GF Piping Systems

Future horizons

Smart water solutions for Cruise and Ferry

Passenger ships

Smart solutions for sustainable fluid transport onboard

The cruise and ferry industry grapples with vital challenges in environmental sustainability, health and safety, and digital transformation. From pollution reduction to passenger well-being and advanced technology adoption, overcoming these hurdles is critical to creating a sustainable and seamless travel experience.

Environmental sustainability and the drive to net zero remain pressing concerns, with a need to mitigate air and water pollution during the ship's operations, reduce greenhouse gas emissions, and implement effective waste management practices. Also, health and safety considerations have gained even more importance due to the COVID-19 pandemic, requiring stringent measures to safeguard passengers and crew. Additionally, the industry grapples with the complexities of digital transformation, adapting to advanced technologies, enhancing connectivity, and meeting evolving automation requirements for operations onboard. Tackling these challenges requires collective action, innovative solutions, and a commitment to embracing sustainability and technological advancements in the industry.

GF Piping Systems steps up to these challenges with cost-effective and smart water solutions that make it easy to plan, install, operate, monitor, and manage your flow solutions with our state-of-the-art technology and a wide range of comprehensive system offering of pipes, fittings, valves, and the ideal jointing technology as well as an optimally adapted selection of components for automation technology. Innovative plastic systems stand for the best ownership cost and the lowest maintenance costs during operation. Thanks to outstanding flow performance and smooth inner surfaces, plastic components contribute to an increased flow rate and reduced energy requirement. These factors result in a positive impact on the carbon Footprint.

Smart water solution for cruise

Future horizons

GF Piping Systems enables shipyards, ship owners, operators, engineers, and installers to switch from traditional piping materials to lightweight, corrosion-free thermoplastics. We help you to efficiently plan, design, install, and operate plastic flow solutions in new build and retrofit projects with a wide range of materials and tools, innovative automation solutions, and services.

Weight and space-saving design
The lightweight design of plastic piping systems contributes to weight reduction of the ship, which helps to improve fuel efficiency and increased passenger capacity. Additionally, plastic piping systems can be designed with smaller dimensions and prefabricated, allowing for space optimization and flexibility in installation.

Cost-effective installation
Due to their lightweight nature, flexibility, easy jointing technologies, and prefabrication options, plastic piping systems can be installed quickly and easily. Faster installation and simplified maintenance can improve project timelines and overall efficiency for shipyards, reducing labor hours and straightforward integration with other systems.

Improved operational performance
Plastic piping systems' resistance to corrosion and long-term durability can contribute to higher construction quality and reliability. The improved operational performance can reduce rework, warranty claims, and post-delivery issues, leading to higher customer satisfaction and the reputation of shipyards.

Scan to view all approved marine solutions:
www.gfps.com/marineapprovals

Enhanced reliability and hygiene
Plastic piping systems require minimal maintenance and offer long-term durability. They do not require regular painting or coating to prevent corrosion, reducing maintenance costs and downtime. The smooth inner surface of plastic pipes also minimizes the risk of fouling and scaling, further facilitating maintenance procedures.

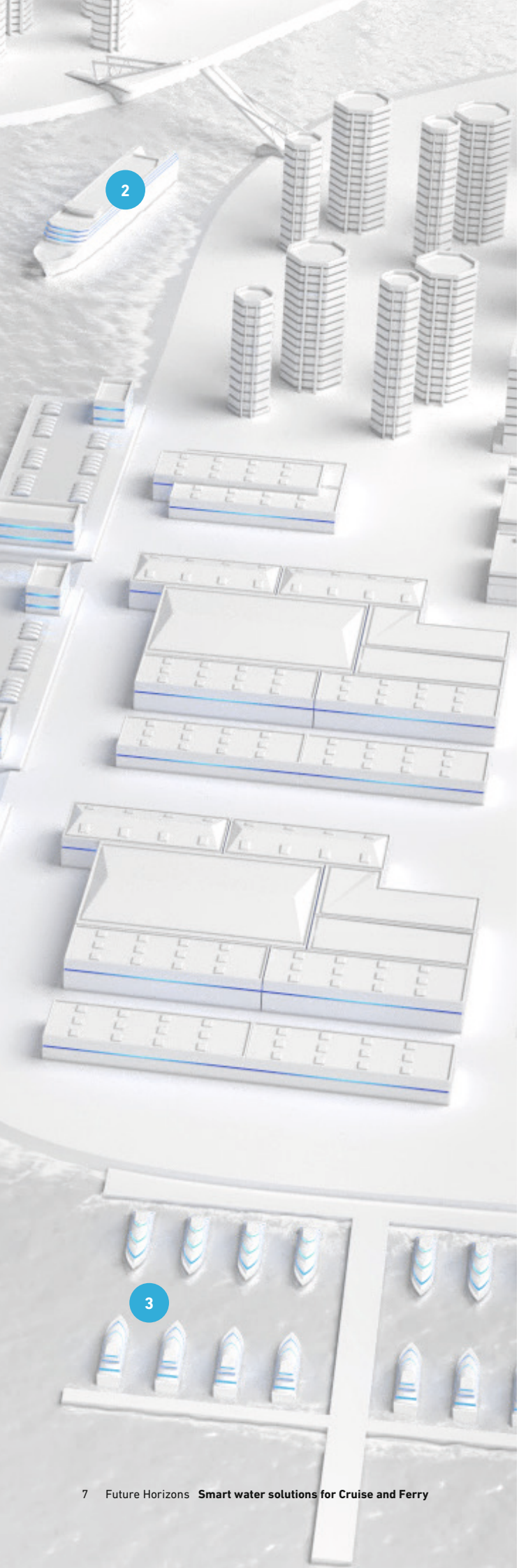
One-stop shop
Shipyards can leverage the expertise and comprehensive support provided by GF Piping Systems. By offering a wide range of lightweight materials, automation solutions, jointing and tools, and services, the collaboration can help you overcome technical challenges, ensure compliance, and streamline the procurement and logistics processes.

