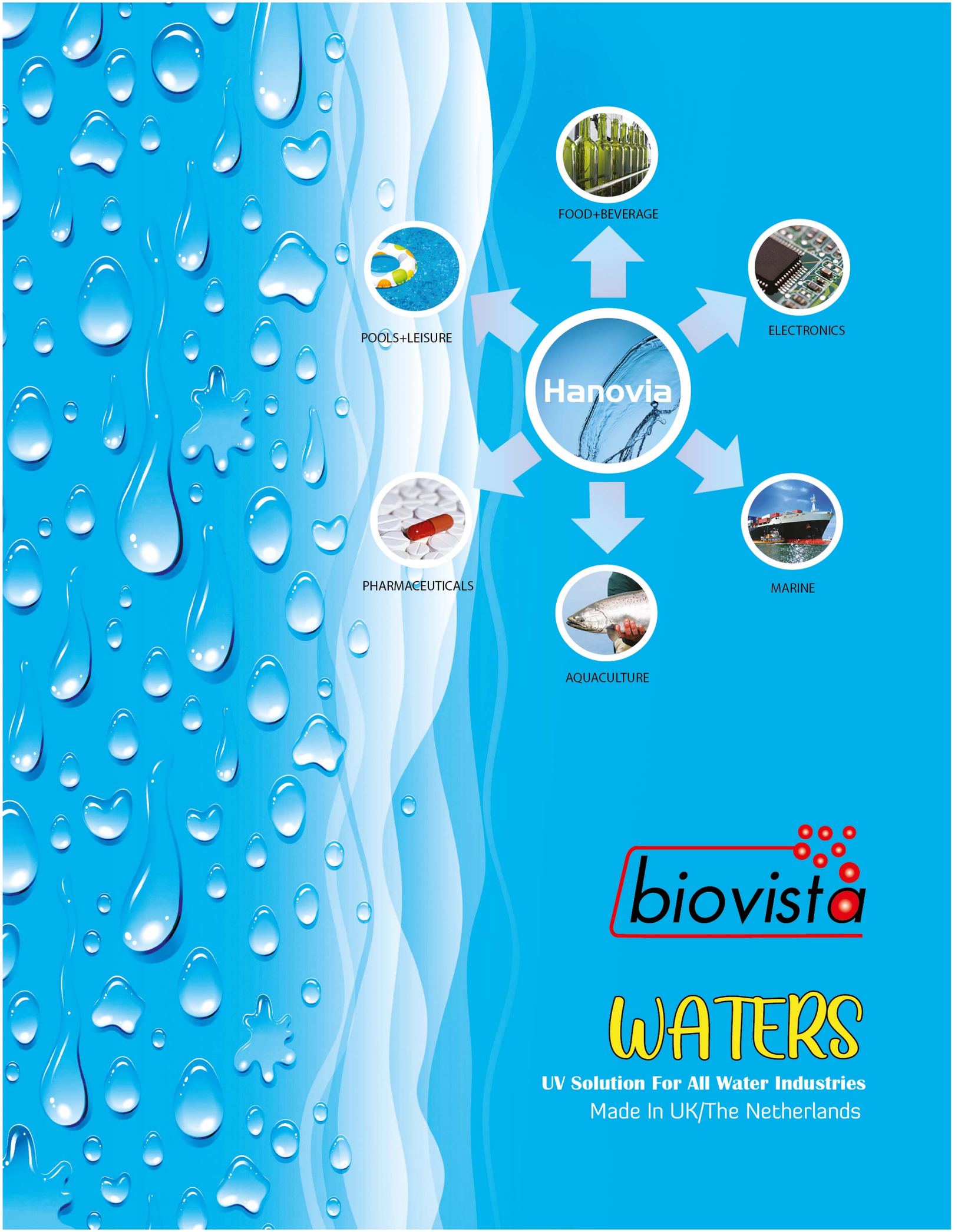


biovista

WATERS

UV Solution For All Water Industries

Made In UK/The Netherlands

OUR PARTNER

Based in the United Kingdom, Hanovia is a world leader in UV disinfection technology for applications ranging from food and beverage processing to pharmaceutical and electronics manufacturing, medical instrument disinfection, fish farming, swimming pools and ship ballast water treatment. The company is celebrating its 90 years and since 1924 has gained experience in the design, development, manufacture and distribution of UV systems worldwide. For more information please visit the company's website at www.hanovia.com .

Hanovia is part of the Water division of Halma p.l.c. (www.halma.com) an international market leader in safety, health and sensor technology.

OUR TEAM MEMBERS

Mr. Halim Mirza

Halim is a Chartered Engineer and a member of the Institute of Chemical Engineers. With a BSc in Chemical Engineering and an MSc in Ion Exchange and Membrane Technology, he has spent his entire career in the water treatment industry. Prior to joining Hanovia he worked at BP Research UK, Esmil Water NL, Permutit Water UK and over past two decades at Veolia Water Systems, where he held various positions in both management and technical sales engineering, and more recently international business development.

Halim has a wealth of international technical experience in water treatment and his role at Hanovia is the on-going commitment in developing the industrial UV market in the region with critical industries.

Ms. Snejana Nakova

She has experience in technical sales for more than 8 years and is responsible for developing and maintaining industrial, commercial and municipal markets. Snejana holds a Master`s Degree in Chemical Engineering from Technical University of Hamburg – Hamburg, Germany.

Dr. M Nahid Hasan

Dr. M Nahid Hasan, a self-made entrepreneur and Director of Biovista Bangladesh Ltd. During his PhD and Post-doctoral research at Delft University of Technology in Biotechnology he spent considerable time in water research. He is the first author for an international pattern for using biomaterial in nano-filtration. Begin of Asian origin he deeply felt the necessity of a simple cost effective and innovative system providing clean drinking and usable water for the whole premise. In collaboration with Dr Howard, Mr Halim and Mr Dominik Graf, he successfully developed and delivered Biovista Water Systems to customers in Bangladesh market with high satisfaction.

Mr. Md. Aktar Hossain

Mr. Aktar Hossain is one of the directors of Biovista Bangladesh Ltd. During activities as Managing Director he has gained training on industrial water filtration and effect of UV technology on water purification. Under his supervision Biovista already supplied more than 100 units of water plant in different industries. All of the plants are running well with good reputation. Mr. Hossain graduated (B.Sc and M.Sc.) from the Department of Biochemistry and Molecular Biology, University of Dhaka. He was awarded M.Phil degree from the same department.

1st Edition, 2021

ULTRAVIOLET (UV) TECHNOLOGY AND ITS APPLICATIONS

Ultraviolet (UV) technology is recognized as an effective chemical free way of disinfecting water and air. Accurate, reliable, controlled delivery of UV is critical to disinfection performance. UV photolysis has proven effectiveness in photolysis of Chlorine, Ozone and Total Organic Carbon (TOC), as required by the United States Pharmacopoeia (USP24). Hanovia, one of the world's premier suppliers of UV disinfection technology.

