

# Ballast Water Treatment Ballast Systems

Marine applications





# Creating connections for life

As the leading flow solutions provider for the safe and sustainable transport of fluids, GF Piping Systems creates connections for life. The division focuses on industry-leading leak-free piping solutions for numerous demanding end-market segments. Its strong focus on customer-centricity and innovation is reflected by its global sales, service, and manufacturing footprint and its award-winning portfolio, including fittings, valves, pipes, automation, fabrication, and jointing technologies.

## + Maintenance-free plastic

Piping systems made of plastics are maintenance-free, light and very durable. They help reduce repair and overall costs and are suitable for the transport of drinking water, abrasive and aggressive liquids, as well as gas.

## + Complete system solutions

With more than 60'000 products, GF Piping Systems can offer complete system solutions. In addition, custom-made special parts and special series are also possible. Customers benefit from perfectly matched solutions from a single source.

## + Local support

GF Piping Systems has its own sales companies in 31 countries, which means it is always by its customers' side. Our production sites in 36 locations in America, Europe, and Asia ensure sufficient availability and quick, reliable delivery.

## + Service in all project phases

GF Piping Systems supports its customers both in the initial switch from metal to plastic and in retrofits – across all project phases. They benefit from more than 60 years of experience in plastic systems and application knowledge from 100 countries.

## + Partner for digitization

With its advanced automation and digitization solutions, GF Piping Systems allows its customers to optimize their applications and gives them easier access to their system data. Digital tools support you in every phase of the project.

## Facts and figures (2022)

- **Established:** 1802 (Georg Fischer AG) in Schaffhausen, Switzerland
- **Sales:** 2'160 million CHF
- **Employees:** 8'085
- **Sales companies** in 31 countries
- **Production sites** in 36 locations in America, Europe and Asia

## Introduction

# Go green with GF Piping Systems

A carbon footprint is the sum of all greenhouse gases given off to the atmosphere during the processes of extraction and refining of a material, production, transportation, use and recycling. Comparisons show that the sum of greenhouse gases released in manufacturing plastic solutions is smaller than in manufacturing traditional materials.

### A comparison of materials

In the framework of an in-depth study, pipes in a length of one metre and made of various materials were compared. The results showed that a plastic pipe has a carbon footprint which is up to five times lower than that of a comparable steel pipe.

### Lightweight all-plastic solutions

Plastics score particularly well because of their low weight, which pays off especially in the areas of transportation and processing. All-plastic solutions from GF Piping Systems are lighter in weight than piping systems made of conventional materials and this has a positive effect on the carbon footprint.

