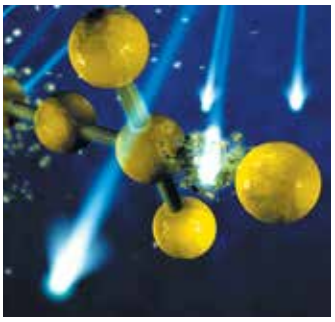


UV for Broad-based Disinfection

- Eliminates bacteria, viruses and chlorine-resistant protozoa
- 254 nm UV penetrates the cell wall of microorganisms, attacking DNA genetic material and preventing replication
- Disinfection is typically characterized as a 3-Log reduction of microorganisms, and is based on a dose of 30 mJ/cm^2 at the end of lamp life

UV for TOC Reduction

- 185 nm UV at a minimum dose of 90 mJ/cm^2 creates powerful hydroxyl radicals that oxidize total organic carbon (TOC)
- UV can be used together with DI and RO to reduce TOC to effluent levels of 1.0 ppb or less

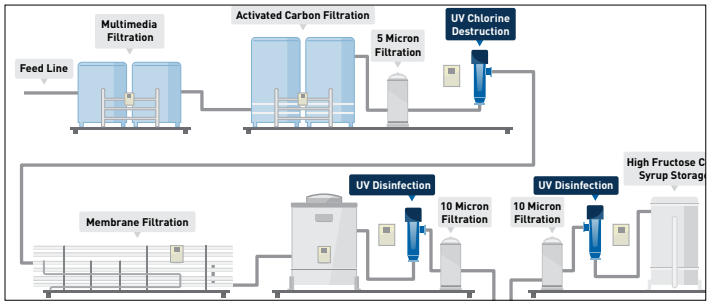


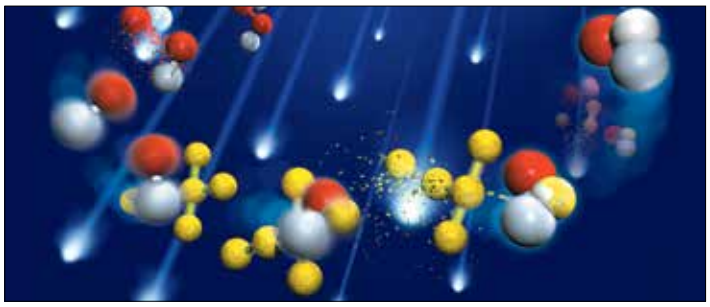
UV for Ozone Destruction

- Residual ozone (O_3) is efficiently removed by UV at a wavelength of 254 nm
- Ozone absorbs the UV energy and quickly breaks down to dissolved oxygen (O_2)
- Typically, 1.0 ppm of ozone can be removed with a UV dosage of 90 mJ/cm^2

UV for Chlorine/Chloramines Destruction

- UV can replace conventional sodium metabisulfite and carbon technologies
- UV breaks down free chlorine and chloramines
- The UV dose requirement for chlorine/chloramines destruction also provides simultaneous disinfection and ozone destruction





UV to Enhance Membrane Performance

- Using UV prior to membrane systems eliminates bacterial loading and prevents fouling caused by the establishment of biofilm
- Reduced biofouling enhances membrane performance and allows longer production runs between cleanings and prolongs membrane life
- Also effective in post-membrane applications for permeate disinfection and TOC reduction

UV for Rinse Water Reclamation and Wastewater Treatment

- Aquafine and TrojanUV have advanced the process of UV-oxidation – using UV in combination with hydrogen peroxide (H_2O_2) – to break down toxic contaminants into safe, elemental components
- An innovative, cost-effective solution to remove chemical constituents from rinse water, allowing its re-use in your processes
- Well suited to address increasingly stringent requirements on wastewater discharge and water reuse

Aquafine UV: The Right Choice

Designed for the Full Range of Industrial Applications

Pressurized and gravity-fed systems designed, sized, and built for disinfection, TOC reduction, and the destruction of ozone, chlorine/chloramines and chemical contaminants

Innovative UV Systems Built on Over 65 Years of Research & Experience

Aquafine and Trojan Technologies' significant body of proprietary, scientific research and knowledge is engineered into innovative UV water treatment solutions incorporating over 200 granted or pending worldwide patents

Compact Systems that Preserve Precious Space

Designed and optimized for high efficiency using advanced 3-D computer modeling and a range of lamp technologies to minimize space requirements