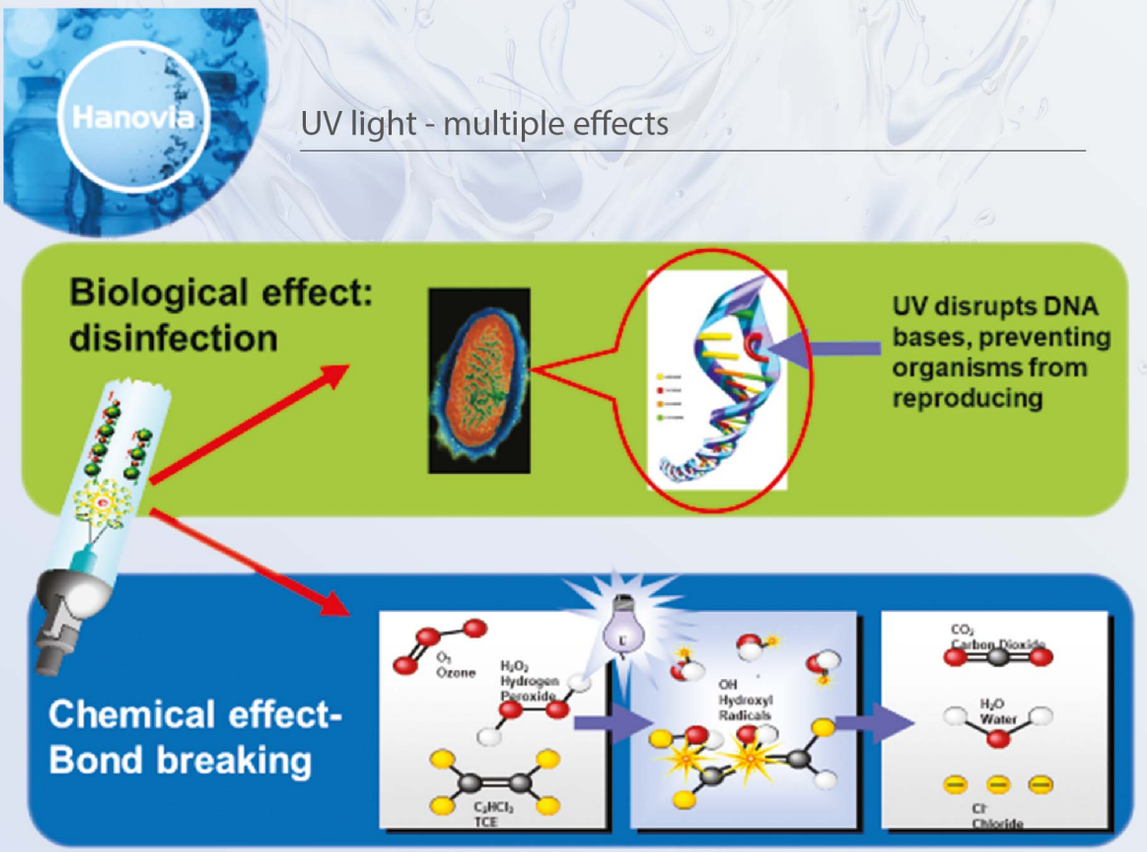
Biological effects of uv (disinfection process)

When a cell is subject to germicidal UV, these processes occur:

- *UV penetrates the cell wall*
- *High energy photons of UV are absorbed by cell proteins and DNA*
- *UV damages protein structure causing metabolic disruption*
- *DNA is chemically altered so organisms can no longer reproduce*
- *Organisms unable to metabolise and reproduce cannot cause disease or spoilage.*

Chemical effects of uv (photolysis process)

- *Emission of high energy photons which break molecular bonds*
- *Conversion of non-ionic organic molecules to charged species making them susceptible to ion exchange removal*
- *Production of Hydroxl (-OH) radicals which oxidise certain molecular bonds causing photochemical breakdown.*



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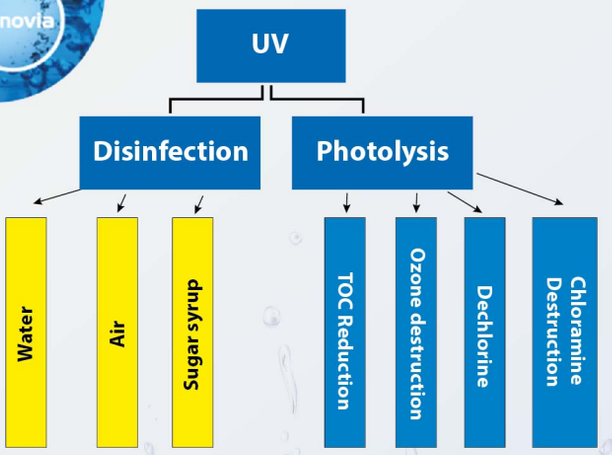
Disinfection Applications of UV

Liquids disinfection:

- Product and process water
- Syrups, brines, whey and starch
- Aquaculture and hydroponics
- Swimming pools and spas
- Ballast water disinfection
- Drinking Water - hospital/hotel supplies
- Effluent re-use.

UV light - multiple applications



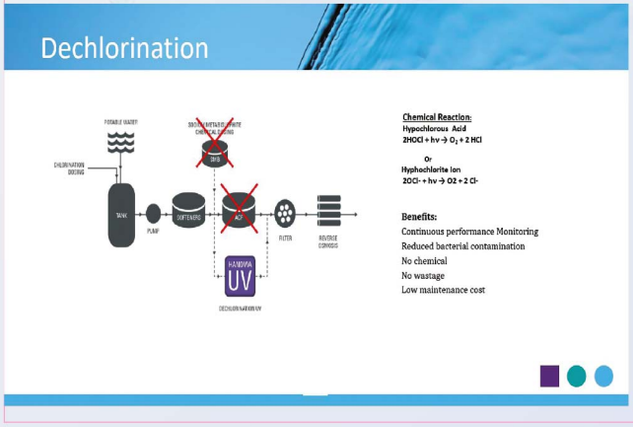
Air disinfection:

- Hanovia UV-C protect airborne pathogens, such as molds, spores, bacteria and viruses, including SARS-CoV-2, the virus that causes the disease COVID-19.
- Facilities includes Healthcare, Office buildings, Retail stores, Manufacturing facilities, Hotels, School, Cinema/Theatres and other common public facilities.

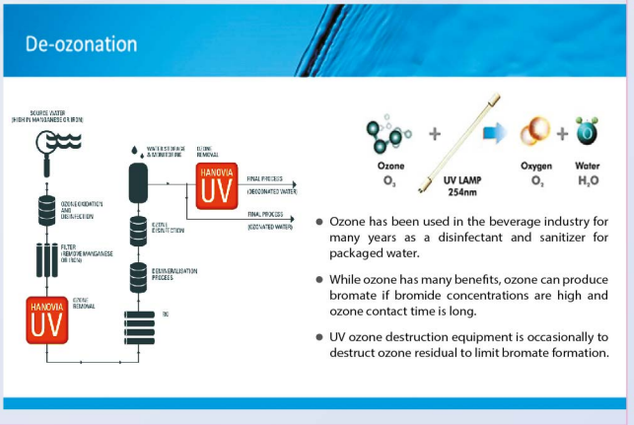
Photolysis application of UV:

- Chloramine destruction in swimming pools
- Destruction of residual ozone after disinfection and sanitation (deozonation)
- Reduction in residual chlorine from earlier treatment (dechlorination)
- Destruction of pesticides in the water supply
- Removal of N-Nitrosodimethylamine (NDMA) and MTBE
- Production of Ultra-pure water for the electronics and semiconductor industry
- Total Organic Carbon (TOC) reduction.

