GF Piping Systems

+GF+

COOL-FIT 2.0

The revolution for efficient cooling

COOL-FIT 2.0

Your solution for chilled water

The efficiency of a cooling plant is defined by the system's Coefficient of Performance (COP), the heat transfer rate at the air cooler and the efficiency of the chilled water piping system. As a contribution to the worldwide initiative to reduce CO_2 emissions and their environmental impact, GF Piping Systems brings a revolution to efficient cooling.

The COOL-FIT 2.0 PE100 pipes and fittings are insulated with 22 mm of high energy efficient (HE) foam and protected with a robust jacket. COOL-FIT 2.0 is the corrosion and condensation free solution for the transport of chilled water inside residential and commercial buildings as well as data centers and for process cooling. The smooth inner surface of the PE100 pipe provides a minimum pressure loss while the low thermal conductivity of the insulation ensures reduced energy loss and running costs for a life time. The 3-in-1 construction keeps installation time to a minimum.

50% faster installation

30% better energy efficiency

100% corrosion free

Take advantage of these benefits

+ Building owners

Minimized energy loss
Top quality insulation thickness and density throughout the entire system.

Light weight
Ideal for retrofitting of prestigious buildings
30% less weight than traditional metal systems.

Hard external jacket
Vapour and moisture tight construction, mechanically loadable.

Low CO_2 footprint
CFC free and recyclable. Zero ODP.

+ General contractors and installers

Build more in less time
3-in-1: pipe, insulation and jacket in one step.

Reliable easy jointing
No hot works for the electrofusion jointing process.

Simple installation
The hard external jacket allows for simple, easy assembly with standard brackets.

Light weight and easy to handle
Up to d110 mm no need for lifts or special devices to handle on-site.

Off-site pre-fabrication
Reduced on-site labor time.

+ Planners and consultants

Easy and accurate planning
Planning fundamentals, CAD library, BIM compatible.

Complete compatible system – clearly defined interfaces
Insulated pipes, fittings, valves, clearly defined interfaces, flexible hoses – one system, one team, one producer.

A system for life
Corrosion and condensation free, moisture and vapour tight, low pressure loss and energy efficient.

State-of-the-art jointing technology
Machine controlled quality.

More than a system

All COOL-FIT 2.0 items are pre-insulated. Products which need to be maintained, such as valves, are delivered with removable insulation.

COOL-FIT 2.0

		d25 mm	d32 mm	d40 mm	d50 mm	d63 mm	d75 mm	d90 mm	d110 mm	d140 mm
	Pipes PN16	–	●	●	●	●	●	●	●	●
	Couplers	–	●	●	●	●	●	●	●	●
	Elbows 90° / 45°	–	●	●	●	●	●	●	●	●
	T-90° equal	–	●	●	●	●	●	●	●	●
	T-90° reduced	–	–	–	–	●	●	●	●	●
	Reducers	–	–	●	●	●	●	●	●	●
	Flexible hoses	●	●	●	●	–	–	–	–	–
	Ball valves	–	●	●	●	●	●	●	–	–
	Butterfly valves	–	–	–	–	–	–	–	●	●
	Transition fittings	–	●	●	●	●	●	●	●	●
	Fixed points	–	●	●	●	●	●	●	●	●

COOL-FIT 2.0 M

	Pipes	–	●	●	●	●	●	●	●	–
	Couplers	–	●	●	●	●	●	●	●	–
	Elbows 90°	–	●	●	●	●	●	●	●	–
	T90° equal	–	●	●	●	●	●	●	●	–

