

Data Center

Leading edge piping systems for mission critical cooling

**Start up on schedule,
operate more efficiently**

**Install data center cooling more quickly
and efficiently. Operate reliably and
comply with environmental regulations.**



Data Center

Years of pioneering innovation at your side

In today's digital world, Data Centers (DC's) are critical infrastructure that require mission critical cooling plants whatever their size or type. The equipment and piping within these plants must be highly reliable and as energy efficient as possible. Since data centers have such quality requirements and high energy consumption, GF Piping Systems' state-of-the-art systems, engineering and prefabrication help to provide 100 % reliability and the best possible energy efficiency.

GF Piping Systems is a leading supplier of plastic and metal piping systems with a global market presence. As a strong partner, GF Piping Systems supports its customers in every phase of the project. With a global presence across more than 100 countries, customers receive worldwide service around the clock. Over 60 years of experience and 60 000 products ensure customers are in safe hands every step of the way.



GF Piping Systems has years of experience in the data center market on all continents, whether that be with large data centers (hyperscales) in Northern Europe, the United States and Southeast Asia or modular container units for enterprise data centers.

The digital market demand is dynamic and growing rapidly. Data Center construction is under enormous pressure to speed up project construction timeframes and improve the efficiency (PUE) of the complete data center.

This market demand for capacity, efficiency and speed is driving the market to build increasingly large data centers (hyperscales). The multiplication of design and equipment, with economies of scale, is resulting in low PUE hyperscale data centers (PUE < 1.5) with cooling capacities of regularly >10MW and sometimes even >100MW.

The dedicated data center team at GF Piping Systems ensures professional advice across the globe, with extensive domain expertise that's focused on long-term reliability and financial viability for our customers.

GF Piping Systems has many years of experience in supplying large and mega projects in many industries worldwide as well as supplying green field semi-conductor factories and off-shore oil production and storage rigs around the globe with core and non-core process piping from China to California.

Markets

- Hyperscales
- Enterprise
- Colocation
- Modular

Ideal materials for use in data centers

Owners and operators of data centers can apply the solutions by GF Piping Systems for quicker set up and more efficient, reliable operation across the entire service life of their data centers. Plastic piping systems make it possible to increase the reliability and safety of your plant and reduce maintenance costs and personnel requirements. This allows you to work more effectively overall.

+ 25 % improved energy efficiency

The piping solutions of GF Piping Systems help reduce energy costs - on average by 25 % compared to conventional metal systems. Plastic has a lower thermal conductivity. The pre-insulation at the factory is highly effective and at the same time extremely resistant to damage.

+ 100 % maintenance-free

Our piping systems are generally maintenance-free for at least 25 years and resistant to the adverse effects of weather and UV radiation when installed outdoors. This reduces maintenance requirements and costs of the cooling system, while supporting reliable operations and hence the reliability of the entire system.

+ Corrosion-free

With the use of plastic instead of metal systems, you can rely on completely corrosion-free material. Unlike their metal counterparts, plastic piping systems do not corrode. The result is that the condition of plastic piping systems remains the same with regards to corrosion is the same after 25 years and there is no value adjustment of corrosion levels throughout their entire lifetime from the moment of installation.

+ 50 % faster installation

By opting for a plastic system, installation can be accelerated by up to 50 percent. Depending on the application, various factors contribute to this: Factory pre-insulation and pre-assembly, faster connection through integrated electric welding, gluing or plugging. In the supply area, the typical material flexibility of plastic allows faster installation.

+ High environmental contribution

Over their entire service life, plastic systems have a carbon dioxide balance that is 80 percent lower than that of metal systems and are fully recyclable. This increases the energy efficiency of your system and also makes an important contribution to the environment.





Complete system solutions for your applications

GF Piping Systems offers a range of complete systems developed specifically for the applications in a data center to offer optimal added-value. From outdoor systems, where our solutions are lightweight and completely 100 % weather resistant, to indoor water distribution, including white spaces, with our double-containment system with leak detection.

