



Polypropylene Welded Systems

Universal use, outstanding chemical and temperature resistance, easy to join by different welding technologies.

PROGEF Standard
PROGEF Plus
PROGEF Natural



PROGEF - more than just a System

The outstanding material for any challenge in industrial applications

We are dedicated to designing, manufacturing and marketing piping systems for the safe and secure treatment or conveyance of water, liquids, chemicals and gases. In close coordination with end-customers and based on their needs, GF Piping Systems introduced the PROGEF family, a specified polypropylene system based on certified raw material, serving a wide variety of industrial applications. Thanks to its beneficial mechanical properties, chemical resistance, outstanding weldability and especially its high resistance to thermal distortion, the PROGEF systems guarantee a maximum of safety, reliability and performance. A system of exceedingly compatible elements, being designed to be highly resistant to impact, abrasion, corrosion and many chemicals, which is thereby the ideal choice for any challenging application in chemical production or distribution processes or discerning applications in the field of water and wastewater treatment.



PROGEF Standard -

for a wide range of industrial applications

The highly resistant system offers numerous fields of application in industries. High stress fracture-, pressure-, abrasion-, corrosion- and temperature-resistance are only some of the advantageous characteristic properties for the durable polypropylene system. Its fine, homogeneous material structure furthermore offers outstanding weldability and low heat distortion.



PROGEF Plus -

for defined water qualities and clean applications

Cleaned and packed in specified processes, the silicone-free or oil-free PROGEF Plus system has a high pureness factor. The system is widely used in demanding applications, where features such as an outstanding surface finish and excellent leach-out characteristics offer additional benefit. The components are double-bagged to ensure cleanliness and prevent contamination before installation.



PROGEF Natural -

for e.g. laboratories and pharmaceutical applications

Wherever pure solutions are needed, especially for applications in chemical or life science industries, PROGEF Natural is predestined. Beneficial properties of the transparent, pigment-free polypropylene such as excellent clean, smooth surface, high chemical and temperature resistance, and additionally the bead and crevice free jointing technologies, ensure highest system quality.

Main Benefits:

Safety = Secure and fast delivery to the jobsite

Simplicity = Packed in batch sizes

Efficiency = Excellent cost-performance ratio on the highest quality level

Environment = Less energy input in the manufacturing process

Everything from one Source

PROGEF Welded Systems are ideally adapted to customer needs

As a leading piping systems provider with global presence, we offer our customers not only reliable and innovative products of highest quality, but we supply also tailor-made solutions from one source. With a comprehensive piping system solution, comprised of pipes, fittings, valves, related jointing as well as automation technologies in high quality thermoplastics, GF Piping Systems provides the right fit and quality for many industrial media conveyance systems and for many industrial applications. Whether installed above or below ground, our system meets any demanding requirement, in every phase of the project, worldwide. Therefore, the variety of our product portfolio is as diverse as our customers and their individual challenges. Together with high level services such as technical support, low- or single-item customizing production and training courses, our specific system range generates exceptional added value for our customers.

Individuality - from the planning stage to installation













Pipes

Fittings

Manual valves

Automation

Jointing technology

Customizing and training

Customizing

The focus of our worldwide located customizing teams is manufacturing custom parts for special systems. Standardized processes guarantee the highest level of quality.

Technical support

Technical support such as material selection is a key factor for a successful installation. A team of experts is available for individual support all around the world.

Technical documentation

Our extensive know-how of more than 50 years is fully documented in detail in our technical manuals, planning fundamentals and application guides.

Chemical resistance

In the area of chemical resistance our specialist teams offer individual support and advice in selecting the right material for the corresponding requirements.

Online and mobile calculation tools

Our numerous online and mobile calculation tools, available in many different languages, support our customers in configuring and commissioning automation products.

CAD library

The extensive CAD library is the most frequently used planning tool. The freely available database comprises over 30 000 drawings as well as technical data for our customers.

Training courses and on-site training

Offering a wide range of training courses we provide participants an excellent opportunity to gain confidence in working with our products and proven jointing technologies.

