

# Aquaculture

Industry Specific Applications for UV Technology

Aquafine's UV Aquaculture systems have proven unparalleled in performance for over 20 years and have provided a virtually maintenance-free value to customers worldwide.

**APPLICATIONS** | Ozone Destruction, Disinfection

**UV SERIES** | TrojanUVLogic, Optima HX and Open Channel Systems

## 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 decline while disease 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, pathogenic micro-organisms to natural waters through a variety of routes: bird, animal and human activities, including ballast water discharge.

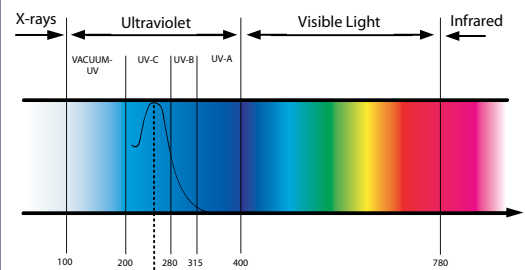
Simultaneously, increased consumption of fish due to reported Omega-3 health benefits has led to an increasing demands for higher stock densities in the same hatchery footprint. This brings many challenges to a rapidly growing industry, but there are solutions available today which can help to overcome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

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

Ultraviolet (UV) light disinfection systems play an important role in a complete water treatment process in aquaculture facilities. UV disinfection system designs are available in both closed pipe and open channel arrangements to provide the greatest flexibility to the hatchery. UV system design and components have evolved rapidly over time to provide some of the most reliably performing and maintenance free technology in water treatment applications.

With Aquaculture UV system designs unparalleled in performance, Aquafine is committed to providing superior quality and the latest advancements in UV technology.

Ultraviolet light is invisible to the human eye, but a highly effective, chemical-free way of inactivating microorganisms and reducing chemical compounds present in the water.



## FOR USE IN :

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



**Aquafine**<sup>®</sup>  
60 Years of Pure Quality



## Reported UV Doses for Inactivation in mJ/cm<sup>2</sup>

### PROTOZOA

|                          |      |
|--------------------------|------|
| CERATOMYXA SHASTA        | 30   |
| COSTIA NECATRIX          | 318  |
| ICHTHYOPHTHIRIUS TOMITES | >310 |
| MYXOBOLIS CEREBRALIS*    | 40   |
| TRICHODINA SP.           | 35   |
| TRICHODINA NIGRA         | 159  |

### VIRUS

|                 |         |
|-----------------|---------|
| CCV             | 20      |
| CSV             | 100     |
| OMV (00-7812)   | 20      |
| IHNV            | 6.0-9.0 |
| IPNV            | 122     |
| AN IRIDOVIRUS   | 26      |
| A. PICORNAVIRUS | 26      |
| VHS**           | 5       |

### FUNGI

|                       |      |
|-----------------------|------|
| SAPROLEGNIA HYPHAE    | 10   |
| SAPROLEGNIA ZOOSPORES | 39.6 |

### BACTERIA

|                           |            |
|---------------------------|------------|
| 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        |

\*Myxobolus cerebralis results from UC Davis

\*\* VHS results from U of Guelph

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 Aquafine Corporation for more information.

## UV Applications in Aquaculture

### DISINFECTION

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

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. 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 and may not be the best design based on its toxic effect to the environment. The second method is applying 254nm UV light systems to consume the residual ozone in the bulk water prior to contacting the fish.

Disinfection lamp technology and design principles are applied when destroying 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 1 ppm of residual ozone being completely removed when a UV dose of 90 mJ/cm<sup>2</sup> is applied. The 254nm UV energy



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**Aquafine equipment performance is guaranteed with the use of genuine OEM replacement parts.**