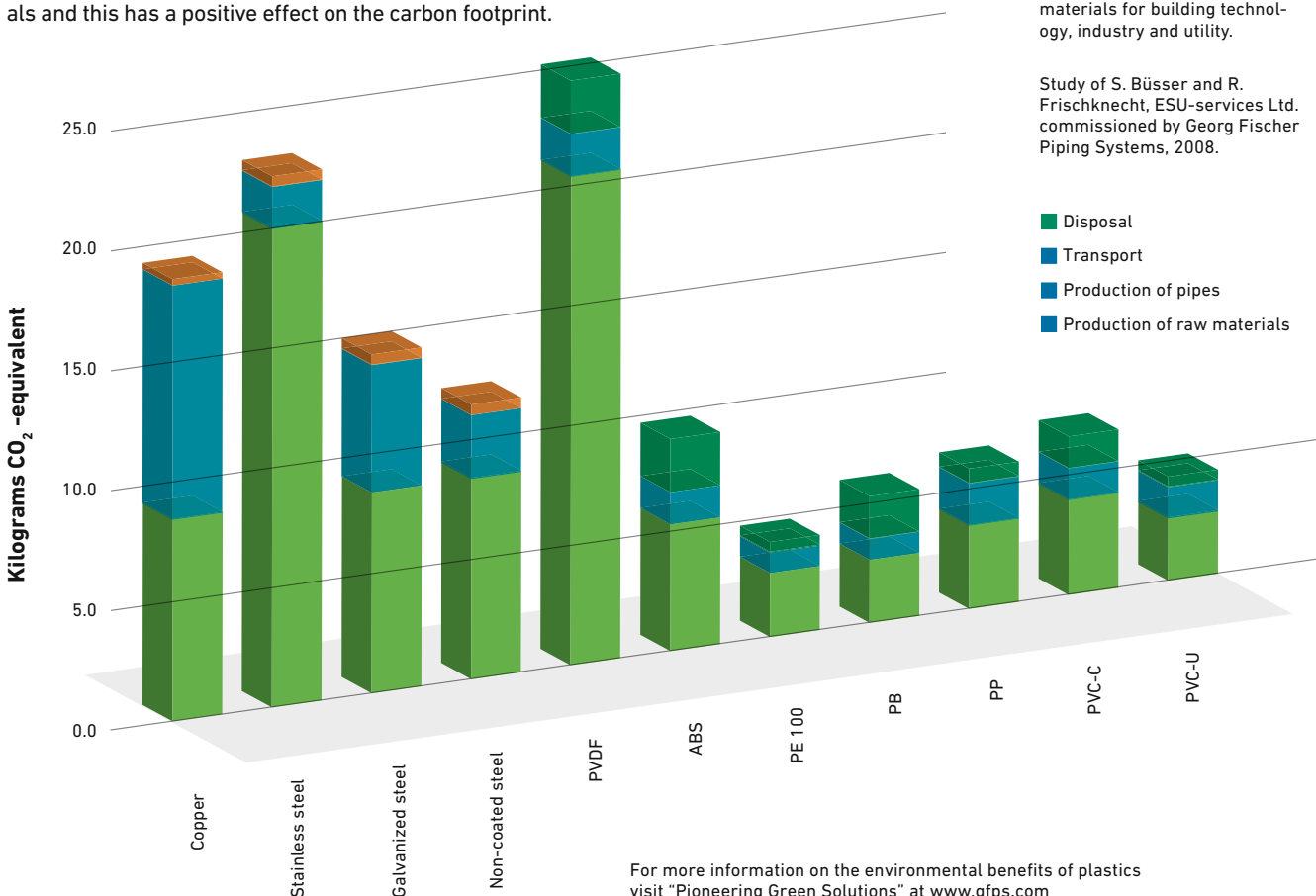
### Lower energy costs

Energy costs can be reduced with targeted layout planning and optimal sizing for pressure needs, allowing lower pump capacity requirements. Using plastic components contributes to a steady flow rate as well as a stable energy requirement. Pre-insulated plastic pipes further reduce energy requirements and have a positive impact on the carbon footprint.

### Carbon footprint

Carbon footprint of plastic and metal pipes (1-meter DN80 pipe) – Comparison of various piping materials for building technology, industry and utility.

Study of S. Büsser and R. Frischknecht, ESU-services Ltd. commissioned by Georg Fischer Piping Systems, 2008.



For more information on the environmental benefits of plastics visit "Pioneering Green Solutions" at [www.gfps.com](http://www.gfps.com)

