

Uppgiftslämnaren reserverar sig för eventuella fel i produktinformationen eller felaktigt registrerade uppgifter och förbehåller sig rätten att korrigera och/eller komplettera produktinformation utan föregående avisering

1 GRUNDDATA

Varubeskrivning

Rör och rördelar av polypropen PP-H

Övriga upplysningar

Klassificeringar

ETIM ›	-EC003024 - Rördel med 2 anslutningar -EC003025 - Rördel med 3 anslutningar -EC003023 - Rördel med 1 anslutning -EC010256 - Flänskrage/Bordring -EC010882 - Plaströr slätt
BK04 ›	-20512 - Plaströrssystem industri
BSAB ›	-PB-.51 - Ledning av plaströr, tryckrör
UNSPSC ›	

Leverantörsuppgifter

Företagsnamn

Georg Fischer AB

Organisationsnummer

5560744285

Adress

Liljeholmstranden 5

Hemsida

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Miljökontaktperson

Namn

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Telefon

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2 HÅLLBARHETSARBETE

Företagets certifiering

- ISO 9000
- ISO 14000

Policys och riktlinjer

Affärsidé Georg Fischer AB:

Vi skall erbjuda våra kunder optimala och kostnadseffektiva tekniska lösningar, med produkter, tjänster och kundservice av hög kvalitet. Vi eftersträvar en marknadsledande position inom valda marknadssegment.

Vi arbetar med försäljning, sammansättning och marknadsföring av rörsystem för säker transport av vätskor och gaser.

Vi skall i vår verksamhet hushålla med naturens resurser.

3

INNEHÅLLSDEKLARATION

Kemisk produkt	Nej
Omfattas varan av RoHS-direktivet	Nej
Innehåller produkten tillsatt nanomaterial, som är medvetet tillsatta för att uppnå en viss funktion	Nej
Varans vikt	0,01 - 31,9 kg

Vara / Delkomponenter

Koncentrationen har beräknats på hela varan

Ingående material /komponenter	Vikt-% i komponent	CAS-nr (alt legering)	EG-nr (alt legering)	Vikt % i produkt	Kommentar
Färgämne		Övrigt, kemikalier		1%	Pigment (ej kadmiumhaltiga) för ändamålet godkända
Polypropen (PP)		9003-07-0		99%	

Del av materialinnehållet som är deklarerat 100%

Särskilt farliga ämnen

Varan innehåller INTE några ämnen med särskilt farliga egenskaper (Substances of very high concern, SVHC-ämnen) som finns med på kandidatförteckningen i en koncentration som överstiger 0,1 vikts-%

Utgåva av kandidatförteckningen som har använts

2020-01-16 00:00:00

Övrigt

Ämnen är redovisade ned till 0.01 viktprocent enligt iBVDs redovisningskrav. Eventuell avvikelse från redovisningskraven redovisas nedan

4

RÅVAROR

Återvunnet material

Innehåller varan återvunnet material: Nej

Träråvara

Träråvara ingår i varan: Nej

5

MILJÖPÅVERKAN

Finns en miljövarudeklaration framtagen enligt EN15804 eller ISO14025 för varan

Ja

Finns annan miljövarudeklaration

Nej

6

DISTRIBUTION

Beskrivning av emballagehantering för distribution av varan

Produkterna levereras till grossist i fulla kartonger

7

BYGGSCKEDET

Ställer varan särskilda krav vid lagring?

Ja

Förvaras i originalförpackning, iakttag följande:

-Konstant lagringstemperatur ej över +30°C

-Skydda mot ljus, speciellt solljus

Ställer varan särskilda krav på omgivande byggvaror?

Nej

8

BRUKSSKEDET

Finns skötselanvisningar/skötselråd?

Nej

Finns en energimärkning enligt energimärkningsdirektivet (2010/30/EU) för varan?

Ej relevant

9

RIVNING

Kräver varan särskilda åtgärder för skydd av hälsa och miljö vid rivning/demontering? Nej

10

AVFALLSHANTERING

Omfattas den levererade varan av förordningen (2014:1075) om producentansvar för elektriska och elektroniska produkter när den blir avfall? Nej

Är återanvändning möjlig för hela eller delar av varan? Ja

Plaströrsbranschen har eget återvinningssystem.

Är materialåtervinning möjlig för hela eller delar av varan? Nej

Är energiåtervinning möjlig för hela eller delar av varan? Ja

Brännbart material

Har leverantören restriktioner och rekommendationer för återanvändning, material- eller energiåtervinning eller deponering? Ja

Plaströrsbranschen har eget återvinningssystem.

När den levererade varan blir avfall, klassas den då som farligt avfall? Nej

Avfallskod (EWC) för den levererade varan 170101

RSK-nummer	Eget Artikel-nr	GTIN
280 10 18	167480710	
280 10 19	167480711	
280 10 20	167480712	
280 10 21	167480713	
280 10 22	167480714	
280 10 23	167480715	
280 10 24	167480716	
280 10 25	167480717	
280 10 26	167480718	
280 10 27	167480719	
280 10 28	167480720	
280 10 29	167480721	
280 10 30	167480722	
280 10 31	727960114	
280 10 32	727910205	
280 10 33	727910433	
280 10 34	727510172	
280 10 35	727510173	
280 10 36	727510174	
280 10 37	727960406	
280 10 38	727960407	
280 10 39	727960408	
280 10 40	727960409	
280 10 41	727960410	
280 10 42	727960411	
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Produktdatablad	gfps-6218-brochure-progef-system-en.pdf
Prestandadeklaration	gfps-system-specification-progef-standard-pp-en.pdf
Säkerhetsblad	
Miljövarudeklaration	EPD PP System (pdf_ June 2014).pdf
Skötselansvisning	

Övriga bifogade dokument

-2019-04-17_EC_declaration of conformity to PED_all languages_signed.pdf

Environmental Product Declaration

PP-System

According to EN 15804

Chemical conveyance

1. Declaration of general information

1.1 Introduction

GF Piping Systems is one of the three divisions within Georg Fischer Corporation and a leading provider of plastic and metal piping systems with global market presence. The product portfolio includes pipes, fittings, valves and the corresponding automation and jointing technology for industry, building technology as well as water and gas utilities. Georg Fischer Piping Systems proactively incorporates its environmental responsibility into its everyday business activities. Because we understand environmental awareness as one of the corporation's core values, internal structures and processes are geared towards sustainability. In this context, life cycle assessments are the correct tool to gain insight in the different life cycle phases of our systems.

This EPD is based on a detailed background report written by the Flemish Institute for technological research (Vito). The report is in line with EN 15804 "Sustainability of construction works – environmental product declarations – Core rules for the product category of construction products". The data of the study complies with the quality requirements set out in EN 15804 (EN 15804+A1:2013, Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products). Data regarding the production of the pipe system components is company specific and was provided by GF Piping Systems.

Declaration

Declaration owner & Program operator's name	Georg Fischer Piping Systems Ltd.
Validity	01.06.2014 – 31.05.2019
Declaration Number	GFPS-EPD_1406-4_4
EPD-Type	Cradle to grave
Data calculated by	Vito NV (Flemish Institute for technological research) www.vito.be
Life Cycle Inventory (LCI) source for generic background processes	Ecoinvent v 2.2 (2010, updated August 2012)
Software	SimaPro 7.3.3

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1.2 System

The analyzed case represents an exemplary system for the transport of chemicals in an aluminium pickling plant. The system is designed in the dimension d63 and installed in Leipzig (Germany). Flange connections and infrared welding are used for the jointing.



