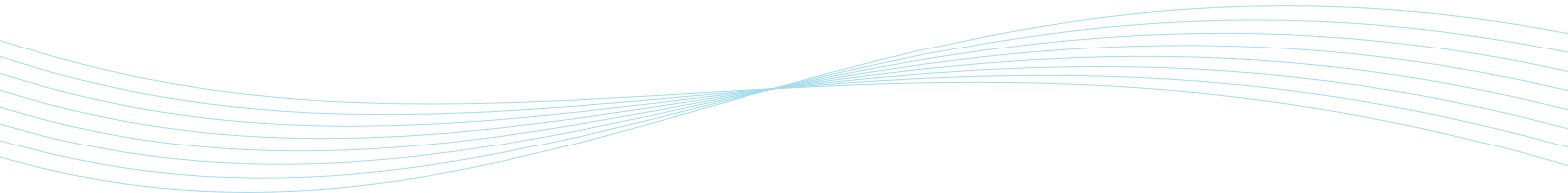




evoqua
WATER TECHNOLOGIES

AQUACULTURE
WATER TREATMENT

**SUSTAINABLE SOLUTIONS
FOR PRODUCTIVE
GROWTH**





ABOUT US

Water fuels and enriches everything, from daily life to industry and manufacturing. But it is a finite resource. To harness the power of water, we need solutions to manage and maintain it.

At Evoqua, we believe that innovation and technology can help us use and preserve this resource, now and in the future.

We are a global leader in identifying emerging water concerns. Our world-class expertise and growing portfolio of products have established Evoqua as the trusted advisor to industrial, municipal and recreational customers worldwide.

Evoqua, and our brands, have over a 100-year heritage of innovation, and every day, millions of people and thousands of companies rely on us as their trusted advisors to help them meet their water needs.

Advanced Aquaculture Solutions

If there is one industry that has complete reliance on our global water resources, it's fishing and aquaculture. Low water quality leads to stress, disease, and lower production. Controlling the water environment is essential to sustain health in any aquaculture system.

Successful RAS and flow-through systems depend on healthy fish and proper water quality management. In environments when imbalance can be devastating, it's critical to have the information and the means to maintain the correct conditions at all times.

Evoqua has been working alongside the aquaculture industry for many years and to help meet their challenges, offers a range of advanced aquaculture solutions.

We design, manufacture, and maintain a wide range of treatment and filtration systems for every aquaculture application to improve water quality, fish health, increase stock density, and boost yields.



HOW EVOQUA CAN HELP

- Improve water quality
- Reduce the risk of disease
- Ensure your operations comply to regulations
- Simplify operations and maintenance
- Deliver high performance in a small footprint

Application	Recirculating Aquaculture Systems	Fish Hatcheries	Well Boats	Shellfish Depuration
Medium Pressure Wafer™ UV System	•	•	•	
Low Pressure VX UV System	•	•		
MG Series Ozone Generators	•	•		
PC Series Portable Ozone Cart	•	•	•	
Monitoring & Control	•	•	•	•
VAF V-Series Screen Filters	•	•	•	

Ultraviolet (UV) Solutions

UV SYSTEMS FOR AQUACULTURE APPLICATIONS

UV technologies, used in the aquaculture industry improves water quality and reduces the risk of disease, without the use of chemicals.

UV is favoured in aquaculture treatments because it can improve the taste, colour, pH, or odour of water, and requires no storage, handling or transportation of chemicals. It is highly effective at inactivating a wide range of microorganisms and offers water reuse capabilities to meet sustainability objectives.

Using UV allows producers in the aquaculture industry to focus on hatching and rearing fish, knowing that their water quality is being maintained in a reliable and sustainable way.

WHAT IS UV DISINFECTION?

UV energy lies between visible light and x-rays on the electromagnetic spectrum and can be used in water treatment to kill microorganisms. UV energy disrupts the DNA of the microorganisms, preventing reproduction without altering water chemically. With UV treatment, nothing gets added apart from energy.

UV solutions are used for disinfection and removal of organic and inorganic contaminants. It is a safe and chemical-free solution to provide a healthy underwater environment and prevent the spread of fish diseases.

