

# OZONIA

**AQUARAY®**  
ULTRAVIOLET SYSTEMS



### OVERVIEW

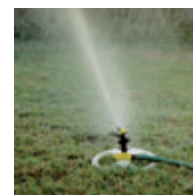
Ultraviolet (UV) disinfection is environmentally safe and recognized as highly effective on a wide range of pathogens, including viruses. For the past 20 years, Aquaray® UV disinfection systems have been used successfully to eliminate hazardous and environmentally unacceptable chemicals such

as chlorine and other associated disinfection by-products. Ozonia offers UV products for municipal wastewater, municipal drinking water and industrial applications.

#### ➤ Municipal Wastewater

To protect the environment (like rivers, streams, lakes,...) increasingly stringent regulations are being implemented to limit the release of pathogenic microorganisms. In arid areas, due to water scarcity, a part of the treated wastewater can also be used for a reuse application such as land sprinkling, golf irrigation, ... Over the past 20 years, Ozonia has been providing UV disinfection systems for :

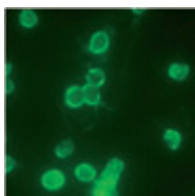
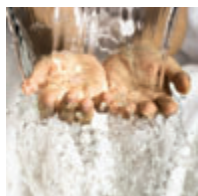
- Secondary or tertiary treatment disinfection
- CSO & SSO applications
- Reuse



#### ➤ Municipal Drinking Water

UV systems are used as a final barrier in drinking water treatment plants to disinfect water by inactivating pathogenic microorganisms such as viruses, bacteria and parasites. UV-C lights are particularly effective for chlorine resistant microorganisms such as *Cryptosporidium* and *Giardia*, even at low dosages. To reduce the risk of waterborne diseases, a growing number of countries are implementing strict limits on these pathogens through new regulations.

Ozonia can always offer the best solutions combining higher efficiency and smaller footprint with low- or medium-pressure UV reactors for small to very large water treatment plants.



#### ➤ Industry

Ozonia provides open-channel or closed-vessel UV systems for Industrial applications for :

- Food and Beverage
- Electronics
- Pharmaceutical
- Cosmetics
- Aquaculture
- Cooling tower water
- Spas and Swimming pools



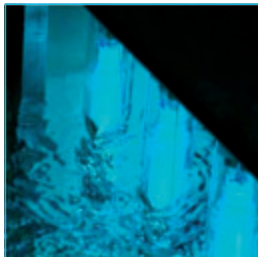
## TECHNICAL DATA:

# ACTION/THEORY

UV systems disinfect by inactivating pathogenic microorganisms such as viruses, bacteria and parasites which may be in the water and may cause waterborne diseases.

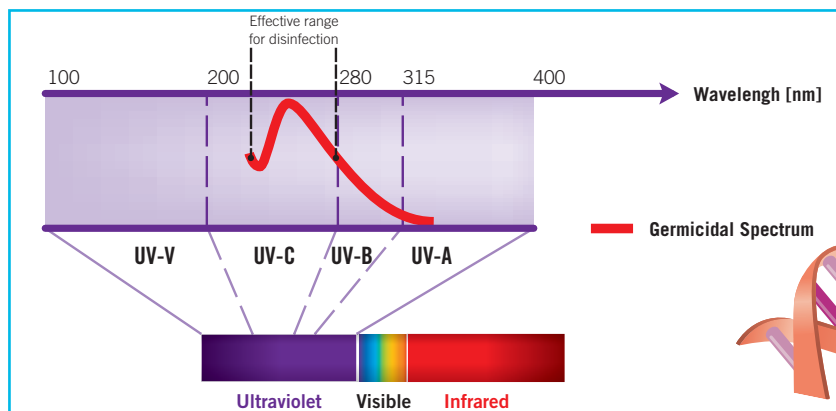
In the broad light Spectrum, the UV-C wavelength (200-280 nm) has been proven to be the most efficient wavelength to inactivate microorganisms by damaging the nucleic acids (DNA or RNA), which prevents the organism's ability to reproduce.

The germicidal effectiveness of a UV system depends on various factors such as UV transmission, flow rate and the applied UV dose, which is a function of the UV intensity delivered by the lamps and the exposure time in the reactor.