UV Dechlorination



UV De-Ozonation



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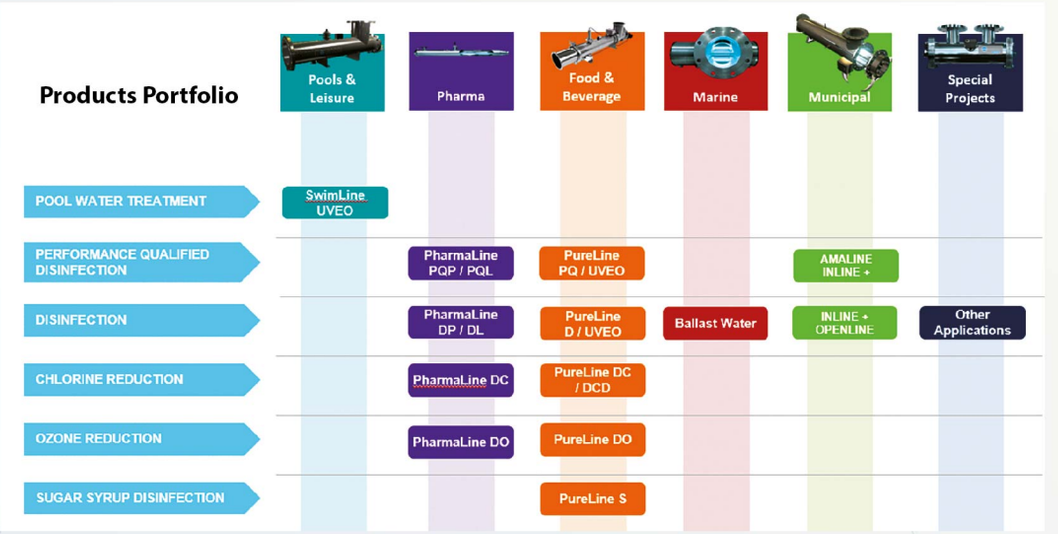
UV technology in different industries



Beverage CSD - UV for water disinfection.

Bottle Water Industry - UV for Water disinfection. Safety from Bromates and nitrites.

Dairy Industry – FDA issues PMO, Allows UV disinfected water.

Soft Drinks Industry – Sugar syrup disinfection in place of heat treat treatment.

All Industry RO Fouling – UV disinfected water before RO reduces fouling, prolonged membrane life and reduced costs and down time.

Pharma and Beverage – Bio security from Primary source water treatment to Process water generation and distribution. UV used to deozonate loop water before POU and dechlorination before RO.

Swimming pool – UV for water disinfection. Safety from chlorine by products like THM, Chloroform etc.

Aquaculture – UV for water disinfection.

UV Dose & Sizing

The UV dose (or fluence) is the product of the intensity of the light incident on the sample and the exposure time. It is commonly expressed in units of mJ/cm2. The dose is related to the disinfection effect; the value required to achieve a reduction in the number of organisms varies with the species concerned.

DOSE is very important parameter, just the same as concentration of Chemicals in chemical disinfection. Hanovia will recommend the appropriate UV dose for each application, taking into account lamp ageing, fluid transmission characteristics, and the temperature correction applicable to the UV output where Low Pressure lamps are used.

UV Dose (mJ/cm2) = Intensity (mW/cm2) x Residence Time (s)

Lamp power
Water quality

Flow rate
Reactor dimension

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Intensity

The intensity of the UV light reaching each organism depends on the UV output of the lamp, the age of the lamp and thimble, and the transmittance of UV light through the process liquid. It is commonly expressed in units of mW/cm2. The intensity decreases over time as the lamp ages.

Water Quality

Water quality is determined by UV Transmittance. UV Transmittance (UVT) is the amount of UV light passing through the water. It is measured in %. The amount (%) of UV which transmits through the sample is measured and thus gives an indication of water quality. Transmittance is reduced as the turbidity of the liquid increases, and also as the concentration of any contaminant which can absorb UV radiation increases.

UVT is increased as the turbidity of liquid decrease.
Example:

- 98% UVT for pure water, post Reverse Osmosis
- 90% UVT for pre sand filtration.

Residence Time

The exposure of the process liquid to the UV radiation is a function of the time it takes for the process liquid to pass through the treatment chamber, and the design of the chamber. The innovative design of the chamber was optimized using computational fluid dynamics (CFD).

The UV system has been selected based on the process liquid flow rate, the level and type of organism that may be present and the nature of the process liquid, to ensure that the appropriate dose of UV light is achieved.

UV dose and disinfection: The D10 Concept

The D value of any micro-organism is defined as the UV dose necessary to affect a 90% reduction. The relationship between dose and kill rate is logarithmic as shown in table 1

Table 1: D10 for E coli, major water borne pathogen

Dose in mJ/cm2	Reduction in number of viable organisms	
5.4	90% (1log reduction)	Different industries have a different dose requirement depending on the contaminating microorganism present. For example, pharmaceutical industries require a dose of 32 mJ/cm2 for their process water while the brewing industry require 50-60 mJ/cm2 to control wild yeast. Coca Cola & PepsiCo has required special dose for their plant.
10.8	99% (2 log reduction)	
16.2	99.9% (3 log reduction)	
21.6	99.99% (4 log reduction)	

Table 2: D10 for other Species in mJ/cm2

Species	Dose in mJ/cm2
	1 Log
Streptococcus viridians	2.0
Legionella pneumophila	2.0
Staphylococcus aureus	2.6
Listeria monocytogenes	3.4
Pseudomonas aeruginosa	5.5
Salmonella enteritidis	7.6
Bacillus subtillis (spores)	12.0
Polio virus	6.5
Saccharomyces carlsbergensis	10.0
Pichia anomola	35.0
Mucor mucedo	17.0
Penicillium digitatum	44.0
Aspergillus niger	130.0

What is a log reduction?

- 1 log reduction = 90% reduction of the target organism
- 2 log = 99% reduction
- 3 log = 99.9% reduction
- 4 log = 99.99% reduction

The log reduction at various levels is not always a linear response, in fact you may require a much larger UV dose from a 3 log to 4 log reduction as compared from a 2 log to a 3 log reduction.