Evoqua UV disinfection generator systems undergo third-party validation testing in accordance with the UVDGM (USEPA, 2006). Validated products are tested to confirm a minimum inactivation equivalent of 3 log (99.9%) for microorganisms in accordance with NSF/ANSI 50 and the UVDGM. Performance is not claimed nor implied for any product not yet validated; unvalidated products use single point summation calculations to provide delivered dose recommendations. Performance limitations depend on feed conditions, overall installed system design, and operation and maintenance processes; please refer to Operations Manuals. For more information: Contactus@evoqua.com

EVOQUA UV RANGE

Evoqua offers a range of industry-leading UV technology, closed vessel UV chambers with no harmful by-products produced.

We provide a range of medium and low-pressure UV models to suit different applications, including:

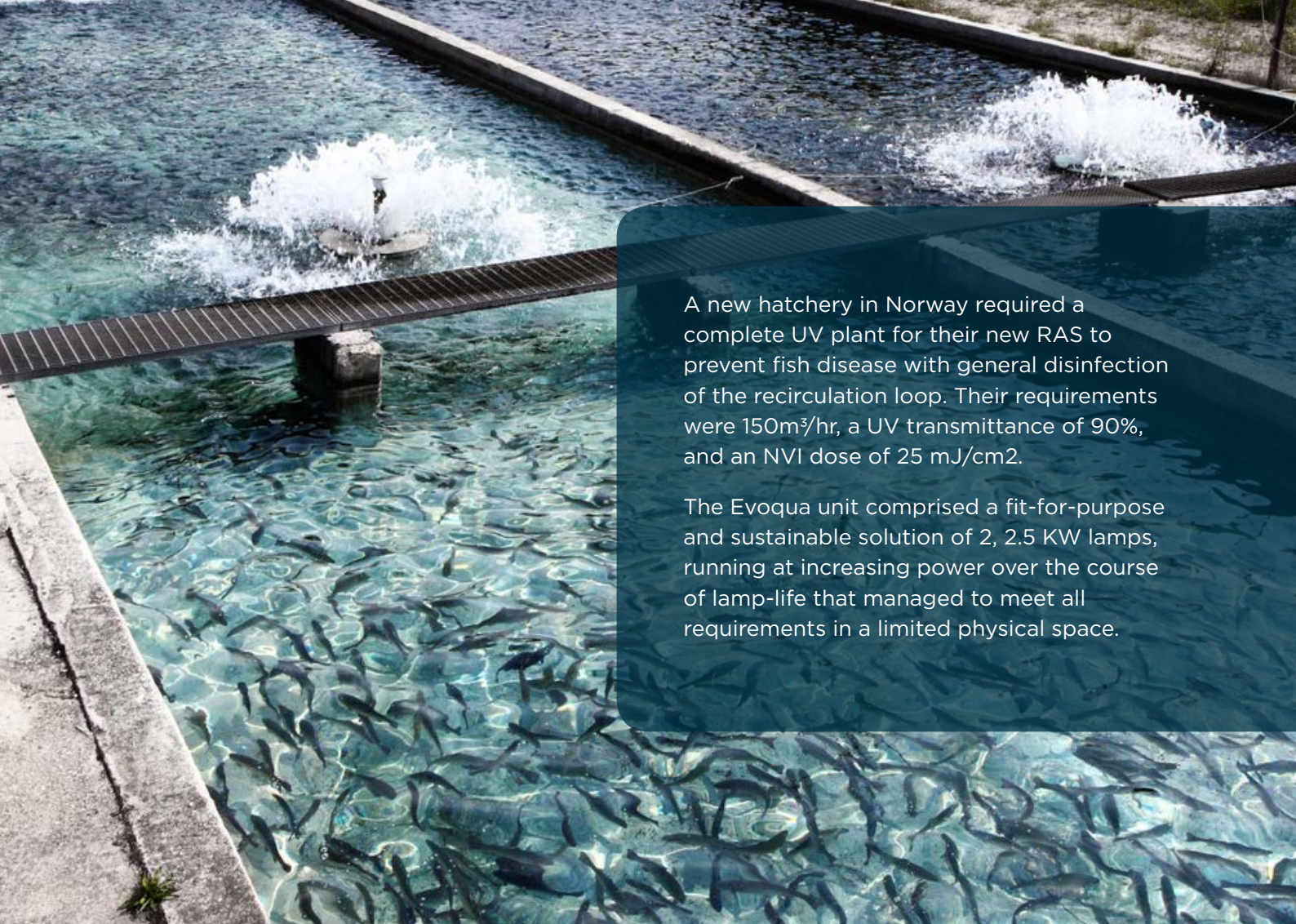
- ATG™ UV Wafer™ UV Range: The world's most compact, medium pressure UV systems designed specifically for the aquaculture industry. The range was laboratory tested for 6 months and is now Norwegian Veterinary Approved* for use in aquaculture applications, with breakthrough results.
- ATG™ UV VX Range: The latest low pressure range of high quality UV systems for operational flexibility and performance.