- ① PROGEF Standard butterfly valve type 567
- ② PROGEF Standard check valve type 561
- ③ Centrifugal pump
- ④ 2350 Temperature sensor
- ⑤ 2551 Magmeter flow sensor
- ⑥ PROGEF Standard ball valve type 131
- ⑦ PROGEF Standard ball valve type 546
- ⑧ 2819 Conductivity/resistivity electrode
- ⑨ 2724 pH/ORP electrode
- ⑩ 2536 Rotor-X paddlewheel flow sensor

Materials

The material of the main pipe system components (pipes and fittings) is PP. The whole system consists of the materials as listed below.

Material	Weight (kg)
PP	39.2
Plastics (other than PP)	9.0
Steel	10.8
Rubber	0.4
Other materials	0.3
Cable (metal + plastics)	0.4 + 1.4
Pump	Plastics 4.5
	Other materials 4.2
Motor	Various materials 9.0

Reference service life time

25 years

Please refer to chapters 2.3 for further information on the reference service life time of the system.

Functional unit (FU)

The transportation of 1.5% sulphuric acid with 250 ppm hydrofluoric acid in a 30 m long piping system (d63) in an aluminium pickling plant over the whole service life time of 25 years. The transport starts from the delivery with a flange connection and ends at the process entry point.

Components of the system (number of pieces or meter)

The system mainly consists of Georg Fischer Piping Systems components. However, to complete the system also external components (Ext.) are necessary which are not produced by Georg Fischer Piping Systems. The calculation of the environmental impact of these products is based on publicly available data and assumptions.

	Product Code	Pieces or meter	Material
System components			
PROGEF Standard pipe, d63	167480716	30 m	PP-H
PROGEF Standard tee 90° equal, d63	727208511	3	PP-H
PROGEF Standard elbow 90°, d63	727108511	6	PP-H
PROGEF Standard union, d63	727518511	4	PP-H
PROGEF Standard reducer, d63/d32	727908560	1	PP-H
PROGEF Standard socket equal, d63	727910111	8	PP-H
PROGEF Standard flange adaptor, d63	727798711	10	PP-H
Backing flange, d63	727700411	10	PPGF30
O-Ring gasket, d63	748410013	6	EPDM
PROGEF Standard butterfly valve type 567, d63	167567802	2	PP-H (body) and others
PROGEF Standard check valve type 561, d63	167561087	1	PP-H (body) and others
PROGEF Standard ball valve type 131, d63	199131368	1	PP-H (body) and others
PROGEF Standard ball valve type 546, d63	167546447	2	PP-H (body) and others
2350 Temperature sensor	159000920	1	PVDF (sensor housing) and others
2551 Magmeter flow sensor	159001110	2	PP (sensor body) and others
2819 Conductivity/resistivity electrode	198844010	1	Stainless steel (electrode) and others
2724 pH/ORP electrode	159001545	1	PPS (sensor body) and others
2536 Rotor-X paddlewheel flow sensor	198840143	1	PPGF30 (sensor body) and others
8900 Multi parameter controller	159000868	1	PBT (housing) and others
PROGEF Standard gauge guard type Z700	199041003	1	PP-H (body) and others
Centrifugal pump	Ext.	1	Various metals and others
Cable	Ext.	36.2 m	Copper and others

Components for installation

Bolts	Ext.	40	Stainless steel
Nuts	Ext.	64	Stainless steel
Washers	Ext.	64	Stainless steel
Brackets	Ext.	25	PP

1.3 Comparability

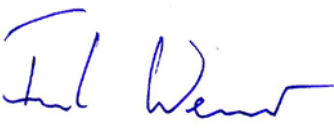
EPDs of construction products may not be comparable if they do not comply with the EN 15804.

1.4 Demonstration of verification

CEN standard EN 15804 serves as core PCR.

Independent verification of the declaration, according to EN ISO 14025:2010

internal
 external

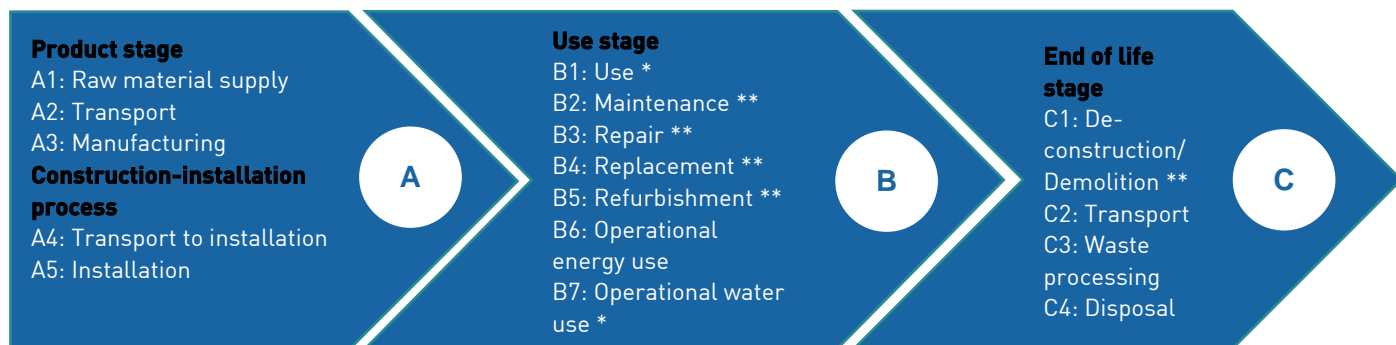


Dr. Frank Werner

Company: Dr. Frank Werner Umwelt & Entwicklung, Zürich (Switzerland)








2. Declaration of environmental parameters derived from LCA

2.1 Flow diagram of the processes included in the LCA



* Stage not relevant, ** Environmental impact below cut-off criteria. Please refer to chapter 2.3 for details.

2.2 Parameters describing environmental impacts

Impact category		Global warming	Ozone depletion	Acidification of soil and water	Eutrophication	Photo-chemical ozone creation	Abiotic depletion - non fossil	Abiotic depletion - fossil
								
		kg CO ₂ eq	kg CFC-11 eq	kg SO ₂ eq	kg PO ₄ ³⁻ eq	kg C ₂ H ₄ eq	kg Sb eq	MJ
A1-3	Product stage	4.22E+02	2.17E-03	3.04E+00	4.85E-01	1.74E-01	5.42E-02	6.41E+03
A4	Transport to installation	3.14E+01	4.16E-06	1.32E-01	2.40E-02	5.10E-03	3.68E-05	4.39E+02
A5	Installation	4.38E+00	2.79E-07	9.63E-03	2.46E-03	1.41E-01	1.48E-05	6.47E+01
B1-5	Use, Maintenance, Repair, Replacement, Refurbishment	0	0	0	0	0	0	0
B6	Operational energy use	6.57E+04	3.10E-03	2.67E+02	3.85E+01	1.20E+01	1.72E-01	7.57E+05
B7	Operational water use	0	0	0	0	0	0	0
C1	De-construction/ Demolition	0	0	0	0	0	0	0
C2	Transport to end-of-life treatment	4.61E+00	7.24E-07	2.54E-02	5.22E-03	7.61E-04	2.99E-05	6.73E+01
C3	Waste processing	2.61E+02	2.21E-07	3.08E-02	6.67E-03	1.13E-03	1.02E-05	2.83E+01
C4	Disposal	0	0	0	0	0	0	0

2.3 Scenarios and additional technical information

The analyzed case represents an exemplary system for the transport of chemicals in an aluminium pickling plant.