DESCRIPTION OF HANOVIA UV SYSTEM

System Overview

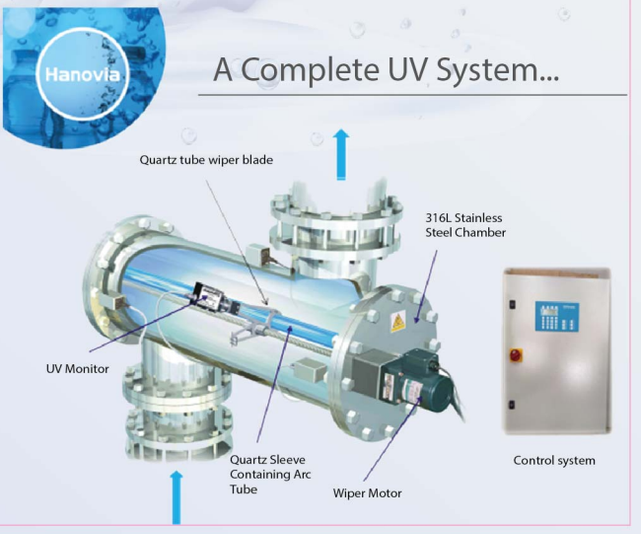
The Hanovia system provides disinfection of process liquid by exposing it to high or low intensity UV light, which inactivates viruses and bacteria, rendering them harmless. The UV light is generated by a Low or medium- pressure UV lamp inside a stainless-steel chamber, which is optimized to ensure that the process stream receives a specified dose of UV to achieve the required level of disinfection. Sensors attached to the chamber send data to the UV controller to allow continuous monitoring and optimization of the system's performance.

An automatic wiper is available as an option to remove deposits from the quartz thimble surrounding the UV lamp. A wiper ring travels up and down the thimble and in the process cleans any deposits from the surface. Limit switches detect the end of each wipe stroke and stop the motor. Where systems are used in critical applications, additional parts and documentation are available, including certified lamps, higher internal chamber finishes and tri-clamp fittings.

The primary components of the system are shown in Figure.

All Hanovia systems Include:

- *Disinfection/Treatment Chamber*
- *Arc Tube (UV lamp)*
- *Control / Power Supply Cabinet*
- *UV Monitor*
- *Automatic Wiper Mechanism (optional).*



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Treatment Chamber

- Capacity up to 1,800 m3 per hour for a single chamber
- 316L stainless steel construction
- Hydrostatically pressure tested to PED requirements
- Tri-clamp or flange connections to suit any pipe size
- Quartz sleeves house arc tubes and permit replacement of arc tubes without interrupting flow
- Automatic wiper maintains operational efficiency
- Optimum hydraulic design for uniform treatment
- Drain valve.

ARC Tube (UV Lamp)

- Up to 6 Arc Tubes per chamber
- Simple to replace
- Hanovia is the only UV systems manufacturer to manufacture ts own medium pressure arc tubes, for ultimate quality and performance
- All Hanovia arc tubes are manufactured and tested to international standard.

Low Pressure (LP) UV Lamp

Ideal for low flow rates or microorganisms that require a low UV dose to inactivate them. It emits UV light at 254 nm wavelength. Low pressure UV can eliminate harmful microorganisms sensitive to 254nm wavelength emitted by the lamp effectively and efficiently preventing biological contamination. The 254 UV wavelength breaks the DNA bonds in a microorganism.

Medium Pressure (MP) UV Lamp

Ideal for large flow rates or microorganisms that require a high UV dose to inactivate them. It emits UV light at 200 to 400 nm. Medium pressure UV by emitting multiple wavelengths can eliminate microorganisms that are not just sensitive to one wavelength. The UV wavelengths break DNA bonds, damage cell enzymes and rupture the cell wall.

UV Monitor

- Provides continuous output measurement of each UV lamp in the treatment chamber
- Keeps system running at maximum efficiency
- With any change in process conditions, the system can switch to new power level or initiate a local or remote alarm
- Optional individual monitor for each lamp.

Wet UV Monitor

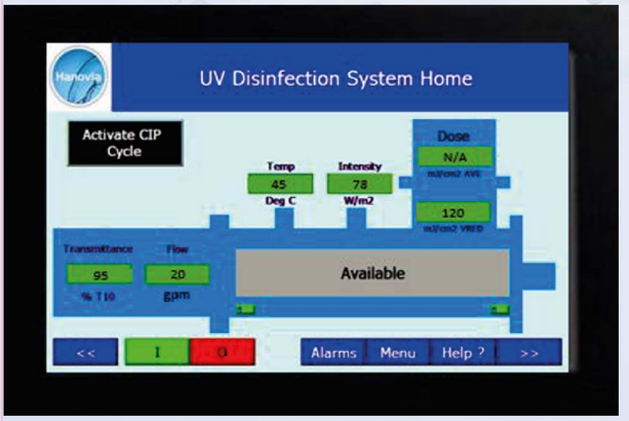
A pre-calibrated UV monitor system needs to be able to respond accurately over a wide dynamic range without the need for user adjustment or set-up. The Hanovia designed signal interface can operate over the widest anticipated UV intensity range within the disinfection chambers.

Dry UV Monitor

The factory-calibrated dry UV sensor is simply a cut above. It provides absolute UV intensity monitoring in real-time, and because it remains outside the water flow it can be removed and inspected without interrupting your processes. The patented design allows verification using a portable reference UV sensor with no risk of harmful UV exposure or need to wear safety equipment.

Control System

- The Hanovia provides microprocessor/PLC based control module with their UV system
- Full traceability and Continuous monitoring
- A Menu-driven interface
- Real-time data display with event logging
- Warning and trip for low UV dose, high temperature, low flowrate etc
- Password protected control panel for security
- Dose optimization and computation from fixed or variable flow and UVT
- Modbus and Hard-Wired interface to SCADA system
- Local/Remote operation.



HMI in PLC based UVtouch control panel

HMI in microprocessor based UVtronic Control panel

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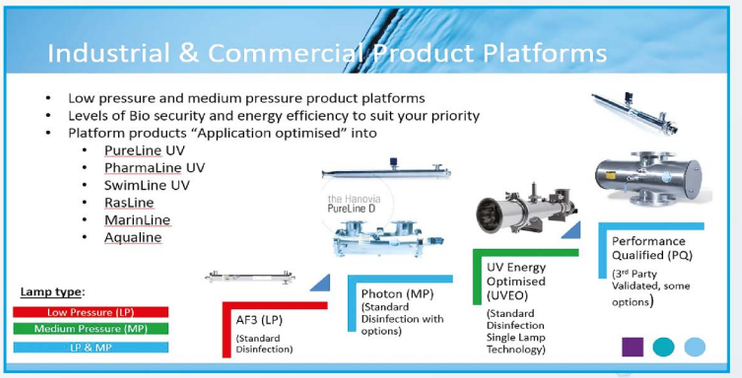
Hanovia Products Platform

All of our Sector based products Pharmaline, Pureline, Swimline etc, are derived and configured from our various product platforms. Our naming convention indicates which product platform it is based on as follows:



Performance Qualified (PQ) Platform

Key features:

- Guaranteed performance: It has bio-security guaranteed disinfection performance validated by 3rd party (Carollo Engineers) according the UV Disinfection Guidance Manual (UVDGM) guidelines.
- UV tronic high performance controller: It shows real-time dose, intensity, lamp self-life and other useful information.
- Dose control system: The ballast ensures the power of lamp to optimize the required dose against the defined micro-organisms.
- Bio-RED dose: A bio-validated real measure of micro-organism killing performance, all particle tracks are considered.
- Dry UV monitor (sensor): It can be infield verified using verification sensor without the interrupting the process.
- Shelf life of lamp: It has long shelf life ranging from 12000 to 16000 hours.