Tools

	Tools	–	●	●	●	●	●	●	●	●
	Fusion machine	–	●	●	●	●	●	●	●	●

Compatible systems

ecoFIT PE100

iFIT

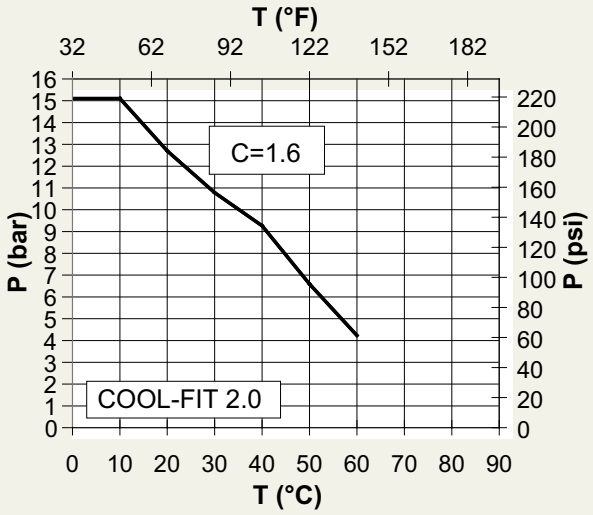
Material properties

Materials*	Media pipe	PE100
	Insulation	GF HE foam, CFC free, closed cell
	Outer jacket	Pipe: HDPE, fitting: GF HE Foam
Dimensions		d32 - d140 (DN25 - DN125)
Jointing technology		Electrofusion welding
Pressure rating		16 bar, SDR11
Insulation	Thermal conductivity λ at 20°C	≤ 0.022 W/mK
	Density	≥ 55 kg/m³
	Foam cell size	max. ø 0.5 mm
	Thickness (Nominal)	22 mm
Temperature	Medium	0° C to +60° C
Weight	Pipe d32	1.14 kg/m
(without liquid)	Pipe d140	9.02 kg/m
Environment	Resistance	Water and vapour-tight
	Ozone depleting potential	Zero
Standards	EN ISO 15494	Plastic piping systems for industrial applications - Metric series
	ISO 7	Threaded joints
	EN ISO 16135, EN ISO 16138	Industrial valves

* All three materials are permanently jointed to each other.

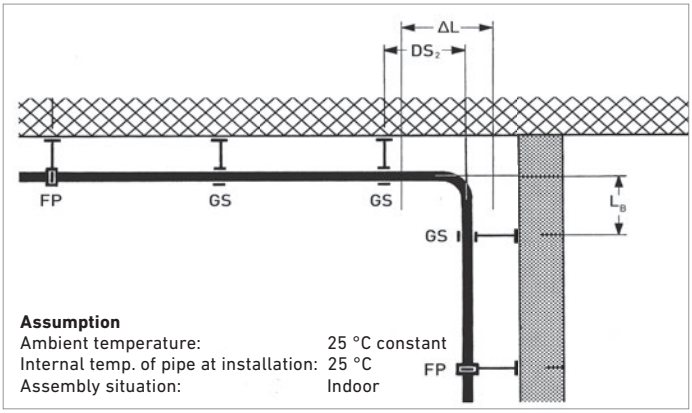
Pressure / temperature

Medium: water
Minimum design life-span 25 years



P Medium pressure (bar, psi)
T Medium temperature (°C, °F)
C Safety factor

Definition of flexible sections COOL-FIT 2.0



Assumption

Ambient temperature:	25 °C constant
Internal temp. of pipe at installation:	25 °C
Assembly situation:	Indoor

Expansion / contraction

The expansion and contraction of pipes is dependent on the cooling fluid temperature, the ambient temperature and the change of both temperatures in an application. It does not have a material expansion-/contraction factor as for standard pipes.

Use the COOL-FIT Calculation Tool to determine detailed, application specific values.

Length changes ΔL in [mm] at 20° C liquid temp.

L [m]	25	50	100	150
d32 mm	-6.0	-12.0	-24.0	-36.0
d40 mm	-7.0	-15.0	-29.0	-44.0
d50 mm	-10.0	-19.0	-38.0	-58.0
d63 mm	-10.0	-19.0	-38.0	-58.0
d75 mm	-11.0	-21.0	-43.0	-64.0
d90 mm	-12.0	-24.0	-48.0	-72.0
d110 mm	-13.0	-27.0	-54.0	-81.0
d140 mm	-14.0	-27.0	-55.0	-82.0

Length changes ΔL in [mm] at 15° C liquid temp.

L [m]	25	50	100	150
d32 mm	-12.0	-24.0	-49.0	-73.0
d40 mm	-15.0	-29.0	-58.0	-87.0
d50 mm	-19.0	-38.0	-77.0	-115.0
d63 mm	-19.0	-38.0	-76.0	-115.0
d75 mm	-21.0	-43.0	-85.0	-128.0
d90 mm	-24.0	-48.0	-96.0	-144.0
d110 mm	-27.0	-54.0	-108.0	-161.0
d140 mm	-27.0	-55.0	-109.0	-164.0

Length changes ΔL in [mm] at 10° C liquid temp.