Reduced carbon footprint
Thanks to their lightweight characteristics and the use of renewable and recyclable raw materials (i.e., bio-attributed PVC), GF Piping System's solutions have a reduced environmental impact than metal solutions. By providing Environmental Product Declarations (EPD), we enable transparent planning and help ship owners and operators to reduce GHG emissions during operation.

Applications for passenger ships

Sustainable processes

GF Piping Systems marine approved portfolio supports a wide range of applications in essential and non-essential areas of your passenger vessel. From private yachts to the world's largest cruise liners, we offer customized solutions for the smart transport of water on board all types of passenger vessels.



1. Cruise Liners

From engine cooling to ballast water treatment, food refrigeration, drinking water distribution, and air conditioning - plastic piping systems have been successfully installed on cruise ships for over 30 years. They enable simplified design and installation (block-to-block), maintenance-free and automated operations, and a service life of up to 25 years. They help ship owners and operators save CO_2 and other environmentally harmful substances to make processes more efficient and environmentally friendly.

2. River Cruise Liners

To provide the most pleasant guest experience possible, all the technical equipment, like piping systems, must fit into confined spaces. Limited space availability is challenging, especially when installing, operating, and maintaining piping systems. Thanks to connectivity technologies such as electrofusion, solutions for automated flow control, and maintenance-free systems, shipbuilders and operators of river cruise ships can save themselves time and project costs.

3. Mega Yachts

Guests on mega yachts have exceptional expectations of their experience onboard. Our corrosion- and incrustation-free piping systems ensure that safe, hygienic drinking water is always available and that wastewater systems operate silently and unnoticed. With pre-insulated piping systems for air conditioning, we also contribute to a pleasant ambient temperature so your guests can feel comfortable and safe. Your crew will also benefit from automated processes and no downtime, allowing them to focus on other areas of the ship.

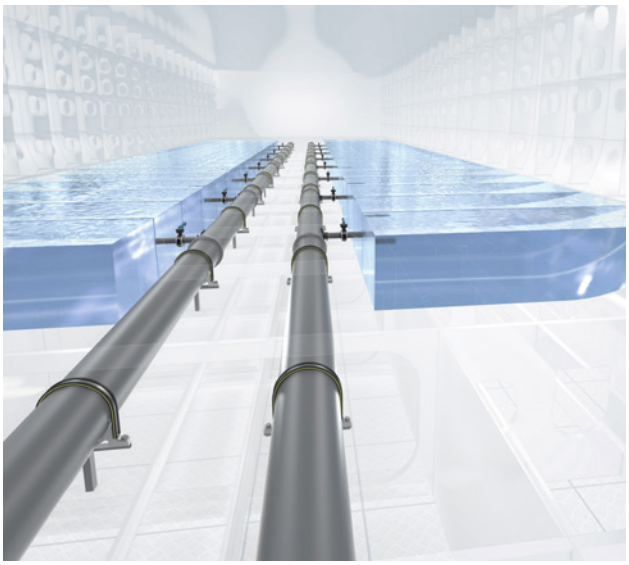
4. Ferries

Roll-on/Roll-off (Ro/Ro) and Roll-on/Passenger (Ro/Pax) ferries are in constant operation, and unexpected interruptions and failures can lead to high losses in sales. Reliable equipment is, therefore, the essential factor here. Therefore, corrosion- and leakage-free plastic piping systems are the optimal choice to ensure uninterrupted operation. Thanks to smart automation and monitoring solutions, any irregularities can be detected and remedied anytime.