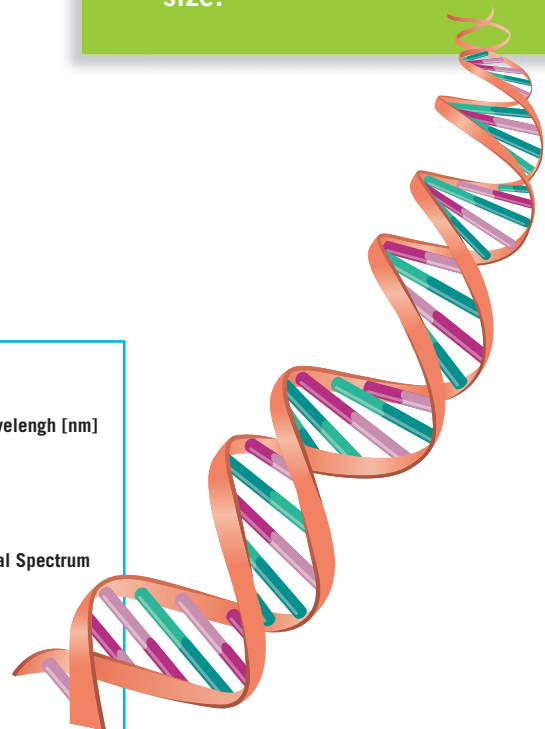
# HOW DOES IT WORK?

UV-C light is created by a lamp filled with an inert gas and mercury. Electrical energy is applied to electrodes within this lamp which creates an electrical arc through the metallic vapor to generate UV radiation. Two main UV lamp technologies are available for water disinfection. Low pressure lamps have the ability to create a monochromatic radiation at 254 nm, close to the germicidal peak (264 nm). Medium pressure lamps create a broad spectrum of UV wavelengths from 200 to 300+ nm. Ozonia offers both of these powerful technologies.



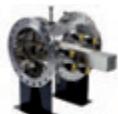
## Product Focus/ Performances

- UV is chemical free and produces no measurable disinfection by-products (DBPs)
- UV can easily inactivate, even with low UV Dose, chlorine resistant microorganisms such as *Cryptosporidium* and *Giardia*
- UV can be part of a Multi-barrier protection strategy in addition to other disinfection methods (such as Ozone systems)
- UV can be easily retrofitted into an existing treatment plant thanks to its compact size.



# RANGE OVERVIEW - DRINKING/PROCESS WATER

## MAIN FEATURES


					
	Aquaray® LP	Aquaray® SLP-DW/PW	Aquaray® SMP-DW/PW	Aquaray® H <sub>2</sub> O	Aquaray® LPTS
Type of reactor	Closed vessel	Closed vessel	Closed vessel	Closed vessel	Closed vessel
Installation	Horizontal & Vertical	Horizontal & Vertical	Horizontal	Horizontal	Horizontal & Vertical
Lamp technology	Low Pressure High Output Amalgam	Low Pressure High Output Amalgam	Medium Pressure High Output	Medium Pressure High Output	Low Pressure High Output Amalgam
Number of Lamp	1 - 4	1 - 20	1 - 2	6 - 10	1 - 4
Power consumption (per lamp)	120 W	200 W	1,5 to 6 kW	4 - 8 kW	200 W
Flow range (at 40 mJ/cm <sup>2</sup> and 95% UVT )	10 to 40 m <sup>3</sup> /h	25 to 940 m <sup>3</sup> /h	20 to 450 m <sup>3</sup> /h	300 to 8 600 m <sup>3</sup> /h	9 to 33 m <sup>3</sup> /h (at 120 mJ/cm <sup>2</sup> and 98% UVT)

## MAIN APPLICATIONS

Municipal Drinking Water	Disinfection	X	X	X	X	-
	AOP	X	X	X	X	-
Food and beverage	Disinfection	X	X	X	X	X
	Ozone destruction	X	X	X	-	X
Aqua-culture	Disinfection	X	X	X	X	-
Power Generation	Disinfection	-	X	X	X	X
	TOC reduction	-	X	X	-	X
Cooling Water	Disinfection	X	X	X	X	-
Micro-electronics	Disinfection	X	X	X	-	X
	Ozone destruction	X	X	X	-	X
	TOC reduction	-	-	X	-	X
Pharmaceutical	Disinfection	X	X	X	-	X
	Ozone destruction	X	X	X	-	X
	TOC reduction	-	X	X	-	X

# RANGE OVERVIEW - WASTEWATER

## MAIN FEATURES

				
	Aquaray® SLP-WW	Aquaray® SMP-WW	Aquaray® 40HO	Aquaray® 3X
Type of reactor	Closed vessel	Closed vessel	Open channel	Open channel
Installation	Horizontal & Vertical	Horizontal	Vertical	Vertical
Lamp technology	Low Pressure High Output Amalgam	Medium Pressure High Output	Low Pressure High Output	Low Pressure High Output Amalgam
Number of Lamps	1 - 20	1 - 6	40	36
Power consumption (per lamp)	200 W	1,5 to 6 kW	165 W	400 W
Flow range (at 35 mJ/cm² and 65% UVT)	10 to 200 m³/h	20 to 350 m³/h	400 m³/h per module (up to 3 200 m³/h)	850 m³/h per module (above 1 600 m³/h)