Main applications

- 1 Chilled water pumping stations – machine room
- 2 Direct liquid cooling – white space – computer rooms
- 3 Chilled water on rooftops

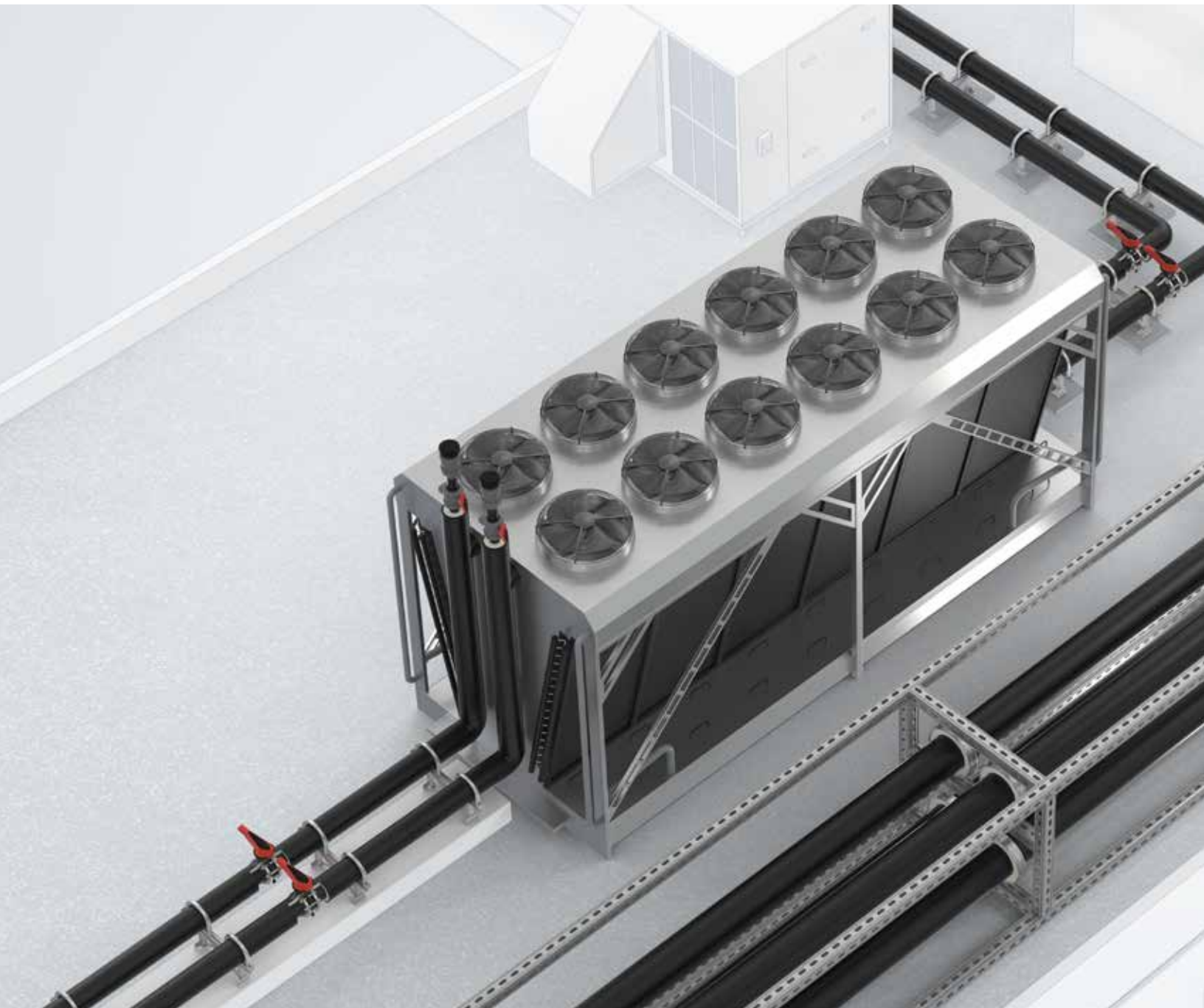
Further applications

- Condensate water (CWS)
- Condensate drainage
- Chilled water outdoors (CHWS)
- Chilled water indoor distribution (Facility water system – CRAC water)
- Town/In-take water (Town/City water)
- Water treatment: Chemical dosing
- Rack: Rear door, in-row, end-row process water
- Domestic Building services
- Direct liquid cooling
- Heat tracing: Leak detection, double containment