PROGEF systems lifetime warranty*

Confirming confidence in the premium quality of our polypropylene product and system range, we grant a limited system lifetime warranty.

^{*}Detailed information online: www.piping.georgfischer.com

PROGEF Standard and PROGEF Plus

System range

With a constant focus on maximum reliability and safety the PROGEF systems assure a sustained high level of product quality and outstanding performance standards in all applications. The clearly defined development and manufacturing processes of our worldwide specified systems are carried out on the basis of all relevant standards and specifications and are regularly audited and evaluated to achieve continuous improvement. Certified processes as well as product approvals are part of the active and sustainable quality management system of GF Piping Systems and makes us a reliable partner. Therefore, with our PROGEF welded system range, our customers can be assured that their needs are covered and comply with necessary standards.

Products			16	20	25	32	40	20	63	75	9.0	110	125	140	160	180	200	225	250	280	315	355	400	450	450	500	260	930
	SDR	DN PN	10	15	20	25	32	40	20	92	80	100	100	125	150	150	200	200	250	250	300	350	400	450	200	500	200	009
	7.4	16																										
Pipes	11	10																										
	17.6	6																										
Socket fusion fittings	11	10																										
Butt fusion fittings, Infrared (IR) compatible (up to d225 mm)	11	10																										
	17.6	6																										
Ball valves	11	10																										
	17.6	6																										
B: 1	11	10																										
Diaphragm valves	17.6	6																										
Butterfly valves		10																										
Control valves		10									ир	on r	eque	est														
Automation											ibou	req	ues	t														
Flanges PP-V/PP-steel																												
Flange seals EPDM/FPM																												
PROGEF Standard	F	ROGE	F Pl	us																								
. ROOL! Standard		NOOL		45																								

Socket fusion machine

Butt fusion machine

IR-fusion machine

PROGEF Standard and PROGEF Plus

System specification

* Standards:









	PROGEF Standard	PROGEF Plus
Material	- d16-d225 ß PP-H 100 (ß Polypropylene Homopolymer) - d250-d500 state-of-the-art PP	- d20-d225 ß PP-H 100 (ß Polypropylene Homopolymer) - d250-d315 state-of-the-art PP
Colour	RAL 7032	RAL 7032
Density	~ 0.90 g/cm³ (ISO 1183/ASTM D 792)	~0.90 g/cm³ (ISO 1183/ASTM D 792)
Thermal expansion coefficient	0.16mm/mK (DIN 53753)	0.16mm/mK (DIN 53753)
Thermal conductivity	0.23W/mK [EN 12664]	0.23W/mK [EN 12664]
Surface resistivity	> 1016 Ω (IEC 60093)	> 1016 Ω (IEC 60093)
Dimensions	d16-d500 in accordance to EN ISO 15494	d20-d315 in accordance to EN ISO 15494
Surface condition	accordance to EN ISO 15494	- Inner surface Ra ≤ 1.0 μm (39μin) for components d20−d110 - Inner surface Ra ≤ 1.5 μm (59μin) for components d125−d315
Material- and product- approvals	FDA CFR 21 177.1520 USP 25 class VI (physiological non-toxic) DIBt (Z-40.23-4, Z-40.34-264, Z - 40.23-265) DNV (K-2630, K - 2636) Loyd's Register (01/20030(E1))	FDA CFR 21 177.1520 USP 25 class VI (physiological non-toxic)
Packaging	pipes, fittings and valves bulk bagged	pipes, fittings and valves, each component double bagged
Marking	 brand name product description article number material dimensions standards and approvals 	 brand name product description article number material dimensions standards and approvals

*Approvals/













^{*} An overview of all standards and approvals is stated online: www.piping.georgfischer.com

PROGEF Natural

System range and specification

* Standards:









Products		d	20	25	32	40	20	63	75	06	110
Products	SDR	DN PN	15	20	25	32	40	20	9	80	100
Pipes	11	10									
, ipe5	17.6	6									
Butt fusion fittings, Infrared (IR)	11	10									
compatible	17.6	6									
Sanitary adapter	11	10									
Ball valves PP-Hbody	11	10									
Diaphragm valves PP-R body	11	6									
Diaphragm valves PP-H body		6									
Butterfly valves PP-H		10									
Cone check valves PP-H body	11	10									
Automation									upor	n requ	ıest
Flanges PP-V/ PP-steel											
Flange seals EPDM/FPM											
Butt fusion machine											
IR-fusion machine											
BCF-fusion machine											
PROGEE Natural											

	PROGEF Natural
Material	- d20-d110 PP-R (Polypropylene Random Copolymer)
Colour	pigment-free, transparent
Density	~ 0.90g/cm³ (ISO 1183/ASTM D 792)
Thermal expansion coefficient	0.15mm/m°K (DIN 53752)
Thermal conductivity	0.23W/mK (EN 12664)
Surface resistivity	> 1016 Ω (IEC 60093)
Dimensions	d20-d110 according to EN ISO 15494
Surface condition	Inner surface: Ra <u><</u> 1.0 µm (39µin)
Material- and product- approvals	FDA CFR 21 177.1520 USP 25 class VI (physiological non-toxic) Food conformity (D)
Packaging	pipes, fittings and valves, each component single bagged
Marking	 brand name product description article number material dimensions standards and approvals

PROGEF Natural







* Sanitary adaptor

Standards: ISO, DIN, ASME BPE, 3A, JIS

^{*} An overview of all standards and approvals is stated online: www.piping.georgfischer.com

Exceeding Welding Technologies for PROGEF Systems

A large diversity of innovative and intelligent welding solutions enriched with global training and service offerings

As a pioneer in the field, GF Piping Systems has always been placing a high priority on developing innovative jointing techniques to fulfill specific requirements and materials in use. Simplicity in application, chemical resistance, thermal stability and long-term weld strength are the key drivers in our jointing technologies. With a global jointing training program, international machine rental and a worldwide network of service centres, our customers benefit from expert know-how and practical experience.



Welding technology

Socket fusion – the strong connection

The strong, fast and easy solution to produce heavy-duty connections, in the workshop or the field.

Welding machine



Joint cross-section



Macro-image

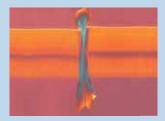


Butt fusion – the economical connection

Economical and flexible fusion especially for bigger diameters. From manual machines to full CNC control with traceability.







IR-Plus (Infrared) fusion – the fast, clean connection

Fast, repeatable and clean welds via non-contact heating. Full traceability of the welding process, with user guidance.







BCF-Plus fusion – the smooth connection

Bead and Crevice Free jointing with high welding factor, low stress, completely smooth with no intrusions in the fusion zone.







Exceeding Quality Standards

Technical specifications with focus on pressure-/temperature attributes



Raw material testing as an integral part in manufacturing to ensure system quality.



Highest test standards for inhouse product quality control in own laboratories.



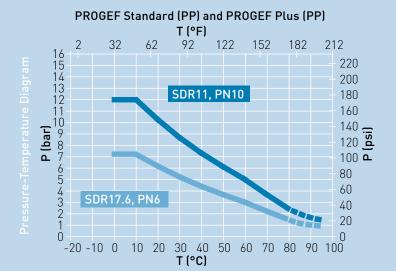
Welding quality tests on site close the extensive quality process.

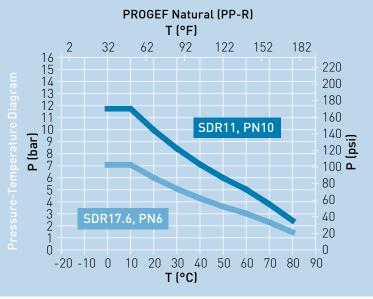
PROGEF Systems* Standard - Plus - Natural

PROGEF Systems out of polypropylene show excellent physical properties and mechanical characteristics, indicating its status as a highly versatile and universal solution. Having a high operational temperature range and ensuring outstanding chemical resistance, high abrasion resistance and high impact strength values, the material meets all requirements of demanding industrial conditions or environments.

Furthermore, properties such as low weight, low density, minimum internal stresses and an excellent smooth internal surface with high finish quality, make PROGEF systems a high-grade piping material.