## MAIN APPLICATIONS

Wastewater disinfection	X	X	X	X
Reuse wastewater	X	X	X	X
Industrial wastewater Treatment	X	X	X	X
Number of Lamp	X	X	X	X
CSO & SSO	-	-	X	X

UV

DISINFECTION

CLOSED VESSEL

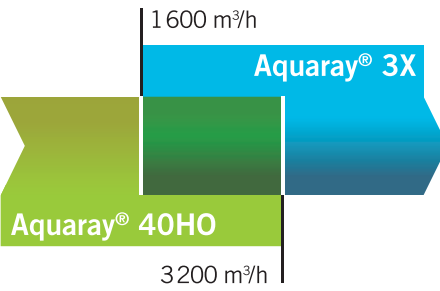
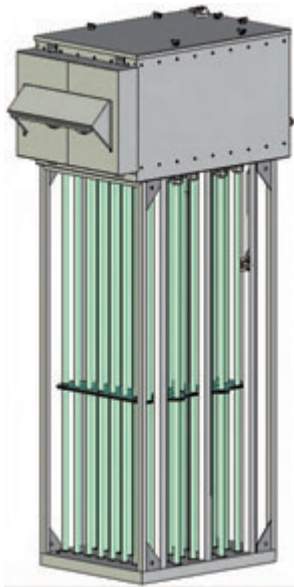
OPEN CHANNEL



PRODUCT FOCUS: Aquaray® 40HO

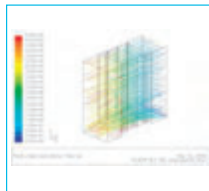
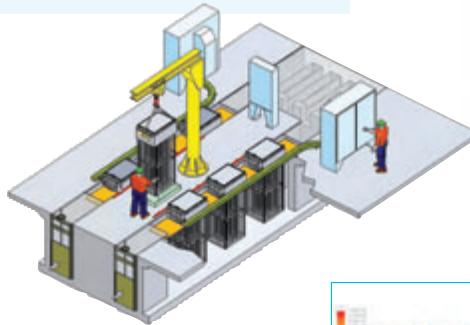
### Aquaray® 40HO

Perfect design for **medium** Wastewater Treatment Plant up to 3,200 m³/h.



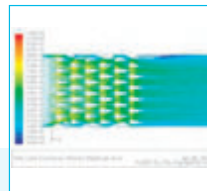
### Modular concept

Aquaray® 3X and Aquaray® 40HO modules can be installed in series and/or in parallel in multiple channels, depending on flow rates and disinfection requirements.



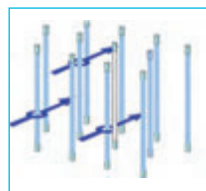
### Optimized Performance

The Aquaray® 3X and Aquaray® 40HO has been optimized with C.F.D. modeling software to maximize UV Dose and minimize head loss.



### Easy Maintenance

Due to the **vertical design**, operators have an easy access to the UV lamps and quartz sleeves (no need to remove the UV module from the channel)



### Secured Performance

The **staggered** vertical lamp configuration in the Aquaray dramatically enhances system performance by making it virtually impossible for an organism to by-pass the UV energy field, even if a lamp fails.

PRODUCT FOCUS: Aquaray® 3X

### Aquaray® 3X

Perfect design for **large** Wastewater Treatment Plant from 1,600 m³/h and greater.