See the full range of Evoqua's UV systems at www.Evoqua.com

NVI APPROVED WAFER™ UV MODELS

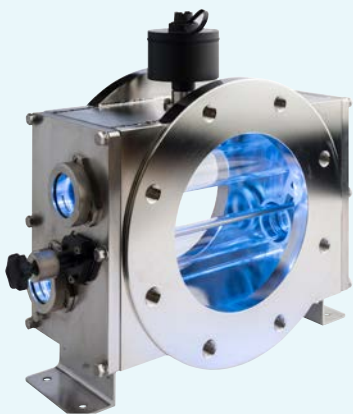
Model	Capacity at NVI Dose 25 mJ/cm ² and UVT of 92%
WF-115-3	33 m ³ /hr
WF-115-4	44 m ³ /hr
WF-125-6	51 m ³ /hr
WF-215-6	85 m ³ /hr
WF-215-8	113 m ³ /hr
WF-225-8	193 m ³ /hr
WF-230-10	168 m ³ /hr
WF-430-12	379 m ³ /hr
WF-640-16	750 m ³ /hr
WF-850-20	2750 m ³ /hr
WF-1060-24	3023 m ³ /hr
WF-1280-32	5375 m ³ /hr

*NVI type-approval UV plant of ATG for treatment of ingestion water and transport water to aquaculture related activities. The approval follows 45 weeks of field-testing onboard the Norsk Fisketransport operated well boat Namsos. Minimum required UV dose of 25 mJ/cm², operating with variable lamp power control according to the UV dose monitoring. UV intensity, flow rate, lamp operating hours, UV dose and chamber temperature were continuously monitored, recorded, and verified against a reference sensor. Water samples were collected weekly for heterotrophic bacteria and Vibrio species analysis which showed an average 2.5 log reduction. Specific design, including filtration and operational limitations are available upon request.



A new hatchery in Norway required a complete UV plant for their new RAS to prevent fish disease with general disinfection of the recirculation loop. Their requirements were 150m³/hr, a UV transmittance of 90%, and an NVI dose of 25 mJ/cm².

The Evoqua unit comprised a fit-for-purpose and sustainable solution of 2, 2.5 KW lamps, running at increasing power over the course of lamp-life that managed to meet all requirements in a limited physical space.



MEDIUM PRESSURE WAFER™ RANGE



LOW PRESSURE VX RANGE

ADVANTAGES OF EVOQUA UV SYSTEMS

- UV is highly effective at inactivating a wide range of microorganisms
- Improving water quality can reduce water consumption, delivering cost and sustainability targets
- There is no handling or transportation of chemicals
- Compact design across a range of flows and demand
- Fully automatic process and easy to install and operate
- Independent 3rd party, validated disinfection performance

Ozone Systems

OZONE SYSTEMS FOR AQUACULTURE APPLICATIONS

Ozone is one of the most powerful, commercially available oxidizing and disinfecting agents on the market. With a proven track record, Ozone rapidly eliminates 99% of known viruses, including resistant and problematic microorganisms, without the use of chemicals. It is a safe and controlled means of water treatment.

