GF Piping Systems

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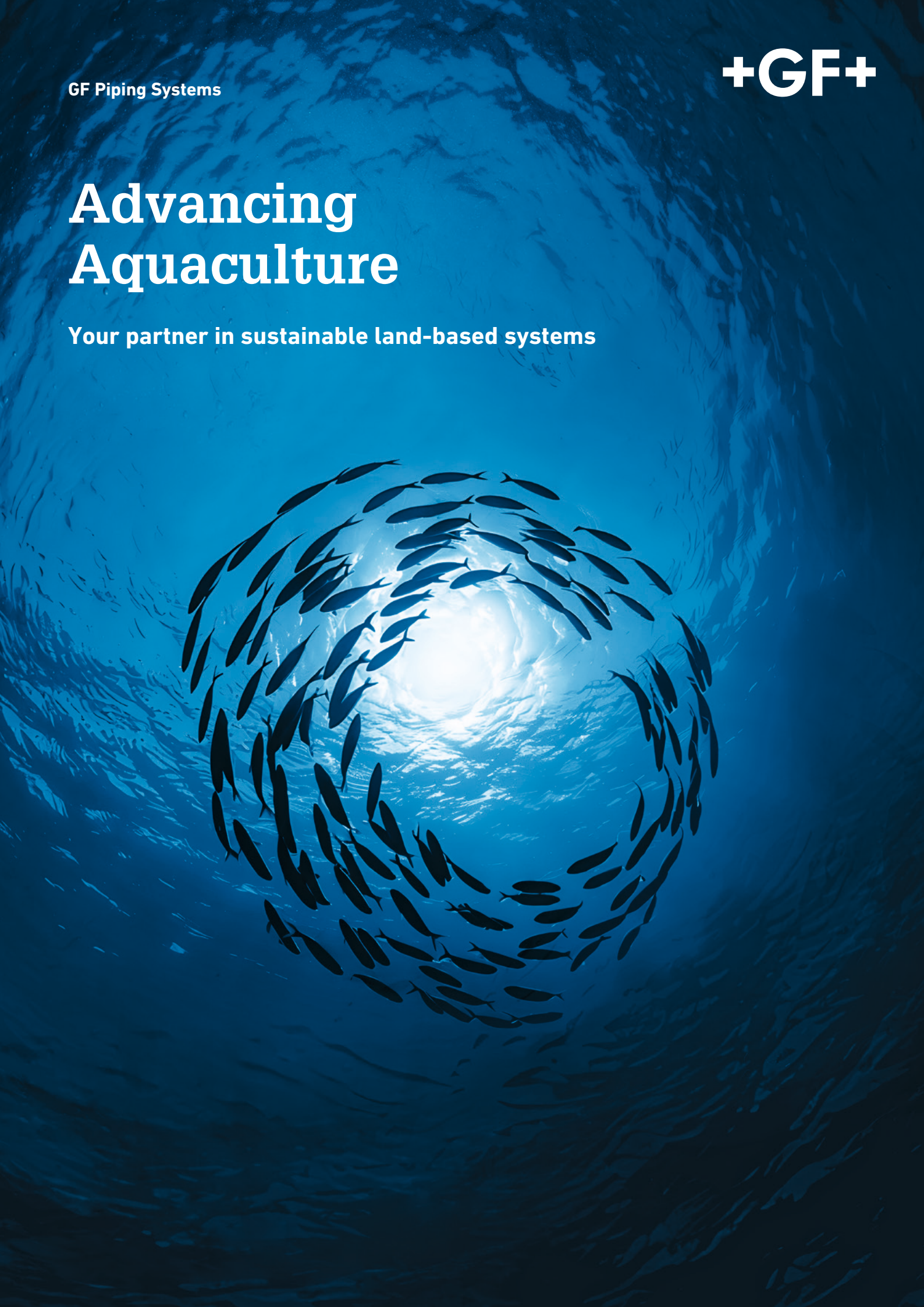
Advancing Aquaculture

Your partner in sustainable land-based systems



Sustainable Aquaculture

The future of sustainable aquaculture

Aquaculture is going through a massive shift toward sustainability, moving from open natural water to a controlled aquatic environment.

Aquaculture will supply over 60% of fish for human consumption by 2030 [1]

Aquaculture is rapidly evolving to meet the growing demand for sustainable food production, especially as more than 35% of the world's marine stocks are already overfished. Traditional net-pen farms face rising costs and regulatory challenges, making alternatives essential. There is a need for a more efficient, sustainable, and technologically advanced aquaculture.

Controlled environment farming is rapidly becoming the industry standard. Key technologies like recirculating aquaculture systems (RAS) and hybrid flow-through methods reduce water usage and waste, allowing for flexible land-based farming near market locations. Additionally, there is a growing emphasis on animal wellbeing, with advanced sensors and automation maintaining optimal water quality and environment health monitoring.

Challenges in land-based fish farming

One of the primary issues is the high capital and operational costs. Establishing land-based facilities, particularly Recirculating Aquaculture Systems (RAS), demands significant investment in infrastructure and technology. The energy requirements for water circulation, filtration, temperature control, and aeration are substantial, leading to ongoing operational expenses.

[1] **FISH TO 2030 Prospects for Fisheries and Aquaculture, WORLD BANK REPORT NUMBER 83177-GLB: https://www.fao.org/4/i3640e/i3640e.pdf**

Water quality management is another critical challenge. Maintaining optimal water conditions, including temperature, pH/ORP, oxygen levels, salinity, and waste removal, is vital for fish health and growth. Any imbalance can lead to disease outbreaks and mortality, significantly impacting productivity. Strict biosecurity measures are necessary to ensure safety and optimized growth, which can be costly and difficult to manage.

Transporting fish to market also presents difficulties. Fish farms are often located in remote areas, adding to the cost and complexity of transport. Consequently, market proximity and complex logistics are issues that modern aquaculture aims to address with land-based fish farming close to markets.