According to the 10°C line in the hydrostatic strength curve for PP, a permissible pressure of 12.0 bar/7.4 bar in the temperature range of 0°C to +10°C for the SDR11/PN10 and SDR17.6/PN6 system can be applied.





The pressure-/temperature curve based on medium water, operating temperature of 20 $^{\circ}$ C, valid life time of 25 years and the design factor C = 2.

P Permissible pressure in bar, psi

T Temperature in °C (Celsius),
°F (Fahrenheit)

^{*} More information regarding technical specifications can be found online in our planning fundamentals: www.piping.georgfischer.com

Chemical Resistance

Polypropylene (PP) - a high quality material with outstanding characteristics for a safe and efficient operation







Chemical resistance at 20 °C (Applications can be very dependent on the concentration)			ally cryst ermoplas			phous plastics	Stainless Steel		
Media	Chemical Examples	PP	PE100	PVDF	PVC-U	PVC-C	1.4401 316	1.4301 304	
Oxidizing Acids	HNO ₃ ≤ 25 %	+	+	+	+	+	0	0	
(HNO ₃ , H ₂ CrO ₄ ,	25 % ≤ HNO ₃ ≤ 65 %	-	0	+	0	+	0	0	
H ₂ SO ₄ etc.)	H ₂ CrO ₄ aqueous solution	0	0	+	0	0	0	0	
	$H_2SO_4 \leq 70\%$	+	+	+	+	+	-	-	
	70% ≤ H ₂ SO ₄ ≤ 96%	-	-	+	+	+	-	-	
Non Oxidizing Acids	HCl ≤ 30 %	+	+	+	+	+	0	-	
(HCl, HF etc.)	HF ≤ 40 %	+	+	+	+	-	0	-	
	40 % ≤ HF ≤ 75 %	+	+	+	-	-	-	-	
Organic	HC00H ≤ 25 %	+	+	+	+	+	0	-	
(formic acid, acetic	$25\% \le HCOOH \le tech.$ pure	+	+	+	+	-	0	-	
acid, citric acid etc.)	CH ₃ COOH ≤ 50%	+	+	+	+	+	0	-	
	$50\% \le CH_3COOH \le tech. pure$	+	+	+	0	-	0	-	
	C ₃ H ₄ OH(COOH) ₃	+	+	+	+	+	0	-	
Bases	Inorganic (NaOH, KOH, etc.)	+	+	-	+	0	+	+	
	Organic (amine, imidazole etc.)	+	+	-	0	-	0	0	
Salts	NaCl, FeCl ₂ , FeCl ₃ , CaCl ₂ , etc.	+	+	+	+	+	0	0	
Halogens	Chlorine, bromine, iodine, (no fluorine)	-	-	0	0	0	0	-	
Fuels/Oils	Aliphatic hydrocarbons	0	0	+	+	0	+	+	
1 4013/ 0113	Aromatic hydrocarbons	-	-	+	-	-	+	+	
Solvents	Chlorinated hydrocarbons	-	-	0	-	-	0	0	
	Ketones	+	+	0	-	-	+	+	
	Alcohols	+	+	+	0	-	+	+	
	Esters	0	0	0	-	-	+	+	
	Aldehydes	+	+	-	-	-	+	+	
Phenols	Phenol, Cresol etc.	+	+	+	-	-	+	-	

⁺ resistant

Please note: The above list is only intended as a guideline and does not replace an indepth review of material suitability for the particular application. The information is based on our experience and is state of the art. These data are general indicators only. In practice, however, other factors such as concentration, pressure and jointing technology must also be taken into consideration. The technical data are not binding and are not expressly warranted characteristics of the goods.

o conditionally resistant, please consult us

⁻ not resistant

The Smarter Way of Automation

A unique system-based approach that bundles and integrates competencies, knowledge, best-in-class resources and technologies

With an innovative product portfolio in the field of measurement, control and actuation devices, GF Piping Systems follows its system approach consistently. The complete solution combines measurement, control and actuation technology together with high quality piping systems and therefore represents a unique form of product and competence bundling. The system-integrated devices that measure values such as temperature, pressure and flow deliver accuracy, productivity, reliability and safety to customers in a wide range of industries. Providing the entire range of automation technology from simple instrument panels to complex measurement installations, GF Piping Systems has not only the product resources and the technical know how, but also the global service and support infrastructure needed to meet the high customer requirements.