Product stage	
A1	The production of the plastic raw material was modeled by generic European data (source: ecoinvent) and complemented by specific data from GF Piping Systems to consider the company specific formulation of the raw material.
A2	Wherever possible, the specific transport distances were taken into account. Data from ecoinvent with the respective parameters was used to model the transportation.
A3	The use of energy is the most important input for this process step. Pipes are extruded while fittings and valve parts are injection moulded. Each of GF Piping Systems' worldwide production sites is certified according to ISO 14001 (Environmental management systems) and to OHSAS 18001 (Occupational health and safety management systems) or is currently in the certification process. For the production of GF Piping Systems components, electricity mixes for the respective country/continent was used. The production of external products was modeled using generic ecoinvent data records for the process.
Construction process	
A4	The system is installed in Leipzig (Germany). Pipes are transported over a distance of 350 km by means of a truck. Valves and measuring instruments are first transported to storage: measuring instruments via air freight (ecoinvent data record: Transport, aircraft, freight, intercontinental, RER U) over 5 000 km; valves via truck over 150 km. Afterwards these components as well as fittings, bolts, nuts, washers and brackets are transported to the installation site by truck over 600 km. The pump and the gauge guard are also transported by truck over 480 km and 540 km respectively to the installation site. For all transportations via truck the ecoinvent data record "Transport, lorry > 16 t, fleet average/RER U) was used. Loading capacity is 60%.
A5	For the installation of the whole system 1.8 kWh welding energy is needed (Electricity, low voltage, production RER, at grid/RER U). Outputs of the complete installation of the system are PP pipe cut-off (0.2 kg/FU) and packaging waste (3.9 kg/FU) whereof 88% is cardboard. Wood and cardboard are recycled; PE film, nylon belts and PP straps are incinerated. Transport distance to recycling is assumed to be 600 km, transport to incineration is 150 km. Transport is carried out by truck.
Use stage	
B1	There are no further environmental impacts arising from the use of the systems. This stage is considered as not relevant.
B2-B5	The system is designed to be operated without repair, maintenance, replacement or refurbishment during the reference service life time. This is subject to the condition that the system is operated according to the specifications given by GF Piping Systems. The lifetime of a valve is mainly influenced by the actuation cycles. The number of actuation cycles the valves are tested for is not reached during the life time of the evaluated system. It is possible that in individual cases components of the valve (e.g. seals) must be replaced. In this case the environmental impact is negligible compared to the impact of the whole system and below the cut-off criteria defined in EN 15804.
B6	The operational use of the system is an important stage mainly because of the long reference service life time of 25 years. 117 000 kWh of energy (ecoinvent dataset: Electricity, low voltage, production RER, at grid/RER U) per functional unit is necessary to run the pump.
B7	No operational water use is necessary for the system. This stage is considered as not relevant.
End of life stage	
C1	A small energy input is needed to cut the pipe into smaller pieces. The environmental impact is negligible compared to the impact of the whole system and below the cut-off criteria defined in EN 15804.
C2	Transportation to the end of life treatment facilities is carried out by truck. Distances are 600 km for recycling and 150 km for incineration.
C3	It is assumed that all metal parts are recycled and all other parts are incinerated with energy recovery. The exported energy is in the form of electricity and thermal energy. Approximately 11.5% of the net energy content of the incinerated waste is converted to electricity and 23.4% is converted to heat. Both are sold to external consumers. These values reflect the situation in Swiss municipal waste incinerators about 10 years ago, as reported in ecoinvent documentation.
C4	It is assumed that all metal parts are recycled and all other parts are incinerated with energy recovery. Therefore module C4 is not relevant.

Reference service life data

Parameter	Data						
Reference Service Life	25 years						
	System components are compliant with relevant international standards, e.g. <ul style="list-style-type: none"> • EN (European Standards) • ISO (International Organization for Standardization) • DVS (German Welding Society) • DIN (German Institute for Standardization) 						
Declared product properties	Most relevant standards are: <table border="0"> <tr> <td>ISO 15494</td> <td>Plastics piping systems for industrial applications - Polybutene (PB), Polyethylene (PE) and Polypropylene (PP) - Specifications for components and the system</td> </tr> <tr> <td>ISO 16138</td> <td>Industrial valves -- Diaphragm valves of thermoplastics materials</td> </tr> <tr> <td>ISO 16135</td> <td>Industrial valves -- Ball valves of thermoplastics materials</td> </tr> </table>	ISO 15494	Plastics piping systems for industrial applications - Polybutene (PB), Polyethylene (PE) and Polypropylene (PP) - Specifications for components and the system	ISO 16138	Industrial valves -- Diaphragm valves of thermoplastics materials	ISO 16135	Industrial valves -- Ball valves of thermoplastics materials
ISO 15494	Plastics piping systems for industrial applications - Polybutene (PB), Polyethylene (PE) and Polypropylene (PP) - Specifications for components and the system						
ISO 16138	Industrial valves -- Diaphragm valves of thermoplastics materials						
ISO 16135	Industrial valves -- Ball valves of thermoplastics materials						

	PP characteristics	Value	Test standard
	Operating temperature range	-10 °C to + 95 °C	
	Density	0.90 - 0.91 g/cm ³	EN ISO 1183 - 1
	Yield Stress at 23 °C	31 N/mm ²	EN ISO 527 - 1
	Tensile e-modulus at 23 °C	1300 N/mm ²	EN ISO 527 - 1
	Charpy notched impact strength at 23 °C	85 kJ/m ²	EN ISO 179 - 1/1eA
	Charpy notched impact strength at 0 °C	4.8 kJ/m ²	EN ISO 179 - 1/1eA
	Ball indentation hardness (132N)	58 MPa	EN ISO 2039 - 1
Design application parameters	Heat distortion temperature HDT B 0.45 MPa	95 °C	EN ISO 75 - 2
	Crystallite melting point	150 °C - 167 °C	DIN 51007
	Heat conductivity at 23 °C	0.23 W/m K	EN 12664
	Water absorption at 23 °C	0.1%	EN ISO 62
	Limited oxygen index (LOI)	19%	ISO 4589 - 1

For more information, please refer to the planning fundamentals which are available at: gfps.com > [Support & Services](#) > [Planning Assistance](#) > [Planning Fundamentals](#) > [Industrial Piping Systems](#)

Assumed quality of work	<ul style="list-style-type: none"> • Wide operating temperature range • High chemical resistance • No corrosion and no incrustation reduces maintenance to a minimum
Indoor environment	The system is installed in Leipzig, Germany. Standard indoor conditions apply. <ul style="list-style-type: none"> • SDR 11 • PN 10
Usage conditions	<ul style="list-style-type: none"> • Flow rate 2 m/s
Maintenance	The system is designed to be operated without repair, maintenance, replacement or refurbishment. This is subject to the condition that the system is installed and operated according to the specifications given by GF Piping Systems.

2.4 Parameters describing resource use

Parameters describing resource use, primary energy		Product stage	Construction process stage		Use stage			End of life			
		Total (of product stage)	Transport	Construction installation process	Use, Maintenance, Repair, Replacement, Refurbishment	Operational energy use	Operational water use	De-construction / Demolition	Transport	Waste processing	Disposal
		A1-3	A4	A5	B1-B5	B6	B7	C1	C2	C3	C4
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ, net calorific value	4.33E+02	2.62E+00	2.49E+00	0	1.18E+05	0	0	1.54E+00	1.59E+00	0
Use of renewable primary energy resources used as raw materials		6.24E+01	0	8.92E-02	0	0	0	0	0	0	0
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)		4.96E+02	2.62E+00	2.58E+00	0	1.18E+05	0	0	1.54E+00	1.59E+00	0
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials		5.94E+03	4.52E+02	6.66E+01	0	1.27E+06	0	0	7.46E+01	3.65E+01	0
Use of non-renewable primary energy resources used as raw materials		1.79E+03	0	7.22E+00	0	0	0	0	0	0	0
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)		7.73E+03	4.52E+02	7.38E+01	0	1.27E+06	0	0	7.46E+01	3.65E+01	0

Parameters describing resource use, secondary materials and fuels, and use of water		Product stage	Construction process stage		Use stage			End of life			
		Total (of product stage)	Transport	Construction installation process	Use, Maintenance, Repair, Replacement, Refurbishment	Operational energy use	Operational water use	De-construction / Demolition	Transport	Waste processing	Disposal
		A1-3	A4	A5	B1-B5	B6	B7	C1	C2	C3	C4
Use of secondary material*	kg	0	0	0	0	0	0	0	0	0	0
Use of renewable secondary fuels*	MJ, net calorific value	0	0	0	0	0	0	0	0	0	0
Use of non-renewable secondary fuels*	MJ, net calorific value	0	0	0	0	0	0	0	0	0	0
Net use of fresh water	m ³	4.85E+00	5.80E-02	1.67E-02	0	5.21E+02	0	0	2.03E-02	1.28E-01	0

*Only for foreground process from which LCI data are made available by GF Piping Systems - the number does not include processes and materials modelled by means of background data, e.g. transportation, electricity, ancillary materials, etc.