Essential applications

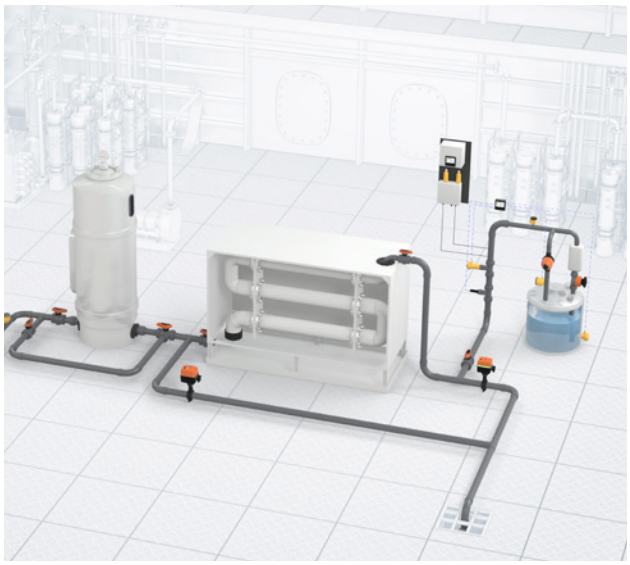
Improving operational safety

GF Piping Systems strives to help customers worldwide improve operational safety and overcome environmental challenges through innovation. By developing highly engineered products, pioneering jointing technologies, and industry-leading training capabilities, we create solutions for smart fluid transportation on board that enhance operational safety and enable our customers to avoid accidents, leakages, and reputation loss.



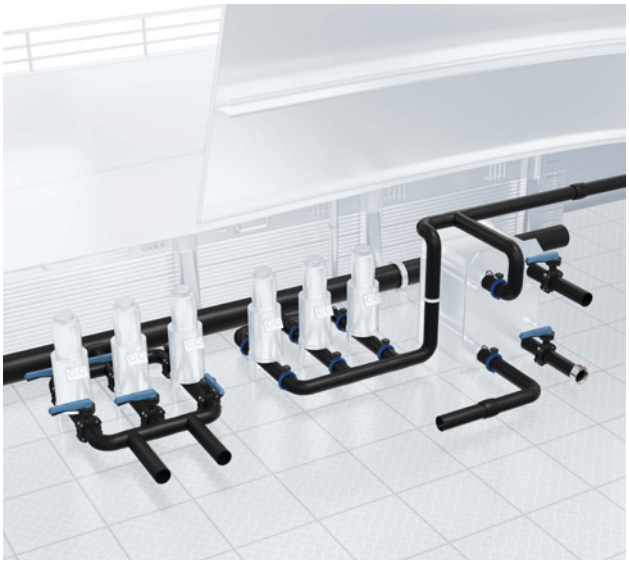
Ballast system

GF Piping Systems' solutions help efficiently load, distribute, and unload ballast water from 0°C to 40°C. Thanks to their material properties, plastic piping systems are corrosion-resistant, and constant contact with seawater and chemicals does not affect them. The systems are designed for a long, maintenance-free service life of up to 25 years and thus help reduce failures, maintenance work, and costs.



Ballast water treatment (BWT)

The spread of invasive species via ballast water can be prevented with the proper treatment of ballast water. Seawater and chemicals often push piping systems of corrosive materials to their limits, resulting in maintenance work, leakage, and downtime. GF Piping Systems provides corrosion-resistant solutions for reliable BWT, and pre-fabrication capabilities can help OEMs build BWT skids for fast integration on or offshore in no time.



Freshwater and seawater cooling

Corrosion- and erosion-free plastic piping systems help ensure hassle-free operations of freshwater and seawater cooling in essential applications. Thanks to the fire retardant pipe jacket system HEAT-FIT, cooling in crucial service areas such as machinery spaces, pump rooms of categories A and B, accommodation service and control spaces, and open decks of classes J and K, according to the fire endurance matrix is now possible.

Exhaust gas scrubber

A very low pH is achieved during the exhaust gas scrubbing process, and piping systems of the effluent lines are exposed to highly aggressive fluids. Therefore, the ultimate resistance of the piping system is of utmost importance to ensure a long system life without any downtimes. Thermoplastic pipes, fittings, and valves have proven excellent chemical resistance and are lightweight, easy-to-install materials for scrubber applications.

Water quality

At GF Piping Systems, we offer deep application knowledge of the entire water treatment process. We offer a wide range of materials for pipes, fittings, and valves, including ABS, PE, PVC-U, PVC-C, Polypropylene (PP), Polybutene (PB), Polypropylene Random Copolymer (PPR), and multilayer materials. Also, we provide automation and measurement and control devices for pH value, pressure, and conductivity measurement. Our solutions guarantee high water quality and system availability.

