



# Pathogen free water for fish, shellfish and crustacean farms

Ultraviolet (UV) Disinfection protection for the Aquaculture Industry and associated applications.

The lifeblood of the aquaculture industry is the quality of the water used to hatch eggs, rear juvenile fish, shellfish or crustaceans and optimise their growth. Poor inflow water quality, recirculation of tank water contaminated by fish diseases and discharging of pathogenic effluents can cause the failure of an aquaculture operation and indeed the collapse of the industry for a whole country.

In 1984 in Norway, the Infectious Salmon Anemia (ISA) virus spread to over 100 fish farms and the damage to the economy was substantial. Norway, along with other countries have since introduced disinfection requirements at intake and outflow points of aquaculture operations to prevent the spread of such diseases. An effective Disinfection method is the use of UV light.



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## How UV Disinfection works

UV lamps contained within UV reactors or channels bombard passing water with a high intensity UV light (in the germicidal 254nm wavelength range) that damages the DNA of waterborne pathogens, destroying them outright or resulting in them being incapable of reproducing.

There are no microorganisms known to be immune to UV Disinfection, unlike some chemical treatments. Additionally, UV Disinfection is a chemical free process, there is no risk of overdosing and no formation of by-products, resulting in a process that is environmentally friendly and safe for fish.

UV Disinfection systems are specified based on the UV dose required to control species specific pathogens. Depending on the bacteria, protozoa, fungi or virus that needs to be controlled, recommended UV dose rates in the aquaculture industry range between 60 mJ/cm<sup>2</sup> to 250 + mJ/cm<sup>2</sup>.

## UV Disinfection applications in Aquaculture

### Fish, Shellfish and Crustacean Farms

Improve quality and increase production yields of salmon, bass, abalone, oyster, prawn, mussels, shrimp and any other aquaculture stock whilst protecting against species specific diseases in the grow out stage of farming.

### Hatcheries

Safeguard broodstock, hatching fish, larvae and fry by using non-chemical pathogen protection methods at this highly sensitive and critical farming stage.

### Marine Well Boats

Protect fish stocks during transportation to and from onshore and offshore aquaculture farming facilities.



## UV-Guard can help overcome Aquaculture challenges

Fish, shellfish and crustacean farms and hatcheries are subjected to a number of challenges and risks that must be managed in any successful aquaculture operation.

UV-Guard's UV Disinfection systems can help mitigate these risks.

The Challenge	Impact	How UV can help
Micro-biological contamination	Decreased growth rates and increased mortality	No microorganisms is known to be immune to the powers of UV Disinfection
Use of drugs and chemicals	<ul style="list-style-type: none"> <li>• Detrimental to environment and human health</li> <li>• Expensive</li> </ul>	<ul style="list-style-type: none"> <li>• Minimise antibiotic use</li> <li>• No harmful by-products</li> <li>• Save costs</li> </ul>
Increase fish density capability	More fish in the same infrastructure increases risk of contamination	Lowers risk of contamination so higher fish populations are possible
Maintaining production stability	Difficult due to fluctuating micro-biological conditions	<ul style="list-style-type: none"> <li>• Stabilises micro-biological conditions</li> <li>• Cost effective and quick return on ROI</li> </ul>



Medical & Pharmaceutical



Agriculture & Horticulture



Mining & Municipal



Aquatics



Food & Beverage



Industrial & Manufacturing



Residential

## Benefits of UV water treatment

- No harmful by-products – chemical free, environmentally and human friendly
- No micro-organism is known to be immune to UV – unlike some chemical treatments
- Minimise antibiotic use in fish farms – save costs
- Enable the safe increase of fish densities – mitigate the greater risk of contamination
- Maximise yields in existing fish farm infrastructures – easily retrofitted with a quick return on investment
- Improve aquaculture production stability - control fluctuating micro-biological conditions
- Proven performance and flexibility – can be used to disinfect total inflow, recirculation flow and effluent to and from tanks

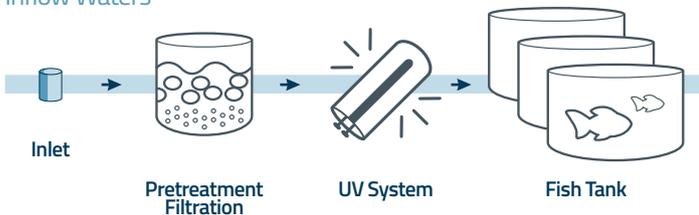
## UV Disinfection system installation

It is recommended that UV-Guard's Disinfection systems are installed after pretreatment to ensure that that water is at an adequate quality for optimal UV Disinfection.

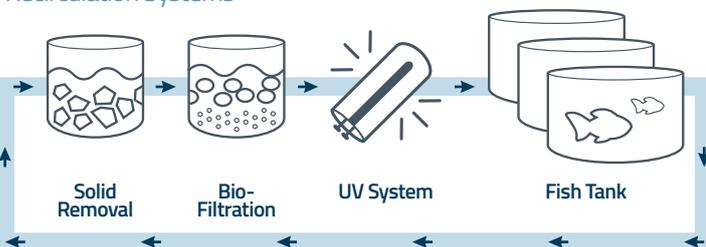
UV-Guard's systems can be used to safeguard:

- Inflow waters
- Recirculation systems
- Effluent discharges

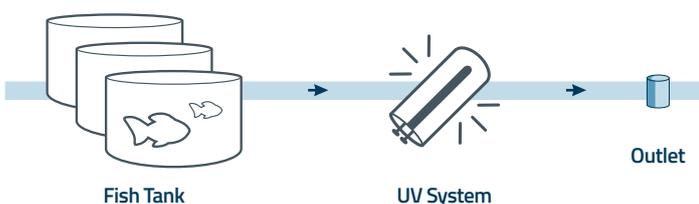
### Inflow Waters



### Recirculation Systems



### Effluent Discharges



## UV-Guard's suite of Aquaculture UV Disinfection systems

UV-Guard have solutions effective in all types of Aquaculture water sources including:

- Fresh water
- Brackish water
- Sea water

Model	Application	Max flow rate	Water type
 UVG S-Series	<ul style="list-style-type: none"> <li>• Recirculation water</li> <li>• Inflow water</li> <li>• Effluent water</li> </ul>	26 m <sup>3</sup> /hr	<ul style="list-style-type: none"> <li>• Freshwater</li> </ul>
 UVG X-Series	<ul style="list-style-type: none"> <li>• Recirculation water</li> <li>• Inflow water</li> <li>• Effluent water</li> </ul>	340 m <sup>3</sup> /hr	<ul style="list-style-type: none"> <li>• Freshwater</li> </ul>
 UVG P-Series	<ul style="list-style-type: none"> <li>• Recirculation water</li> <li>• Inflow water</li> <li>• Effluent water</li> <li>• Well Boats</li> </ul>	750 m <sup>3</sup> /hr	<ul style="list-style-type: none"> <li>• Brackish Water</li> <li>• Seawater</li> </ul>
 UVG T-Series	<ul style="list-style-type: none"> <li>• Tank headspace Disinfection</li> </ul>	N/A	<ul style="list-style-type: none"> <li>• Freshwater</li> <li>• Brackish Water</li> <li>• Seawater</li> </ul>

UV-Guard's engineers can design a water treatment system specific to your aquaculture needs. We see each project as being unique and take into consideration your fish, shellfish or crustacean type and the UV dose required to control species specific pathogens in your processes. Contact us today.