2.5 Environmental information describing output flows

Other environmental information describing output flows		Product stage	Construction process stage			Use stage			End of life		
		Total (of product stage)	Transport	Construction installation process	Use, Maintenance, Repair, Replacement, Refurbishment	Operational energy use	Operational water use	De-construction / Demolition	Transport	Waste processing	Disposal
		A1-3	A4	A5	B1-B5	B6	B7	C1	C2	C3	C4
Components for re-use*	kg	0	0	0	0	0	0	0	0	0	0
Materials for recycling*	kg	4.09E+00	0	3.87E+00	0	0	0	0	0	2.24E+01	0
Materials for energy recovery*	kg	0	0	0	0	0	0	0	0	0	0
Exported energy - electricity*	MJ per energy carrier	1.53E+00	0	1.14E+00	0	0	0	0	0	2.03E+02	0
Exported energy - thermal energy*	MJ per energy carrier	3.23E+00	0	2.22E+00	0	0	0	0	0	1.26E+01	0

*Only for foreground process from which LCI data are made available by GF Piping Systems - the number does not include processes and materials modelled by means of background data, e.g. transportation, electricity, ancillary materials, etc.

Other environmental information describing waste categories		Product stage	Construction process stage			Use stage			End of life		
		Total (of product stage)	Transport	Construction installation process	Use, Maintenance, Repair, Replacement, Refurbishment	Operational energy use	Operational water use	De-construction / Demolition	Transport	Waste processing	Disposal
		A1-3	A4	A5	B1-B5	B6	B7	C1	C2	C3	C4
Hazardous waste disposed	kg	6.61E-02	2.52E-04	5.26E-05	0	1.56E+00	0	0	7.41E-05	1.93E-04	0
Non-hazardous waste disposed		1.33E+02	8.06E-01	1.85E-01	0	1.90E+03	0	0	4.84E-01	5.49E+00	0
Radioactive waste disposed		1.50E-02	1.77E-04	1.46E-04	0	7.25E+00	0	0	9.88E-05	1.15E-04	0

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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

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										
	11	10	DN	15	20	25	32	40	50	63	75	90	110
Pipes	17.6	6											
Butt fusion fittings, Infrared (IR) compatible	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.

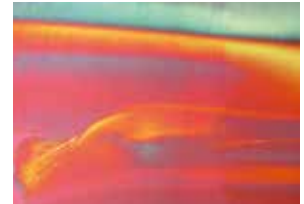
Welding machine



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.

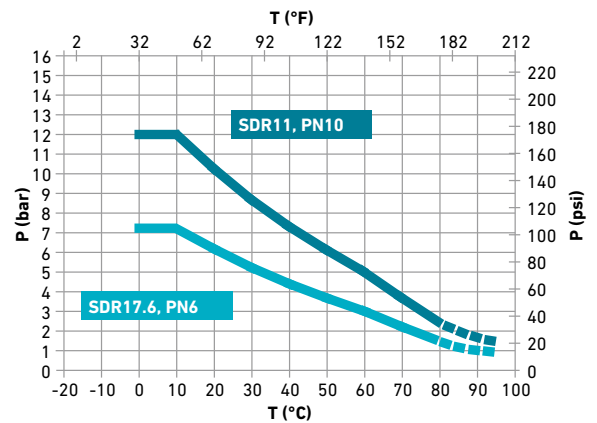
Furthermore, properties such as low weight, low density, minimum internal stresses and an excellent smooth internal surface with high finish quality, make PROGEF systems a high-grade piping material.

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)

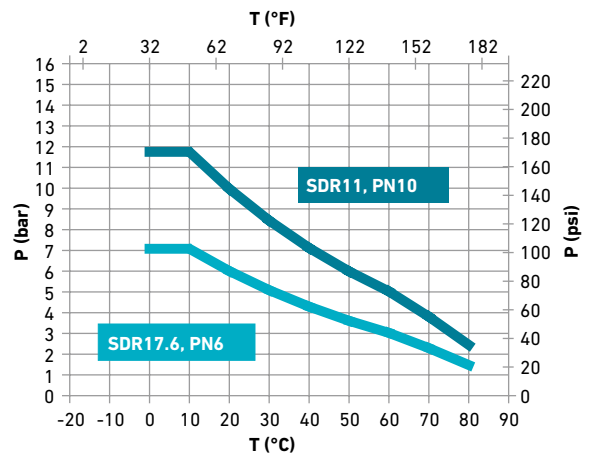
PROGEF Standard (PP) and PROGEF Plus (PP)

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	+	+
	Organic (amine, imidazole, etc.)	+	+	-	o	-	o	o
Salts	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	Phenol, Cresol, etc.	+	+	+	-	-	+

+ 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.



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- System Specification - for PROGEF Standard Piping Systems in Polypropylene (PP)

1. Scope

This specification covers the requirements of the PROGEF Standard (PP) Piping Systems intended for a wide range of applications including water, wastewater and effluent treatment as well as a wide range of chemical applications. The complied standards by piping systems of the PROGEF Standard (PP) piping systems will be described in the following.

2. Basic System Data

2.1 Material Specification for PROGEF Standard (PP) System

All **PROGEF Standard (PP)** pipes, fittings and valves from GF Piping Systems are manufactured either from isotactic Polypropylene Homopolymeride **β-PP-H** or from Polypropylene random co-polymeride **PP-R** with a value of MRS 10 MPa, which pipes and fittings are designed for 25 years operational life with water at 20°C. The material is designed for use with pressure bearing piping systems with long-term hydrostatic properties in accordance with EN ISO 15494, as supplied by GF Piping Systems.

2.2 Characteristics of PROGEF Standard (PP) Material

Characteristics	β-PP-H	PP-R	Units	Standard
Density	0.90-0.91		g/cm ³	EN ISO 1183-1
Yield stress at 23°C	31	25	N/mm ²	EN ISO 527-1
Flexural E-Modulus at 23°C	1300	900	N/mm ²	EN ISO 527-1
Charpy notched impact strength at 23°C	50	20	kJ/m ²	EN ISO 179-1/1eA
Charpy notched impact strength at 0°C	4.8	3.4	kJ/m ²	EN ISO 179-1/1eA
Ball indentation hardness (132N)	58	49	MPa	EN ISO 2039-1
Heat distortion temperature HDT B 0,45 MPa	95	75	°C	EN ISO 75-2
Crystallite melting point	150-167	145-150	°C	DIN 51007
Thermal expansion coefficient	0.16...0.18		mm/mK	DIN 53752
Heat conductivity at 23°C	0.23		W/mK	EN 12664
Water absorption at 23°C	0.1		%	EN ISO 62
Colour	Neutral /RAL7032			
Limiting oxygen index (LOI)	19		%	ISO4589-1

2.3 PROGEF Standard (PP) Product Range

Products	SDR	PN	d16 DN10	d20 DN15	d25 DN20	d32 DN25	d40 DN32	d50 DN40	d63 DN50	d75 DN65	d90 DN80	d110 DN100	d125 DN100	d140 DN125	d160 DN150	d200 DN200	d225 DN200	d250 DN250	d280 DN250	d315 DN300	d355 DN350	d400 DN400	d450 DN450	d450 DN500	d500 DN500	d560 DN600	d630 DN600																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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available

For more technical information, please see the GF Piping Systems Planning Fundamentals on the +GF+ website (www.gfps.com).