Fresh cold and hot water

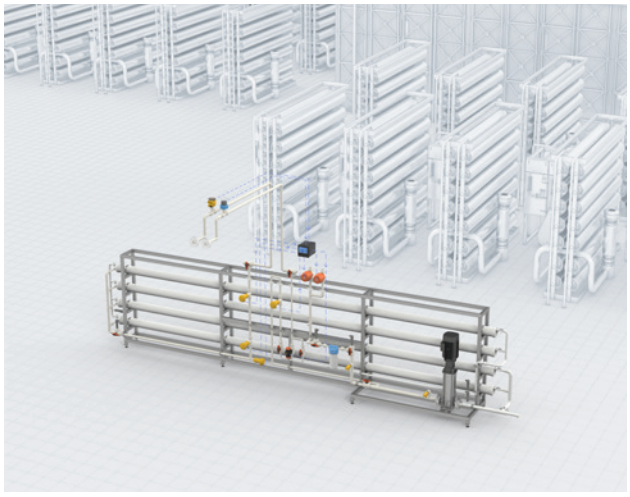
Our highly efficient water supply systems featuring corrosion-resistant solutions like Instaflex (PB), or iFit (Multilayer composite), simplify the installation process and help you with a consistent flow of fresh water to cabins, kitchens, restaurants, and bars on all types of ships. This flexibility allows for various setup options, cutting installation time and costs to a minimum while ensuring reliable potable water delivery.

Sewage, black and grey water, vent lines

Greywater and blackwater, originating from sinks, showers, toilets, and medical facilities, necessitate secure conveyance to the onboard wastewater treatment system. GF Piping Systems offers reliable solutions like SeaDrain White (PP-FR) system, ensuring safe transport. Our advanced electrofusion, adhesive, or mechanical jointing techniques facilitate quick installation, while our diverse product range offers installers the flexibility they need. In addition, our plastic systems are corrosion-resistant and boast a prolonged service life, guaranteeing enduring performance, including vent lines, to maintain the integrity of the entire wastewater management system.

Pools and Spa

The main challenge with pools and spa areas is hygiene. Regular water circulation, cleaning, and treatment are essential. Therefore, a lot of disinfecting media is used in this area. GF Piping Systems' high-performance plastic solutions allow easy installation and long service life. The low leach-out of materials like PVC-U, PVC-C, or PP helps to improve the process-wide water purity. Further, our marine-approved thermoplastic components have an outstanding resistance to disinfection media and meet the requirements for highly demanding operating conditions.



Water Treatment

GF Piping Systems offers comprehensive solutions for all applications throughout the water cycle, from chemical dosing systems and media filtration applications to ion exchangers. For customers seeking to automatize their processes on board, GF Piping Systems follows this wish with a comprehensive system of offering pipes, fittings, valves, the ideal jointing technology, and an optimally adapted selection of components for automation technology.

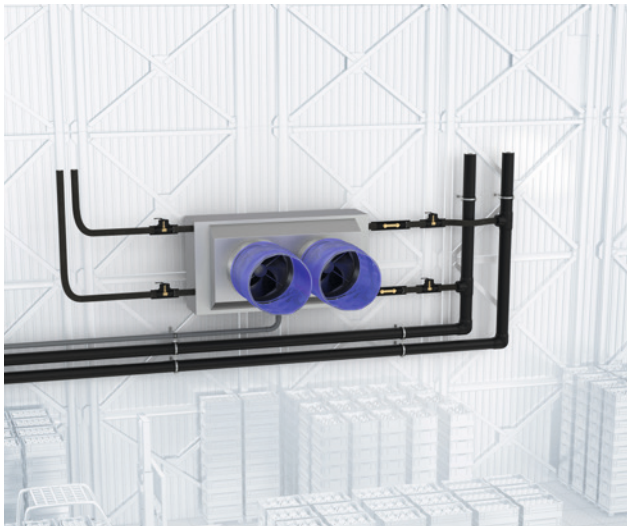
Non-essential applications

Energy efficiency

Only a fraction of cooling and refrigeration solutions in use today re highly power-efficient. Upgrading cooling applications on board can considerably increase the energy efficiency, reducing GHG emissions, fuel consumption, and operating costs of your ship. GF Piping Systems has developed the fully pre-insulated, marine-approved solution COOL-FIT for efficient cooling on board.

Air Conditioning (HVAC)

Air conditioning plays a vital role in onboard accommodation as it helps to have a healthy and pleasant atmosphere concerning temperature and humidity. GF Piping Systems provides energy-efficient flow solutions that help owners and operators lower the overall energy efficiency of cooling applications. Thanks to pre-insulated systems, the planning and installation time of the HVAC system can be reduced by up to 50% compared to conventional systems that have to be post-insulated.