L [m]	25	50	100	150
d32 mm	-18.0	-36.0	-73.0	-109.0
d40 mm	-22.0	-44.0	-87.0	-131.0
d50 mm	-29.0	-58.0	-115.0	-173.0
d63 mm	-29.0	-57.0	-115.0	-172.0
d75 mm	-32.0	-64.0	-128.0	-191.0
d90 mm	-36.0	-72.0	-144.0	-216.0
d110 mm	-40.0	-81.0	-161.0	-242.0
d140 mm	-41.0	-82.0	-164.0	-246.0

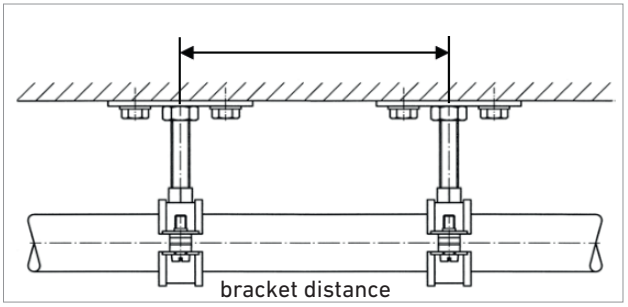
Length changes ΔL in [mm] at 5° C liquid temp.

L [m]	25	50	100	150
d32 mm	-24.0	-49.0	-97.0	-146.0
d40 mm	-29.0	-58.0	-116.0	-175.0
d50 mm	-39.0	-77.0	-154.0	-231.0
d63 mm	-38.0	-76.0	-153.0	-229.0
d75 mm	-43.0	-85.0	-170.0	-255.0
d90 mm	-48.0	-96.0	-192.0	-288.0
d110 mm	-54.0	-108.0	-215.0	-323.0
d140 mm	-55.0	-109.0	-218.0	-327.0

Flexible sections L_B in [cm]

ΔL [mm]	10	20	30	40	50	60	70	80	90	100	150	200	300
d32	71	101	123	142	159	174	188	201	214	225	276	318	390
d40	78	110	135	156	174	191	206	221	234	247	302	349	427
d50	78	110	135	156	174	191	206	221	234	247	302	3490	427
d63	86	122	149	173	193	211	228	244	259	273	334	386	472
d75	92	130	159	184	206	225	243	260	276	291	356	411	503
d90	97	138	169	195	218	238	257	275	292	308	377	435	533
d110	104	147	180	208	233	255	275	294	312	329	403	465	570
d140	116	164	200	233	260	285	308	329	349	368	450	520	637