## Introduction

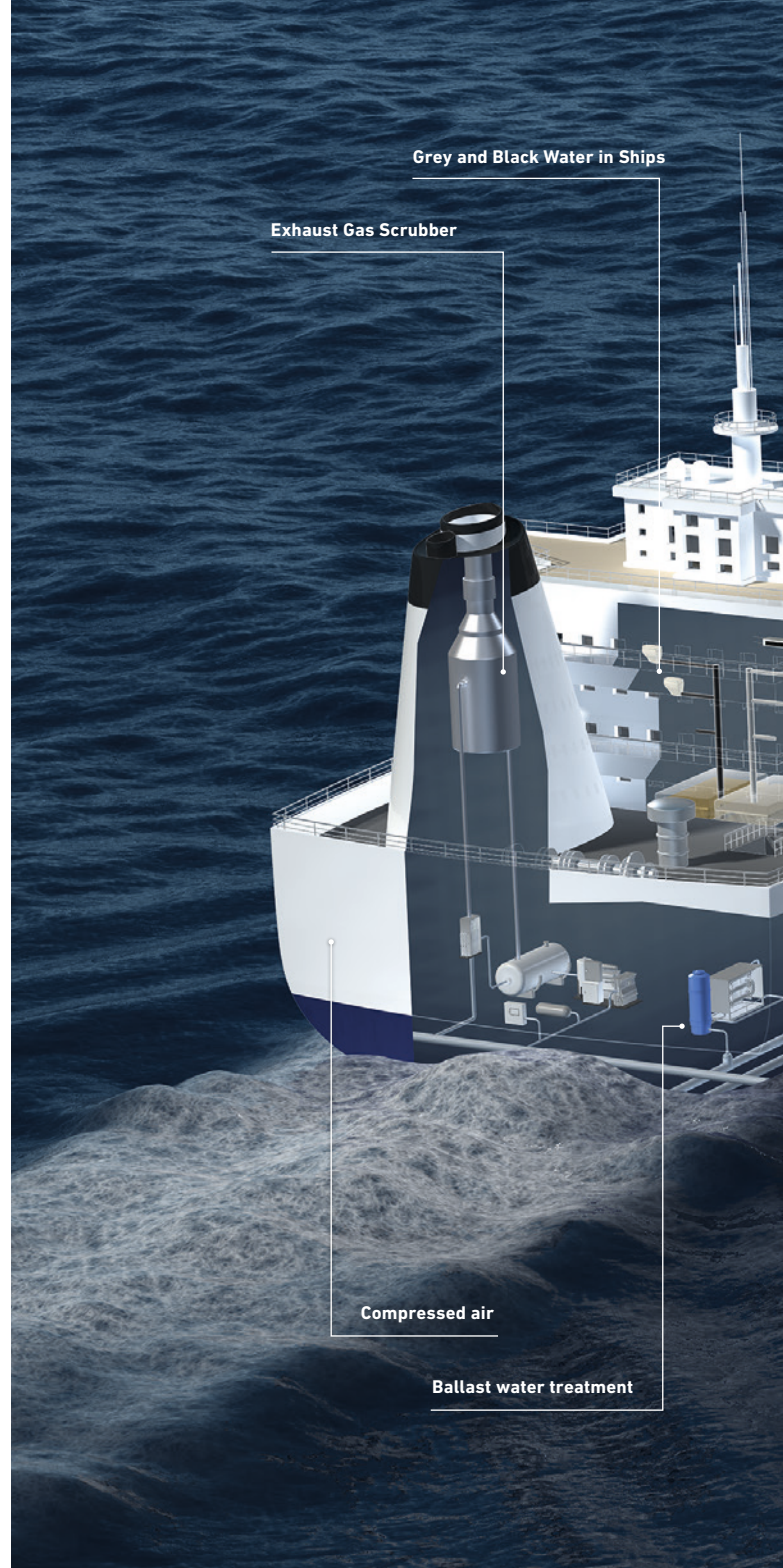
# Tailored for the future

**Intelligent solutions reliably fulfilling the requirements of the maritime industry and the responsibility towards the maritime environment.**

Over the years, the global shipbuilding market has been in continuous growth, undergoing a process of profound change at the same time. Due to a significant increase in transport volumes and worldwide tourism, vessel fleets of larger dimensions dominate today's worldwide maritime traffic. This trend is accompanied by rising environmental requirements and standards to counteract pollution resulting from the expanded trade and travel. With high-quality plastic piping solutions for ballast systems, ballast water treatment and other shipbuilding applications, GF Piping Systems supports the industry to face these technical, operational and environmental challenges. The corrosion, abrasion and chemical resistant systems are ideally adapted to the extreme conditions on the high sea, offering outstanding cost-efficiency and a long system life cycle.