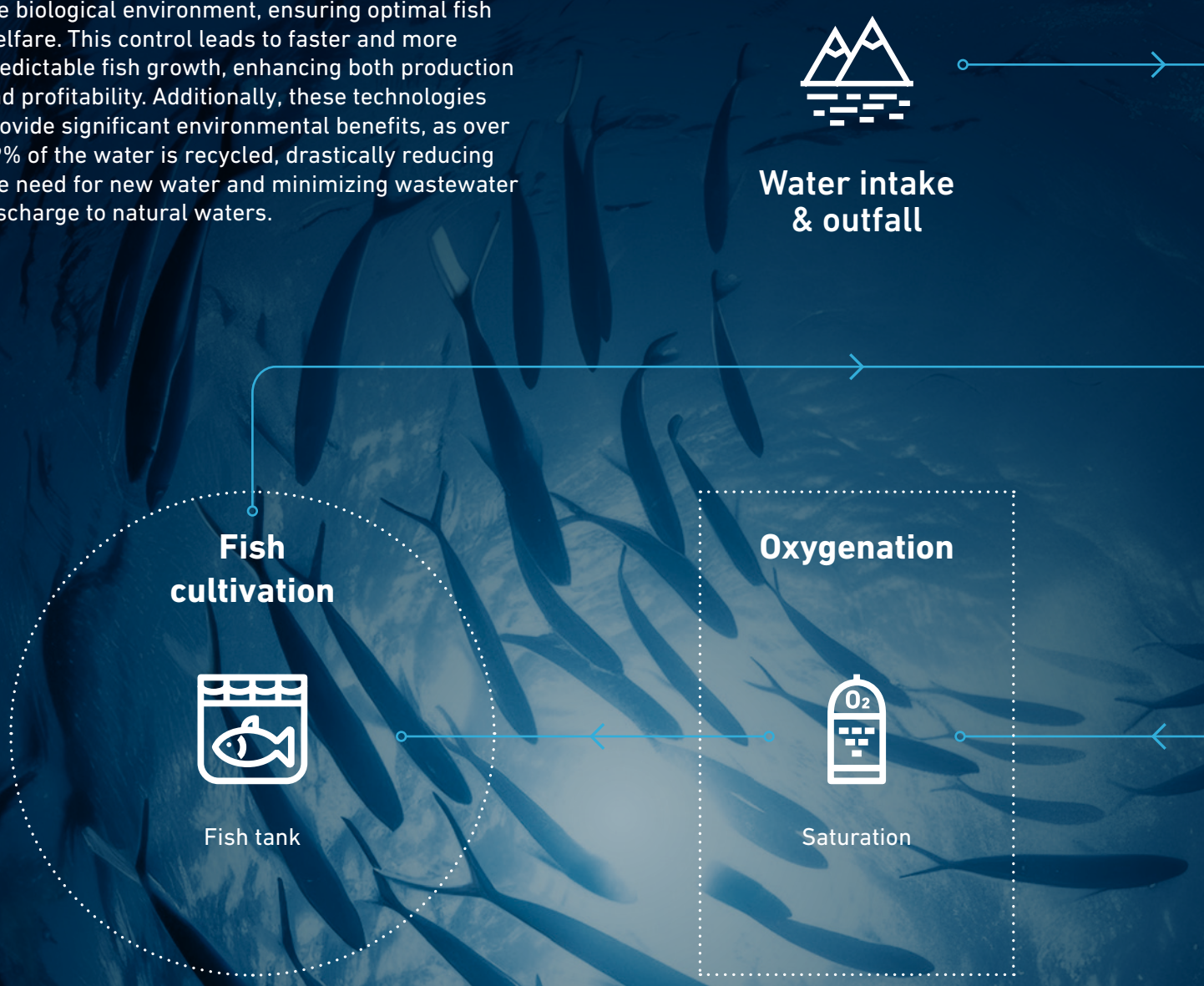
System expertise

GF Piping Systems has supported the aquaculture industry's since the 80's. Leveraging our extensive experience, we provide comprehensive piping, valve, and measurement solutions, along with services that support each phase of your project. Our global teams help the industry with proven technologies while supporting their mission to use water resources more sustainably, reduce their carbon footprint, and lessen their impact on the environment. We utilize our industry-leading off-site fabrication capabilities, domain expertise, and speed of delivery to meet the rapid demands of large-scale projects tailored to challenging specifications.