2.4 Approvals / Acceptance / Conformance

This **PROGEF Standard (PP)** material specification is met the directives of GF Piping Systems. Therefore GF Piping Systems is approved according to the different categories all over the world. For more information please see our approvals database on the +GF+ website.

	FDA	USP 25 class VI	DIBt	GOST-R	CE	DNVGL	Lloyd's register	RINA	BV
	Marine								
Raw material									
Pipe									
Fittings									
Valves									
Backing Flanges									
Gaskets									

available

3. Pipes

PROGEF Standard pipes are made of **β-PP-H** and comply with a MRS class of 10 MPa. Processing of pipes is done according to EN ISO 15494, DIN 8077 (dimensions) and DIN 8078 (quality specifications).

Outer diameter, ovality and wall thickness are defined according to Tables 1 - 3.

Table 1: Measurements SDR 7.4

In millimeters

Nominal outer diameter	Min. wall thickness	Tolerance limit of outer diameter	Maximum deviation for ovality	Tolerance limit of wall thickness	Pipe series	Nominal pressure
d_n	e_{min}			a	S	PN
16	2.2	+ 0.3	1.2	+ 0.5	3.2	16
20	2.8	+ 0.3	1.2	+ 0.5	3.2	16
25	3.5	+ 0.3	1.2	+ 0.6	3.2	16

Tolerance limit of wall thickness: $0.1e + 0.2$ mm, rounded to 0.1mm

Maximum deviation for ovality: $0.015 d_n$, rounded to 0.1 mm

Table 2: Measurements SDR 11

In millimeters

Nominal outer diameter	Min. wall thickness	Tolerance limit of outer diameter ¹	Maximum deviation for ovality	Tolerance limit of wall thickness	Pipe series	Nominal pressure
d_n	e_{min}			a	S	PN
16	1.8	+ 0.3	1.2	+ 0.4	5	10
20	1.9	+ 0.3	1.2	+ 0.4	5	10
25	2.3	+ 0.3	1.2	+ 0.5	5	10
32	2.9	+ 0.3	1.3	+ 0.5	5	10
40	3.7	+ 0.3	1.4	+ 0.6	5	10
50	4.6	+ 0.3	1.4	+ 0.7	5	10
63	5.8	+ 0.4	1.6	+ 0.8	5	10
75	6.8	+ 0.5	1.6	+ 0.9	5	10
90	8.2	+ 0.6	1.8	+ 1.1	5	10
110	10.0	+ 0.6	2.2	+ 1.2	5	10
125	11.4	+ 0.8	2.5	+ 1.4	5	10
140	12.7	+ 1.9	2.8	+ 1.5	5	10
160	14.6	+ 1.0	3.2	+ 1.7	5	10
180	16.4	+ 1.1	3.6	+ 1.9	5	10
200	18.2	+ 1.2	4.0	+ 2.1	5	10
225	20.5	+ 1.4	4.5	+ 2.3	5	10
250	22.7	+ 1.5	5.0	+ 2.5	5	10
280	25.4	+ 1.7	9.8	+ 2.8	5	10
315	28.6	+ 1.9	11.1	+ 3.1	5	10
355	32.2	+ 3.2	12.5	+ 3.5	5	10

- System Specification -



In millimetres

Nominal outer diameter	Min. wall thickness	Tolerance limit of outer diameter ¹	Maximum deviation for ovality	Tolerance limit of wall thickness	Pipe series	Nominal pressure
400	36.3	+ 3.6	14.0	+ 3.9	5	10
450	40.9	+ 3.8	15.8	+ 4.3	5	10
500	45.4	+ 4.0	17.5	+ 4.8	5	10

d16–125 suitable for socket-, butt and electrofusion welding technologies

d140–500 suitable for butt- and electrofusion welding technologies

Table 3: Measurements SDR 17.6

In millimetres

Nominal outer diameter	Min. wall thickness	Tolerance limit of outer diameter ¹	Maximum deviation for ovality	Tolerance limit of wall thickness	Pipe series	Nominal pressure
d_n	e_{min}			a	S	PN
50	2.9	+ 0.3	1.4	+ 0.5	8.3	6
63	3.6	+ 0.4	1.6	+ 0.6	8.3	6
75	4.3	+ 0.5	1.6	+ 0.7	8.3	6
90	5.1	+ 0.6	1.8	+ 0.8	8.3	6
110	6.3	+ 0.6	2.2	+ 0.9	8.3	6
125	7.1	+ 0.8	2.5	+ 1.0	8.3	6
140	8.0	+ 0.9	2.8	+ 1.1	8.3	6
160	9.1	+ 1.0	3.2	+ 1.2	8.3	6
180	10.2	+ 1.1	3.6	+ 1.3	8.3	6
200	11.4	+ 1.2	4.0	+ 1.4	8.3	6
225	12.8	+ 1.4	4.5	+ 1.5	8.3	6
250	14.2	+ 1.5	5.0	+ 1.7	8.3	6
280	15.9	+ 1.7	9.8	+ 1.8	8.3	6
315	17.9	+ 1.9	11.1	+ 2.0	8.3	6
355	20.1	+ 3.2	12.5	+ 2.3	8.3	6
400	22.7	+ 3.6	14.0	+ 2.5	8.3	6
450	25.5	+ 3.8	15.8	+ 2.8	8.3	6
500	28.4	+ 4.0	17.5	+ 3.1	8.3	6

d16–125 suitable for socket-, butt and electrofusion welding technologies

d140–500 suitable for butt- and electrofusion welding technologies

- System Specification -

The mean outer diameter (d_{em}) is the average value which results from the measurements of the outer diameter at an interval of d_n and $0.1 d_n$ to the end of the test piece. It is determined by measuring the circumference to 0.1 mm accuracy with a measuring tape.

The minimum and maximum wall thickness is determined to 0.1 mm, whereby the measurement points should be distributed on the pipe circumference as evenly as possible. Individual exceedances of the pipe wall thickness maybe

for $e \leq 10 \text{ mm}$ + 0.2 mm
and for $e > 10 \text{ mm}$ + 0.15 e

The mean value of the wall thickness must be within the allowable tolerance limit. Smaller wall thicknesses are not allowed.

Ovality is the difference between the measured maximum and the measured minimum external diameter (d_e) at the same cross-section. It is calculated to 0.1 mm and measured immediately after production. The ovality requirement applies to the timepoint of manufacture.

Approved pipes comply with the corresponding quality specifications of DIN Certco ZP 9.4.1.


Pipe material has been designed for industrial service and an enhanced chemical resistance (esp. at elevated temperatures) based on modified thermo-stabilizer package used. The chemical resistance comply with the DIBt-list as a minimum.

3.1 Product Marking

All pipes must be marked permanently and consecutively at intervals of at least 1 meter.

- Material identification: +GF+ manufacturing plant identification **PROGEF**
- Material code: PP-H 100
- Pipe diameter, wall thickness, SDR and PN: see Tables 1 - 3
- RAL symbol and Z-40.23-4 (DIBt)
- Manufacture date, shift and machine number
- Product norm: DIN 8077/78

Example of marking :

PROGEF +GF+  DEKAPROP PP-H 100 63 x 5.8 DIN 8077/78 PN10 SDR 11
Manufacture date Shift Machine no. RAL symbol 006 Z-40.23-4 Ü

The marking shall be done by hot embossing and a yellow/black coding tape. Marking is also possible with an inkjet device.

4. Fittings

All **PROGEF Standard (PP)** fittings are either as butt fusion type, metric sizes d20-500 or socket fusion type, metric sizes d16-110, labelled with +GF+. The dimensions of both fitting types fulfil the tolerance requirements of the standard

EN ISO 15494. They need to be tested according to EN 10204. All threaded connections have pipe threads in accordance with the requirements of ISO 7-1.