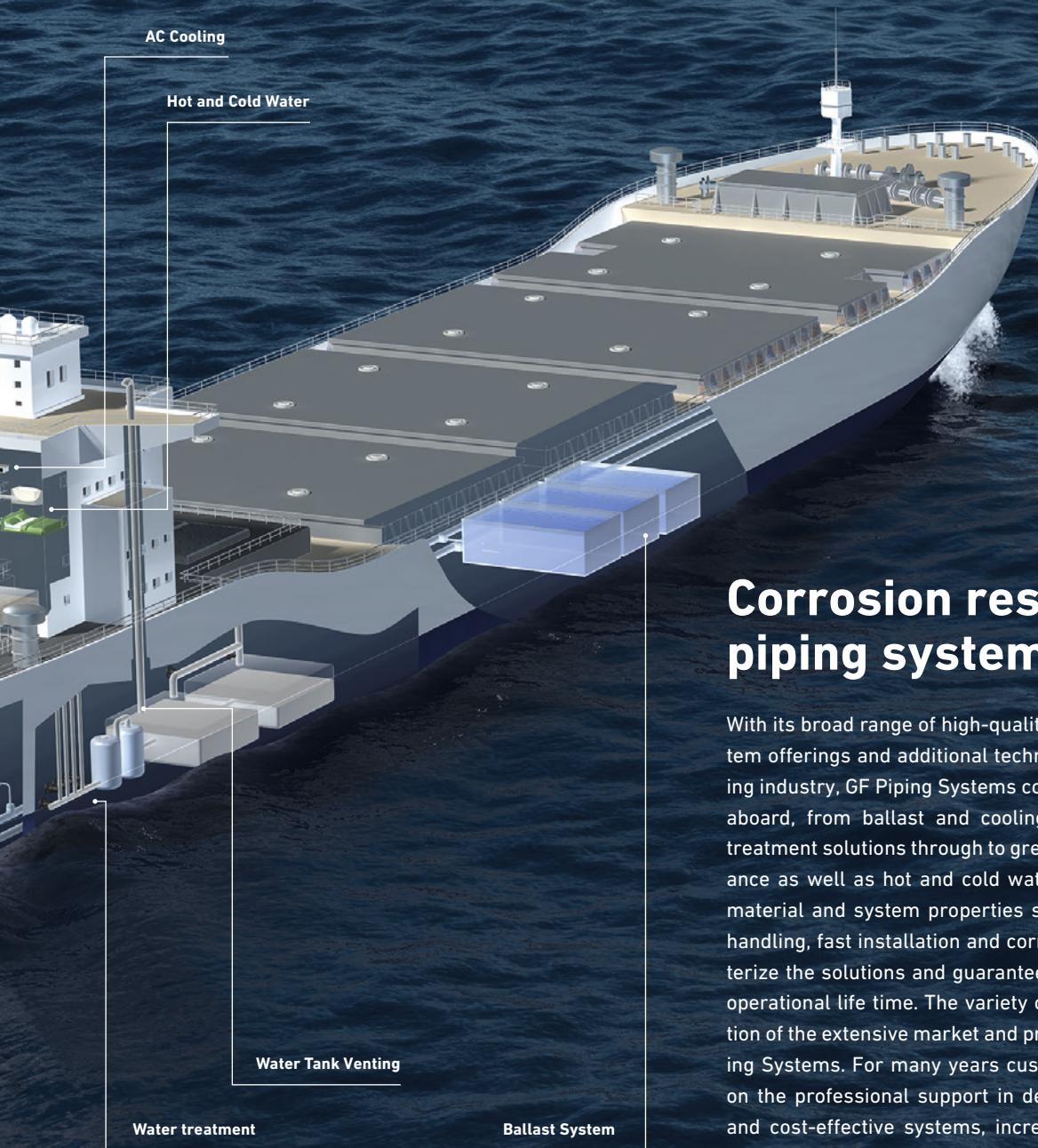
### Solutions for extreme conditions

Since sea water can be described as the lifeblood of ships, products and systems used in applications aboard have to deal with extreme conditions. Thus, preventing corrosion and leakage is more important here than anywhere else. With all-in-one plastic solutions, GF Piping Systems provides tailored systems for various ship applications, consisting of pipes, fittings, valves and corresponding jointing and automation technologies.



### Environmental approach

To a great extent, world's economy benefits from the high-performance maritime sector. But using the oceans as traffic and commercial routes, signifies a responsible approach at the same time. Several approvals, complying with international standards and current IMO\* guidelines, prove the quality, safety and reliability of our products and systems. Compared to competitive materials, plastic solutions cause less CO<sub>2</sub> emissions and show a lower ecological footprint, lately forming the basis for sustainable performance.\*\*



## Corrosion resistant piping systems

With its broad range of high-quality products, complete system offerings and additional technologies for the shipbuilding industry, GF Piping Systems covers all main applications aboard, from ballast and cooling systems, ballast water treatment solutions through to grey and black water conveyance as well as hot and cold water distribution. Beneficial material and system properties such as light weight, easy handling, fast installation and corrosion resistance, characterize the solutions and guarantee a long and cost-efficient operational life time. The variety of applications is a reflection of the extensive market and product expertise of GF Piping Systems. For many years customers have been relying on the professional support in designing efficient, reliable and cost-effective systems, increasing productivity by reducing maintenance and dry-dock times as well as overall operating costs.