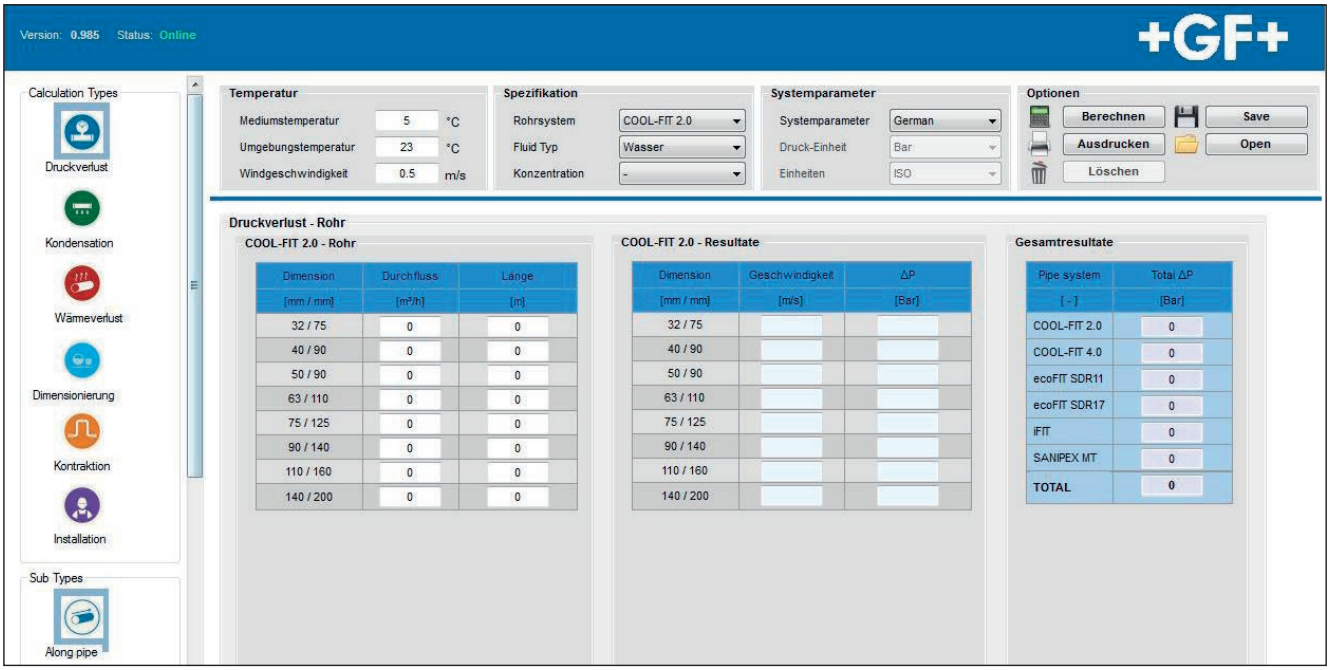
Pipe bracket distances



	d32	d40	d50	d63	d75	d90	d110	d140
Bracket distance (m) COOL-FIT 2.0	1.6	1.7	1.7	1.85	1.95	2.0	2.1	2.35

Values are valid independent of the ambient temperature.

COOL-FIT Calculation Tool



The GF Piping Systems Cooling Calculation Tool is used to support in the dimensioning and design of cooling systems.
The Cooling Calculation Tool handles:

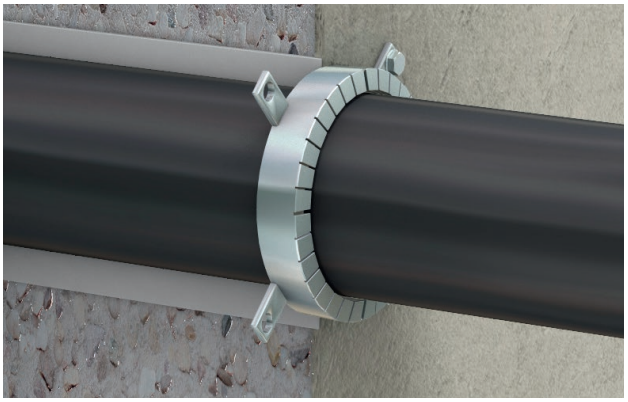
- Expansion, contraction
- Flexible section design
- Energy savings
- Pipe exterior temperature
- Pipe dimensioning
- Pressure loss
- Dew point/ insulation thickness
- Pipe bracket spacing
- Freezing time
- Weight comparison
- CO_2 footprint

Fire classes

	COOL-FIT 2.0	COOL-FIT 2.0 M	COOL-FIT 2.0/Mineral Wool[2)]
			
EN 13501-1	E	B s1 d0	$A2_L$
VKF	$RF3_{cr}$	RF2	RF1
BS 5422:2009 [1)]	National Class 3	National Class 0	National Class 0

[1)] Test method according to BS 476-6 and BS 476-7
[2)] Type: Rockwool 800

Firewall penetrations



COOL-FIT 2.0 pipes are tested and certified with ROKU® System AWM II of ROLF KUHN GmbH. They withstand the impact of fire, minimum at 120 minutes according to the DIN EN 1363-1 testing procedure.

Chemical resistance to cooling agents

COOL-FIT 2.0 can be used with various types of cooling agents, such as:

- Water
- Organic salt solutions
- Inorganic salt solutions
- Water-Glycol mixtures up to 50%
- Ice slurry

Refer to the GF Planning Fundamentals for more detailed information.

The easy connection

The state-of-the-art electrofusion technology is perfect for on-site jointing.