Ultra-Violet Energy Optimised (UVEO) Platform

Key features:

- MP system - Polychromatic lamp (wide range UV germicidal wavelengths 240 – 280nm - effective against various microbes).
- 3rd Party fully validated to USEPA - Offers certainty in disinfection performance.
- Energy optimised chamber – the system has one lamp, one sleeve and smaller flange connections.
- Control system – delivers and displays UV dose. Latest high intelligence Control system – UVtouch + RS485 industrial ethernet.
- Control systems has stepless ballast - maintains UV dose set point with changes in process conditions (flowrate + UV transmittance).
- Calibrated DVGW compliant dry sensor with UVGuard™ sensor window.
- Hanovia UV Guard (standard) safety feature - This safety features reduces the possibility of UV light exposure to the operator when removing the UV dry intensity monitor. A patented technology "eyelid shutter offers auto closure as the sensor is pull out. (The removal of the dry intensity monitor is necessary for occasional verification of the sensor).

- Optimised UVI sensor position – detects UV transmittance changes and adjust the power to reach set UV Dose.
- F240 quartz sleeve - This sleeve will block the wavelength below 240 nm and if nitrates are present in the disinfection water our system will not form Nitrite by-products.
- Water Leak detection safety feature - This feature offers additional safety in the event that there is a break in the lamp or quartz tube - where by a signal is provided to allow your control system to operate service lines by shutting off water flow.
- Hanovia UV Shied safety feature - This feature offers enhanced protection to the operator. If the operator forgets to turn off the lamp power before servicing the cut-out feature will remove power to the lamp.

AF3 Platform

Key Features:

- Single lamp amalgam from 140w to 600w.
- Pneumatically driven auto wiper when required.
- Hygienic designs available.
- Dry DVGW style sensors for validated unit allowing on line sensor verification.
- Simple low-cost controller or sophisticated controller for validated units with dose display.
- Suitable for High UVT low dose applications.
- Low energy consumption and high energy efficiency.

Photon Platform

Key Features:

- Well established product with a long history of reliable service.
- Single to 8 lamp medium pressure design in U or S shaped chambers.
- Simple PCB based control system.
- Rugged Transformer based power supply with a reputation for lasting a life time.
- Automatic wiper available.
- Power stepping to 70% available to minimise power consumption.
- Wet UV intensity sensor.

InLine + Platform

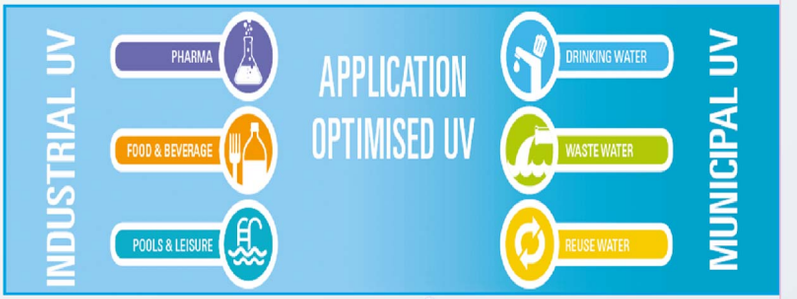
Key Features:

- Compact construction that fits directly in the pipe line – hence the name InLine.
- Multiple medium pressure lamps perpendicular to flow ensures even dose distribution.
- Particularly suitable for low UVT or high dose applications.
- Variable power control down to 30% achieves dose at minimum power levels.
- Automatic wiper with Ultra Wipe available with on line Chemical clean assist when required.
- Dry DVGW compliant sensor allows on line sensor verification.
- USEPA and DVGW validations for drinking water for Cryptosporidium through to Virus control.
- NWRI validation for Waste Water and NVI validation for Fish Farming.
- Available with UV Tronic controller or Allan Bradley PLC with touch screen HMI.
- Datalogging available for regulated systems.

HANOVIA OPTIMIZED UV SOLUTION

Hanovia optimised UV solution into following categorized;

- PharmaLine for Pharmaceuticals
- SwimLine for Pools & Leisure
- PureLine for Food & Beverage
- MarineLine for Marine
- RASLine for Aquaculture
- ProLine for Municipal applications
- Airline for Air disinfection.

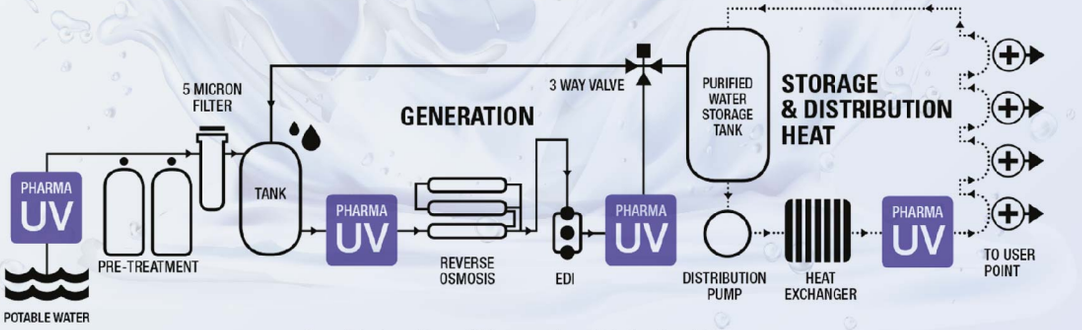


PharmaLine Optimised UV

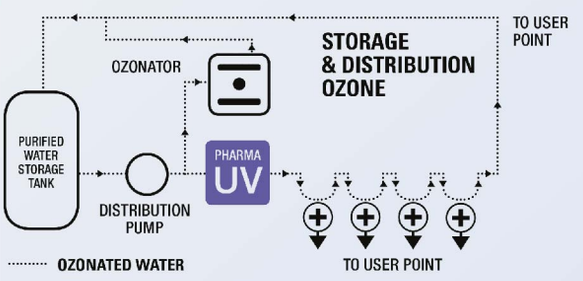
Pharmaline range of **Pharmaceutical sector UV solutions** protects your products and processes from harmful contamination against bacteria, viruses and Chlorine without resorting to chemicals.