Ozone gas quickly dissolves in water, and then decomposes back to oxygen in solution, leaving effectively no residuals in the treatment stream.

Ozone has a number of direct benefits for aquaculture production, improving water quality and fish health.

WHAT IS OZONE?

Dissolving Ozone in water creates an effective biocide that destroys bacteria and viruses. Using Ozone to create oxidation is a natural process that can destroy bacteria, algae, and biofilms within water systems, without developing resistance or immunity.

Safe for operators and safe for live product, Ozone provides both sanitisation & microflocculation benefits from a single system making it a cost-effective solution for aquaculture applications. Finally, Ozone contributes to Geosmin reduction, leading to improved taste and flavour.

EVOQUA OZONE RANGE

Evoqua's Pacific Ozone System uses innovative floating plate technology to produce ozone from compact, efficient, air-cooled generators for residual-free disinfection, oxidation, and sanitisation.

Our Pacific Ozone range for aquaculture applications includes:

- Pacific Ozone™ MG Series Ozone Generators
- Pacific Ozone™ PC Series Portable Cart

See the full range of Evoqua's Ozone systems at www.Evoqua.com



MG SERIES OZONE GENERATOR

Evoqua Ozone Generation systems undergo factory acceptance testing to ensure they are capable of producing the desired ozone concentration, based on operational parameters outline in the Operating Manual. System performance of microorganism inactivation depends on the CT value, pH, and temperature of water. Performance limitations depend on feed conditions, overall installed system design, and operation and maintenance processes; please refer to Operations Manuals. For more information: Contactus@evoqua.com

ADVANTAGES OF EVOQUA OZONE SYSTEMS

- Ozone is a highly effective sanitiser
- The use of Ozone can reduce microbial counts by 5-6 log in just 2-3 minutes
- Designed with safety in mind
- Ozone is effective at very low residual levels
- Ozone is generated on-site with no chemical handling, storing or disposal requirements
- Ozone is an ideal replacement for 'Clean-In-Place' (CIP) process applications



PC SERIES PORTABLE CART



Ideal Fish was formed in 2013 to provide locally produced, sustainable, and high-quality fish. Evoqua was brought in to provide an economical disinfection solution to help remove the water impurity loadings and create a better, more biologically efficient system for the fish to grow in.

Evoqua's disinfection team provided one ozone generator to meet the needs of Ideal Fish. The advanced air-cooled, smart ozone generator delivers powerful, precision-controllable ozone from 140g/h (5lbs/day) to 1.4kg/hr (75lbs/day).

Ideal Fish saw a profound increase in water clarity and fish health, enabling them to further increase the growing and performance parameters with controlled and precise use of Ozone technology.

Monitoring and Control

With treatment systems in place, monitoring and control technology can be used to measure crucial quality indicators and optimise an aquaculture environment.

Monitoring and control ensures that only the highest quality water is used, and processes operate with maximum efficiency and safety.

Helping you respond to changes in the environment and to control the spread of diseases, Evoqua's solutions enable the management of disinfection process parameters assuring compliance with health, safety and regulatory standards, providing peace of mind for aquaculture producers.



DEPOLOX® 400 M ANALYSER

ADVANTAGES OF MONITORING

- Monitoring enables complete control of your water quality
- Chemical control improves sustainability and compliance
- Increased water and energy savings
- Monitoring leads to improved plant productivity

Controller Offerings	Description
SFC	Flexible one channel disinfection measurement systems
MFC	Online process analyser for the measurement and control of multiple disinfection process parameters
DEPOLOX® 400 M Analyser	Online process analyser for the measurement of disinfectant concentration in clean water applications
DEPOLOX® 700 M Analyser	Online process analyser for the measurement and limited control of disinfectant concentration in clean water applications
Varia Sense™	Flow cell for use with membrane sensors. Compatible with 400 M, MFC and SFC electronics modules
DEPOLOX® 5 Measurement Module	Flow cell and measuring module with the fast-reacting and reliable bare electrode and self-cleaning system. Compatible with 400M, 700M, MFC and SFC electronics modules
Sensors	<ul style="list-style-type: none"> • Electrode sensors: Total chlorine, Free chlorine, Chlorine dioxide (ClO₂), Ozone (O₃) Potassium permanganate (KMnO₄), pH, Fluoride, Redox (ORP), Conductivity, Temperature • Membrane sensors: TC3 (total chlorine), FC2 (free chlorine), CD10.1 (chlorine dioxide), OZ7 (ozone)



Sustainable Solutions for Productive Growth

Climate change, population growth, and water scarcity are growing concerns around the world. Evoqua is proud to provide solutions to help communities and industries solve such complex problems and build safe and resilient water systems.