PROGEF Standard fittings from d16-315 are manufactured from isotactic Polypropylene Homopolymeride **β-PP-H**. Fittings from d355-500 are manufactured from Polypropylene random- copolymeride **PP-R**.

All butt fusion spigot fittings of the dimension d20-315 are manufactured with laying lengths designed for use with the fusion machine IR-63 Plus, IR-110 Plus, IR-110 A, IR-225 Plus and IR-315 A from GF Piping Systems.

4.1 Product Marking

Each part is marked according to EN ISO15494:

- Logo of manufacturer
- SDR-rating / PN rating
- Dimension (without the letter “d”)
- Material
- Permanently embossed date indicating the year and the production series

4.2 Packaging and Labelling

The packaging must ensure that the fittings are not damaged during transportation.

Packaging and labelling must meet the following requirements:

- Identification of the content, in type, quantity and product details
- Information about standards and approvals covered by the product
- Content of the label has to accomplish legal requirements
- Labels must be EAN coded for automatic identification
- Comply to GF standards as well as to international standards such as ISPM15

5. Accessories

5.1 Flanges

Backing flanges in metric sizes DN15-400 shall be designed according to EN ISO 15494, in a thermo plastic-oriented design, consisting of 100% glass fibre reinforced polypropylene, PP-GF30, graphite black and UV stabilized. These flanges are manufactured in a seamless technology injection moulding process by GF Piping Systems. The backing flange shall be optimised with a V-groove in the inner diameter to ensure an evenly distributed force on the thermo plastic flange adapter. The backing flanges shall be marked with dimension, PN-value, standards, brand and lot number. Connecting dimensions metric according to ISO 7005, EN 1092; Bolt circle diameter PN10; Inch: ANSI B 16.5, BS 1560; class 150 (1/2" – 12").

As an alternative backing flanges in metric sizes DN15-600 shall be designed according to EN ISO 15494, in a thermo plastic-oriented design, consisting of glass fibre reinforced polypropylene, PP-GF30, graphite black and UV stabilized with steel or cast inserts. The backing flanges shall be marked with dimension, PN-value, standards, brand and lot number. Connecting dimensions metric according to ISO 7005, EN 1092; Bolt circle diameter PN10 (DN15-600) + PN16 (DN15-400); Inch: ANSI B 16.5, BS 1560; class 150 (1/2" – 8").

5.2 Gaskets

Gaskets in metric sizes DN10–600 shall consist of elastomeric material according to EN681, designed with or without metal reinforcement for use with flange adaptors according to EN ISO 15493. Gaskets with reinforcement shall be designed to be centred by the outer diameter. Gaskets with reinforcement shall provide fixation aids to fit on the flange bolts.

5.3 Pipe Support System

Pipe Support System shall be KLIP-IT, sizes d10-400, supplied by GF Piping Systems.

6. Valves

All **PROGEF Standard (PP)** valves shall be metric sizes manufactured by GF Piping Systems or equal in accordance with EN ISO 16135, 16136, 16137, 16138, tested according to the same standard.

6.1 Ball Valves

All **PROGEF Standard** ball valves, which are made from isotactic Polypropylene Homopolymeride **β-PP-H** with metric sizes DN15-100 shall be GF Piping Systems Type 546, 543, 523 with true double union design manufactured by GF Piping Systems in accordance with EN ISO 16135. Incorporated into its design shall be a safety stem with a predetermined breaking point above the bottom O-ring, preventing any media leaking in the event of damage. The valve nut threads shall be buttress type to allow fast and safe radial mounting and dismounting of the valve during installation or maintenance work. Seats shall be PTFE with backing rings creating self-adjusting seals and constant operating torque. Backing rings and seals shall be EPDM or FKM. The handle shall include in its design an integrated tool for removal of the union bush. Union bushes shall have left-hand threads to prevent possible unscrewing when threaded end connectors are removed from pipe.

Following accessories shall be available:

- A Multi-Functional Model (MFM) in PPGF equipped with internal limit switches for reliable electrical position feedback, is mounted directly between the valve body and the valve handle. This MFM is also the necessary interface for later mounting of actuators.
- Mounting plate in PPGF with integrated inserts for later screw mounting on any support
- Lockable multi-functional handle

6.1.1 Electrically Actuated Ball Valves

Electric actuators shall be Types EA15 (metric sizes DN10-50), EA25 (metric sizes DN10-50), EA45 (metric sizes DN65) and EA120 (metric sizes DN80-100) shall be available manufactured by GF Piping Systems in accordance with EN 61010-1, EC directives 89/336/EWG-EMV and 73/23/EWG (LVD). Additionally they need to be CE marked. Actuator housing shall be made of PPGF (polypropylene glass fibre reinforced), flame retardant with external stainless steel screws. All electric actuators shall have an integrated emergency manual override and integrated optical position indication. All electric actuator types shall have the following accessories available:

Accessories

EA15 / EA25 / EA45 / EA120 / EA250:

- Failsafe return unit
Battery incorporated into the housing for moving to a safe position in case of power outage (open or closed).

EA25 / EA45 / EA120 / EA250:

- positioner

For continuous valve control with 4-20mA or 0-10V and 4-20mA feedback

- Monitoring board
 - Cycle time extension
 - Cycle time monitoring
 - Cycle counter
 - Motor current monitoring
- Fieldbus connection
 - Profibus DP auxiliary card
 - AS interface module

- System Specification -



The system Specifications for electric actuators are as follows:

* at rated torque

Specification

Combinations	EA15	2-Way Ball valve type 546 upto DN50 3-Way Ball valve type 543 up to DN50
	EA25	2-Way Ball valve type 546 up to DN50 3-Way Ball valve type 543 up to DN50
	EA45	2-Way Ball valve type 546 up to DN65 Butterfly valve types 567/578, Type 038/039
	EA120	2-Way Ball valve type 546 up to DN100 Butterfly valve types 567/578, Type 038/039
	EA250	Butterfly valve types 567/578, Type 038/039
Rated voltage	AC	100 – 230 V, 50/60 Hz
	AC/DC	24 V, 50/60 Hz
Rated voltage tolerance	- 10 ... + 15%	
Protection class	IP67per EN 60529	
Contamination level	2 according to EN 61010-1	
Overload protection	Current/time-dependent (resetting)	
Overvoltage category	II	
Ambient temperature	-10 °C to +45 °C	
Allowable humidity	Max. 90% relative humidity, non-condensing	
Housing material	PP-GF for very good chemical resistance	

	EA15	EA25	EA45	EA120	EA250
Power input max.	45 VA	45 VA	65 VA	60 VA	70 VA
Rated torque MDN. (peak)	10 (20)	10 (25)	20 (45)	60 (120)	100 (250)
Duty cycle at 25 °C / 15 min	40%	100%	50 %	50 %	35 %
Cycle time s/90 at Mdn.	5s	5 s	6s	15 s	20 s
Connection	F05	F05	F05	F07	F07
Tested cycles (at 20 °C and Mdn.)	150 000	250 000	100 000	100 000	75 000
Weight	1.85 kg	2.193 kg	2.193 kg	3.356 kg	4.995 kg
Actuating angle	Max. 355°, set to 90 °				

6.1.2 Pneumatically Actuated Ball Valves

Pneumatic actuators shall be GF Piping Systems Types PA11 (for valve sizes DN15-25) and PA21 (for valve sizes DN32-50). They shall be manufactured by GF Piping Systems. Pneumatic actuators shall be available as fail safe close, fail safe open and double acting and have an integrated optical position indication. Actuator housing shall be made of Polypropylene fibre glass reinforced (PPGF) and flame retardant. Actuators shall contain a preloaded spring assembly to ensure safe actuator operation and maintenance. Actuators shall contain integrated Namur interface for the easy mounting of positioners, limit switches and accessories. The valve shall be equipped with a Multi-functional-module for reliable electric feedback, mounted directly between the valve body and the actuator as manufactured by GF Piping Systems.