## PRODUCT FOCUS: Aquaray® SLP

### Optimized Performance

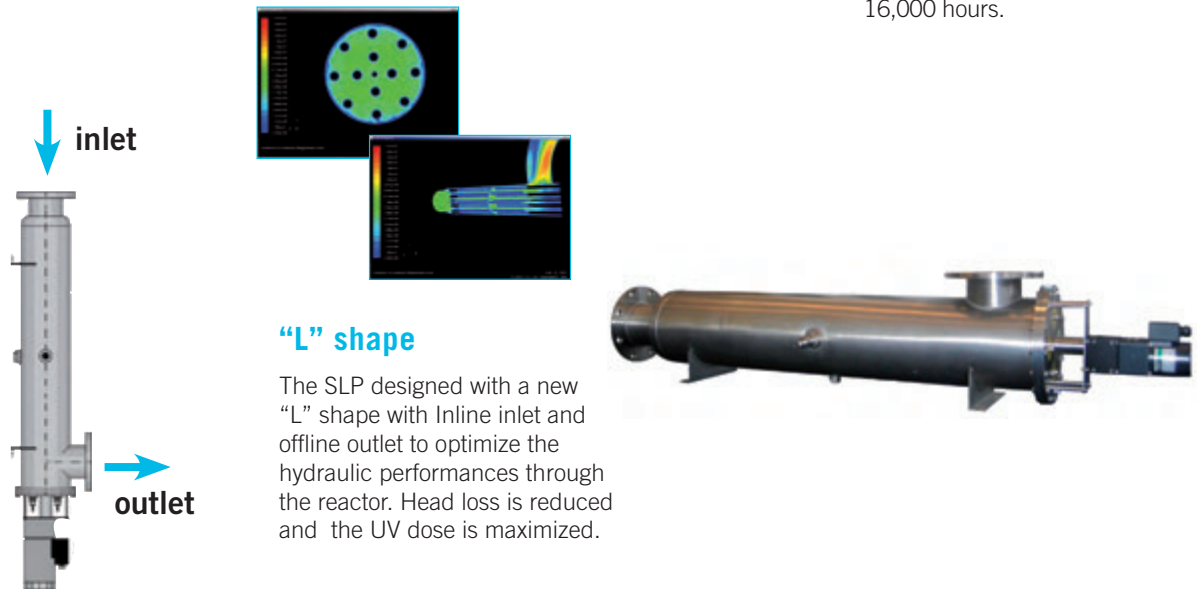
The **Aquaray® SLP** has been optimized with C.F.D. modeling software to maximize UV Dose and minimize head loss.

### Save space

Compare to standard LPHO reactors, the **Aquaray® SLP** offers between two and three times more power.

### Lifetime extended

With the new Low Pressure extra-High Output Amalgam lamps, the **Aquaray® SLP** range offers a highly efficient lamp with an average lifetime of 16,000 hours.



### “L” shape

The SLP designed with a new “L” shape with Inline inlet and offline outlet to optimize the hydraulic performances through the reactor. Head loss is reduced and the UV dose is maximized.

## PRODUCT FOCUS: Aquaray® H<sub>2</sub>O

### Optimized Performance

The **Aquaray® H<sub>2</sub>O** has been optimized with CFD modeling software to maximize UV Dose and minimize head loss.

### Save Space

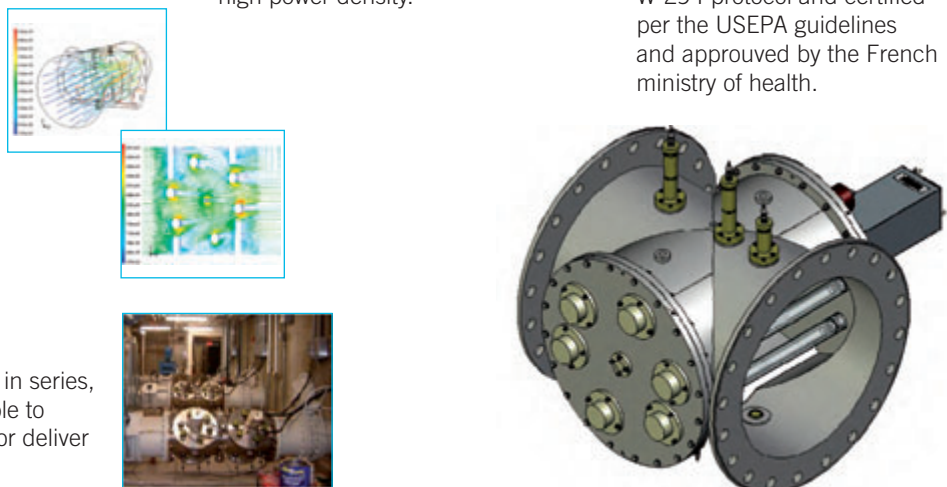
To minimize the footprint and simplify retrofitting in an existing plant, the **Aquaray® H<sub>2</sub>O** uses Medium Pressure lamps with high power density.

### Validated Performance

The **Aquaray® H<sub>2</sub>O** has been subjected to rigorous bioassay testing and has been third party validated to DVGW W-294 protocol and certified per the USEPA guidelines and approved by the French ministry of health.

### “Duplex” version

By putting two reactors in series, the **Aquaray® H<sub>2</sub>O** is able to treat greater flow rates or deliver higher doses.



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