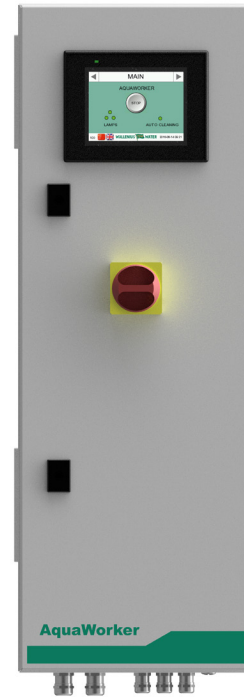


# AquaWorker

UV disinfection solutions for industrial applications

FOR INTAKE AND RECIRCULATION SYSTEMS



## IMPROVED WATER QUALITY

- reduces bacteria, protozoa and virus
- clean and safe water
- chemical free

## RELIABLE OPERATION

- corrosive resistant materials
- long service life
- automatic cleaning system
- easy maintenance

## LOW OPERATIONAL COSTS

- low pressure drop
- low energy consumption
- efficient UV lamps in cold and warm water

## AQUAWORKER - specifically developed for water disinfection in tough environments.

AquaWorker stops harmful microorganisms from entering water systems (e.g. cooling systems) and reduces the risk for biological growth in circulation systems.

Extremely durable materials meet the tough demands of the corrosive industrial environment (chemicals, salinity, ambient humidity and shifting water temperatures) to ensure long-term, trouble-free operation. AquaWorker can be installed in fresh or seawater applications.

## IMPROVED WATER QUALITY - increased safety

Industrial cooling systems (especially utilizing evaporation) comprise conditions (warm and humid) ideal for pathogenic reproduction. This includes different types of Legionella bacteria which is the cause of Legionnaires disease and Pontiac fever. AquaWorker is highly effective in reducing many different types of water-borne microorganisms such as Legionella Pneumophila, Cryptosporidium and Giardia. Together with other residual disinfection methods effective against aggregated bacteria (biofilms), AquaWorker will reduce the risk of disease outbreak in open and closed circulating systems.

## UV DISINFECTION by AquaWorker

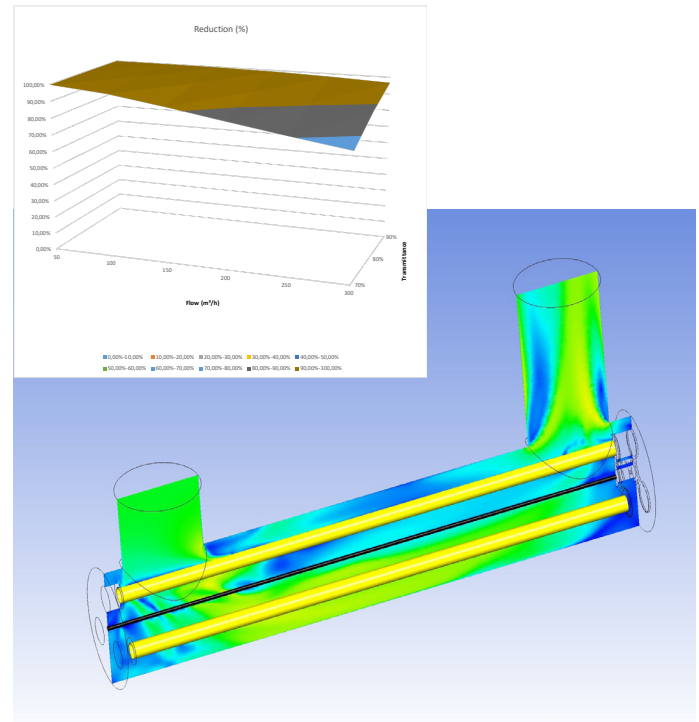
Disinfection by UV has proven to be a cost effective method of controlling pathogens.

