

PROGEF

More than a system

Polypropylene welded system
for industrial applications



The system

PROGEF – more than 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. 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. 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.



+ Individuality – from the planning stage to installation

PROGEF Welded Systems are ideally adapted to customer needs

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.

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.

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.



Pipes



Fittings



Manual valves

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 in microelectronics or coating and surface treatment, 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 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.



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. Many formats are available.

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.

System lifetime warranty *

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



Automation



Jointing technology



Customizing and training

* Detailed information regarding the warranty can be found under: www.gfps.com - Planning fundamentals

System range

Everything from one source

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.

PROGEF Standard & PROGEF Plus

Products	SDR PN		d																										
	SDR	PN	DN 10	15	20	25	32	40	50	63	75	90	110	125	140	160	180	200	225	250	280	315	355	400	450	500	560	630	
Pipes	7.4	16																											
	11	10																											
	17.6	6																											
Socket fusion fittings	11	10																											
Butt fusion fittings, Infrared (IR) compatible	11	10																											
	17.6	6																											
Ball valves	11	10																											
	17.6	6																											
Diaphragm valves	11	10																											
	17.6	6																											
Butterfly valves		10																											
	11/17.6	10																											
Check vales		6																											
	11	10																											
Pressure regulating valves	11	10																											
Ventilating and bleed valve		10																											
Automation			varies between products																										
Flanges PP-V / PP-steel																													
Flange seals EPDM / FKM																													
Pipe clips PP / PE																													

Welding machines	d	16	20	25	32	40	50	63	75	90	110	125	140	160	180	200	225	250	280	315	355	400	450	450	500	560	630	
Socket fusion machines																												
Butt fusion machines																												
Infrared (IR) fusion machines																												

System specification



*** Standards:**



PROGEF Standard & PROGEF Plus

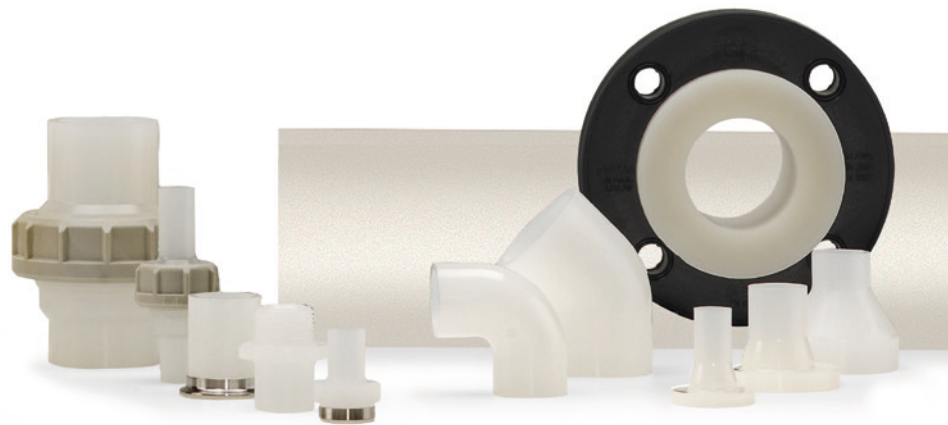
	PROGEF Standard	PROGEF Plus
Systems		
Material	- d16–d315 β PP-H 100 (β Polypropylene Homopolymer) - d355–d500 state-of-the-art PP	- d20–d315 β PP-H 100 (β Polypropylene Homopolymer)
Colour	RAL 7032	RAL 7032
Density	~ 0.90 g / cm ³ (ISO 1183 / ASTM D 792)	~0.90 g / cm ³ (ISO 1183/ASTM D 792)
Thermal expansion coefficient	0.16mm / mK (DIN 53752)	0.16mm / mK (DIN 53752)
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) Lloyd's Register (01/20030(E1)) UL94HB (horizontal burning)	FDA CFR 21 177.1520 USP 25 class VI (physiological non-toxic) UL94HB (horizontal burning)
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 / Acceptance:**



* The most significant standards and approvals are shown above. An overview of all approvals online: www.gfps.com

System range & system specification



* Standards:



PROGEF Natural

Products	SDR PN		d									
	DN	15	20	25	32	40	50	63	75	90	110	
Pipes	11 10											
	17.6 6											
Butt fusion fittings, Infrared (IR) compatible	11 10											
	17.6 6											
Sanitary adapter	11 10											
Ball valves PP-H body/PP-R	11 10											
Ball valves PP-H Flange connections		10										
Diaphragm valves PP-R	11 10											
Diaphragm valves PP-H Flange connections		10										
Butterfly valves PP-H		10										
Cone check vales PP-H body/PP-R	11 10											
Cone check vales PP-H Flange connections		10										
Automation												upon request
Flanges PP-V / PP-steel												
Flange seals EPDM / FKM												
Pipe clips PP / PE												

Welding machines	d	20	25	32	40	50	63	75	90	110
Butt fusion machines										
Infrared (IR) fusion machines										
BCF fusion machine										

System	PROGEF Natural
Material	d20-d110 PP-R (Polypropylene Random Copolymer)
Colour	pigment-free, transparent
Density	~ 0.90g / cm ³ (ISO 1183/ ASTM D 792)
Thermal expansion coefficient	0.16mm / mK (DIN 53752)
Thermal conductivity	0.23W / mK (EN 12664)
Surface resistivity	> 10 ¹⁶ Ω (IEC 60093)
Dimensions	d20-d110 according to EN ISO 15494
Surface condition	Inner surface: Ra < 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

* Approvals / Acceptance:



* Sanitary adaptor Standards:

ISO, DIN, ASME BPE, 3A, JIS

* The most significant standards and approvals are shown.

An overview of all approvals online: www.gfps.com

Joining methods

Proven technologies for your installation

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

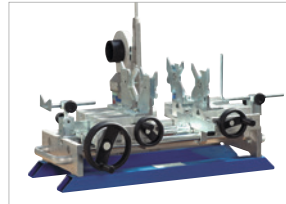
As a pioneer in the field, GF Piping Systems has always been placing a high priority on developing innovative joining techniques to fulfill specific requirements and materials in use. Simplicity in application, chemical resistance, thermal stability and long-term weld strength are the key drivers in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

Welding technology

Socket fusion – the strong connection

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

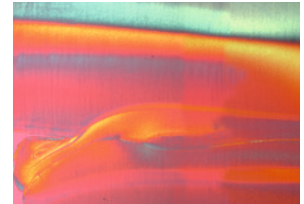
Welding machine



Joint cross-section

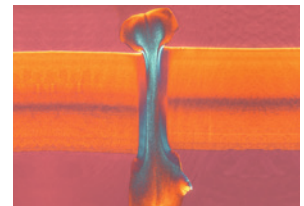


Macro-image



Butt fusion – the economical connection

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



IR- (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 the highest weld factor, lowest stress and completely smooth fusion zone without any intrusions.



For more information about training courses from GF Piping Systems please contact our local sales companies.

Specifications

Exceeding quality standards

Technical specifications with focus on pressure-/temperature attributes

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.

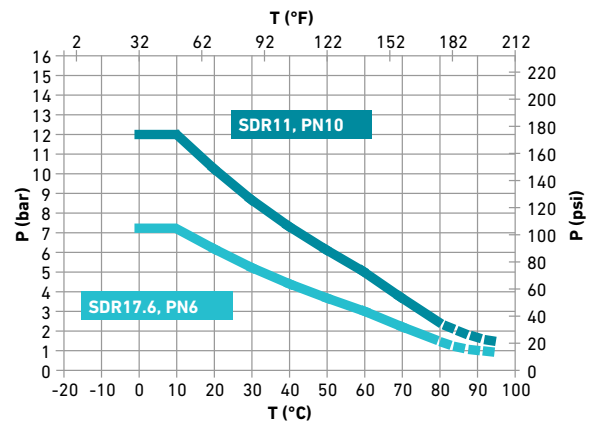
Furthermore, properties such as low weight, low density, minimum internal stresses and an excellent smooth internal surface with high finish quality, make PROGEF systems a high-grade piping material.

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.