PROGEF Systems Applications

Leading applications enabled by safe and reliable systems adapted to fit the needs of demanding industries

GF Piping Systems develops customized best-in-class solutions, aligned to the specific requirements of our customers in various sectors of industry, enabling profitable operation. Most notably our systems are ideally suited for the water treatment, pharmaceutical and chemical process industry, in fields of microelectronics and energy as well as in food & beverage production. With our system knowledge and product expertise, we support our customers during the planning process, the sustainable realization of the projects and provide valuable added services. Expertise in developing and producing piping systems, combined with profound industry and market knowledge, based on longstanding experience, makes GF Piping Systems a qualified and professional partner for our customers.



Applications of Highest Security in Chemical Industry

The usage of PROGEF Standard systems in chemical processes strengthens the industries approach of manufacturing and conveying chemical media in the safest and at the same time most economical way.



Demanding Applications in Water Treatment

With PROGEF system, application processes in water treatment can be designed reliable and of highest efficiency. Thereby, challenges such as guaranteeing high water quality and assuring stringent regulations can be faced.



Clean Water Applications in Microelectronics

Wherever defined water qualities and controlled processes are required PROGEF Plus offers reliable and economical system solutions. With PROGEF Plus high purity water specifications and quality standards are dependably met.



Highly Specialised Applications in Energy Production

For secure processing in water and chemical applications PROGEF Standard system combines high performance utilization with outstanding material properties. This leads to a beneficial gain in conditions of safety and health.

GF Piping Systems - worldwide at home

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

www.piping.georgfischer.com



The technical data are not binding. They neither constitute expressly warranted characteristics nor quaranteed properties nor a quaranteed durability They are subject to modification. Our General Terms of Sale apply

Argentina/Southern South America

Georg Fischer Central Plastics Sudamérica S.R.L. Buenos Aires, Argentina Phone +5411 4512 02 90 gfcentral.ps.ar@georgfischer.com

George Fischer Pty Ltd Riverwood NSW 2210 Australia Phone +61(0)2 9502 8000 australia.ps@georgfischer.com www.georgfischer.com.au

Austria

Georg Fischer Rohrleitungssysteme GmbH 3130 Herzogenburg Phone +43(0)2782 856 43-0 austria.ps@georgfischer.com www.georgfischer.at

Belgium/Luxembourg

Georg Fischer NV/SA 1070 Bruxelles/Brüssel Phone +32(0)2 556 40 20 be.ps@georgfischer.com www.georgfischer.be

Brazil

Georg Fischer Sist. de Tub. Ltda. 04795-100 São Paulo Phone +55(0)11 5525 1311 br.ps@georgfischer.com www.georgfischer.com.br

Canada

Georg Fischer Piping Systems Ltd Mississauga, ON L5T 2B2 Phone +1(905)670 8005 +1(905)670 8513 ca.ps@georgfischer.com www.georgfischer.ca

Georg Fischer Piping Systems Ltd Shanghai Pudong, Shanghai 201319 Phone +86(0)21 58 13 33 33 china.ps@georgfischer.com www.georgfischer.cn

Denmark/Iceland

Georg Fischer A/S 2630 Taastrup Phone +45 (0)70 22 19 75 info.dk.ps@georgfischer.com www.georgfischer.dk

Georg Fischer AB 01510 VANTAA Phone +358 (0)9 586 58 25 +358 (0)9 586 58 29 info.fi.ps@georgfischer.com www.georgfischer.fi

Geora Fischer SAS 95932 Roissy Charles de Gaulle Cedex Phone +33(0)1 41 84 68 84 fr.ps@georgfischer.com www.georgfischer.fr

Georg Fischer GmbH 73095 Albershausen Phone +49(0)7161 302-0 info.de.ps@georgfischer.com www.georgfischer.de