UV inactivates pathogens by damaging biomolecules. Cellular RNA and DNA absorb the wavelengths, irradiated by a UV unit, primarily at 254 nm. This high-energy absorption, called photochemical damage, is highly effective to prevent replication and infection.

## ADVANTAGES with UV treatment

- chemical-free process
- no handling of toxic or corrosive chemicals
- user-friendly operation
- inactivates a broad range of micro-organisms

All these benefits together with its design made for rugged conditions; AquaWorker is the designated disinfection choice for industrial applications.



## OPTIMISED DESIGN - low operational cost

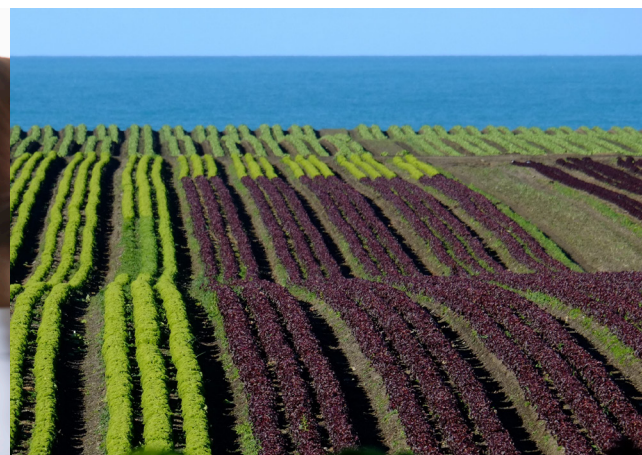
AquaWorker is designed using CFD (Computational Fluid Dynamics) optimizing flow and distribution of UV dose. Long-life UV lamps are selected to work efficiently in cold as well as warm water.

## PATENTED AUTOMATIC CLEANING SYSTEM

AquaWorker is equipped with a unique cleaning system capable of removing hard forming scaling as well as fouling. Keeping the lamp sleeves clean, ensures optimal UV disinfection performance.

## SIMPLE INSTALLATION and handling

AquaWorker is ready to be installed in both new and existing constructions. For systems with larger flows, multiple units can be installed as required.



**GENERAL SPECIFICATION**

Depending on application, the maximum flow through AquaWorker is different and can be determined for each specific case.

For one-pass applications (i.e. influent or effluent protection), the philosophy is to reduce the number of pathogenic organisms to a safe level. Recommended maximum flow to achieve a UV dose of 40mJ/cm<sup>2</sup>\* is 100m<sup>3</sup>/h at a UV-transmittance of 90%.

For recirculating applications, the maximum flow is rather defined by the organisms' cell growth. The growth curve of all organisms follows an exponential trend and the term doubling time or generation time is used to quantify the potential for an organism to grow. The doubling time of an organism depends on the environmental conditions (e.g. temperature and available oxygen and nutrition) but also on the specific organism.

Higher flow rates passing the unit can be advantageous (lower UV doses per passage and more frequent passages). For recirculating applications, flows up to 250m<sup>3</sup>/h is possible.

Legionella in extracellular environment ("in free-condition") is highly UV sensitive. However, it is well documented that Legionella uses free-living amoeba (protozoa) as host cell for replication purposes. Under these conditions, a much higher UV dose is required for inactivation. UV disinfection requires pre-filtration; an effective treatment can be met by combining filtration and disinfection and is application specific.

**Flexible installation**

- Vertical or horizontal installation according to requirements.
- Reactor and control panel are installed separately offering flexible installation possibilities.