Over 150,000 Global Installations

Aquafine UV systems are in operation around the world – providing proven, reliable treatment of everything from the highest purity water to wastewater with extremely low UV transmittance

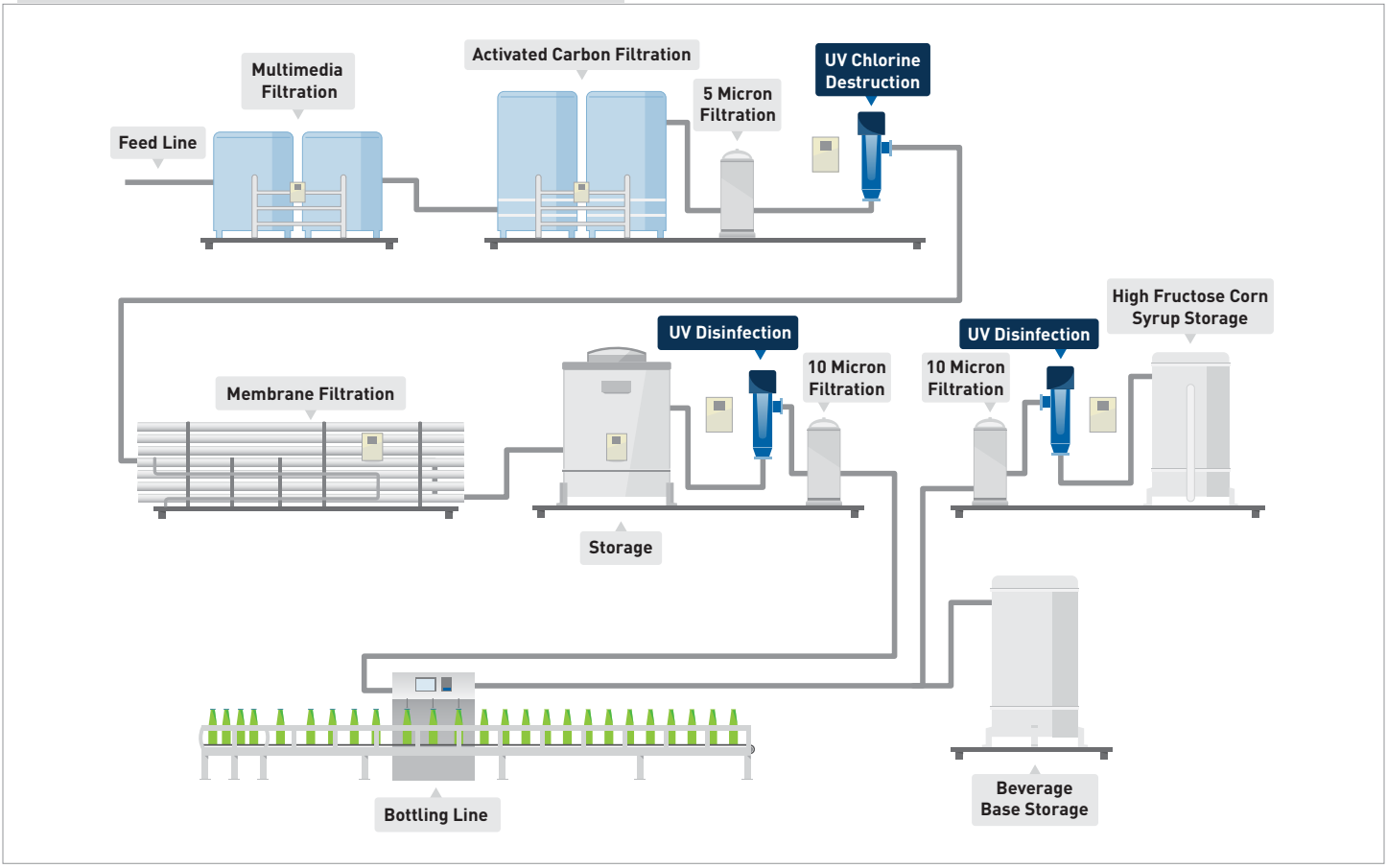
Aquafine offers the most comprehensive line of industrial solutions, including open channel, gravity systems and closed, pressurized systems, to address an extensive range of industrial liquid treatment requirements.

