UV FAQs

1. What are the primary benefits of ultraviolet water treatment?

Ultraviolet (UV) light treatment is a widely recognized and proven method of disinfection of water. It is a physical treatment, not chemical, so it doesn't alter the water chemistry. UV adds nothing to the water such as undesirable color, odor, taste or flavor and neither does it generate harmful by-products.

2. What industries use UV water treatment?

It is a well-proven technology and pretty much every industry that utilizes water for process or production could employ UV technology for water treatment. Examples include microelectronics, life sciences, food & beverage, chemical, utilities (power generation,) aquaculture/hatchery, recreational water, municipal drinking water, etc.

3. Describe a typical UV water treatment unit and how it works.

A typical UV unit works by irradiating flowing water using UV lamps strategically placed within the treatment chamber. Although the water resides within the chamber for only a few seconds, it receives sufficient UV dosage to be lethal to microorganisms present in the feed water. A dosage of 30,000 microwatt-seconds per squared centimeter is more than sufficient to destroy most water-borne microorganisms. UV treatment requires only a fraction of the contact time required by other disinfection methods.

4. In the Chlorine/Chloramine removal process, what advantages does UV treatment have over the conventional methods?

With UV, there are no side effects to overcome because no chemicals are added which have to be removed later. The two conventional processes for chlorine/chloramines elimination- activated carbon adsorption and sodium metabisulfate injection- have inherent drawbacks such as biofouling, added substance problems for the sodium metabisulfate methods, and disposal of the spent carbon for the activated carbon method. UV is environmentally friendly where the other two methods are not.

5. Explain the need for TOC reduction for the ultrapure water used for the semiconductor industry.

Residual Total Organic Carbon (TOC) in semiconductor rinse water streams causes a haze over the wafer surface that contaminates the wafer and leads to wafer defects. UV treatment renders the rinse water cleaner and virtually devoid of the undesirable TOC. That is one of the reasons why Aquafine's skid-mounted systems that were engineered especially for the semiconductor industry are in such wide use around the world.

6. UV treatment is a proven method of Ozone destruction. Why is that so important to the beverage industry?

Beverage companies use residual ozone in their water systems to sanitize/disinfect the storage tanks, plumbing and pumps and to insure that they remain bacteria free. The residual ozone needs to be destroyed prior to contact with the product so that it does not contaminate. UV is ideal because it is a non-chemical process and it's fast. Aquafine UV equipment can guarantee complete elimination of residual ozone that results in a product that's safer for human consumption.

7. Why are two different wavelengths used in water treatment?

Two different UV wavelengths are employed in water treatment 254 and 185 nm. 254 nm UV light is called the germicidal light because of its ability to destroy microorganisms. It is used to disinfect and to destroy ozone. It penetrates the outer cell wall of the microorganism, passes through the cell body, reaches the DNA and alters the genetic material, destroying the organism. The 185 nm light carries more energy than the 254 nm light. It

generates hydroxyl (OH·) free radicals by cleavage of the water molecules, and is used in TOC reduction to decompose organic molecules into carbon dioxide and water.

8. What manufacturing processes does Aquafine employ to ensure superior performance?

Aquafine's products employ state-of-the-art design standards such as T-drill connections and orbital welding that assure longevity and purity. Sanitary inlet/outlet connections are available on all units, sanitary ferrule endplates replace the normal bolted and threaded design eliminating potential contamination points. Aquafine's UV systems feature lamps with single-ended (SE) designs. The single-ended option offers easier and faster lamp change-out time with few disconnects. Our Colorguard® lamps are color coded for easy identification and are available with validation. Even the quartz tubes (sleeves) that house the lamps are specially designed for high efficiency. They transmit 95% of the UV energy produced by the lamps. Aquafine's Lamp Lok™ assembly securely centers the UV lamps within the quartz sleeve and locks in place. The wetted surfaces on these systems are 316L stainless steel, passivated and electropolished to ensure corrosion resistance and minimize carbon precipitation.

9. What other advantages does Aquafine offer?

Aquafine offers more than 50 years experience in UV water treatment equipment design and manufacturing. In that time, we pioneered the TOC reduction and chlorine destruction applications on a commercial basis. We have more industrial water treatment experience and a greater number of successful installations worldwide than any other UV company. We also have a field service network that is unmatched in the industry and we offer some very innovative engineering advantages that translate into faster maintenance, faster installations and longer equipment life. Aquafine's new facility features 100,000-square ft. of office and factory space dedicated to research and development platforms, including enhanced UV lamp and power testing areas. The installation of a recirculating water system with chiller allows us to simulate hours of actual operating conditions on any new UV skid system before it is shipped, insuring the uninterrupted performance of the system. The new factory floor plan incorporates high performance manufacturing cells, which reduce lead times and increase efficiency. State-of-the art training rooms with video conferencing have been incorporated to meet the product support needs of our diverse customer base as well as our global network of distributors and OEMs.