### Added value for our customers

For more than 50 years, GF Piping Systems has been the market leader in supplying innovative plastic and metal piping solutions, that offer:

- a long lasting system life
- highest corrosion resistance
- outstanding welding systems
- a maximum of efficiency and safety

Our experience in specified water applications, profound market expertise and a global presence and network, with sales subsidiaries, production sites and distribution centers in 108 countries, make GF Piping Systems a qualified partner for different customer groups in shipbuilding. Experts ensure valuable customer proximity and a reliable support performance worldwide.

Approvals:



ClassNK



\* IMO = International Maritime Organization

\*\* For more information on the environmental benefits of plastics visit "Pioneering Green Solutions" at [www.gfps.com](http://www.gfps.com)

# Ballast water treatment

Stabilizing systems with ballast water tanks are essential for safe and efficient shipping operations. But due to the multitude of marine organism, carried in ballast water, ballast water treatment on ships is required to prevent serious ecological or health effects. Powered by growing environmental awareness and by the current IMO regulation activities, ballast water management is becoming more and more important. With its wealth of experience in water treatment, media filtration, dosing and chemical conveyance, GF Piping Systems offers various innovative solutions for ballast water treatment applications on ships. Covering the entire treatment process from pre-treatment via filtration or coagulation to chemical or physical disinfection, GF Piping Systems supports the ship industry with reliable, long-lasting solutions.

## Main benefits

<b>Corrosion-free</b>	Products with an expected life span of 25 years
<b>Simplicity</b>	CAD data for easy planning
<b>Efficiency</b>	High dosing precision, using less chemicals
<b>Environment</b>	Lower carbon footprint compared to metal piping systems

## Key systems in ballast water treatment

### + Corrosion-free



#### PVC-U system

Solvent cementable plastic, universal use, good chemical resistance, easy to join with special adhesives.

#### Dimensions

6 to 400mm / ¼ to 24inch\*

#### Temperature

0°C to +60°C / 32°F to +140°F\*

### + Simplicity



#### PVC-C system

Solvent cementable plastic, universal use, good chemical resistance, easy to join with special adhesives.