Food & Beverage

UV Applications in Food & Beverage

- **Disinfection** – the most common application of UV in water treatment. UV systems can significantly reduce the microbial counts by providing 4-log Virus deactivation in the influent stream.
- **TOC Reduction** – in ultrapure water systems, UV treatment is used for the effective reduction of organics, commonly referred to as TOC.
- **Ozone Destruction** – commonly used in the pre-treatment area of a water system as well as for sanitizing process and recalculating systems. UV radiation can effectively eliminate residual Ozone present in water.
- **Chlorine/Chloramines Destruction** - UV radiation can effectively eliminate residual chlorine/chloramine present in water.

Typical UV Beverage Installation Schematic

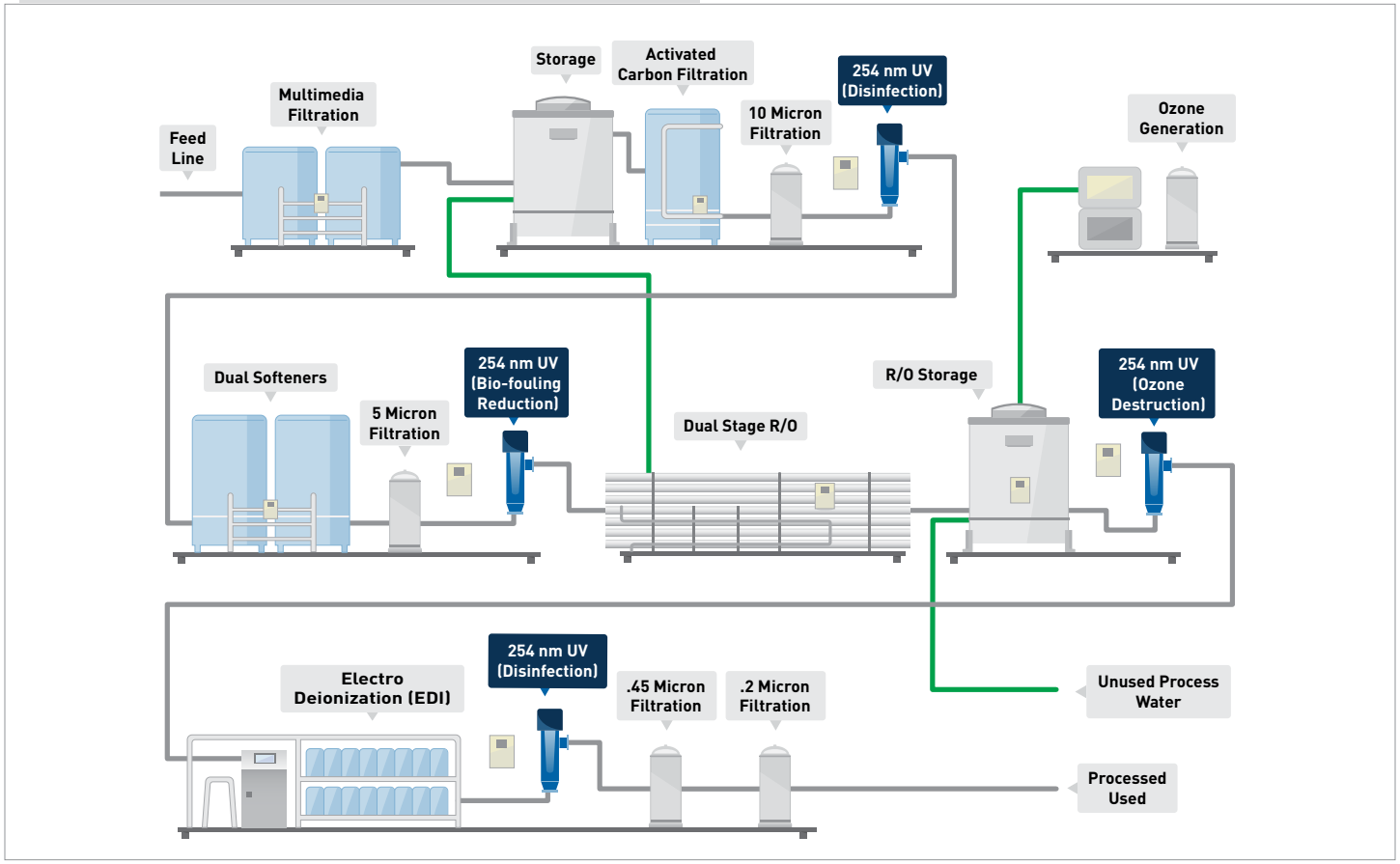


Life Sciences

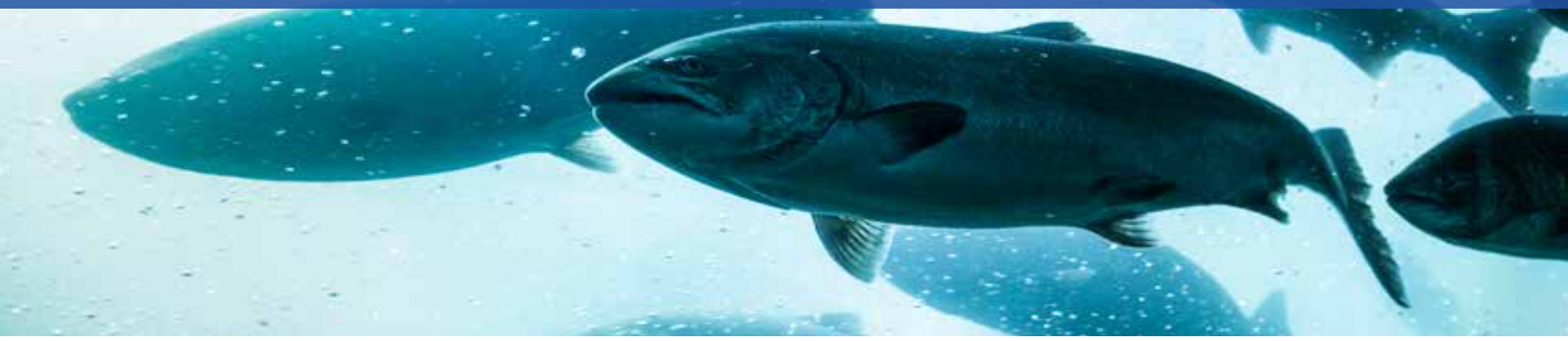
UV Applications for Life Sciences

- **Disinfection** – the most common application of UV in water treatment.
- **TOC Reduction** – the USP 31 regulations require an upper limit of 500ppb for TOC for both Purified Water and Water for Injection. Aquafine uses a powerful 185nm wavelength appropriately sized and designed to meet this application.
- **Ozone Destruction** – ozone is commonly used in the pretreatment area of a water system, as well as for sanitizing process and re-circulating systems. UV radiation can effectively eliminate residual Ozone present in water.
- **Chlorine/Chloramines Destruction** - while the addition of chlorine and chloramines to city water may control bacteria levels, they have undesirable effects on the degradation of membrane filtration or RO. Aquafine pioneered the technology of chlorine and chloramines destruction utilizing UV light in the pre-membrane filtration or RO make-up water stream.