Application

Chilled water on rooftops

Pipe systems on rooftops for chillers and condenser units are open to environmental conditions daily and seasonally. Ambient conditions of $-25^{\circ}/-13^{\circ}\text{F}$ for several days are not uncommon in Northern Europe and direct sunlight on black pipes can cause surface temperatures of $+70^{\circ}\text{C}/+158^{\circ}\text{F}$. These extreme temperatures together with general weathering (wind, rain, UV light) create demanding conditions. GF Piping Systems' PE-100 black and COOL-FIT are designed for a life-span of 25 years with continued high performance under such harsh conditions.



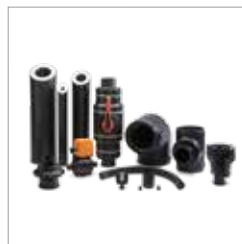


Your key benefits

- **Save weight:** plastic densities are 0.9-1.5 g / cc (0.03 - 0.05lb/in³) vs. metals 7.8-9.3 g / cc (0.28-0.33lb / in³) *
- **Faster handling and generally no special handling equipment required**
- **Less structural steelwork and concrete required**
- **Health and safety benefits (less weight to be handled by personnel)**

* For more information about weight savings of GF Piping Systems' plastic pipes compared to metal, please refer to our website (www.gfps.com/data-center).

Highlight solutions



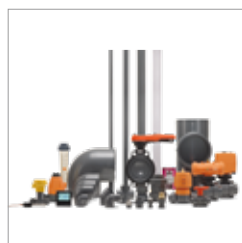
COOL-FIT 4.0 Pipe, d32-d450

The pipe is pre-insulated PE100 SDR11/17 metric with insulation made from GF HE foam. It is impact resistant and comes with free ends for electrofusion and a length of 5 meters in temperature -50°C to +60°C (-122°F to +140°F).



ecoFIT Pipe DN100

The qualified, corrosion resistance solution for universal usage in highly diverse industrial applications. ecoFIT offers a maximum of safety, reliability and performance and covers most international standards.



PVC-U system

Ensuring highest possible thermal stability and chemical resistance, PVC-U systems stand up to the most demanding conditions, particularly where media such as acids, alkalis, bases and salts are transported.



Type 591 De-Venting Valve PVC

An innovative PP-H (PVDF) float on the air and venting valve type 591 has a very low density of 0.91 g/cm³ and ensures complete and reliable venting of the pipe system. At the same time, the valve prevents media overflow.