Establishing effective and sustainable disinfection and filtration of water is crucial to ensuring safe, clean and reliable water quality and quantity for everyone.

Sustainability is a core value at Evoqua. It's driven by our culture, our people, and the services we provide.

Filtration Solutions

FILTRATION SYSTEMS FOR AQUACULTURE APPLICATIONS

Maintaining water quality in recirculating systems is often a product mechanical filtration in intake and RAS applications. Mechanical filtration, including screens, granular filtration, and separators is highly effective at removing suspended solids, oils, and other contaminants from water for greater cleaning efficiency.

Evoqua is a world leader in providing water filtration solutions for a variety of applications, including aquaculture, and offers a range of filtration solutions for different applications in the industry. There are numerous advantages of filtration systems, depending on their application and input.

VAF™ FILTRATION SYSTEMS

VAF filtration systems are automatic, self-cleaning screen filters for the removal of suspended solids from 10 to 1000 micron for flow rates from 200 to 3,500 GPM.

VAF systems provide cost-effective, efficient, and space-saving solutions that reduce water waste and limit maintenance.

ADVANTAGES OF EVOQUA VAF SYSTEMS

- Flush waste is less than 1% of system flow
- Fewer moving parts means lower maintenance requirements
- Continuous flush capability in both directions to manage spikes in TSS loading
- No additional electric motors, pistons, gear boxes to maintain, reducing safety concerns