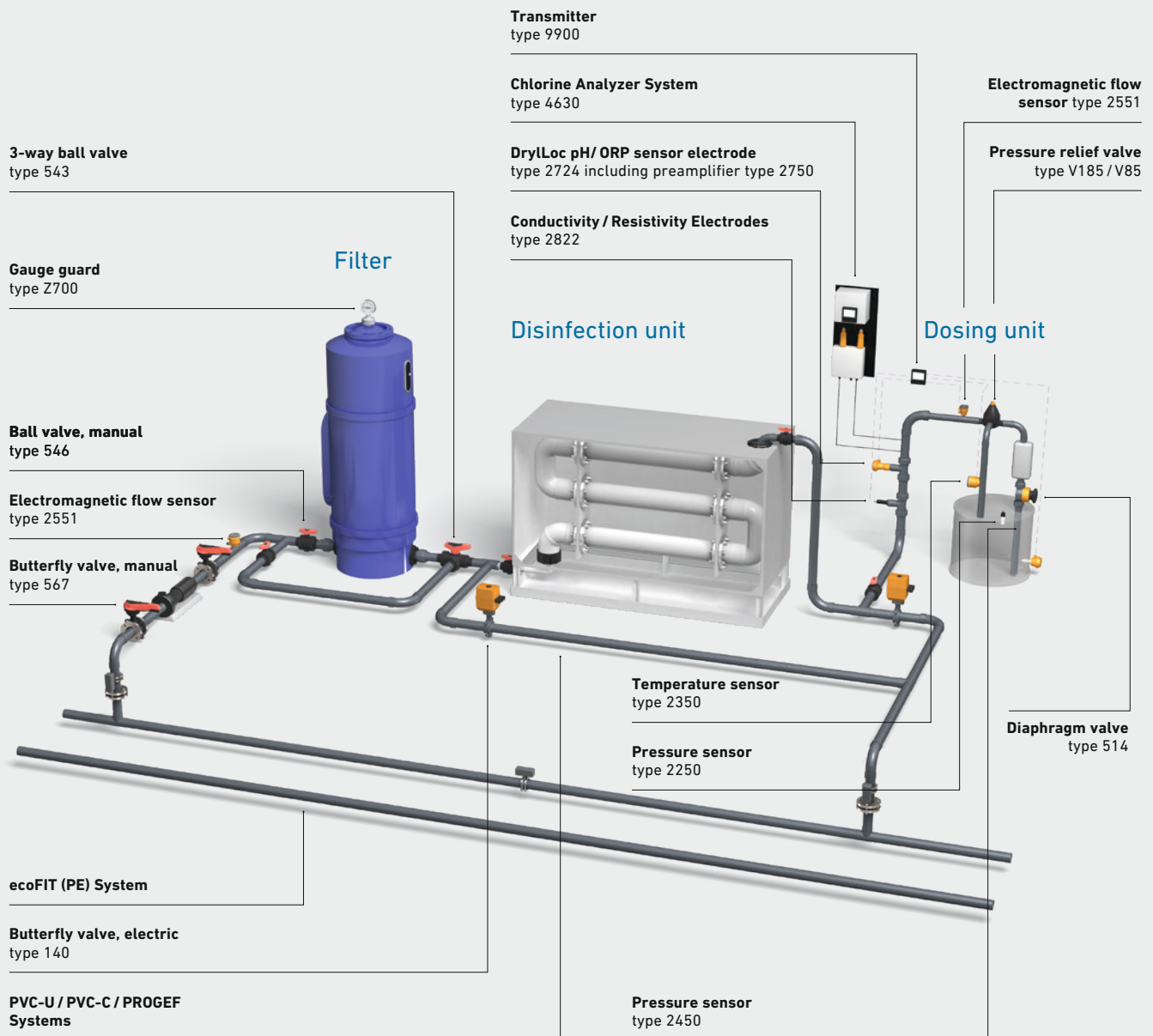
#### Dimensions

16 to 225mm / ¼ to 24inch\*

#### Temperature

0°C – +80°C / 32°F – +210°F\*

\* Sch80



## + Efficiency



### PROGEF (PP) system

Polypropylene, socket, butt and BCF- / IR-Plus fusion.

#### Dimensions

PROGEF Standard 16 to 500mm  
 PROGEF Plus 20 to 315mm  
 PROGEF Natural 20 to 110mm

#### Temperature

0°C to +80°C

## + Environment



### Automation

A broad range, especially designed for harsh environments, consisting of sensors, transmitters, actuators and controllers, which is simple to use and highly reliable.

# Ballast system

To guarantee safe operation conditions throughout voyage, certain parameters regarding the vessel's transverse stability, trim, list, maneuverability and hull girder stresses have to be defined and reliably maintained. Therefore, ballast water systems are used for the purpose of providing weight at strategic locations within a vessel. To ensure optimal ballasting operations afloat and during cargo loading and discharging processes in harbors, ballast piping and ballast tank systems are installed on board, precisely pumping and conveying ballast water. Highly corrosion and abrasion resistant plastic solutions from GF Piping Systems - prefabricated if required - provide a maximum of safety, robustness and flexibility in handling ballast water transport. Complemented with fast, reliable and safe welding technologies, the light-weight solutions convince with its complete system approach.

## Main benefits

- Corrosion-free** Products with an expected life span of 25 years
- Simplicity** Easy jointing on site with electro-fusion welding technology
- Efficiency** Energy savings thanks to smooth surface (no incrustation)
- Environment** Lower carbon and water footprint compared to metal piping

## Key systems in ballast system

### + Corrosion-free



**ecoFIT (PE) system**  
Fuseable plastic (butt, socket, electro, and IR-Plus fusion), UV and impact resistant.  
**Dimensions**  
20 to 630mm\*  
**Temperature**  
-50°C to +60°C