This UV can be applied in many parts of your water system depending on your design philosophy

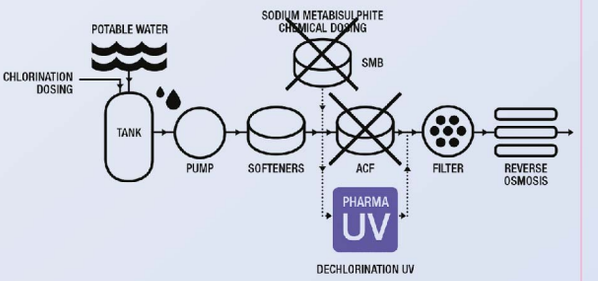
- *Pre-treatment Disinfection as a firewall to incoming pathogens – chlorine resistant organisms such as Cryptosporidium and viruses.*
- *Pre-treatment Dechlorination eliminating the need for carbon beds to protect RO membranes and EDI systems.*
- *Post Carbon or resin beds to disinfect bacterial growth which proliferates in these processes.*
- *Post RO disinfection prior to treated water tanks as final protection in the generation plant.*
- *Disinfection in circulating loops to keep secondary contamination under control.*
- *Ozone removal from loops.*



Possible location of PharmaLine disinfection UV



Possible location of PharmaLine de-Ozonation UV



Possible location of Pharmaline Dechlorination UV

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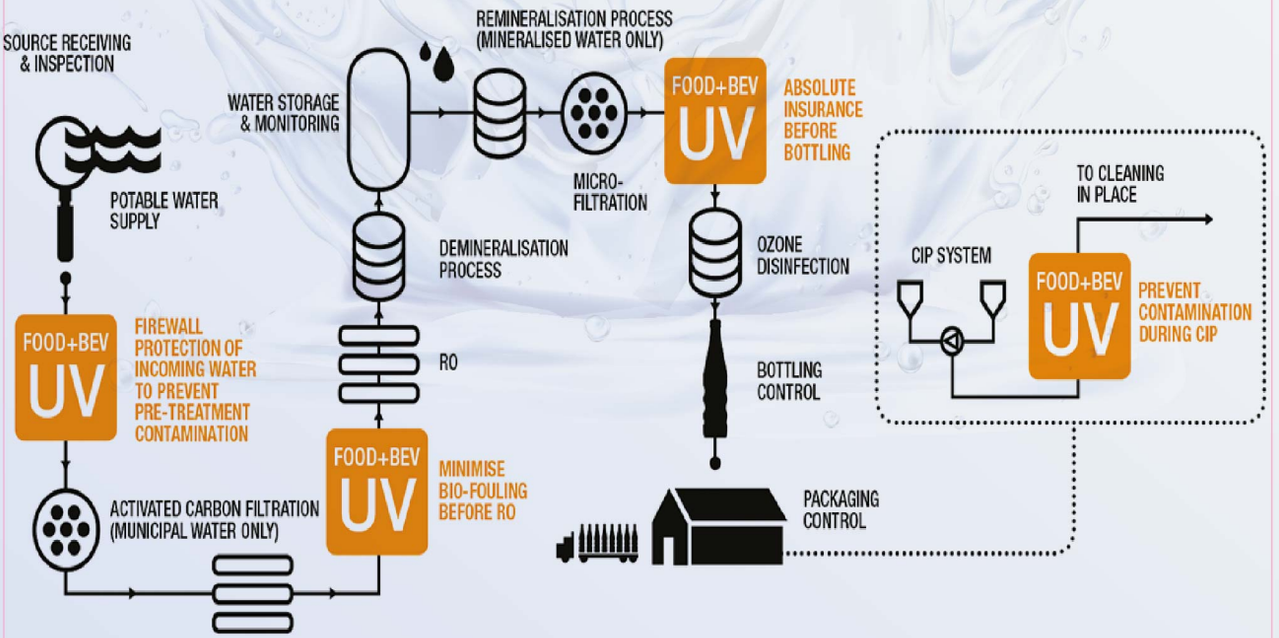
PureLine Optimised UV

PureLine range of **Food & Beverage UV** solutions protects your products and processes from harmful contamination from bacteria, viruses, Chlorine, Chlorine Dioxide and Ozone without resorting to chemicals. Used for Process water, Ingredient water, CIP, Syrup and Brine disinfection the PureLine range is applied in many Food & Beverage applications including: Bottled Water, Soft Drinks, Brewing, Dairy, Wineries, Meat Processing, Processed and Packaged Foods, Salad Washing.

Depending on design philosophy this UV can be applied in many parts of your water system as follows

- *Pre-treatment Disinfection as a barrier to incoming pathogens – chlorine resistant organisms such as Cryptosporidium and viruses.*
- *Pre-treatment Dechlorination eliminating the need for carbon beds to protect RO membranes.*
- *Post Carbon or resin beds to disinfect bacterial growth which proliferates in these processes.*
- *Post RO disinfection prior to treated water tanks.*
- *Disinfection in circulating loops to keep secondary contamination under control.*
- *Ozone removal from loops.*
- *Removal of Chlorine dioxide prior to use.*
- *Disinfection of CIP water.*
- *Pasteurization equivalent for use in Dairies.*



Possible location of Pureline UV in food & beverage water plant

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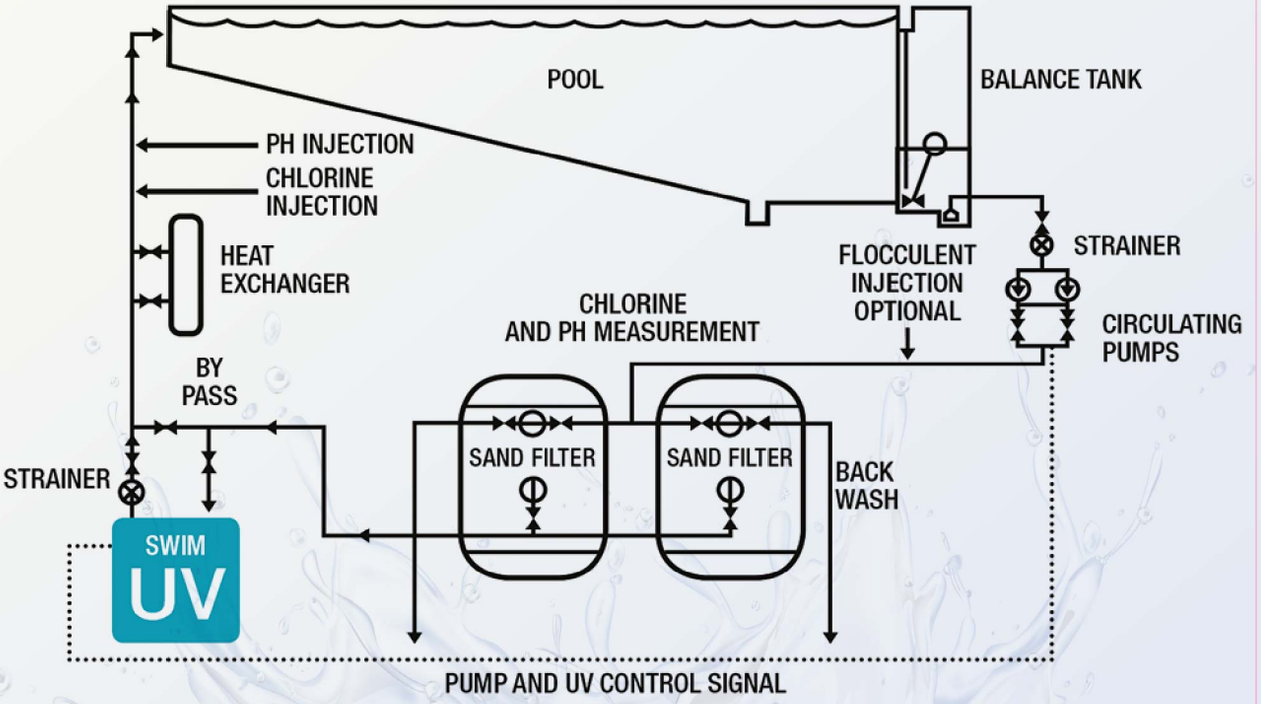
SwimLine Optimized UV

UV SwimLine ranges has been providing bather protection in the **pool and leisure** industry for over 30 years. Used as both a secondary disinfection system and for the removal of Chloramines. It is ideal because it easily deals with chlorine resistant organisms such as Cryptosporidium and Giardia which are responsible for very unpleasant gastric infections, and it removes Chloramines responsible for sore eyes and respiratory problems.