Typical UV Pharmaceutical Installation Schematic



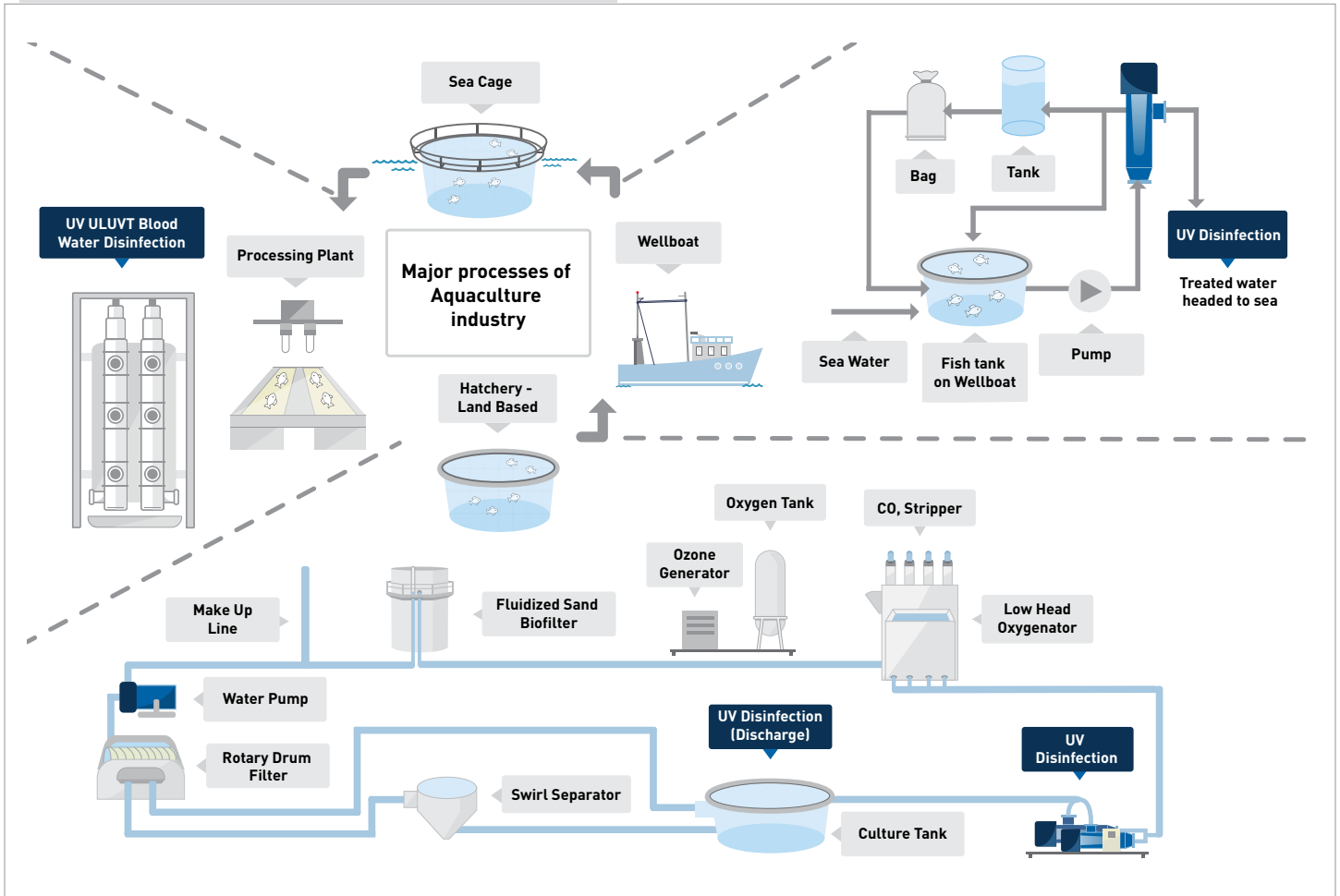
Aquaculture



UV Applications in Aquaculture

- **Disinfection** – the most common application of UV in water treatment. UV systems significantly reduce pathogen counts in incubation and rearing facilities and have proven to be the most cost-effective disinfection technology for the inactivation of many types of bacteria, viruses and parasites harmful to many species of fish.
- **Ozone Destruction** – ozone is often used in a fish hatchery to enhance the quality of problematic water sources used for incubating and rearing fish. However, residual ozone in the water can be extremely toxic or fatal to the aquatic life being reared. UV light systems are applied to consume the residual ozone in the bulk water prior to contacting the fish.

