Fit for use onboard

Ballast water treatment
Ballast system
The best choice for you

Corrosion and chemical resistant system solutions

+ Georg Fischer
Georg Fischer focuses on three core businesses: GF Piping Systems, GF Automotive and GF Machining Solutions. The industrial corporation, founded in 1802, headquarters in Switzerland and operates approximately 120 companies with more than 14 800 employees in 33 countries. GF Piping Systems is a leading supplier of plastic and metal piping systems with global market presence. We offer pipes, fittings, valves, automation products, jointing technology and corresponding services for the treatment of water and chemicals, as well as for the safe distribution of liquids and gases.

+ Global presence
Our global presence ensures customer proximity worldwide. Sales companies in 26 countries and representatives in another 80 countries provide customer service around the clock. With 32 production sites in Europe, Asia and the USA we are close to our customers and comply with local standards. A modern logistics concept with local distribution centers ensures highest product availability and short delivery times. GF Piping Systems’ specialists are always close by.

+ Our market segments
Being a strong implementation partner, GF Piping Systems supports its customers in every phase of the project. No matter which processes and applications are planned in the following market segments:
- Automation
- Building Technology
- Chemical Process Industry
- Energy
- Food & Beverage / Cooling
- Microelectronics
- Marine
- Water & Gas Utilities
- Water Treatment

Complete solutions provider
Our extensive product range represents a unique form of product and competence bundling. With over 70 000 products, allied with a broad range of services, we offer individual and comprehensive system solutions for a variety of industrial applications. Having the profitability of the projects of our customers in focus, we optimize processes and applications that are integrated into the whole system. Continually setting standards in the market, we directly provide our customers with technological advantages. Due to our worldwide network customers benefit directly from our 50 years+ experience in plastics.

From start to finish, we support our customers as a competent, reliable and experienced partner.
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.

For more information on the environmental benefits of plastics visit “Pioneering Green Solutions” at www.gfps.com

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

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 extend, 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 inter-national standards and current IMO* guidelines, prove the quality, safety and reliability of our products and systems. Compared to competitive materials, plastic solutions cause less CO₂ emissions and show a lower ecological footprint, lately forming the basis for sustainable performance.**
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.

**Corrosion resistant piping systems**

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.

**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

**Approvals:**

* IMO = International Maritime Organization
** For more information on the environmental benefits of plastics visit “Pioneering Green Solutions” at www.gfps.com
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

- **Corrosion-free**: Highest chemical and seawater resistance
- **Simplicity**: CAD data for easy planning
- **Efficiency**: High dosing precision, using less chemicals
- **Environment**: 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 400 mm / ¼ to 24 inch*
- **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 225 mm / ¼ to 24 inch*
- **Temperature**: 0 °C to + 80 °C / 32 °F to +210 °F*
**Electromagnetic flow sensor**
type 2551

**Ball valve, manual**
type 546

**Ball valve, manual**
type 546

**ecoFIT (PE) System**

**Butterfly valve, electric**
type 140

**PVC-U / PVC-C / PROGEF Systems**

**Temperature sensor**
type 2350

**Pressure sensor**
type 2250

**DryLoc pH/ ORP sensor electrode**
type 2724 including preamplifier type 2750

**Conductivity / Resistivity Electrodes**
type 2822

**Chlorine Analyzer System**
type 4630

**Transmitter**
type 9900

**Pressure relief valve**
type V185 / V85

**Diaphragm valve**
type 514

**Electromagnetic flow sensor**
type 2551

**Filter**

**Disinfection unit**

**Dosing unit**

**Butterfly valve, manual**
type 567

**Electromagnetic flow sensor**
type 2551

**Gauge guard**
type Z700

**Butterfly valve, manual**
type 543

**3-way ball valve**
type 543

**PROGEF (PP) system**
Polypropylene, socket, butt and BCF- / IR-Plus fusion.

**Dimensions**
- PROGEF Standard 16 to 500 mm
- PROGEF Plus 20 to 315 mm
- PROGEF Natural 20 to 110 mm

**Temperature**
0 °C to + 80 °C

**Efficiency**

**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.
Applications

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 a 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 630 mm *
  - Temperature -50 °C to + 60 °C

**Simplicity**

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

* To check maximum dimensions approved, please visit www.gfps.com
**Butterfly valve, type 567 / 578**  
The double eccentric operating principle of the butterfly valve type 567 / 578 guarantees good friction behavior and therefore less wear and tear compared to conventional centric butterfly valves. A high level of security against water hammer is thus provided.

**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

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

- +++ excellent performance
- ++ good performance
- + sufficient performance
- - poor performance
- -- very poor performance
- --- insufficient performance
Electrofusion – the easy connection
State-of-the-art semi-automatic technology, combined with a low weight, make the MSA-Plus electrofusion machines perfect for onsite electrofusion.

Butt fusion – the economical connection
Economical and flexible fusion especially for bigger diameters. From manual machines to full CNC control with traceability and reproducibility.

Solvent cementing – the fast connection
Solvent cementing is the simplest and most efficient jointing method, suitable for almost every medium and requiring.

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.
GF Piping Systems

Worldwide at home

Our sales companies and representatives ensure local customer support in over 100 countries

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