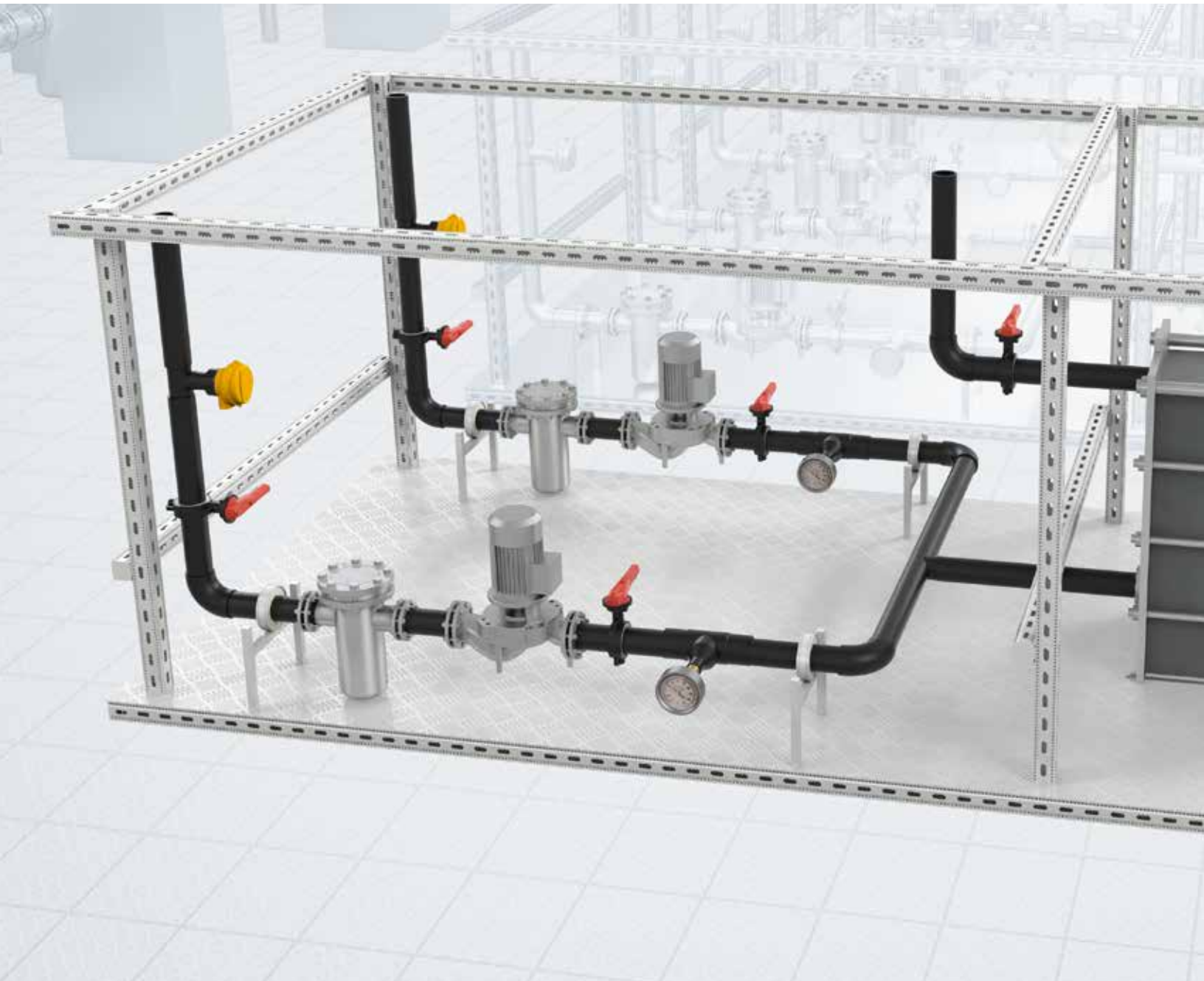
Off-site prefabrication

GF Piping Systems shortens the time period from the planning to the commissioning stage by means of factory preinsulated components and off-site pre-assemblies.

Application

Chilled water pumping stations – machine room

The prefabrication of pump station skids under controlled working conditions off-site, using plastic pipes and valves, offers considerable advantages. The low weight of plastic allows large skids to be prefabricated off-site and delivered ready to plug in place. ecoFIT PE-100 is UV and impact resistant and therefore ideal for such an application. GF Piping Systems offers a wide range of compatible manual and actuated plastic and metal valves, designed to be integrated cleanly into the complete plastic system.





Your key benefits

- Efficiency benefits up to 25 % (for example in COOL-FIT, $\lambda=0.026W / m \cdot K$)*
- Fast, reliable jointing
- Fully compatible systems (manual valves, automatic valves etc.)
- Smooth bore, non-corroding pipes provide consistent high performance for over 25 years life span

* For more information about efficiency benefits (U- Values) of GF Piping Systems' plastic pipes compared to metal, please refer to the respective product information and specifications on our website.