Electrofusion with GF Piping Systems

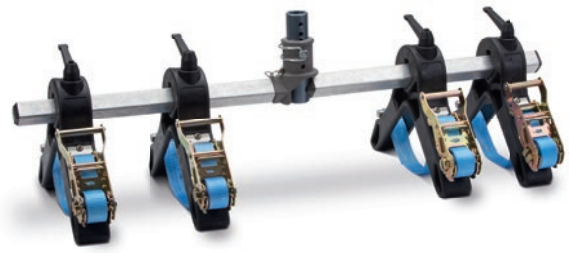
Electrofusion is a safe and reliable way to joint plastic piping systems. The installer only needs to connect the leads to the fitting, scan the bar code and leave the fusion process to the machine.
The electrofusion fittings are equipped with integrated resistance wires, which are supplied with electricity during the fusion process. Depending on the ambient temperature, the fusion time is automatically adjusted for the correct supply of energy. A soft start is applied to minimise the load on the power generator and fusion is carried out to completion. In case of anomalies, like inadequate input current or fitting wires fault, the machine stops immediately and informs the operator with a specific error message.

MSA electro fusion device

The MSA fusion devices can weld COOL-FIT 2.0 electrofusion fittings up to three times faster than welded steel joints. Risks to the surroundings caused by open flames simply do not exist. Fittings recognition through bar code scanning ensures the quality of the joint and due to recorded fusion parameters a high level of quality assurance is provided.
Its low weight of less than 12 kg allows simple handling.

Foam removal tool

COOL-FIT 2.0 pipes are supplied with free ends (non-insulated), ready for assembling and fusion with fittings. If a pipe needs to be cut to the desired length, the foam removal tool helps to remove the foam and outer jacket dust-free and in less than two minutes. At the same time it peels the surface of the media pipe in order to prepare it perfectly for the subsequent fusion process.



Pipe installation clamps

During the fusion process forces occur, causing the pipe to move out of the fitting. GF recommends to fix the assembly with COOL-FIT 2.0 installation clamps. They restrain the movement of the pipes and keep their alignment. Their reduced weights (less than 6kg) as well as their compact design allow easy overhead assemblies, even in narrow conditions.

Insert – Clamp – Weld – Done!

The jointing of COOL-FIT 2.0 pipes fittings and valves is very easy. The procedure takes just a few minutes and the GF Piping Systems MSA fusion devices ensure the quality of the joints.

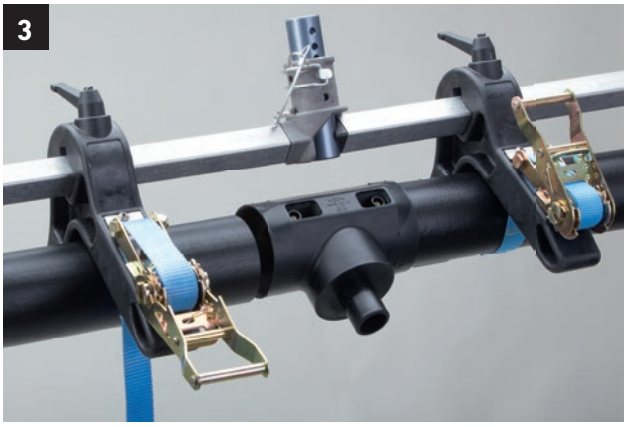
1

The GF foam removal tool helps to remove the foam and peel the pipe efficiently.

2

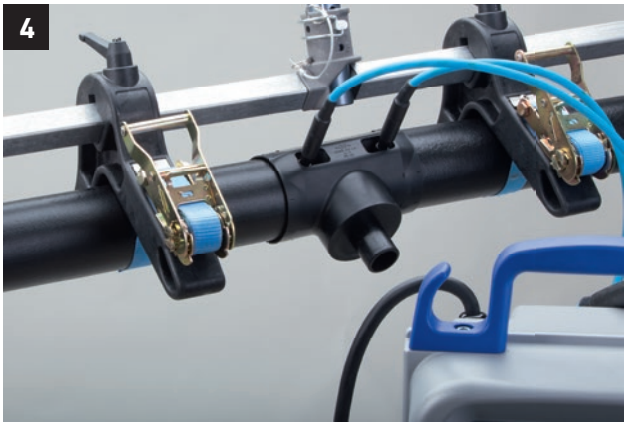
Clean pipe and fitting, then simply push pipe and fitting together.

3



Use the pipe installation clamps in order to avoid tensions during installation.