V-SERIES AUTOMATIC SCREEN FILTERS

HYDROCYCLONE SEPARATORS

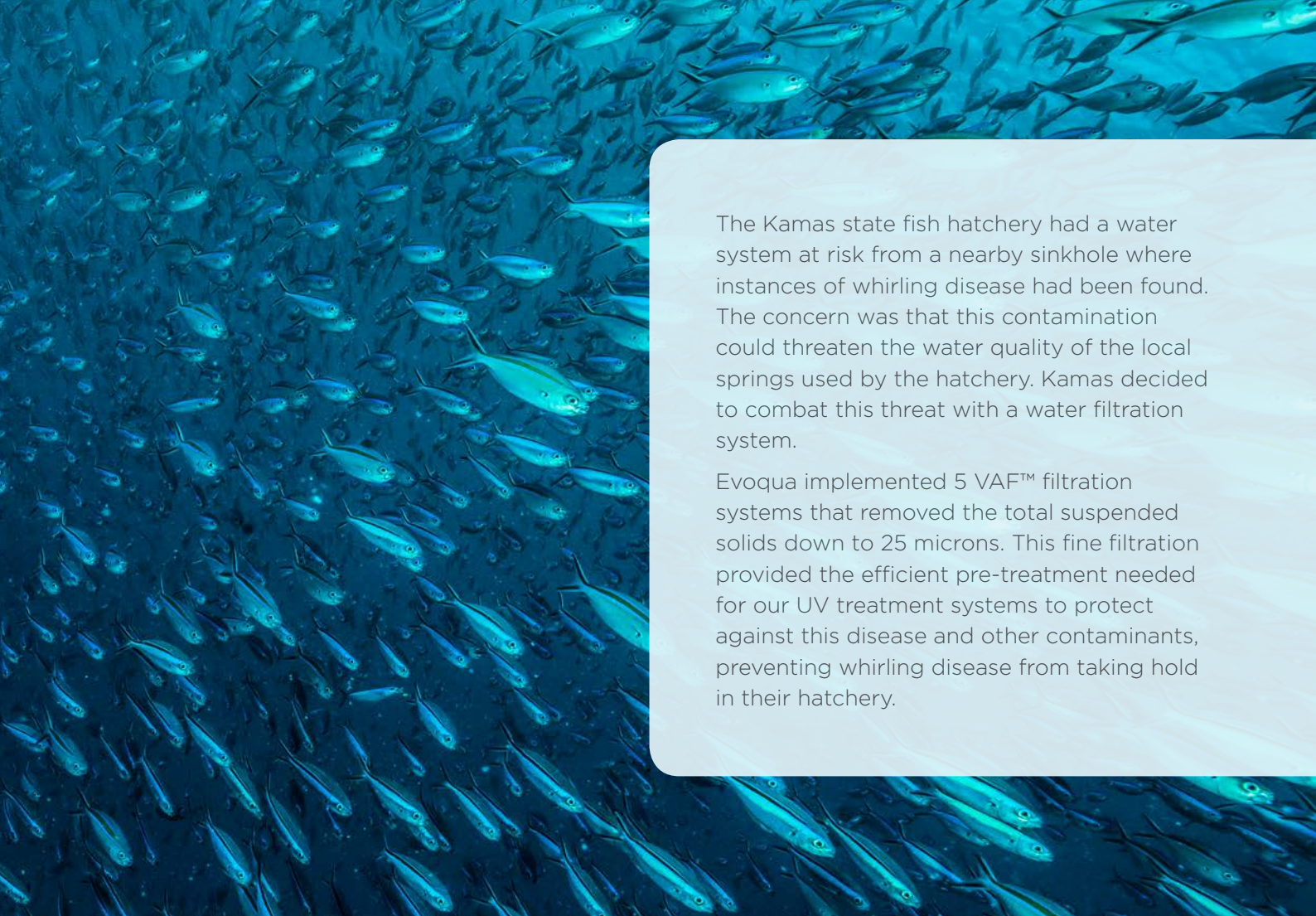
Hydrocyclone Separators remove suspended particles from any flow stream of water where the density of the particle is greater than the water it is in. The greater this difference is, the more effective Hydrocyclone Separators are.

Separators work using centrifugal action that forces heavier particles downward in a spiral motion through the separation chamber and eventually purged from the system.



ADVANTAGES OF HYDROCYCLONE SEPARATORS

- No electricity required
- No moving parts means less maintenance is required
- Excellent pre-removal to reduce load on downstream filtration
- Low cost



The Kamas state fish hatchery had a water system at risk from a nearby sinkhole where instances of whirling disease had been found. The concern was that this contamination could threaten the water quality of the local springs used by the hatchery. Kamas decided to combat this threat with a water filtration system.

Evoqua implemented 5 VAF™ filtration systems that removed the total suspended solids down to 25 microns. This fine filtration provided the efficient pre-treatment needed for our UV treatment systems to protect against this disease and other contaminants, preventing whirling disease from taking hold in their hatchery.

Service

Evoqua Water Technologies is one of the world's leading providers for water treatment equipment and service. We offer industrial customers and communities sustainable solutions for highly efficient water usage and supply.

Service is a key issue for the satisfaction of our customers. Aftermarket services offers unique, product-related service and support across a product's entire lifecycle.

To protect your investment in our premium quality equipment, we deliver unrivalled after-sales service packages—including technical support, training, on-site service, troubleshooting and spare parts—provided by a worldwide network of factory trained and dedicated professionals.

EVOQUA SERVICE

Service Contracts—Recurring scheduled services with a defined scope of work for operations, or maintenance of a customer's water treatment systems.

Field Services—One time event services covering a broad range of activities; equipment repairs, warranty services, new equipment startups, unscheduled maintenance and safety audits.

Spare Parts/Repairs—Evoqua provides both proprietary spare parts, consumable items and comprehensive repair services for clients.

Technical Support—Evoqua can quickly support you in all technical queries during the complete product life cycle.

Training—Evoqua offers training directly from the manufacturer and therefore first hand know-how. The courses comprise the entire disinfection range.

TRANSFORMING
WATER
— ENRICHING —
LIFE