Highlight solutions



ecoFIT Pipe DN100

The qualified, corrosion resistant solution for universal usage in highly diverse industrial applications. ecoFIT offers maximum safety, reliability and performance and covers most international standards.



Butterfly valve type 567 PVC-U

Butterfly valves type 567 are compact, flexible and reliable shut-off valves for wafer and lugstyle applications. The modular design principle allows you to exchange individual system components fast and easily.



Tee 90° reduced PE100

The most widespread use of polythene in pipeline systems is for ground-laid gas and water pipes. The model comes with a welded reducer and is usable for 5 bar gas / 10 bar water and available as a long spigot version.



Digital libraries

Our BIM & Plant Design product libraries enable planning with real dimensions, embedded bill of materials, and simplified digital cooperation. They reduce planning errors and shorten your project times.



Engineering

We check the design of your piping system, support you with the choice of materials and components as well as with the correct installation. Our 60 years of experience with plastic systems help you to reduce your own risks.

Application

Direct liquid cooling for white spaces and computer rooms

While the use of liquid cooled servers offers clear efficiency benefits, it also raises safety and reliability issues, as pressurised water moves closer and closer to the CPUs. GF Piping Systems is the worlds expert in high quality pressure bearing plastic pipe systems and has years of experience in the semi-conductor manufacturing industry, developing user and application specific systems with real added-value, for all stakeholders.





Your key benefits

- Efficiency, pressure drop down to a minimum (full bore fittings and valves)
- 100 % reliability, no corrosion, 25 year design life-span
- Quick and 100 % drip-free connections, for maintenance of blades
- No corrosion and no metallic residue, complete pressure bearing plastic solution

Highlight solutions



Ball Valve type 546 PVC-U

The easy to install Ball Valve 546 PVC-U with spigots PE is manually operated and comes with a manual override with ratchet setting. Pneumatic or electric actuators are available separately.



EA 127 Ball Valve PVC

The Ball Valve type 127 consists of the Ball Valve type 546 and the electric actuator EA15. It offers a proven high level of modularity and reliability.



JRG Sanipex MT pipe in coils

The JRG Sanipex MT system is highly corrosion resistant. The construction of the pipe connection is free of water pockets and offers full flow rates without any reduction of the internal cross section and multiple safety.



CONTAIN-IT

A modular system that combines the chemical resistance of dedicated inner plastic piping with the additional safety of a second outer piping.



Engineering

We check the design of your piping system, support you with the choice of materials and components as well as with the correct installation. Our 60 years of experience with plastic systems help you to reduce your own risks.

Efficiency gain for customer projects

GF Piping Systems has extensive offsite manufacturing experience with data centers. These services are also known as offsite construction, prefabrication and modular construction. When offsite is considered from the outset, GF Piping Systems is able to maximize the benefits achieved for supporting consultants, specifiers and contractors to develop and deliver innovative solutions that provide the best value for your projects.

Offsite Prefabrication

Engaging with GF Piping Systems early encourages collaboration and integration that ultimately brings value to your project. Especially in environments like data centers, a seamless transition from GF Piping Systems to the construction site is key and exceptional product quality is a must. Our products hold industry-recognized approvals through established facilities with highly trained personnel. And with offsite manufacturing increased levels of accuracy are provided and defect variability is reduced, leading to a reduction in lifetime system costs. To be even more cost efficient, an early engagement with contractors can drive out risk allocations.

+ Higher quality and consistency

Offsite manufacturing, often using CAD systems and specialized personnel, can mean fewer defects and shorter snagging lists. Modules and components are tested for quality before leaving GF Piping Systems.

+ Labor advantages to save time

Fabrication at our offsite facilities allows developers flexibility to build in areas with local shortages of skilled or expensive labor. With more of the work being carried out offsite, programs are less likely to be impacted by weather stoppages or site congestion. Build time tends to be considerably shorter because of efficiencies such as the ability to carry out ground works simultaneously to fabrication of key elements of the eventual structure.