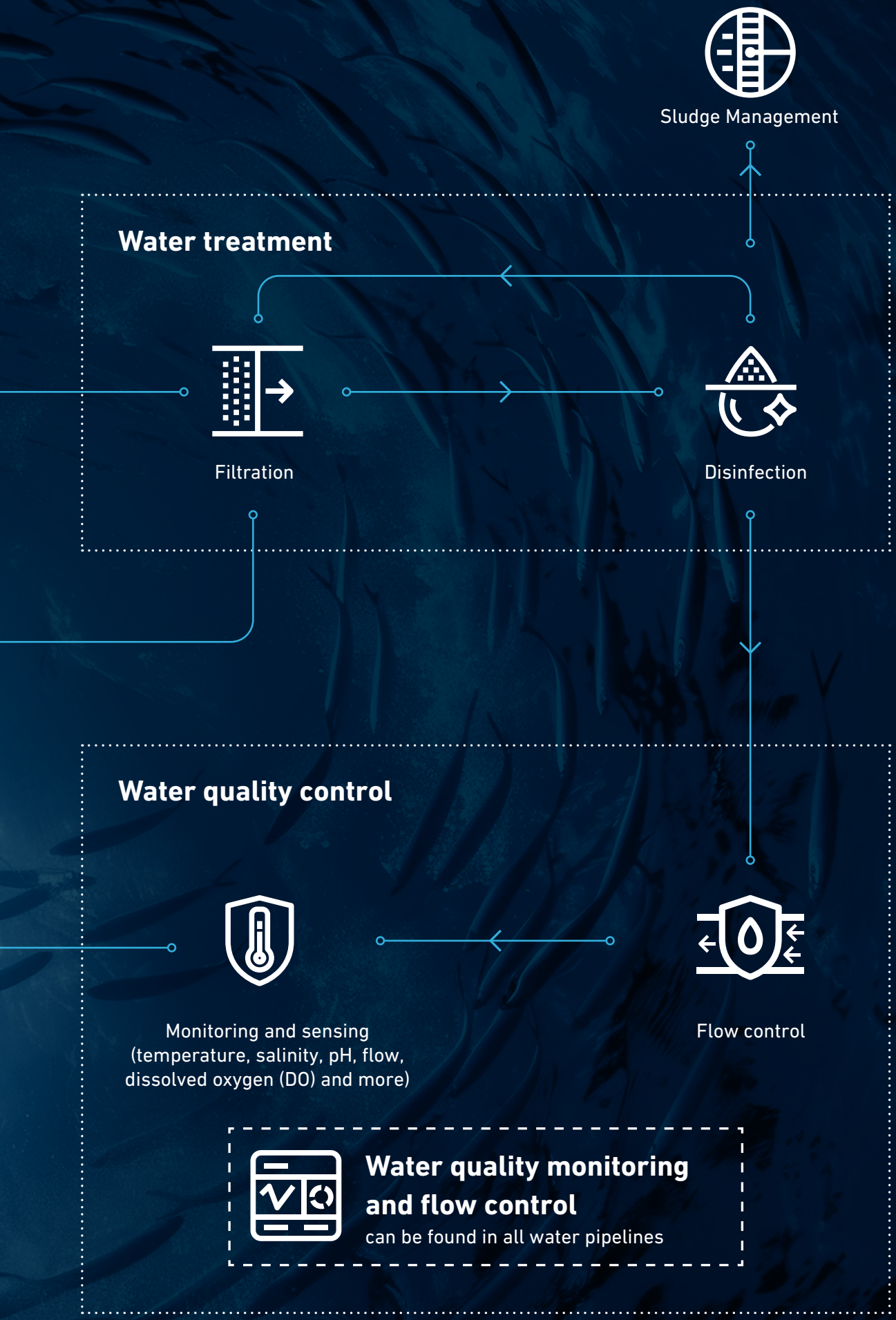
Solutions for Aquaculture

Are you ready for the future of aquaculture?

Recirculating and hybrid flow-through systems represent the future of land-based fish farming. By recycling water in a closed loop, recirculating aquaculture systems (RAS) offer full control over the biological environment, ensuring optimal fish welfare. This control leads to faster and more predictable fish growth, enhancing both production and profitability. Additionally, these technologies provide significant environmental benefits, as over 99% of the water is recycled, drastically reducing the need for new water and minimizing wastewater discharge to natural waters.



To create an effective RAS system, you must select the correct materials, solutions, and sensors. Additionally, your system needs to be able to manage corrosive seawater and maintain the correct temperature for maximum efficiency. GF Piping Systems has been a trusted partner in aquaculture for over 30 years. We provide comprehensive piping, valve, and measurement solutions that support the unique problems in aquaculture. In addition, we offer service and support throughout the entire project timeline; from material and product selection to design, GF Piping Systems can be your single partner for your project.


Sludge Management
Water treatment
Filtration
Disinfection
Water quality control
Monitoring and sensing
(temperature, salinity, pH, flow,
dissolved oxygen (DO) and more)
Flow control
Water quality monitoring
and flow control
can be found in all water pipelines