Food storage

For river and deep-sea cruises, tons of goods are stored that need to be kept fresh during the travel season. Leaks and refrigeration problems can result in high costs and food waste. Reliable refrigeration is, therefore, essential. With the pre-insulated plastic piping system, GF Piping systems offer a system that provides highly efficient transport of cooling media and the energy efficiency of the insulation is up to 30% more efficient.

How COOL-FIT helps to reduce GHG emissions of your vessel

Download our whitepaper to learn how pre-insulated plastic piping systems help improve the energy efficiency of AC chilled water systems on board, positively impacting the fuel consumption, GHG emissions, and operating costs.

Download Whitepaper
gfps.com/energy-efficiency-onboard

Applications possibilities in accordance with IMO Resolution A.753 (18) guidelines

	Marine Grade		SeaCor		COOL-FIT		ecoFIT
Material	PVC-U	PVC-C	PVC-C	ABS	2.0	4.0	PE-100
System of measurement	Met./Sched.	Met./Sched.	Schedule	Met./Sched.	Metric		Metric
Jointing	Cementing	Cementing	Cementing	Cementing	Welding	Welding	Welding
Applications in Accomodation, Engine Room, Technical Spaces							
Freshwater System Hot		X*	X				
Freshwater System Cold	X	X*	X				X
Greywater System & Treatment	X	X	X	X			X
Blackwater / Sewage System & Treatment	X	X	X	X			X
Technicalwater / Deckwash Treatment	X	X	X				X
HVAC System / Chilled Water System				X	X	X	X
Food Processing / Waste Water Service	X	X	X				X
Kitchen Drains / Grease Trap System	X	X	X				X
Swimming Pool / Jacuzzi	X	X	X	X			X
Brine Water System / Cool-Freeze / Sec.System						X	X
Central Heating							
Drainage / Scuppers	X	X	X				X
Cable Protection Piping							X
Working Air / Compressed Air							X
Starting Air/ Engine							
FiFi / Fire Main System							X**
Engine Cooling Water System							X**
Ballastwater / Heeling System							X**
Bilgewater System							X**
Scrubber Treatment System							X**
Scrubber Effluent Lines							X**
Cargo Lines							X
Purging Lines Air / Water							X
Jetting Leg Backup System / Spud Pillars							X
Jet-Water System							X
RSW System (Refrigerated Sea Water)				X	X	X	X
Fish Production / Processing Street	X			X			X
Ballast Bubble System / De-Icing System							X
Tank Venting							X
Sounding Pipes							X
Desalination Units / RO Units	X	X	X				
Ballast Water Management System (BWMS)	X	X	X				X**
Cooling Hydrogen / H2-Container / Methanol							X
Electrical Cabinet / Panel Cooling							

*Only schedule system is applicable.
** If L3 is required, ecoFIT is only applicable in combination with HEAT-FIT Jacket System.

PROGEF PP-H	**AQUASYSTEM** PP-R	**INSTAFLEX** PB	**i-FIT** Multilayer Composite	**Hycleen Automation System**	**JRG Sanipex MT** Multilayer Composite	**Seadrain White** PPFR	**HEAT-FIT** Insulation Jacket	**UNI-Coupling**	**Butterfly valve 565**
Metric	Metric	Metric	Metric		Metric	Schedule	Metric	Metric	Metric
Welding	Welding	Welding	Mechanical		Mechanical	Welding/ Mechanical	Mechanical	Mechanical	Mechanical
	X	X	X	X	X			X	X
X	X	X	X	X	X			X	X
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Sustainable solutions for the marine industry

Environmental benefits

GF Piping Systems is committed to enabling the safe and sustainable transport of fluids and is a reliable partner for achieving the ambitious IMO goals of GHG reductions.
We continuously analyze and improve our solutions to the latest (environmental) standards and our solutions are compliant with the green ship passport.

The environmental benefits of thermoplastic at a glance:

30% lower environmental impact

On average, GF's plastic piping systems have a potential environmental impact of around 30% lower than the competing systems made of stainless steel, copper, or glass-reinforced plastic.

Long service life

GF's thermoplastic solutions are extremely durable under harsh marine conditions and their service life can exceed 25 years. Compared to competitive products which might require replacement after 10 to 15 years, the long service life has a high, positive environmental impact across all categories.

GF Piping Systems' solutions comply with the Green Passport (Ship Recycling Plan or Inventory of Hazardous Materials). We help you identify environmentally preferable piping system options by providing (comparative) Life Cycle Assessments of our products and solutions. Additionally, our Environmental Product Declarations provide transparent information about the environmental performance of recycling practices, facilitating informed decision-making and encouraging responsible actions among stakeholders.