4



MSA welding devices ensure high quality jointings.

5

Check the system with a pressure test.

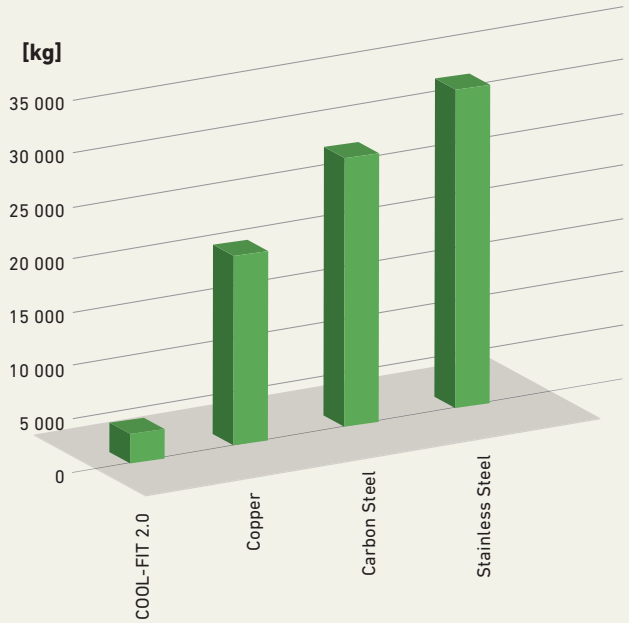
6

Seal the welding connectors with the attached insulation plugs - done!

Environmental efficiency

The use of COOL-FIT 2.0 has significant advantages compared to traditional post-insulated metal systems, particularly when it comes to CO_2 emissions or energy loss.

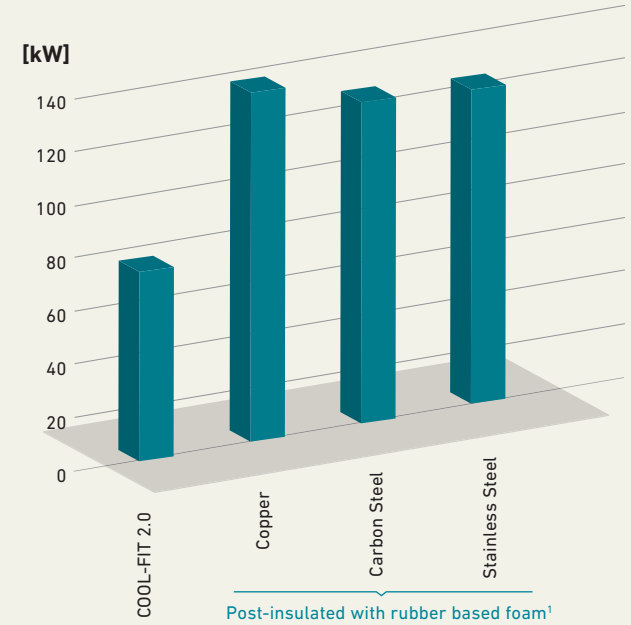
+ CO_2 emissions



A three story building with e.g. 123 offices would need a piping system of nearly 3000 metres for chilled water for the air conditioning.
The use of copper for the piping system equates to 17,5 tons of CO_2 equivalent, which would be reduced to nearly 5 tons by using COOL-FIT 2.0. This saving is equivalent to a 78 000 km journey with an average car.

12,5 tons
CO_2 saved

+ Total energy loss



Analyzing the energy loss on this same installation, COOL-FIT 2.0 is on average 35% more efficient compared to metal piping systems post-insulated with rubber based foam.

[1] "Life Cycle Analysis", conducted by the company ESU-services GmbH, Uster/ Switzerland (www.esu-services.ch) on behalf of Georg Fischer Piping Systems in 2008. Report available on www.gfps.com (Pioneering Green Solutions, GF Piping Systems)

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 14 500 employees in 32 countries. GF Piping Systems is a leading supplier of plastic and metal piping systems with global market presence. We offer corresponding pipes, fittings, valves, automation products and jointing technology for the treatment of water and chemicals, as well as for the safe distribution of liquids and gases.

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 and Beverage / Cooling
- Microelectronics
- Marine
- Water and Gas Utilities
- Water Treatment

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.

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.

Worldwide at home

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

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