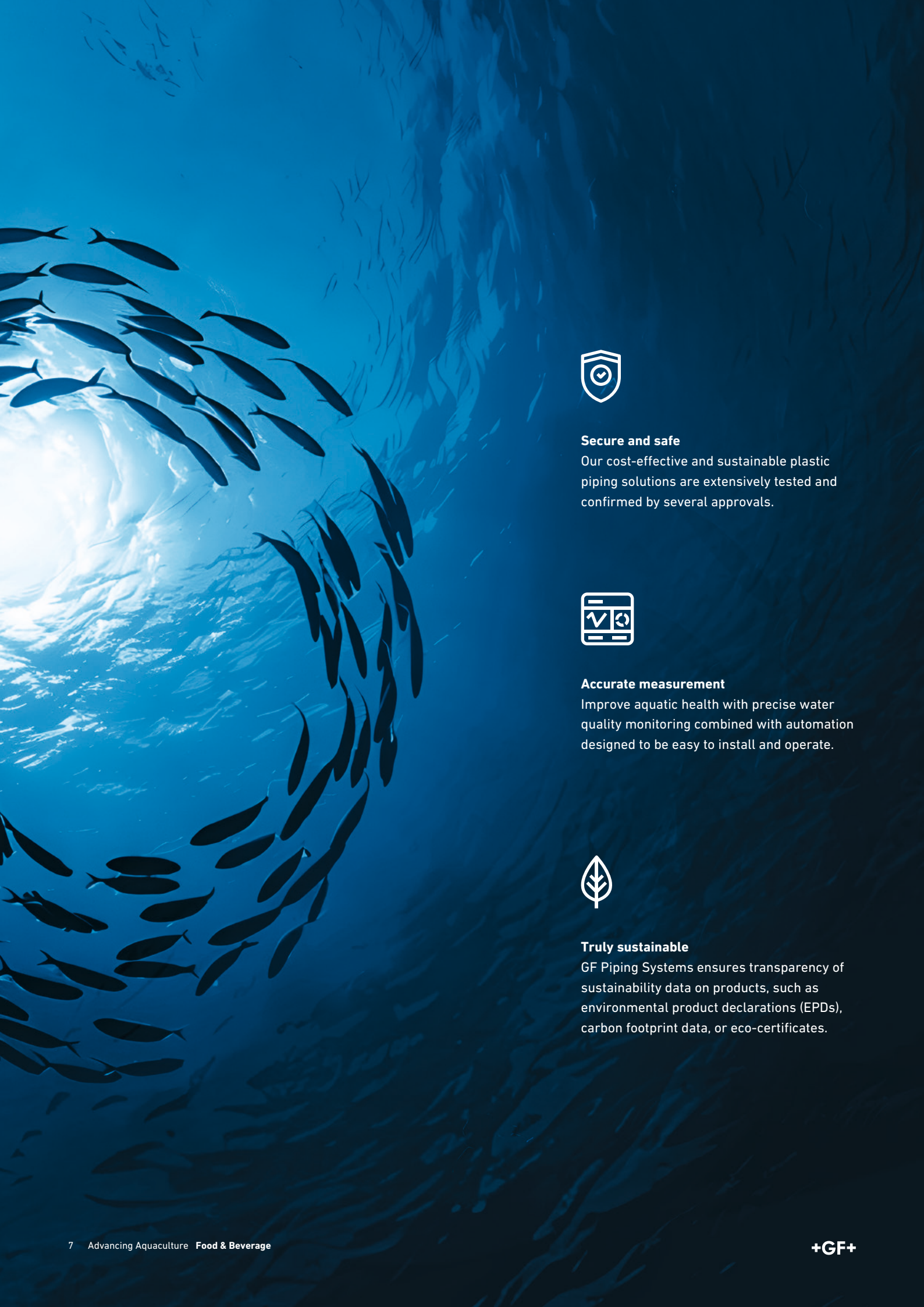
Trusted partnership

Innovating aquaculture together

Production assurance
Corrosion and leak-free piping solutions, quality assured with leading-edge welding technology. Smooth inner surfaces provide excellent flow rates and no deposits.

Fast response
Reduce project and operation lead times through off-site prefabrication and advanced stock management. Quick and easy valve replacement thanks to unique design and removable inserts as standard.

Cost effective
Accuracy in design, low weight, simplified installation and automated monitoring and control. All contribute to the same target – cost-effectiveness of operations.



Secure and safe
Our cost-effective and sustainable plastic piping solutions are extensively tested and confirmed by several approvals.

Accurate measurement
Improve aquatic health with precise water quality monitoring combined with automation designed to be easy to install and operate.

Truly sustainable
GF Piping Systems ensures transparency of sustainability data on products, such as environmental product declarations (EPDs), carbon footprint data, or eco-certificates.

Solutions for Aquaculture

Simplify aquaculture construction

GF Piping Systems offers comprehensive solutions to facilitate the construction of modern fish farms. We are the only piping company that supplies not only the products but also the machines and tailored off-site manufacturing service for efficient construction.
Our advanced welding machines ensure reliable jointing even in large-diameter pipes and high wall thicknesses while local training, annual service, and machine calibration ensure optimal performance and longevity.

Streamlined installations for modern fish farms

The comprehensive portfolio of PE couplers, saddles, and fittings, and the variety in pipe dimensions provide infinite solutions, featuring maintenance-free connections. Our value to our customers is to streamline the construction, reduce downtime, and ensure high-quality, reliable installations for efficient fish farm operations.

Weholite: Industry-Leading Large-Diameter HDPE solutions

Larger and larger piping dimensions are requested for water intake and fish transport. Weholite technology allows piping diameters up to 3500mm and soon up to 4000mm internal diameter that is the largest dimension in the industry. In addition, the PE Wehopanel solution allows the building of custom-made, large-dimension full plastic chambers and structures for land and sea installations. Weholite and Wehopanel is a structured wall HDPE pipe or structural panel made from high-density polyethylene (HDPE). With Weholite, raw material properties have been combined with advanced production technology to create a lightweight engineered solution with superior loading capacity that is chemically inert and provides a 100-year design life.

Good to know

Tailored large dimensions by prefabrication
Large dimensions are challenging to weld, especially at site installations. Our prefabrication teams around the world support aquaculture customers to design and build special parts, like branches and curves, with tailored features such as removal of internal fusion beads for extra smooth surfaces.

Minimizing CAPEX with ELGEF Plus Electrofusion Couplers

It is widely common today that the cost of work dominates the capital expenditure (CAPEX) over the parts and components. Civil works are known for their extreme cost dependency on installation time and effort, that makes our ELGEF electrofusion couplers the choice of the industry. ELGEF Plus is a modular product range with a legacy of 25 years of customer satisfaction for its quality and leak-tight connections. Compared to competing solutions, the ELGEF Plus system tolerates more pipe ovality in installation without compromising the joint quality, making them easier to install especially when handling large dimensions.

Advanced Welding Solutions for Aquaculture with GF's OMICRON Machines and Infrared Fusion technology

Joint quality is critical in Aquaculture to prevent leakage and contamination growth. In large dimensions, the welding is also challenged by high wall thickness. GFPS is the only piping company in aquaculture with the complete supply of machines, local training, annual service and machine calibration. With our OMICRON welding machines we ensure reliable jointing in butt fusion and socket fusion set-up. Omicron TOP 2.0 630 and WM 315/630 butt fusion machines are our best seller for welding the floating structures. When connecting PVC piping, we are the pioneer and market leader for infrared fusion technology.

Solutions for Aquaculture

Safeguard water quality

Maintaining a balanced aquatic environment is crucial for the health of aquatic life and operational efficiency. Fast and accurate measurement is a must. Daily challenges revolve around preventing waste accumulation, curbing algae proliferation, and mitigating oxygen stress for aquatic life. GF Piping Systems provides dedicated solutions for accurately monitoring key water quality parameters, leading to reduced chemical use, improved water quality, and significant customer cost savings.