Learn more about our sustainability efforts:
www.gfps.com/sustainability

IABILITY

250'300 kg less CO_2

Regarding the global warming impact, one plastic system saves on average between 1'900 kg (PVC-U) to 250'300 kg (PB) of CO_2-equivalents. This corresponds to the volume of CO_2 released by a midsize vehicle on a journey of 11'900 to 1'564'000 kilometers, respectively.

Renewable and recyclable

The environmental impacts during the raw and manufacturing phases are significantly higher for most competitive materials like stainless steel or copper. Additionally, GF Piping Systems uses renewable raw materials, such as tall oil, to produce systems like PVC-U.

Together as one

Process automation

We offer a true partnership with a unified vision toward active water conservation. Our solutions for automated flow processes ease the way toward autonomous vessels.

GF Piping Systems offer deep application knowledge of the entire process within the water treatment onboard. Depending on the application area, there are different water treatment process challenges, ranging from guaranteeing high water qualities and providing reliable measurements to assuring stringent regulations. Plastic piping solutions from GF Piping Systems provide higher efficiency around the water cycle with increased productivity and lower operational and overall costs.

One user experience across the whole control loop

GF Piping Systems is your experienced partner with a full portfolio of measurement, control, and actuation components, which are easy to install and use and have local support through all project phases. We offer the full package with our products and solutions, providing top-quality installation, a highly skilled team of experts standing by our customers' side every step of the way worldwide, and digitalized services ensuring a project is at the forefront of the market.

Design (Planning phase)
Easy planning thanks to application-specific solutions making an effortless combination around the complete control loop.

Select (Ordering phase)
Easy to select and order via configurators and matching components throughout the whole portfolio.

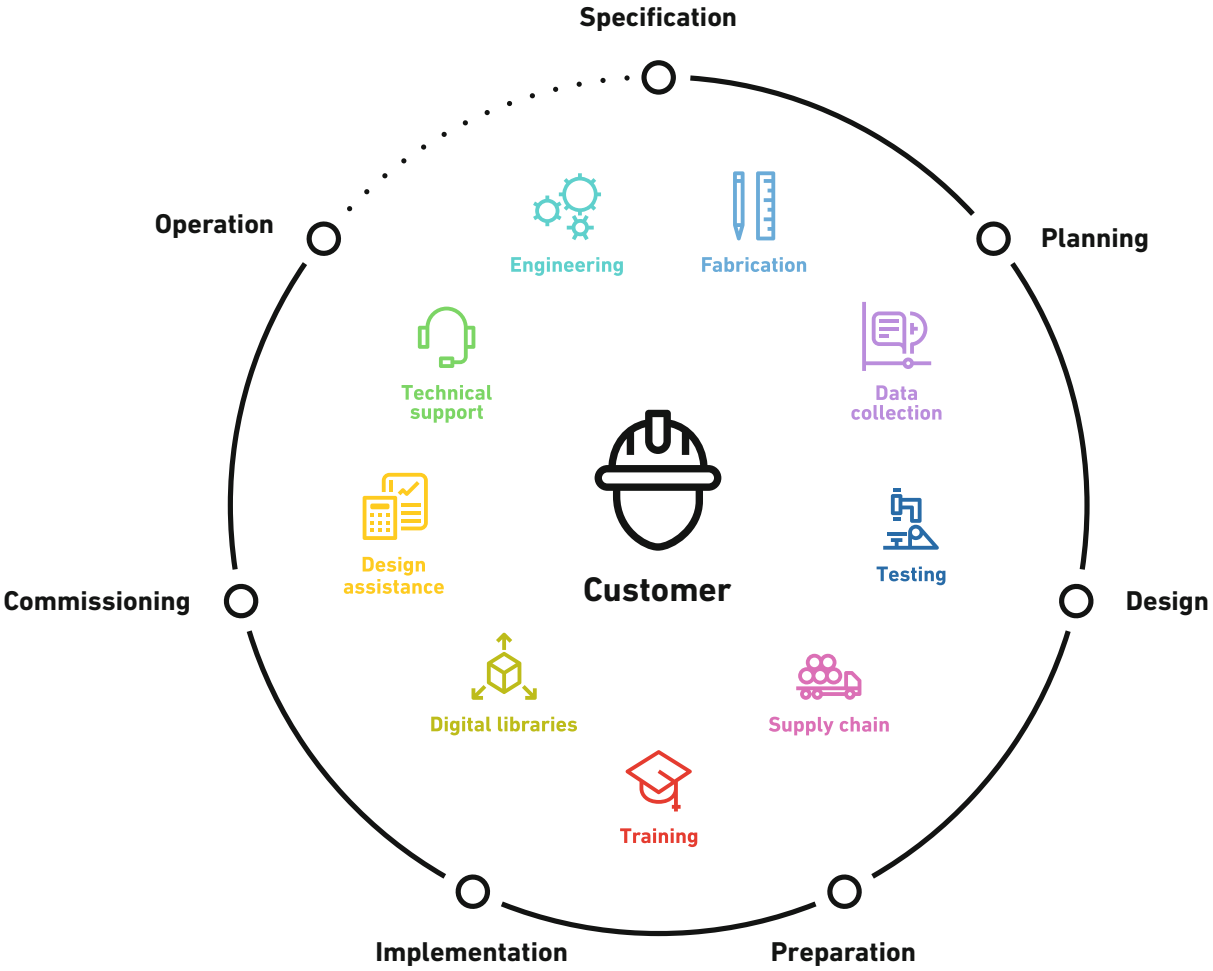
Install (Building phase)
Easy planning thanks to application-specific solutions making an effortless combination around the complete control loop.