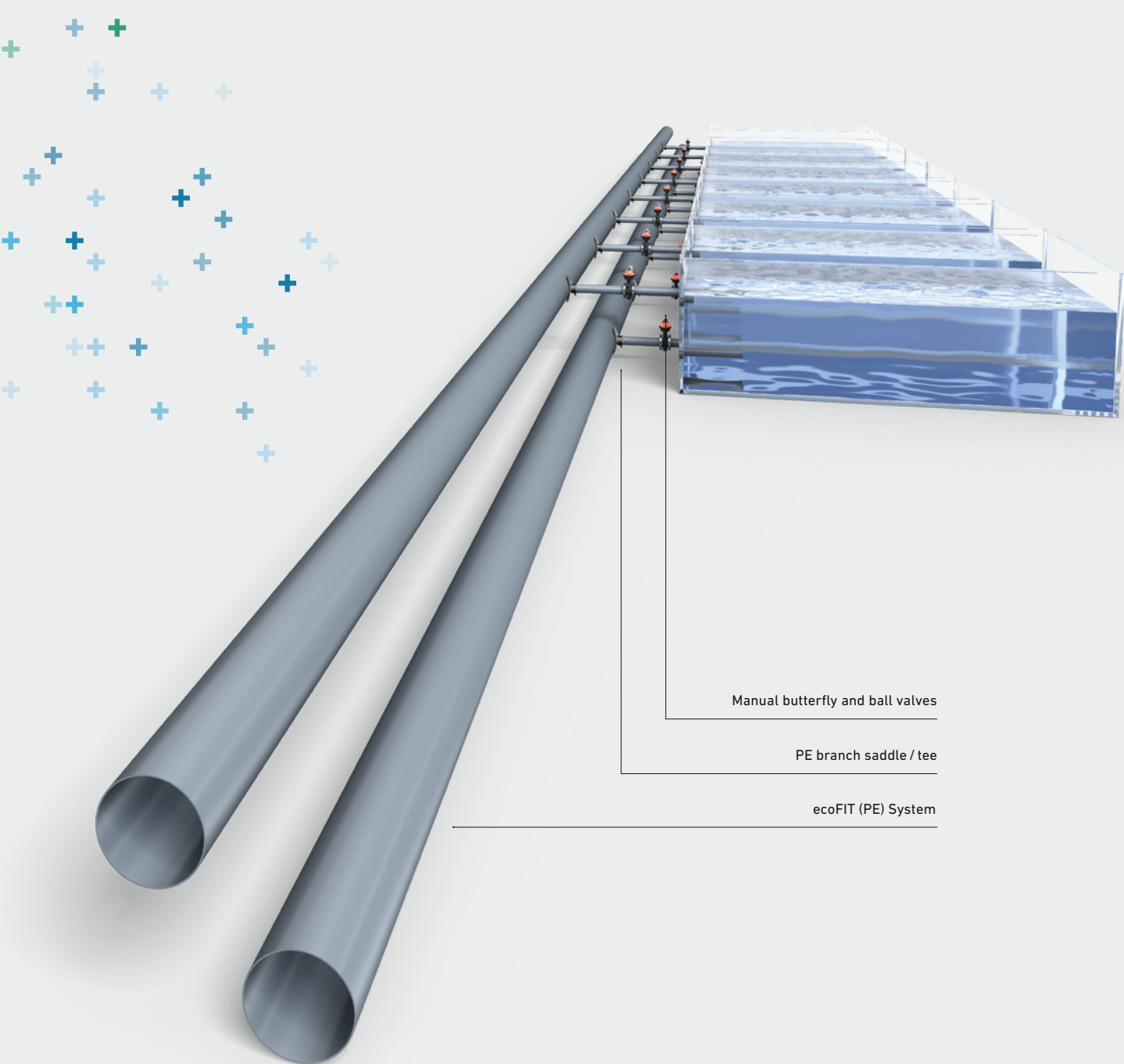
### + Simplicity



**ELGEF Plus system**  
High quality electrofusion system. Modular concept - high flexibility.  
**Dimensions**  
20 to 1 200mm\*  
**Temperature**  
-50°C to +60°C

\* To check maximum dimensions approved, please visit [www.gfps.com](http://www.gfps.com)





## + Efficiency



### Butterfly valve, type 565

The new Butterfly Valve 565 is the best choice for optimizing piping systems built for water applications and a wide range of other applications. This new generation comes at a significantly lower initial cost, and will save even more thanks to its lower static weight, requiring less energy for both operation and transportation.