Advanced dissolved oxygen measurement

Our optical dissolved oxygen (DO) sensor eliminates the need for electrolyte changes and comes factory calibrated, requiring no field calibration. This ensures faster startup and significantly reduces maintenance efforts. Available with a range of installation options including rail mount adapter and extension pipes with float assembly for open tanks as well as in-line options in GF saddles and tees.

Paddlewheel flowmeters for reliable performance

Our highly repeatable, rugged paddlewheel flow sensors offer exceptional value with little or no maintenance. The type 515 and 2536 sensors measure liquid flow rates in full pipes and can be used in low pressure systems.

Multi-channel automation and monitoring

Compact yet powerful, the 9950 Six-Channel Transmitter has the easy setup of a transmitter with the versatility of a controller. With on-board clock/calendar, derived functions, advanced relay operation and Boolean logic you have seemingly countless configurations to meet your process control needs.

ORP monitoring with wet-tap assembly

With our wet-tap assembly, our Oxidation-Reduction Potential (ORP) electrode can be installed and removed under pressure without shutting down operations, essential for continuous aquatic applications. The patented SafeLoc ™ mechanism and short stroke design ensure safety. The unit mounts at any angle and is compatible with GF DryLoc ™ electrodes, enhancing installation flexibility.

Efficient salinity monitoring with conductivity sensors

GF Piping Systems offers conductivity sensors for salinity measurement, that can be installed in-line or submerged in tank for maximum system integration. Our conductivity sensor electronics avoid interference from long cables or nearby electromagnetic fields, ensuring accurate readings. Additionally, up to six conductivity sensors can connect to a 9950 Six-Channel Transmitter, reducing startup costs and enhancing efficiency.

Magmeter with wet-tap assembly

Designed specifically for the aquaculture industry, our Magmeter Type 2551, paired with a wet-tap assembly, significantly reduces system downtime and enhances operational efficiency in critical applications. This innovative system supports continuous operation and non-disruptive maintenance, enabling users to clean, replace, or inspect the sensor without the need for a system shutdown.

Good to know

Wet-tap magmeter

Our wet-tap magmeter can be installed at any angle and allows for maintenance without disrupting operations, making it simple and convenient.

pH Sensors

Using 9900 pH Calibrator paired with 2751 pH sensor electronics, GF pH sensors can be remotely calibrated, facilitating recurring maintenance.

Save energy

In fish farming, energy management is crucial for optimizing operation costs and ensuring sustainability. Continuous water circulation, aeration, and temperature control create significant energy demand. Infrastructure longevity also affects cost efficiency by reducing wear and maintenance, preventing costly repairs. Paying attention to these practices, fish farms improve economic efficiency and regulatory compliance, promote fish health, and reduce environmental impact, supporting more sustainable and successful aquaculture operations.

Minimizing thermal energy loss by COOL-FIT Technology

In aquaculture water temperature control units are among the main energy consumers as they can be very inefficient and need to run 24/7. Due to noise they are often remotely located in the facility where the distances can be long. Another application where heat transport is finding its need in Aquaculture is the green energy trend to connect fish farming with industries with excess heat to benefit from this free energy in farming operations. Whenever heat or cooling needs to be transported, our pre-insulated COOL-FIT portfolio with robust HDPE outer jacket outperforms any wrapped solutions in extremely humid aquaculture conditions.

Good to know

COOL-FIT for the entire cooling loop

COOL-FIT can be used on both the chilled loop (gylcol) side for the chilling plants as well as for the main system water to keep the optimal temperature for the animals. The pre-insulation in COOL-FIT uses high-density polyuretane (PUR) foam that prevents water from penetrating the insulation. As such, the insulation remains intact in extreme humid aquaculture environment.

30% more
energy efficient

100%
corrosion-free

50% faster
to install

25 years
service life

Control the flow

Manual and actuated flow control is needed for effective water circulation all over fish farms. Manual valves are typical in main lines while automated valve solutions are increasingly used for modern land-based fish farming, offering precision, efficiency, and reliability in managing water conditions. This precision reduces stress on fish, enabling faster growth and better production efficiency. Automated valves also increase safety and reliability and enable real-time response to issues, ensuring a stable and productive aquaculture environment.

Minimizing Turbulence with GF 5-Series diaphragm valves

Turbulence can disturb fish and cause oxygen to escape from the water, significantly impacting operational expenses. GF 5-Series diaphragm valves are renowned for providing the lowest turbulence in the market. The optimized body geometry enables linear flow characteristics that enhance control precision. Integrating electric or pneumatic actuators allows the entire control loop to be reliably automated. GF actuators' full plastic, screwless design makes them highly corrosion-resistant. In today's market, automation is essential for efficiency and safety. GF valves' modular concept allows for extensive customization possibilities and enables actuation to be added to modernize existing installations.

Effortless Flow control with Corrosion-Resistant Butterfly Valve 565 and 567/578

Metal valves are common, although heavy, and do not remain functional in the highly corrosive environment of aquaculture. Therefore, we help our customers worldwide to replace their corroded metal valves with our new Butterfly Valves 565. Replacement is made easy with its unique plug-in and play design and removable inserts as standard . The BuV-565 is maintenance-free. Also, upgrading with process automation is simple and quick. The electric position indicator, actuators in electric and pneumatic form, and manual actuation with a hand wheel or lockable lever are readily available. Our double eccentric butterfly valves, such as the Butterfly Valve 567/578 boast at 50% lower actuation torques compared to our competitors, leading to a longer lifetime due to reduced stress and requiring less maintenance than conventional centric valves. This makes these valves adequate for high-pressure applications.

Ball Valves pro series

Our Ball Valve Pro Lineup is made to resist the harshest environments and offers secure operation with a standard lockable handle, and future-ready automation compatibility. It supports electric and pneumatic actuation, reduces piping strain, and can be equipped with accessoreies such as the LED-position feedback sensor for monitoring and automated alarms, ensuring reliable, flexible, and safe system performance. In particular, the Ball Valve 543 Pro is the ideal valve for all mixing and distribution processes, including redirecting, mixing, distributing, or even shutting off a medium.