Own (Operation phase)
Easy monitoring once installed, including spare part availability. Long lifetime and low maintenance make for low downtimes.

Full service provider

Ready when you are

Customer centricity for a fast and customized project delivery: With 36 production facilities and a global presence of our sales representatives and consultants, we help you realize your new build or retrofit project from planning to commissioning. Our sustainable water solutions for marine applications and our specialized solutions such as engineering, offsite prefabrication, and training programs help with a smooth project implementation.



Engineering

Increase the efficiency of your project with the tailor made analysis packages from GF Piping Systems and decide which offer is right for you according to your needs. You have the choice between Project Analysis and Advanced Engineering, thus always receiving the appropriate support in every phase of your project.

Digital libraries

GF Piping Systems is continuously developing digital libraries with all of our product design drawings. Our files are fully compatible with Autodesk Revit, AVEVA, Intergraph, Autodesk AutoCAD Plant 3D and Trimble SketchUp with 3Skeng to provide proper engineering design tools used by planners, architects, owners and operators for BIM and Plant Design.

Custom product design and prefabrication

Having your individual needs and application in focus, our customizing teams forge the solution that fits you best, developing custom-made parts to complete systems or special solutions produced in small series, individual consulting and off-site prefabrication. Through our global network of flexible locations, we offer a wide range of comprehensive solutions.

Training

GF Piping Systems instructional courses to help you teach your customers and their installers essential knowledge for the welding of pipes and piping components, as well as an in-depth understanding of butt and electrofusion connections. Trainings are available virtually, in-house or on site. Trusted training, empowering you.

Ultrasonic Non-Destructive Testing (NDT)