**Management & control**

- Communicates – all information available on a touch screen
- Alarm and emergency stop
- Prepared for external alarm handling
- Minimum maintenance required
- Patented automatic cleaning system, preventing both scaling and fouling on lamp sleeves, securing disinfection performance
- No tools required to replace UV lamps

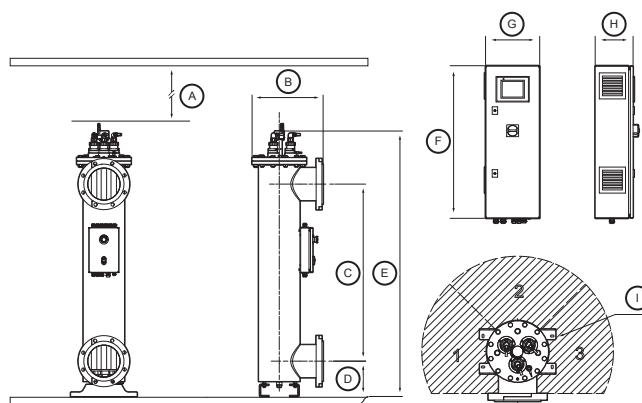
\*99,9% reduction of the organisms with the higher UV resistance (a dose response of 40mJ/cm<sup>2</sup> for 3 log reduction).

Disease	Pathogenic agent (Dose for 99,9% reduction)	Type of organism
Legionnaires disease	Legionella pneumophila (log 3=5-7 mJ/cm <sup>2</sup> )	Bacteria
Typhoid fever	Salmonella typhii (log 3=7 mJ/cm <sup>2</sup> )	Bacteria
Cholera	Vibrio cholerae (log 3=6,5 mJ/cm <sup>2</sup> )	Bacteria
Hemorrhagic diarrhea	Escherichia coli O157:H7 (log 3=6,6 mJ/cm <sup>2</sup> )	Bacteria
Cryptosporidiosis (Crypto)	Cryptosporidium parvum (log 3=3-5 mJ/cm <sup>2</sup> )	Protozoa
Giardiasis (Beaver fever)	Giardia lamblia (log 3=<20 mJ/cm <sup>2</sup> )	Protozoa

Table 1. Listed pathogenic agents belong to different types of organisms such as bacteria, virus, fungus and protozoa which internal or external parasites can be distinguished from. The reduction rate will differ depending on pathogen, UV transmittance and flow.

AquaWorker	
Number of UV lamps	3
Total lamp power	Max. 1050 W
Total power consumption	Max. 1200 W
Water temperature	5..40°C
Automatic cleaning system	Yes
Drainage	Yes
Temperature sensor	Yes
Service timer	Yes
Lockable On/off switch	Yes
On/off via external switch	Emergency stop
Weight including packing material	Approx. 170 kg
Exterior dimensions (W x D x H)	600 x 800 x 1850 (mm)
Max cable length (Control panel <-> Reactor)	30 m
Reactor	
Volume reactor	83 liters
Weight reactor (empty / filled)	71 / 155 kg
Material reactor	Titanium, Gr 2
Pressure class	PN10
Dimensions in- and outlet pipe	DN200, EN 1092-1
Temperature control	Thermo switch, EN 1.4571 (316 Ti)
Sealing	FPM (Viton®), EPDM
Protection class	IP54
Ambient relative humidity, reactor	up to 100% condensing
Control panel	
Weight control panel	18 kg
Chassis material	Painted steel (RAL7035)
Protection class	IP 54
Ambient operating temperature	5..40°C
Ambient relative humidity	10-90%, non-condensing
Power input	400V, 50/60 Hz, 16A
Standard wired output	Potential free relay for alarm
HMI	5.7" color touch screen

Dimension	Description	Value
A	Service space <sup>1</sup>	MIN. 1600 mm
B	Max width	470 mm
C	C-C Inlet/Outlet	1180 mm
D	Floor distance	240 mm
E	Total height (With cleaning system)	1750 mm (1770 mm)
F	Electrical cabinet height	850 mm
G	Electrical cabinet width	300 mm
H	Electrical cabinet depth	210 mm
I	Accessibility space <sup>2</sup>	MIN. 300/600 mm



- 1 Minimum distance to ceiling or wall, depending on installation, for service.
- 2 One of the zones 1-3 should fulfill the larger dimension measured from the center of the reactor.

**WALLENIOUS**  
**WATER** INNOVATION