MarineLine Optimised UV

The MarineLine range protects your **passengers and crew, and the environment** from harmful contamination from bacteria and viruses without resorting to chemicals.

MarineLine range of UV solutions for shipboard applications are used in 3 key areas:

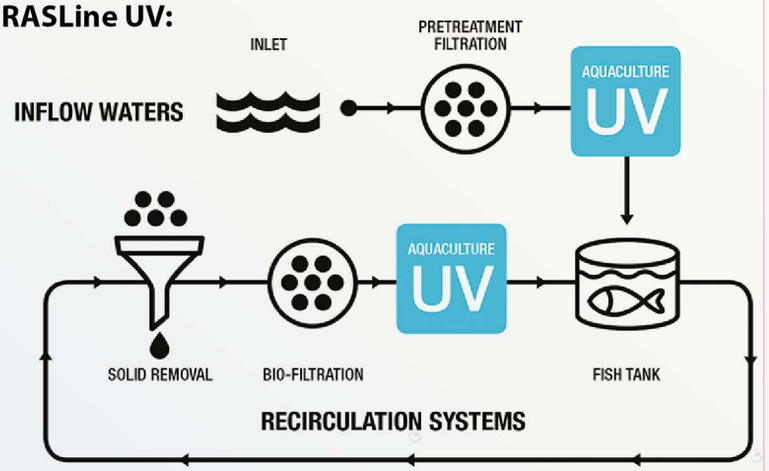
- *Ballast Water Treatment*
- *Drinking Water Disinfection*
- *Black water disinfection after activated sludge treatment and prior to discharge.*

RASLine Optimised UV

RASLine range of **Fish Farming UV solutions** protects your fish, your processes and the environment from harmful contamination without resorting to chemicals. RASLine UV systems can play a vital part in **aquaculture** installations, by destroying bacteria, viruses, protozoans, cysts, spores, unwanted algae and other microorganisms.

Fish disease organisms treatable by RASLine UV:

- *Viral haemorrhagic septicaemia (VHS)*
- *Infectious Salmon Anaemia (ISA)*
- *Saprolegenia (fungal disease)*
- *Infectious pancreatic necrosis (IPN)*
- *Coliform bacteria*
- *Ichtyophthirius (white spot disease)*
- *Faecal streptococci.*



Possible location of UV in the Aquaculture water treatment plant

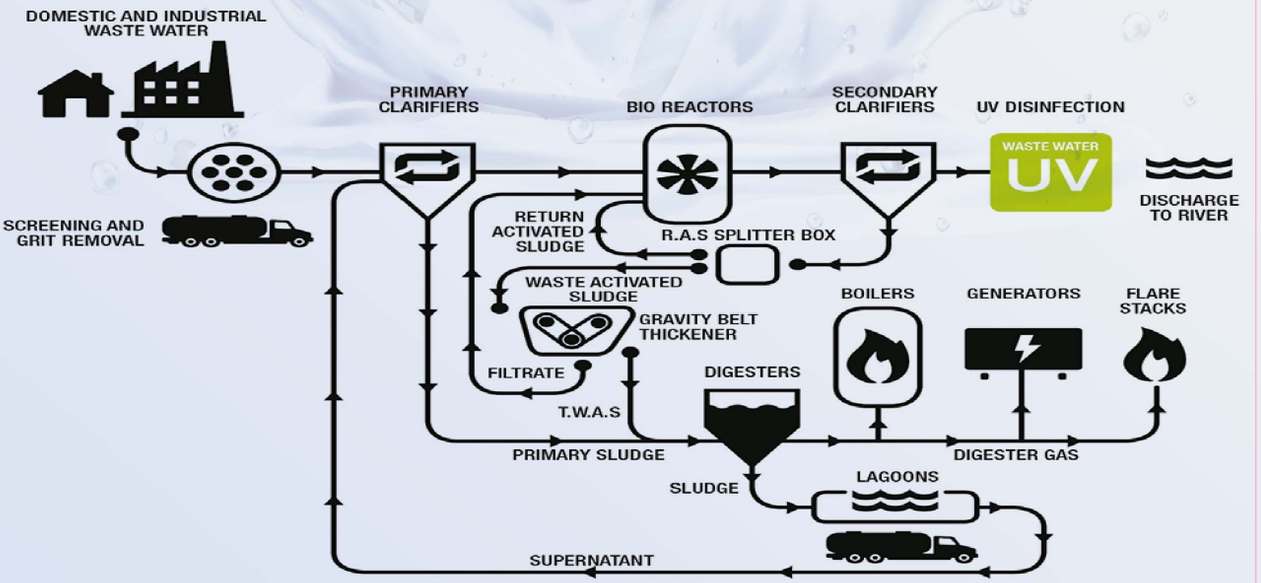
The RASLine range is applied in many Fish farming applications including:

- *Make up water pathogen barrier*
- *Recirculating water disinfection*
- *Waste water disinfection prior to discharge to the environment*
- *Well boat Hygiene.*

Proline Optimised UV

With increasing urbanization and water stress the need for **tertiary treatment and disinfection of waste water** is growing, particularly for discharge to sensitive environments. UV is also growing in popularity as it provides a proven alternative to Chlorination avoiding the generation of potentially harmful by-products.

Proline UV systems are particularly suited to low UVT applications and can be deployed after clarifiers sand filters and Membranes. The ProLine UV range is intended as a cost-effective treatment as part of a multi barrier system for less critical applications where there is no risk to people or the food chain.