Valve accessories

GF Piping Systems offers a wide range of accessories designed to enhance valves' performance, functionality, and ease of use that can be customized to fit specific application needs, ensuring that each system operates at peak performance. With accessories like position indicator switch, spring return, stem extensions, pressure sensors, and feedback units, system operators can monitor and control processes more effectively, reducing the risk of accidents or system failures. Our check valves and air break valves are built to withstand highly corrosive environments. These accessories allow our modular solutions to become even more specialized to individual needs.

Good to know

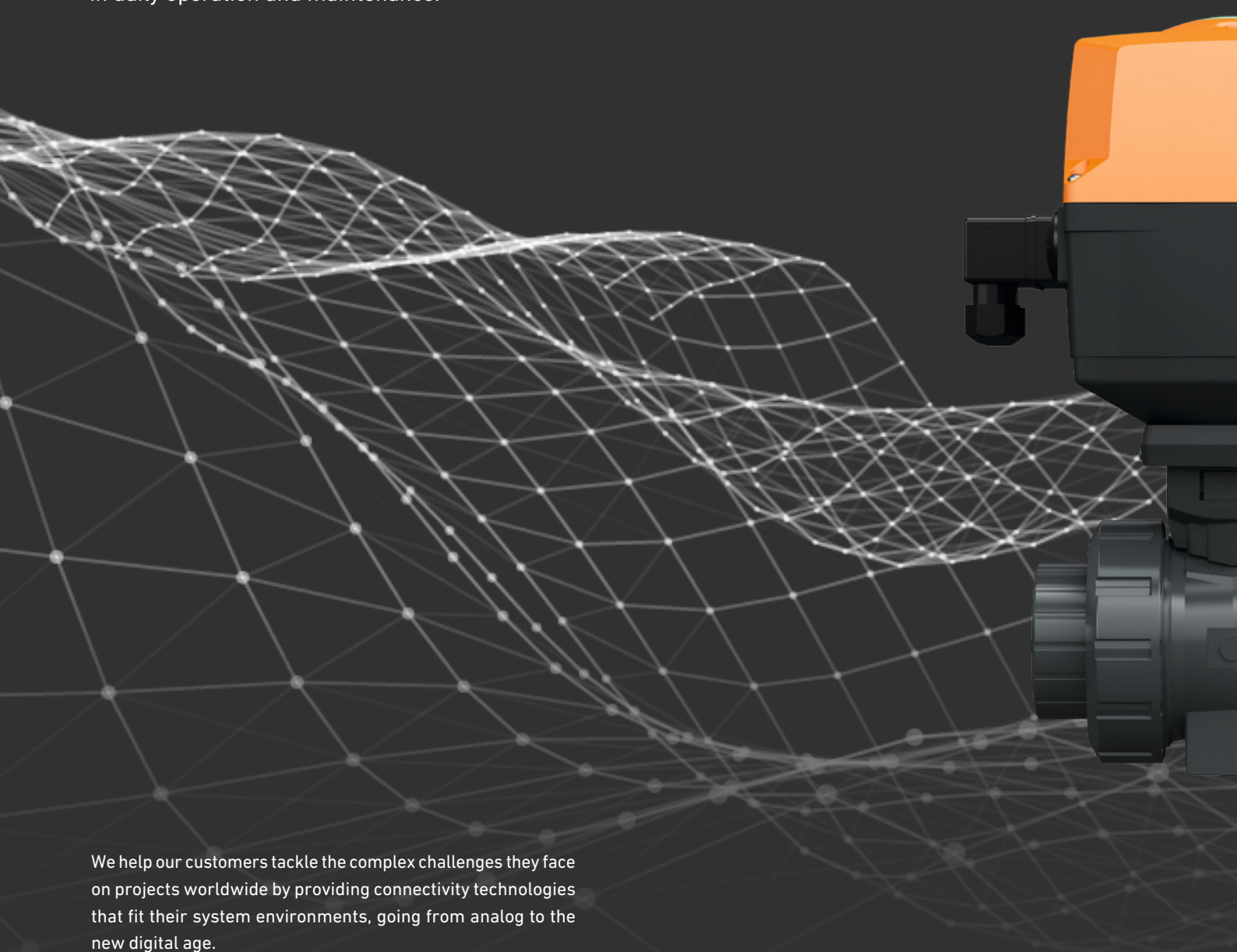
Local automation without PLCs

Our valve accessories enable local automation and safety function to protect vital system equipment when PLCs are not present.

Solutions for Aquaculture

Seamless connectivity

Leading-edge field devices are intelligent and have a vast amount of relevant process and device data available. Connectivity technologies unlock this data, leading to increased efficiency in daily operation and maintenance.



We help our customers tackle the complex challenges they face on projects worldwide by providing connectivity technologies that fit their system environments, going from analog to the new digital age.

Our solutions allow for the automation of processes that provide remote access, high data transfer rates, and real-time diagnostic insights, giving users access to all relevant device parameters 24/7, 365.

Supporting future-proof Industrial Ethernet protocols

State-of-the-art network technology

- Seamless access to field device data without complex, expensive, and error-prone protocol conversions
- Flexible network topology concepts for any kind of plant environment

Up to 40% more efficient in commissioning and maintenance

- Remote access to field devices for simple parameterization and commissioning
- Real-time insights into device health, preventive maintenance and diagnostics for troubleshooting
- Plug&Play device exchange with automatic re-configuration of a new device

Up to 30% increase in operational performance

- Digital data transfer leads to accurate process values
- Devices offer multiple process variables
- Trend monitoring of any process variable for continuous process optimization and preventive maintenance
- High availability of a plant by robust communication

Good to know

Modbus accessory available

Our electric actuators offer optional Modbus accessory boards which allows you to daisy chain a line of actuators to one Modbus board. This enables reduced labor costs, less space used on your PLC, and less cabling used during installation.