+ Less waste, more sustainability

By constructing data center elements at a fixed facility using precision equipment and standardized processes, any waste produced onsite can be virtually eliminated, controlled and recycled. This provides both financial and environmental advantages. With careful programming efficient production and unit design are ensured and can reduce even more carbon emissions.



Our experienced experts will support you directly on site.



Engineering

GF Piping Systems has in-house engineering staff with years of experience in plastic pipe systems design and installation, and re-engineering. To ensure efficient pipe system installation our experts can perform engineering calculations as well re-design isometrics to make them conform to plastics. Service examples include: stress analysis, isometric layouts, expansion-contraction, allocation of fixed points and expansion elbows, and static load calculations. We also offer on-site technical support including non-destructive testing (NDT) of plastic welds and on-site certification of installers. Our experts offer calculations and recommendations for bracketing and fixed-point installations to aid customer design.

Digital Libraries

Our comprehensive CAD library is the most widely used client planning resource we offer today. Simply access our database hosting over 25 000 drawings for pipes, fittings, measurement and control devices as well as manual and actuated valves by using our dedicated CAD website. The drawings are available in 2D and 3D file formats and can be downloaded from our easy-to-use customer interface. Our CAD library is available at cad.georgfischer.com. To ensure your projects run smoothly and successfully, GF Piping Systems also supports you with a full range of BIM LOD 200 family models for our products.

Global prefabrication manufactories for data centers

1. Schaffhausen (Switzerland)
2. Irvine (USA)
3. Coventry (United Kingdom)
4. Avesta (Sweden)
5. Dautphetal-Mornshausen (Germany)
6. Ratnagiri (India)
7. Shanghai (China)

Local experts and help around the clock

+ Help in all project phases

A circular diagram illustrating the GF Services process flow. The central circle is white and contains the text "GF Services" in blue. Surrounding this central circle is a blue ring divided into five segments, each representing a stage of the process. The segments are labeled as follows, starting from the top and moving clockwise: "Planning", "Tendering", "Preparation", "Implementation", and "Commissioning". Each segment is separated by a white gap, and the entire ring is composed of five blue arrow-like shapes pointing clockwise.

the local requirements and specific features and can recommend you solutions that can be used safely and reliably for the project site. This also applies to projects spanning several countries and continents.



Everything is connected



Making your global footprint sustainable

GF Piping Systems is making flow sustainable: Environmental regulations, water scarcity and an increasing demand of consumers and society for greener and more sustainable solutions are an important set of trends shaping customer behavior. Saving energy in high-consumption areas such as the cooling of data centers or food storage, reducing the carbon footprint of cruise ships or reducing the levels of chemicals in industrial wastewater treatment are examples of areas where GF Piping Systems can provide attractive solutions.

Our mission at GF Piping Systems is to make sure customers enjoy sustainable flows of water, gas or chemicals without safety issues, leakages and other environmentally challenging consequences. Our solutions improve our clients' sustainability in terms of energy use and the CO₂ footprint, creating a more sustainable future for everyone. GF supports the sustainable success of its customers by increasing their efficiency during installation and operation.

GF Piping Systems directly contributes to the United Nations' Sustainable Development Goals. Support for the global effort includes good health and well-being, clean water and sanitation, industry, innovation and infrastructure, sustainable cities and communities, responsible consumption and production, and last, but certainly not least, climate action.

Next steps

This brochure has provided 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.

On the GF Piping Systems website you will find specialized contact persons in your area. There you will also find further information on the product, including technical data sheets and operating instructions as well as relevant certificates and approvals.

- Appointment with an expert from GF Piping Systems
- Advice on the benefits of the solution for you
- Information on reference applications
- Help with selection and calculations
- Support in all project phases

More information

www.gfps.com/data-center



Local support around the world

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



The information and technical data (altogether "Data") herein are not binding, unless explicitly confirmed in writing.
The Data neither constitutes any expressed, implied or warranted characteristics, nor guaranteed properties or a guaranteed durability. All Data is subject to modification. The General Terms and Conditions of Sale of Georg Fischer Piping Systems apply.