Possible location of Proline UV in the waste water treatment process

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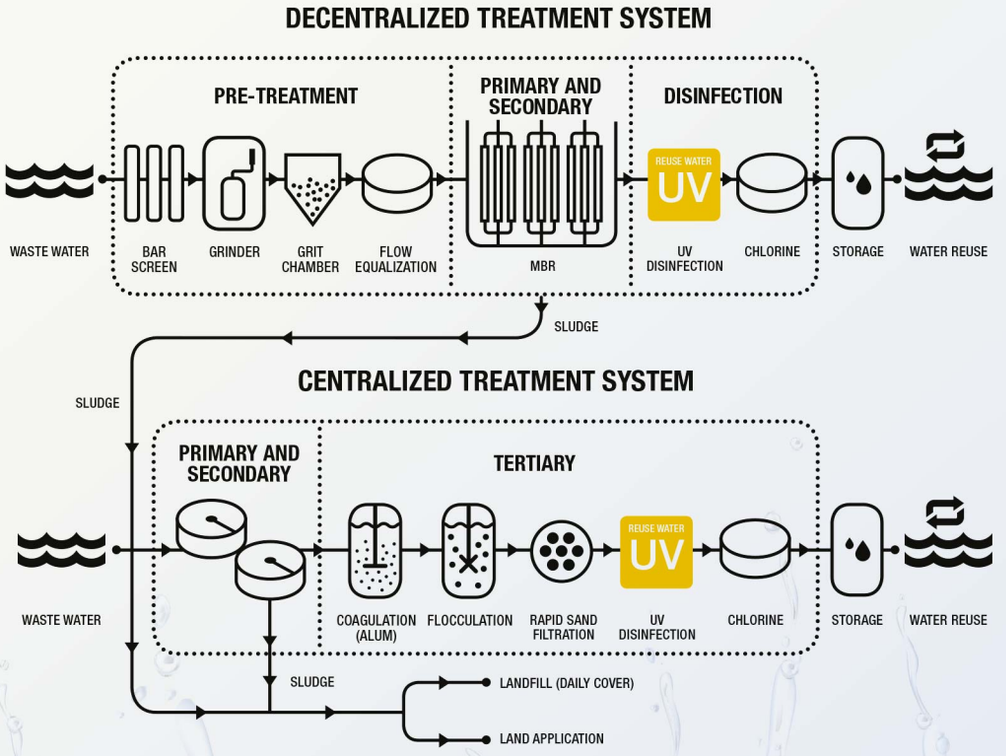


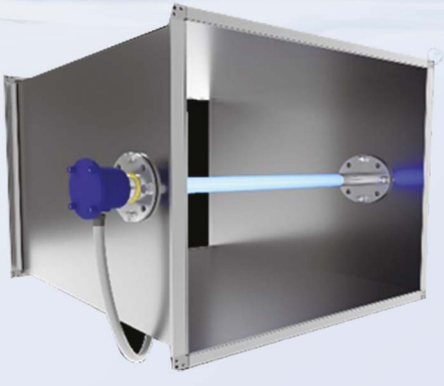
Possible location of Proline UV in the reuse water treatment process

Airline Optimized UV

The UVv ultraviolet disinfection systems are installed in HVAC duct work and use high output medium pressure UV-C lamps for the inactivation up to 99.99% of **airborne pathogens, such as molds, spores, bacteria and viruses, including SARS-CoV-2 (COVID 19).**

The high output lamp(s) of the UVv treat airborne pathogens being distributed through air-conditioning, heating and ventilation systems. As air passes over the high output lamps, airborne pathogens are inactivated, reducing pathogen transmission.

Healthcare facilities, office locations, retail workers, customers, manufacturing facilities, hotels and the general public have a concern about the transmission of pathogens through the air.



Airline UV in the HVAC duct.

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USEFUL DEVICES FOR HANOVIA UV SOLUTION

In field Reference Sensor kit

The Hanovia in field reference sensor kit is designed to allow plant operators to check that the UV duty sensors of Hanovia PQ UV systems are operating within acceptable limits.

The Hanovia in field reference sensor kit consists of a hand-held measurement instrument, battery charger and at least one UV reference sensor to DVGW standard W 294 specifically calibrated to the measurement instrument. It is battery operated and has a two-line LCD display which indicates irradiation intensity in W/m^2.

In-field Sensor Verification Meter

UV Transmittance Analyzer (TX Meter)

The TX Online is manufactured using microprocessor technology making it the most reliable and cost-efficient instrument for monitoring the % transmittance of drinking water UV disinfection systems.

The Auto Clean Ultrasonic Cleaning System continuously cleans the optical chamber to reduce operator maintenance time.

The TX Online process transmission monitor allows for the UV transmission measurement of process water on-line. A unique feature of the instrument is the ultrasonic cleaning.

TX online Analyzer

Lamp Tester

Lamp Tester LT1 is a device used for the testing the integrity of UV lamps. Simply touch the lamp contacts with the test probe and press the button. The lamp is defective if there is no illumination visible from the lamp. A clear blue illumination indicates that the tube is in perfect condition. A pink glow means that the lamp is starting to fail.

This unit is designed for testing of gas filled medium and low-pressure lamps.
The following lamps can be checked:

- *Mercury low pressure lamps*
- *High power amalgam lamps*
- *Mercury medium pressure lamps*
- *High pressure sodium lamps*
- *Fluorescent & Neon lamps*
- *Metal halogenid lamps*
- *Low pressure sodium lamps.*

Hand-held Lamp Tester

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Hanovia UV System Enquiry Data Sheet

End user name		***Distributor name***	**Biovista Bangladesh Ltd.**
End user location		***Enquiry reference***	

End use business type	**Pools / leisure**	**Food**	**Brewing / Beverage**	**Electronics**	**Pharma / healthcare**	**Aqua-culture**	**Marine**	**Oil / petrochem**	**Other**

Application type please check box:	**Disinfection**	**TOC reduction**	**Chlorine reduction**	**Ozone reduction**	**Pools**	**Other**

APPLICATION DETAILS			
Application:			
Is application for human consumption?			
Any special specification, validation or certification requirements?			
Feed Water type (e.g. raw water, potable, before or after RO, etc)			
Location of UV in process			
Fluid operating pressure		barg	Any other details of the application or fluid:
Fluid operating temperature		°C	
Is CIP required? (specify temp.)		°C	
Transmittance (T_{10})		%	
Total Dissolved Solids		mg/litre (ppm)	
Chlorides		mg/litre (ppm)	
Free chlorine		mg/litre (ppm)	
Combined chlorine		mg/litre (ppm)	
Sugar content (for sugar syrups)		Brix	

UV PERFORMANCE REQUIREMENTS		
Flow rate (design / max / min)		m^3/hr
UV dose required		mJ/cm^2
What are the target species (or TOC / Chlorine / Ozone)		
Input level of target species		
Required output level of target species		
Log reduction required		

CHAMBER & PANEL REQUIREMENTS	
Shape: **U** (top in/out) or **S** (bottom in / top out)	
Process connection type (e.g. flange, tri-clamp), specify flange type (PN16, ANSI, JIS, etc)	
Process connection size	
Internal surface finish required	
Cabinet (painted or stainless)	

SITE CONDITIONS & UTILITIES					
General site description:			Is area is non-hazardous?		
			Details of electrical power supply available at site		Volts
					Phase
Ambient site temperature (max/min)		°C			Hz
Ambient site relative humidity (max/min)		%	Air supply available? (specify pressure)		Yes

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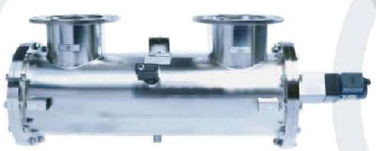
berson

hanovia

aquionics

We UVCare...
Municipal + Industrial UV



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