Good-to-Know

Best practices for reliable performance

Ultrasonic sensors

Ultrasonic sensors with Doppler technology are non-invasive and ideal for measuring flow in corrosive and abrasive water with high particulate content, such as life support systems.

Hastelloy-C electrodes

For sea water applications with higher dissolved oxygen levels, we recommend using Hastelloy-C electrodes instead of 316L stainless steel electrodes in sensors.

Wet-tap installation

Using wet-tap installation allows for maintenance without disrupting operations, making upkeep simple and convenient.

Valve with position indicator

Using a valve with position indicator offers clear visual feedback of the true valve position, enhancing security with minimal effort and cost.

System design

Optimizing a system involves more than just choosing the right components. Poor design choices, such as excessive 90° turns or fittings, can create backpressure, forcing pumps to operate at higher rates. Our skilled technical design team specializes in creating systems with optimized energy efficiency. among many other considerations.

Diaphragm valves

Diaphragm valves, with their low-turbulence geometry, are preferred for lines with oxygen oversaturated water. They are used to provide controlled, consistent flow rate.

Global network

Integration partner

Connected support

GF Piping Systems is the perfect partner to integrate into your project from design through to commissioning. Our portfolio in piping, solutions for process automation and machinery together with our services such as design support, off-site prefabrication, and training programs ensure we are always ready when you are.

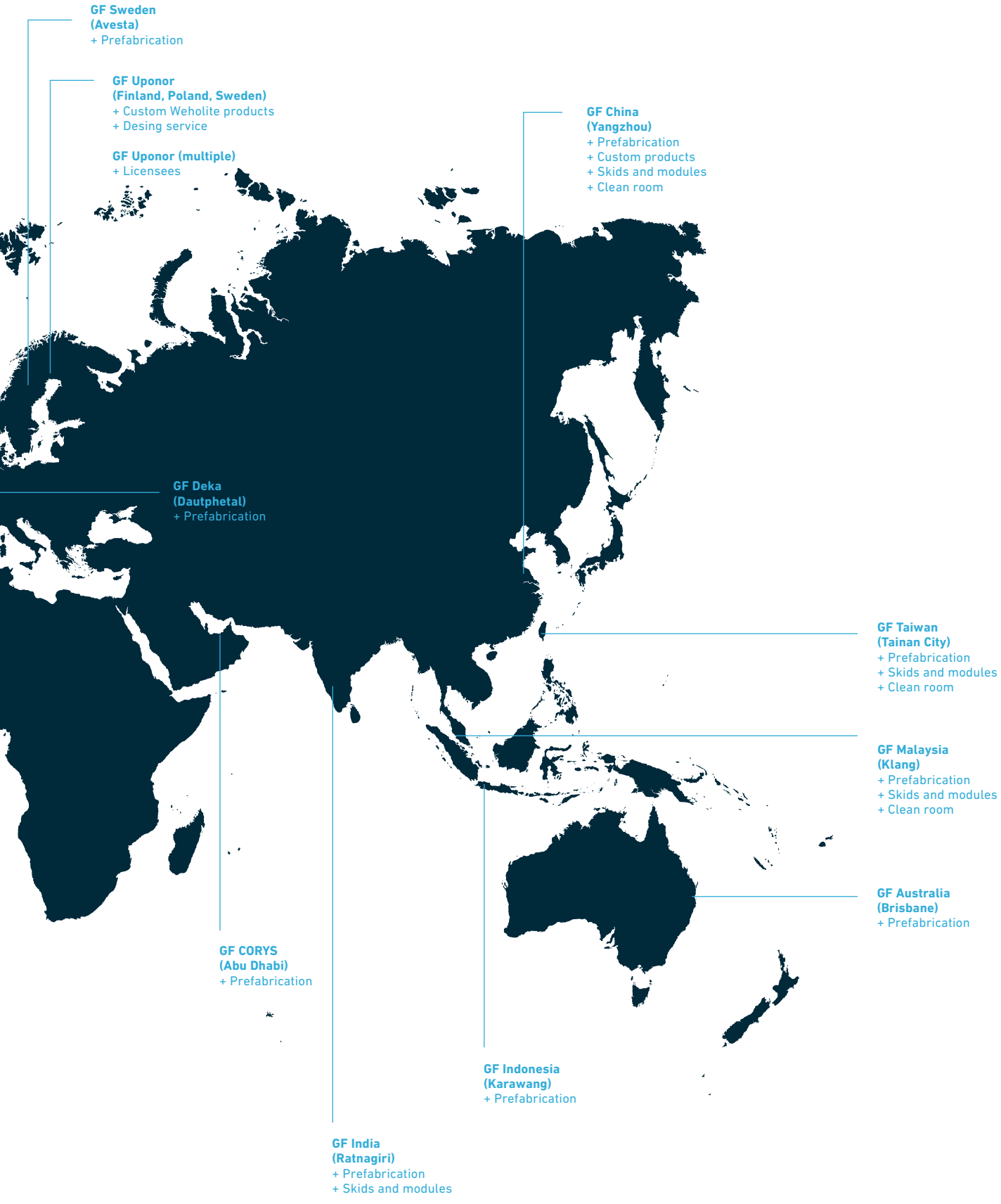
Fast response

Our highly skilled project managers, engineering services, state-of-the-art welding technology, and advanced stock management ensure that we meet your tight deadlines on time, every time.