- P Permissible pressure in bar, psi
- T Temperature in °C (Celsius), °F (Fahrenheit)

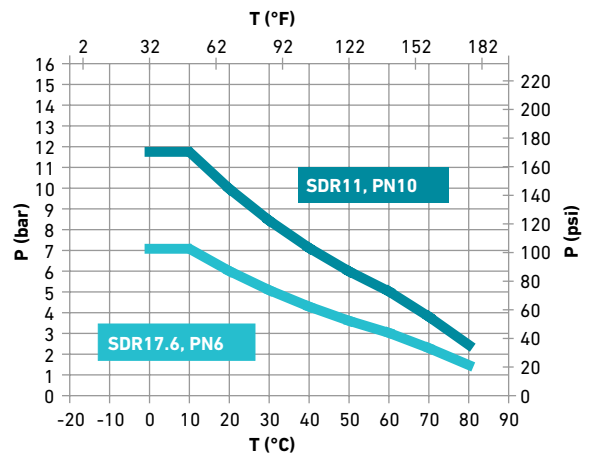
PROGEF Standard (PP) and PROGEF Plus (PP)

Pressure-Temperature Diagram



PROGEF Natural (PP-R)

Pressure-Temperature Diagram



The pressure-/temperature curve based on medium water, operating temperature of 20 °C, valid life time of 25 years and the design factor C = 2.

*More information regarding technical specifications can be found online in our planning fundamentals: www.gfps.com

Chemical resistance

For your operational safety



Professional material technology

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)

Media	Chemicals	Partially crystalline thermoplastics			Amorphous thermoplastics		Stainless Steel	
		PP	PE	PVDF	PVC-U	PVC-C	1.4401 316	1.4301 304
Oxidizing Acids (HNO ₃ , H ₂ CrO ₄ , H ₂ SO ₄ , etc.)	HNO ₃ ≤ 25 %	o	o	+	+	+	o	o
	25 % ≤ HNO ₃ ≤ 65 %	-	o	+	o	+	o	o
	H ₂ CrO ₄ aqueous solution	o	o	+	o	o	o	o
	H ₂ SO ₄ ≤ 70%	+	+	+	+	+	-	-
	70 % ≤ H ₂ SO ₄ ≤ 96 %	-	-	+	+	+	-	-
Non Oxidizing Acids (HCl, HF, etc.)	HCl ≤ 30 %	+	+	+	+	+	o	-
	HF ≤ 40 %	+	+	+	+	-	o	-
	40 % ≤ HF ≤ 75 %	+	+	+	-	-	-	-
Organic (formic acid, acetic acid, citric acid, etc.)	HCOOH ≤ 25 %	+	+	+	+	+	o	-
	25 % ≤ HCOOH ≤ tech. pure	+	+	+	+	-	o	-
	CH ₃ COOH ≤ 50 %	+	+	+	+	+	o	-
	50 % ≤ CH ₃ COOH ≤ tech. pure	+	+	+	o	-	o	-
Bases	C ₃ H ₄ OH (COOH) ₃	+	+	+	+	+	o	-
	Inorganic (NaOH, KOH, etc.)	+	+	-	+	o	+	+
Salts	Organic (amine, imidazole, etc.)	+	+	-	o	-	o	o
	NaCl, FeCl ₂ , FeCl ₃ , CaCl ₂ , etc.	+	+	+	+	+	o	o
Halogens	Chlorine, bromine, iodine, (no fluorine)	-	-	o	o	o	o	-
Fuels / Oils	Aliphatic hydrocarbons	o	o	+	+	o	+	+
	Aromatic hydrocarbons	-	-	+	-	-	+	+
	Chlorinated hydrocarbons	-	-	o	-	-	o	o
Solvents	Ketones	+	+	o	-	-	+	+
	Alcohols	+	+	+	o	-	+	+
	Esters	o	o	o	-	-	+	+
	Aldehydes	+	+	-	-	-	+	+
	Phenols	+	+	+	-	-	+	-

+ resistant o conditionally resistant, please consult us - not 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.

Please contact us for help in selecting the right materials.

The smarter way of automation

Automation made easy

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 consistently follows its system approach. The complete solution combines measurement, control and actuation technology together with high quality piping systems and represents a unique form of product and competence bundling. The system-integrated devices that measure values such as temperature, pressure and flow delivering 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 expertise, but also the global service and support infrastructure needed to meet the high customer requirements.



Applications

As versatile as your 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.



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.



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.



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.



Worldwide at home

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

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