Typical UV Aquaculture Installation Schematic

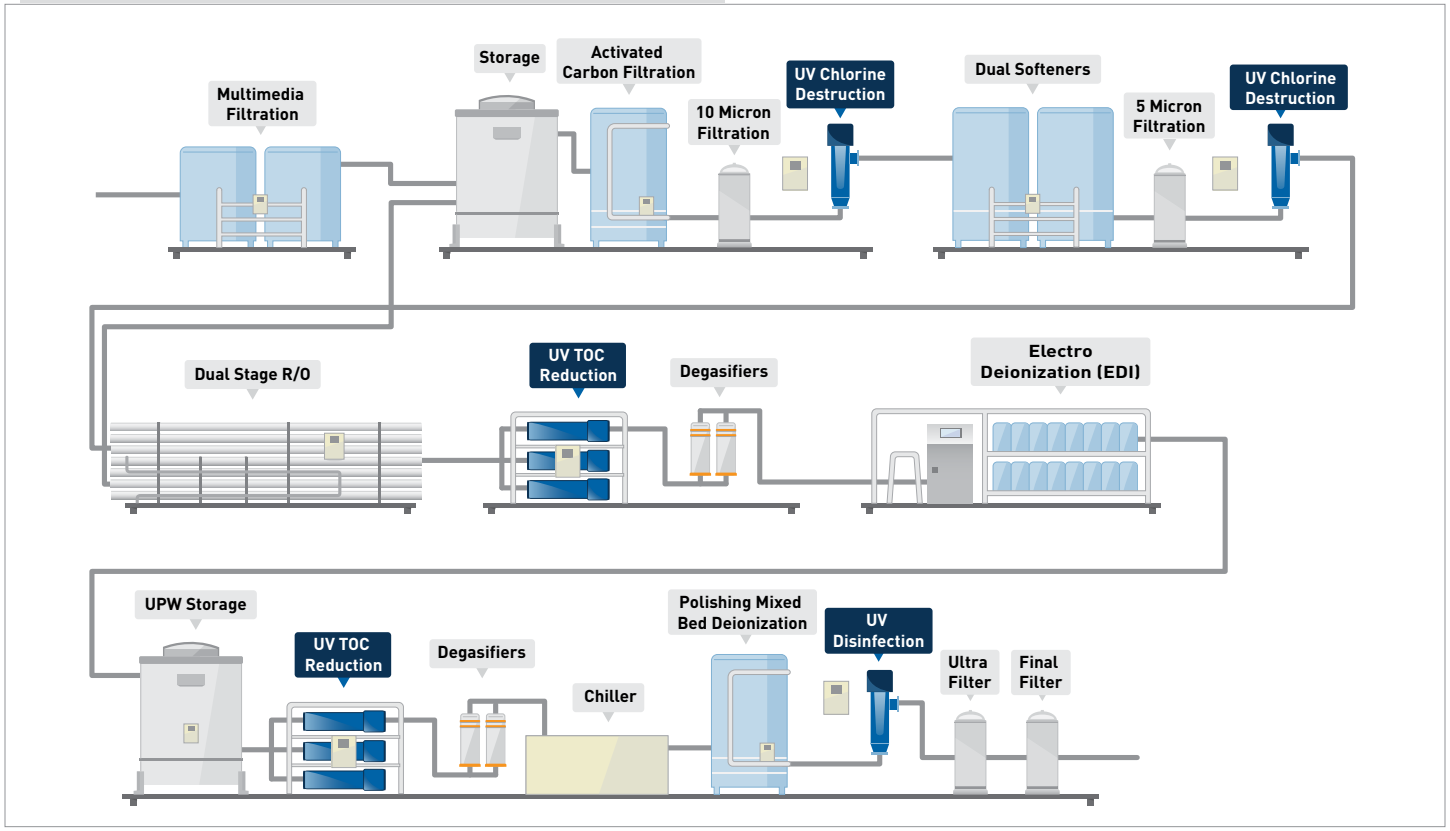


Microelectronics

UV Applications in Microelectronics

- **TOC Reduction** – Ultraviolet (UV) systems are used for the effective reduction of organics, commonly referred to as TOC (total Organic carbon). Reduction of TOC is accomplished by incorporating a 185nm UV system appropriately designed and sized as well as strategically located in conjunction with other equipment.
- **Disinfection** – the most common application of UV light in water treatment. Typical locations in a microelectronics water systems would be Post-carbon filter, pre-RO and post-RO (reverse osmosis).
- **Ozone Destruction** – ozone is commonly used in the pre-treatment area of a water system, as well as for sanitizing process and re-circulating systems.
- **Chlorine/Chloramines Destruction** - while the addition of chlorine and chloramines to city water may control bacteria levels, they have undesirable effects on the scaling of membrane filtration or RO. UV solves these problems while destroying chlorine, using a small footprint and reducing maintenance costs.

Typical UV Microelectronics Installation Schematic



Market Success Stories

Microelectronics Market

Installed: 2009
Flow rate: 300 GPM
Equipment: SCD1750H – 10 pack
Service: TOC reduction - High Purity loop

Food & Beverage Market

Flow rate: 150 GPM
Equipment: LSHX 36R60
Service: Disinfection of liquid sugar

Aquaculture Market

Installed: 2004
Flow rate: 3000 GPM
Equipment: UVLogic 24AL50 systems (4 units)
Service: Disinfection of *Myxobolis cerebralis*

UV-Oxidation Scrubber Market

Installed: 2012
Flow rate: 2,325 GPM
Equipment: UV3000+ system (160 lamps)
Service: UV/Catalyst VOC Destruction from Scrubber

Pharmaceutical Market

Installed: 2006
Flow rate: 150 GPM
Equipment: UVLogic 02AM20 (2 units)
Service: Disinfection/Ozone Destruction

Key Features and Benefits of our Industrial Line

Proven Performance for Multiple Treatment Applications

Our products are robust, highly versatile, UV water treatment systems with broad capabilities for many industrial applications. With availability in numerous configurations and proven reliability in thousands of installations on six continents. Fully equipped with system features other manufacturers consider optional.