Georg Fischer Piping Systems Ltd 400 076 Mumbai Phone +91 224007 2001 in.ps@georgfischer.com www.georgfischer.in

Italy

Georg Fischer S.p.A. 20063 Cernusco S/N (MI) Phone +3902 921 861 it.ps@georgfischer.com www.georgfischer.it

Georg Fischer Ltd 556-0011 Osaka, Phone +81(0)6 6635 2691 jp.ps@georgfischer.com www.georgfischer.jp

Georg Fischer Piping Systems 271-3 Seohyeon-dong Bundang-gu Seongnam-si, Gyeonggi-do Seoul 463-824 Phone +82 31 8017 1450 +82 31 8017 1454 kor.ps@georgfischer.com www.georgfischer.kr

George Fischer (M) Sdn. Bhd. 40460 Shah Alam, Selangor Darul Ehsan Phone +60 (0)3 5122 5585 my.ps@georgfischer.com www.georgfischer.my

Mexico/Northern Latin America

Georg Fischer S.A. de C.V. Apodaca, Nuevo Leon CP66636 Mexico Phone +52 (81)1340 8586 Fax +52 (81)1522 8906 mx.ps@georgfischer.com www.georgfischer.mx

Middle East

Georg Fischer Piping Systems (Switzerland) Ltd. Dubai, United Arab Emirates Phone +971 4 289 49 60 gcc.ps@georgfischer.con www.export.georgfischer.com

Netherlands

Georg Fischer N.V 8161 PA Epe Phone +31(0)578 678 222 nl.ps@georgfischer.com www.georgfischer.nl

Norway

Georg Fischer AS 1351 Rud Phone +47(0)67 18 29 00 no.ps@georgfischer.com www.georgfischer.no

Adding Quality to People's Lives

Georg Fischer Sp. z o.o. 05-090 Sekocin Nowy Phone +48(0)22 31 31 0 50 poland.ps@georgfischer.com www.georgfischer.pl

Romania

Georg Fischer Piping Systems (Switzerland) Ltd. 020257 Bucharest - Sector 2 Phone +40[0]21 230 53 80 ro.ps@georgfischer.com www.export.georgfischer.com

Georg Fischer Piping Systems (Switzerland) Ltd. Moscow 125047 Tel. +7 495 258 60 80 ru.ps@georgfischer.com www.georgfischer.ru

Singapore

George Fischer Pte Ltd 528 872 Singapore Phone +65(0)67 47 06 11 sgp.ps@georgfischer.com www.georgfischer.sg

Spain/Portugal

Georg Fischer S.A. 28046 Madrid Phone +34[0]91 781 98 90 es.ps@georgfischer.com www.georgfischer.es

Sweden

Georg Fischer AB 117 43 Stockholm Phone +46(0)8 506 775 00 info.se.ps@georgfischer.com www.georgfischer.se

Georg Fischer Rohrleitungssysteme (Schweiz) AG 8201 Schaffhausen Phone +41(0)52 631 30 26 ch.ps@georgfischer.com www.piping.georgfischer.ch

Taiwan

Georg Fischer Co., Ltd. San Chung Dist., New Taipei City Phone +886 2 8512 2822 Fax +886 2 8512 2823 www.georgfischer.tw

United Kingdom/Ireland

George Fischer Sales Limited Coventry, CV2 2ST Phone +44[0]2476 535 535 uk.ps@georgfischer.com www.georgfischer.co.uk

USA/Caribbean

Georg Fischer LLC Tustin, CA 92780-7258 Phone +1(714) 731 88 00 Toll Free 800 854 40 90 us.ps@georgfischer.com www.gfpiping.com

George Fischer Pte Ltd 136E Tran Vu, Ba Dinh District, Hanoi Phone +84 4 3715 3290 +84 4 3715 3285

International

Georg Fischer Piping Systems (Switzerland) Ltd. 8201 Schaffhausen/Switzerland Phone +41(0)52 631 30 03 +41(0)52 631 28 93 info.export@georgfischer.com www.export.georgfischer.com

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