- For valve size DN65 pneumatic actuators shall be Type PA 30 (fail safe to close or open function), Type PA35 (double acting function).
- For valve size DN80 pneumatic actuators shall be Type PA 35 (fail safe to close or open function), Type PA40 (double acting function).
- For valve size DN100 pneumatic actuators shall be Type PA 45 (fail safe to close or open function), Type PA45 (double acting function)

Pneumatic actuators shall have an integrated optical position indicator. Actuator housing shall be made of hardened anodized aluminium. Actuators shall contain integrated Namur interface for the easy mounting of positioners, limit switches and accessories.

All pneumatically actuated ball valves shall have the following accessories available:

- Pilot valve remote or direct mounted in voltages 24VDC/AC, 110VAC, 230VAC
- Positioner Type DSR 500-3
- Limit switch kits AgNi, Au, NPN, PNP
- Stroke limiter
- Manual override for all sizes up to d110
- AS Interface control module with incorporated position feedback and a solenoid pilot valve

- System Specification -

6.2 Diaphragm Valves

6.2.1 Manual Diaphragm Valves

6.2.1.1 Diaphragm Valves DN15 to DN50

All **PROGEF Standard** Diaphragm Valves, which are made from isotactic Polypropylene Homopolymeride **β-PP-H** with metric sizes d20-63, shall be either:

- - Type 514 (true double union design, DN15-50), or
 - Type 515 (spigot design, DN15-50), or
 - Type 517 (flange design, DN15-50), or
 - Type 519 (T-type design, DN15-15 to 50-25)

All diaphragm Valves shall be manufactured by GF Piping Systems in accordance with EN ISO 16138. The upper body shall be PPGF (polypropylene glass fibre reinforced) connected to the lower body with a central union avoiding exposed screws.

A two colored position indicator integrated into the hand wheel must be present to determine diaphragm position. The hand wheel shall have an integrated locking mechanism.

Diaphragms are to be EPDM, FKM, NBR, PTFE with EPDM or FOM supporting diaphragm. Following options shall be available:

- Electrical feedback unit with either AgNi or AU contacts
- Pressure proof housing

The diaphragm valve shall have following KV values:

d [mm]	DN [mm]	KV [l/min @ ΔP=1 bar]
20	15	125
25	20	271
32	25	481
40	32	759
50	40	1263
63	50	1728

6.2.1.2 Diaphragm Valves DN65 to DN150

All **PROGEF Standard** Diaphragm Valves, which are made from isotactic Polypropylene Homopolymeride **β-PP-H** with metric sizes shall be Type 317 (flanged design, DN65-150).

- System Specification -

All diaphragm valves shall be manufactured by GF Piping Systems in accordance with EN ISO 16138. The upper body shall be PPGF (polypropylene glass fibre reinforced) connected to the lower body with exposed stainless steel bolts. A position indicator integrated into the hand wheel must be present to determine diaphragm position. Diaphragms are to be EPDM, FKM, NBR, or PTFE with EPDM or FKM supporting diaphragm.

6.2.2 Pneumatic Diaphragm Valves

6.2.2.1 Pneumatic Diaphragm Valves DN15 to DN50

All **PROGEF Standard** Diaphragm Valves, which are made from isotactic Polypropylene Homopolymeride **β-PP-H** with metric sizes DN15-50, shall be either:

- true double union design, DN15-50, or
- spigot design, DN15-50, or
- flange design, DN15-50 or
- T-type design, DN15-15 to DN50-25

All Diaphragm Valves shall be manufactured by GF Piping Systems in accordance with EN ISO 16138. The upper body shall be connected to the lower body with a central union avoiding exposed screws.

Diaphragms are to be EPDM, FKM, NBR, PTFE with EPDM or FKM supporting diaphragm. Following options shall be available:

The diaphragm valve shall have following KV values:

d [mm]	DN [mm]	KV [l/min @ ΔP=1 bar]
20	15	125
25	20	271
32	25	481
40	32	759
50	40	1263 (960*)
63	50	1728 (1181*)

*DIASTAR Six

Pneumatic actuators shall be GF Piping Systems Type DIASTAR or 604/605 and shall be available as

- Type 604/605
- DIASTAR Six for PN up to 6 bar,
- DIASTAR Ten for PN up to 10 bar,
- DIASTAR Sixteen for PN up to 16 bar

The mode of operation shall be fail safe close (FC), fail safe open (FO) and double acting (DA). The valves shall have an integrated optical position indicator. Actuator housing shall be made of PPGF (polypropylene glass fibre reinforced). Actuators with FC mode shall contain a preloaded galvanised steel spring assembly to ensure safe actuator operation and maintenance. The actuator DIASTAR Ten and DIASTAR Sixteen shall have following accessories available:

- Solenoid pilot valve remote or direct mounted in voltages 24VDC/AC, 110VAC, 230VAC
- Positioner Type DSR 500-1
- Feedback with following limit switches AgNi, Au, NPN, PNP, NAMUR
- Stroke limiter & emergency manual override
- ASI controller

6.2.2.2 Pneumatic Diaphragm Valves DN65 to DN150

All **PROGEF Standard** diaphragm valves, which are made from isotactic Polypropylene Homopolymeride **β-PP-H** with metric sizes shall be flanged design, DN65-150.

All diaphragm valves shall be manufactured by GF Piping Systems in accordance with EN ISO 16138. The upper body shall be connected to the lower body with exposed stainless steel bolts. Diaphragms are to be EPDM, FKM, NBR, or PTFE with EPDM or FKM supporting diaphragm.

Pneumatic diaphragm actuators shall be GF Piping Systems Type DIASTAR Type 025. The mode of operation shall be fail safe close (FC), fail safe open (FO) and double acting (DA). The valves shall have an integrated optical position indicator. Actuator housing shall be made of PPGF (polypropylene glass fibre reinforced). Actuators with FC mode shall contain a preloaded galvanised steel spring assembly to ensure safe actuator operation and maintenance. The actuator DIASTAR 025 shall have following accessories available:

- Solenoid pilot valve remote or direct mounted in voltages 24VDC/AC, 110VAC, 230VAC
- Positioner Type DSR 500-2
- Feedback with following limit switches AgNi, Au, NPN, PNP, NAMUR
- Stroke limiter & emergency manual override
- ASI Controller

6.3. Butterfly Valves

All **PROGEF Standard** butterfly valves from DN50 (2") – DN300 (12") are made from isotactic Polypropylene Homopolymeride **β-PP-H** and in dimension DN350 (14") – DN600 (24") are made from Polypropylene random co-polymeride **PP-R** with metric sizes. They shall be GF Piping Systems Type 567/578/563 wafer/lug type with a double eccentric disc design manufactured by GF Piping Systems in accordance with EN ISO 16136. Seals shall be available in both EPDM and FKM. The lever handle shall be lockable in increments of 5 degrees. There shall always be six teeth engaged between the ratchet and the index plate to ensure accurate and safe positioning of the lever. There shall be the option of fine adjustment by use of a specific hand lever, allowing the disc to be exposed at any angle between 0° und 90°.

As an option, the hand lever shall be lockable. The hand lever shall be manufactured of high strength PPGF (polypropylene glass fibre reinforced). The option of an integrated electric position indicator shall be available. Optional the valves can be actuated by gear box with hand wheel. The electric position indicator shall be integrated into the mounting flange. Butterfly valves shall have low actuation torque to enable easy operation. All butterfly valves Type 567 manufactured by GF Piping Systems are in dimension DN50-200 designed for a nominal pressure rate of 10 bar and in dimension DN250-300 for a nominal pressure rate of 8 bar. All butterfly valves Type 563 are designed for a nominal pressure rate of 4 bar.