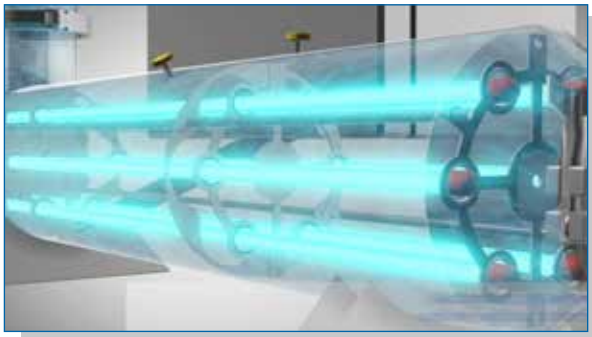
*This product contains additional options. See Aquafine or an Authorized Distributor for details. Images shown for illustration purposes only.

Standard Equipment on Aquafine UV Systems

- SiC photo diode UV sensor
- UV intensity display with 4-20mA output
- Individual lamp status display and alarms
- Elapsed time display and alarms
- High temperature monitoring and alarms
- Remote monitoring and control capability
- Purpose-designed, electronic power supply
- FDA-approved sealing materials
- Comprehensive, pre-delivery electronic and hydrostatic pressure testing
- Full, pre-delivery assembly, including quartz sleeves, lamps and sleeves

Sleeve Wiping System Maximizes UV Dose

- Optional manual or automatic wiping system simplifies routine maintenance
- Prevents fouling of the quartz sleeves for more consistent UV dosing
- Reduces the frequency, inconvenience and cost of manual chemical cleaning
- Operates online while the lamps are disinfecting



LIFETIME ★ GUARANTEE ★ PERFORMANCE

Life Time Performance Warranty only applicable with the use of genuine OEM replacement parts.

Key Features and Benefits of our Industrial Line

User-Friendly Digital Controller

- Programmable digital and analog I/O capabilities allow alarm code differentiation and remote on/off control
- Discreet alarm outputs for rapid identification and correction of changes in system conditions
- Linkable to plant SCADA systems for integrated plant operation and monitoring
- Built in memory for data acquisition and trending analysis of UV intensity and alarm conditions
- Digital interface provides real-time system performance information at-a-glance
- Menu-driven for simple configuration with password protection to secure critical settings
- Cabinet is TYPE 4X/IP65 with UL, NEN and CE rating for maximum safety

High-Output Amalgam Lamps

- Produce higher UV output than conventional low-pressure lamps
- Deliver equivalent dosages using 1/6 to 1/3 the number of lamps compared to conventional UV systems
- Energy efficiency – draw less power than competitive high-output systems
- Deliver flat, stable UV output in water temperatures ranging from 41° to 104° F (5° to 40° C)

Designed for Easy Maintenance

- Operator-friendly design with single-ended lamps for simplified annual lamp replacement
- Lamp changeovers can be done in about 5 minutes per lamp without tools
- UV lamps incorporate a angel based design that virtually eliminates the potential for arcing – even in wet or humid conditions
- Externally mounted sensor allows easy access
- Optional automatic or manual sleeve wiping system reduces the frequency, inconvenience and cost of manual chemical cleaning
- Sleeve wiping system operates while the system is operating

Complete Solutions and Service

Rapid Service and Parts

- Aquafine maintains a staff of highly-trained Service Technicians, deployed from our head office and globally to provide support, training, and routine and emergency service
- Our core team is supplemented with local service and support provided by our extensive, international network of Manufacturer's Representatives
- Aquafine maintains spare parts stocking centers in North America and internationally to ensure sufficient quantities and quick turnaround time for spares and replacement parts.

Guaranteed Performance and Support Services

All of our systems come with a lifetime performance warranty. Global customer support is available from our Authorized Distributor Network and from our Technical Service Group.

For questions regarding your application needs, please contact your local Authorized Distributor or Aquafine for more information.

Aquafine is an ISO 9001:2008 certified company. Aquafine equipment performance is guaranteed with the use of genuine OEM replacement parts.

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