## + Environment



### PP-V backing flange

The fiberglass-reinforced polypropylene flange can be used wherever aggressive media needs to be conveyed. Thanks to its innovative design, the all-plastic flange, suitable for PE / PVC systems, weighs a third of comparable metal flanges.

# Benefits of plastic

The right material for durable and cost-efficient system performance



Flexible jointing with saddle: Under pressure drilling without operational interruptions.



Reliable welding: Quality control protocol and barcode reader card for data input.




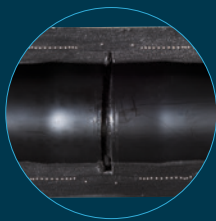
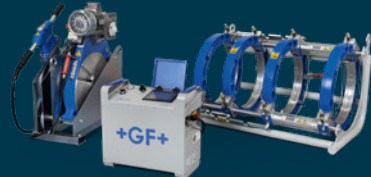
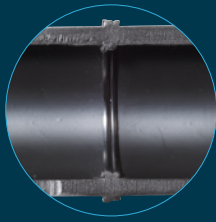

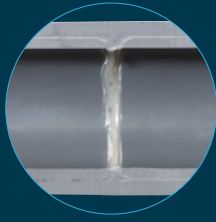
Easy and safe welding on site: Without hazardous vapors, smoke and flame formation.

	PE	Metal	GRP
<b>Environmental benefits</b>			
Full recyclability	+++	+	-
<b>Chemical and physical properties</b>			
Low weight	+++	-	++
Material flexibility	+++	++	--
Impact resistance	+++	+++	-
Corrosion resistance	+++	-	+++
Abrasion resistance	+++	--	++
<b>Welding and jointing characteristics</b>			
100 % reliable welding process on site	+++	-	--
Quality control protocol and data report	+++	+	--
Welding process safety	+++	+	++
Welding/ jointing on board	+++	++	--
<b>Installation and maintenance savings</b>			
Easy customizing on site	++	+++	---
No painting required	+++	--	+++

+++ excellent performance      - poor performance  
 ++ good performance            -- very poor performance  
 + sufficient performance        --- insufficient performance

# Exceeding jointing technologies

As a pioneer in the field, GF Piping Systems has always been placing a high priority on developing innovative jointing techniques for different materials and to fulfill specific requirements. Simplicity in application, chemical resistance, thermal stability and long-term weld strength are the key drivers in our jointing technologies. Years of practical experience and sound specialist knowledge, enables us to transfer our extensive expertise in this field to individual, application-driven solutions. For the harsh environment of marine applications with demanding working conditions on site such as limited space, we offer jointing technologies that convince with easiness and safety of use. Furthermore, with a global jointing training program, international machine rental and a worldwide network of service centers, our customers benefit from local expert know-how.

Jointing technology	Main benefits	Technologies	Joint cross-section
<p><b>Electrofusion – the easy connection</b></p> <p>State-of-the-art semi-automatic technology, combined with a low weight, make the MSA-Plus electrofusion machines perfect for onsite electrofusion.</p>	<ul style="list-style-type: none"> <li>• No sparking</li> <li>• No flame formation</li> <li>• No vapor</li> <li>• Welding protocol facility and full traceability</li> <li>• Easy welding in narrow space</li> </ul>		
<p><b>Butt fusion – the economical connection</b></p> <p>Economical and flexible fusion especially for bigger diameters. From manual machines to full CNC control with traceability and reproducibility.</p>	<ul style="list-style-type: none"> <li>• Highest cost-efficiency</li> <li>• 100 % reliability</li> <li>• One-man operation with no need for additional tools</li> <li>• Quick and easy pipe fixation and removal</li> </ul>		
<p><b>Solvent cementing – the fast connection</b></p> <p>Solvent cementing is the simplest and most efficient jointing method, suitable for almost every medium and requiring.</p>	<ul style="list-style-type: none"> <li>• No external energy source required</li> <li>• Suitable for all dimensions</li> <li>• Fast and simple bonding process</li> <li>• No investment in expensive equipment</li> </ul>		

## Local support around the world

Visit our webpage to get in touch with your local specialist:

[www.gfps.com/our-locations](http://www.gfps.com/our-locations)



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