Aquafine™

TROJAN technologies®

AQUACULTURE

INDUSTRY-SPECIFIC APPLICATIONS FOR UV TECHNOLOGY

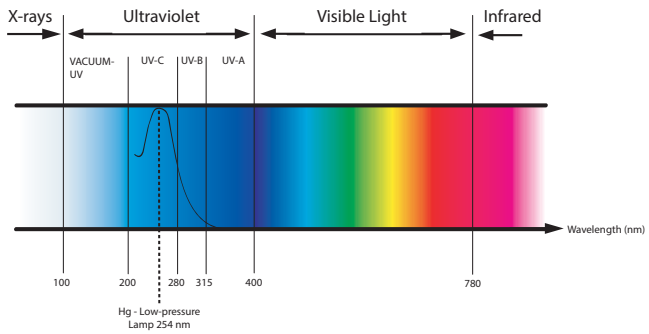
APPLICATION: Ozone Reduction, Treatment | AQUAFINE® UV SYSTEM SERIES: OptiVenn®, Logic™, and Open Channel Systems

Trojan Technologies' UV systems for aquaculture have demonstrated unparalleled performance for over 20 years, and provide customers with an easy-to-operate solution for a wide array of applications.

For Use In:

- Hatcheries
- Incubation, Rehabilitation Facilities
- Depuration Facilities
- Aquariums
- Zoos
- Processing Plants
- Influent/Effluent Treatment

Ultraviolet (UV) light is a form of light that is invisible to the human eye. It occupies the portion of the electromagnetic spectrum between X-rays and visible light. A unique characteristic of UV light is that a specific range of its wavelengths, those between 200 and 300 nanometers (billionths of a meter), they are capable of inactivating microorganisms.



UV Technology for Aquaculture

The lifeblood of today's aquaculture industry is the water used to incubate fish eggs and rear juvenile fish. Water abundance and purity continue to decrease, while stock concerns found in source waters continues to increase. This phenomenon is due in part to the increased demand for water from growing urban areas, continued pollution of our natural waters and the introduction of new microorganisms to natural waters, through bird, animal, and human activities, including ballast water discharge.

Simultaneously, increased consumption of fish due to reported Omega-3 benefits has led to an increasing demand for higher stock densities in the same hatchery footprint. This brings many challenges to a rapidly growing industry, but there are solutions available today which can help to overcome them.

Increasingly, fish hatcheries and rearing facilities are evaluating ways to improve the quality of their source water while off-setting quantity losses through the implementation of recirculating water systems. This is leading more fish hatcheries to install sophisticated water treatment systems to enhance water quality and balance water needs due to the lack of available water from natural sources.

Ultraviolet (UV) light treatment systems play an important role in a complete water treatment process in aquaculture facilities. System designs are available in both closed pipe and open channel arrangements to provide the greatest flexibility to the hatchery, and components have evolved rapidly over time to provide some of the most reliable and easy-to-operate technology in water treatment applications.

Trojan Technologies is committed to providing superior quality and the latest advancements in treatment technology. The Aquafine series of UV systems designed for aquaculture offer unparalleled performance.

Aquafine™

CASE STUDY

UV Applications in Aquaculture

Microbiological Treatment

This is the most common application of UV in water treatment. Typically, UV systems are installed after all other water treatment technologies used to enhance water quality (e.g., filters, degasifiers, etc.), just prior to the water contacting fish eggs in an incubation facility or fish in a rearing facility. UV systems can also be used in hatchery recycle loops and in the effluent treatment system (which is becoming more common in some regions).

UV systems significantly reduce microorganism counts in incubation and rearing facilities and have proven to be the most cost effective technology for inactivating a wide variety of microorganisms.

Ozone Reduction

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 even fatal — to the aquatic life being reared. To ensure that the fish are not exposed to residual ozone, there are often one of two removal processes employed. The first is an ozone off-gassing column which vents ozone to atmosphere; this may not be the best design based on its toxic effect to the environment. The second method is applying 254nm UV energy to consume the residual ozone in the bulk water prior to contacting the fish.

Similar lamp technology and design principles are applied when reducing residual ozone in a water stream. A determined amount of UV dose is required to be applied to consume residual levels in the water. A common sizing would be up to 1ppm of residual ozone being completely removed when a UV dose of 90 mJ/cm2 is applied. The 254nm UV energy breaks apart the ozone molecule, with one of the by-products being oxygen, a benefit to the fish.

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

Reported UV Doses for Inactivation in mJ/cm2

CERATOMYXA SHASTA	30
COSTIA NECATRIX	318
ICHTHYOPHTHIRIUS TOMITES	>310
MYXOBOLIS CEREBRALIS*	40
TRICHODINA SP.	35
TRICHODINA NIGRA	159
CCV	20
CSV	100
OMV (00-7812)	20
IHNV	6.0–9.0
IPNV	122
AN IRIDOVIRUS	26
A. PICORNAVIRUS	26
VHS**	5
SAPROLEGNIA HYPHAE	10
SAPROLEGNIA ZOOSPORES	39.6
AEROMONAS HYDROPHILA	13.1-29.4
AEROMONAS SALMONICIDA	3.62
PSEUDOMONAS SP. (OYSTERS)	92.3-155.5
PSEUDOMONAS FLOURESCENS	13.1-29.4
SARCINA LUTEA	26.4
VIBRIO ANGUILLARUM	13.1-29.4
VIBRIO ORDALIL	5.5
VIBRIO SALMONICIDA	2.7
VIBRIO SP. (OYSTER)	92.3-155.5
YERSINIA RUCKERI	2.7

*Myxobolis cerebralis results from UC Davis
**VHS results from U of Guelph

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