Worldwide Presence

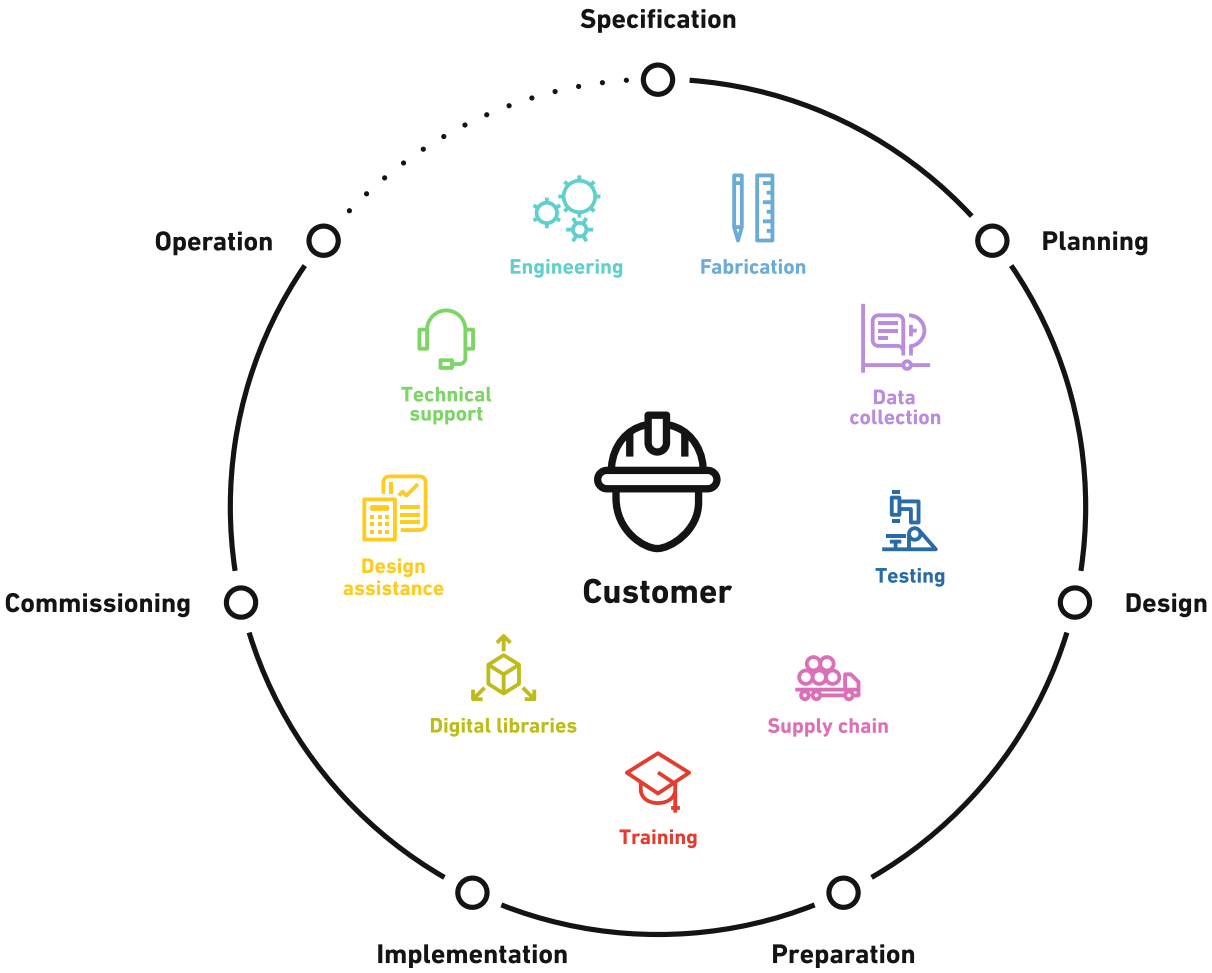
Profit from our global locations for tailored design, innovation, sales; rental, consulting and distribution centers. Our global offsite prefabrication and customization network is ready to serve you locally, close to where you are.

Project support at every step of the process to achieve construction excellence.



One partner from planning to commissioning

With Specialized Solutions, the global leader GF Piping Systems provides project support every step of the way to achieve construction excellence. Allowing owners and planners to concentrate on their daily business without interruption.



Jointing technologies
GF Piping Systems is a pioneer in developing advanced welding machines for a broad portfolio of jointing technologies. As a comprehensive solution provider for jointing excellence, we offer not only the necessary fusion technologies but also the appropriate installation tools, ensuring long-lasting connections. With a global jointing training program, international machine rental and a worldwide network of service centers, our customers benefit from expert know-how and practical on-site consultancy.

Advanced engineering: From metal to plastic
GF Piping Systems provides engineering and design support every step of the way, from part modification of an existing product, to full-system design from customer piping and instrumentation diagrams.

Off-site manufacturing
Helping speed up site work activities by prefabricating systems and standard products, including complete modules and installation sections off-site and delivering them directly to the place of use. With prefabrication workshops around the globe, customers save costs and time and increase their system reliability with proven and certified GF Piping Systems quality.

Ultrasonic Non-Destructive Testing (NDT)
The Ultrasonic NDT solution present at our prefabrication workshops provides scientific proof of weld quality at the point of installation. With Ultrasonic NDT, you can proceed with assurance, thanks to scientific proof that the welds are secure.

Testing facilities and training courses
We offer individual support through our specialists in our testing facilities to select the suitable material for the corresponding chemical resistance requirements. Numerous training courses are offered for installers, to master installation techniques related to our portfolio in a safe environment, using our instructional courses and our pioneering virtual reality training modules.

www.gfps.com/specialized-solutions

Where next?

In this brochure, you have received the most important information and technical details. But nothing replaces a personal conversation with an expert from GF Piping Systems. It is all about your needs and how we can support you in your daily business challenges. If you have not already done so, make an appointment today.

Find your local contact on the back cover of this brochure or visit our GF Piping Systems website, where you will find specialized contact persons in your area. You will also find additional information on our products, including technical datasheets, operating instructions, and relevant certificates and approvals.

More information at
www.gfps.com/aquaculture

GF Piping Systems

Local support around the world

Visit our webpage to get in touch with your local specialist:
www.gfps.com/our-locations

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