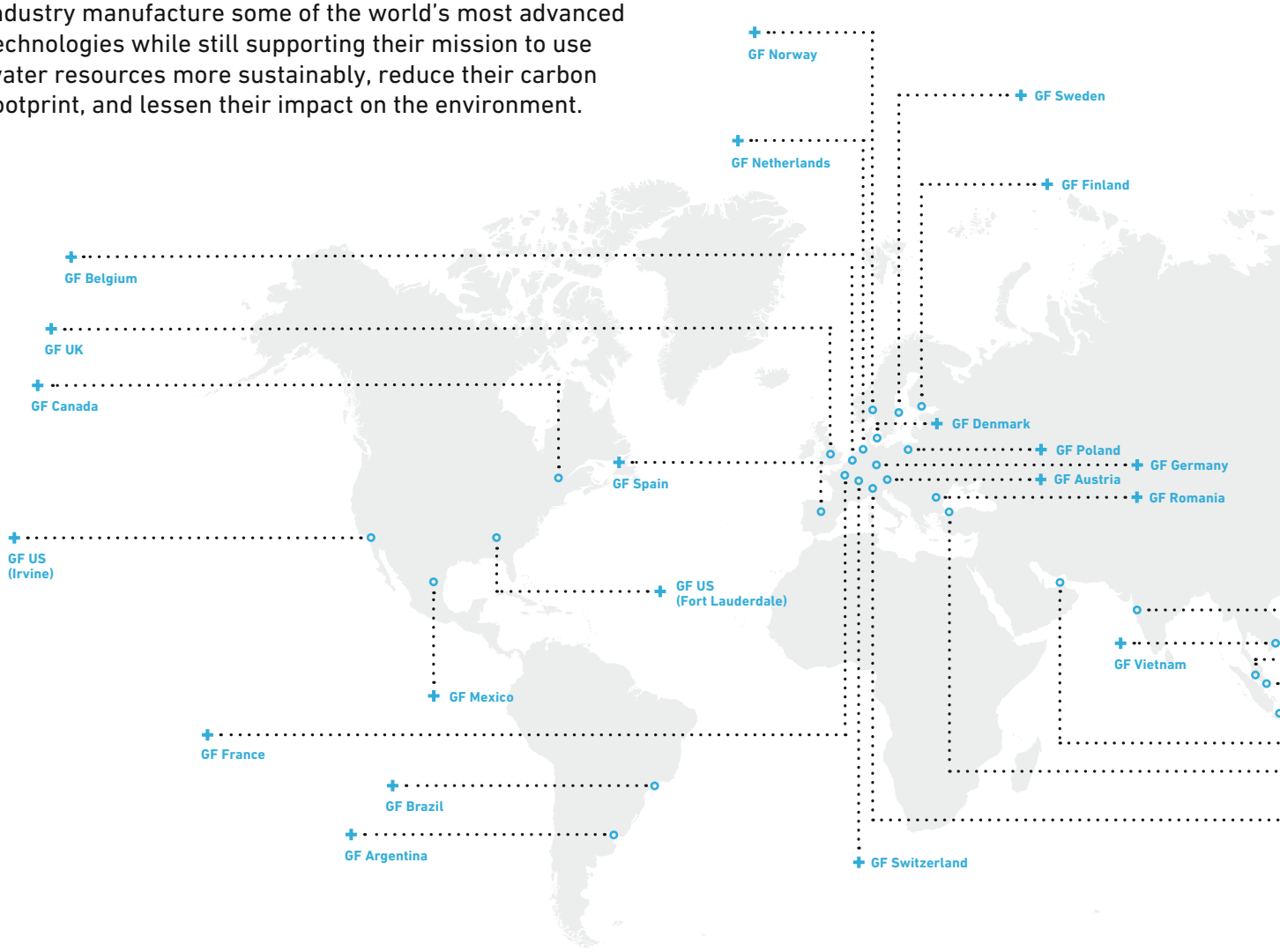
When installing a system, the most critical parts are going to be the weldings – often seen as the weakest point of a system and highly critical to a safe and reliable operation. With Ultrasonic NDT, you can proceed with assurance thanks to scientific proof that the welds are secure.

www.gfps.com/specialized-solutions

Speak to an expert

Support around the globe

GF Piping Systems has supported the marine industry's efforts to build efficient, safe, and hygienic piping systems onboard for more than 30 years. Our global teams help the industry manufacture some of the world's most advanced technologies while still supporting their mission to use water resources more sustainably, reduce their carbon footprint, and lessen their impact on the environment.

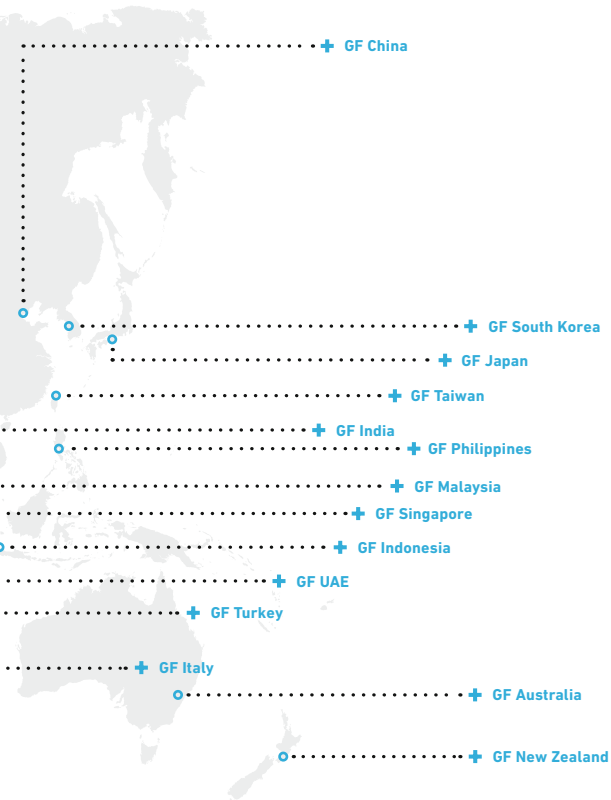


Locations

GF Piping Systems is represented in 33 countries with its own sales companies and 40 production sites. This means that we are always by our customer's side. Our production sites in the Americas, Europe, and Asia ensure sufficient availability and quick, reliable delivery.

Local Marine experts

Additionally, GF Piping Systems has a global network of more than 30 local experts specialized in the marine sector to provide you with the best service on site. With a deep application know how and strong background in regulations for the applications of thermoplastics on board, our team is available to our customers as partners throughout all project phases: from planning to implementation.



Next steps

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 about our smart solutions for cruise:
www.gfps.com/cruiseandferry

+GF+

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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