6.3.1. Electrically Actuated Butterfly Valves

Electric actuators shall be GF Piping Systems Types EA45, EA120 or EA250 dependent on valve size up to DN300. For valve size from DN350 - 600 with Valpes VS300, VT600 and VT1000.

They shall be manufactured by GF Piping Systems in accordance with EN 61010-1, as per the above specifications. Actuator housing shall be made of PPGF (polypropylene glass fibre reinforced), flame retardant and feature external stainless steel screws. All electric actuators shall have an integrated emergency manual override and integrated optical position indication.

All electric actuator types shall have the following accessories available:

- Failsafe return unit
Battery incorporated into the housing for moving to a safe position in case of power outage (open or closed).
- positioner

- System Specification -

For continuous valve control with 4-20mA or 0-10V and 4-20mA feedback

- Monitoring board
 - Cycle time extension
 - Cycle time monitoring
 - Cycle counter
 - Motor current monitoring
- Fieldbus connection
 - Profibus DP auxiliary card
 - AS interface module

6.3.2. Pneumatically Actuated Butterfly Valves

Pneumatic actuators shall be GF Piping Systems Types PA 35 (metric sizes DN50-65), PA40 (metric size DN80 only), PA45 (metric size DN100-125), PA55 (metric size DN150-200), PA60 (metric sizes DN200 FC), PA65 (metric sizes DN250 FC) PA70 (metric sizes DN300 FC). For valve size from DN350 – 600 with Revac types.

They shall be supplied by GF Piping Systems. Pneumatic actuators shall be available as fail safe close, fail safe open and double acting and have an integrated optical position indication. Actuator housing shall be made of hardened anodized aluminium. Actuators shall contain integrated Namur interfaces for the easy mounting of positioners, limit switches and accessories. All pneumatically actuated butterfly valves shall have the following accessories available:

- Solenoid pilot valve remote or direct mounted in voltages 24VDC/AC, 110VAC, 230VAC
- Positioner Type DSR 500-3
- Feedback with following limit switches AgNi, Au, NPN, PNP, NAMUR
- Stroke limiter & emergency manual override
- ASI-controller

6.4 Check Valves

All **PROGEF Standard** check valves, which are made from isotactic Polypropylene Homopolymeride **β-PP-H** according to EN ISO 16137 with metric sizes DN10-100 metric, shall be Type 561/562 true double union design. Seals shall be EPDM or FKM. Union bushes shall have a left hand thread to prevent possible unscrewing when threaded end connectors are removed from pipe. This valve shall be suitable for mounting in a vertical and horizontal position. Type 562 shall be equipped with a spring made of stainless steel (V2A) to allow position independent installation. The valves are designed for a nominal pressure of 10 bar.

- System Specification -

6.4.1 Wafer Check Valves

All **PROGEF Standard (PP)** Wafer Check Valves shall be GF Piping Systems Type 369, metric size DN32-300. The minimum water column of 2m is required for sealing. They have to be equipped with a spring (either in 316 stainless steel or Hasteloy C) guaranteeing closing in all installation positions. Attention: A stabilizing pipe zone of at least 5 times nominal diameter (DN) (recommended 10 times nominal diameter) before and after the wafer check valve should be provided.

The wafer check valves are dimensioned in metric sizes DN32-125 for nominal pressure 10 bar and in metric sizes DN150-300 for nominal pressure 6 bar.

6.5 Pressure Regulating Valves

All **PROGEF Standard (PP)** pressure regulating valves as supplied by GF Piping Systems shall have the following characteristics:

Pressure ranges for all pressure regulating valves are the following:

- DN10–50 from 0 up to max. 10 bar
- DN65–80 from 0 up to max. 6 bar
- DN100 from 0 up to max. 4 bar

6.5.1 Pressure Reducing Valves

As supplied by GF Piping Systems reduces the pressure within the system to a pre-set value. By using the differential pressure, the pressure reducing valve adjusts itself to the set working pressure. The outlet pressure (working pressure) is not directly related to the inlet pressure. If the outlet pressure increases above the set value, the diaphragm is lifted against the spring force. If the outlet pressure falls below the set value, the diaphragm is pressed down by the spring force. The pressure reducing valve begins to close/open until a state of equilibrium is re-established; in other words, the outlet pressure remains constant irrespective of an increasing or decreasing inlet pressure. Following types and sizes are available:

- Type 582, compact Pressure Reducing Valve, sizes DN10–50
Features:
 - Metal free central housing union nut
 - Set pressure selectable 0 - 9 bar or 0.3 – 3 bar
 - Manometer optional
 - Manometer assembly possible on both sides
 - Selection of direct manometer assembly or with gauge guard
 - Possibility to show either inlet or outlet pressure
 - Injection molded directional arrow for direction of flow
 - Threaded inserts for assembly

- System Specification -

- Type V82, Pressure Reducing Valve with an integrated manometer, sizes DN50-100

6.5.2 Pressure Retaining Valves

As supplied by GF Piping Systems serves to keep the working or system related pressures constant, to balance out pressure pulsation, and to reduce pressure peaks in chemical process systems. If the inlet pressure rises above the set value, the pressurized valve piston is lifted against the spring force. Consequently,

the valve opens and there is a reduction of pressure through the outlet pipe. The valve closes as soon as the inlet pressure sinks below the pre-set spring tension.

Following types and sizes are available:

- Type 586, compact Pressure Retaining Valve, sizes DN10-50
Features:
 - Metal free central housing union nut
 - Set pressure selectable 0 - 9 bar or 0.3 – 3 bar
 - Manometer optional
 - Manometer assembly possible on both sides
 - Selection of direct manometer assembly or with gauge guard
 - Possibility to show either inlet or outlet pressure
 - Injection molded directional arrow for direction of flow
 - Threaded inserts for assembly
- Type V86, Pressure Retaining Valve, sizes DN65-100

6.6 Direct-acting Solenoid Valves

Supplied by GF Piping Systems serves to regulate and control fluids, if no compressed air is available or not wanted. They are used for diverse functions, e.g. opening, shutting, dosing, distribute and mixing. The medium flow is switched directly by the armature moved by the magnetic force.

- Safety position shall be available

Following type and sizes are available:

- Type 166, sizes DN3-5

6.7 Servo-assisted Solenoid Valves

- System Specification -

Supplied by GF Piping Systems serves to regulate and control fluids, if no compressed air is available or not wanted. They are used for diverse functions, e.g. opening, shutting, dosing, distribute and mixing. Opening large orifices using the direct-acting method would require enormous and expensive coils. Servo assisted valves use the power of the fluid to open the flow channel by controlling a small pilot channel to alter the forces on a larger main seal. A Δp of 0.5 bar is mandatory with servo-assisted valves.

- Type, 165, sizes DN10-50

6.8 Ventilating- and Bleed Valves

All **PROGEF Standard** Ventilating- and Bleed valves, which are made from isotactic Polypropylene Homopolymeride **β -PP-H** shall be GF type 591. Dimensions DN10-100 are with pressure rating PN10. They shall be equipped with a PP-H floater with density of 0,91 g/cm³.

6.9 Ventilating Valves

All **PROGEF Standard** Ventilating Valves, which are made from isotactic Polypropylene Homopolymeride **β -PP-H** shall be GF type 595.

Dimensions DN10-100 are with pressure rating PN10. They shall be equipped with plastic coated stainless steel spring with minimal opening pressure (10-80 mbar).

7. Welding and Assembly

All butt fusion fittings and valves in dimension d20-315 shall also be manufactured with laying lengths designed for use with fusion machines IR-63 Plus, IR-110 Plus, IR-110 A, IR-225 Plus and IR-315 A from GF Piping Systems, providing welds with increased mechanical and chemical stability than conventional welding methods (socket- and butt fusion).

The IR Plus fusion machines use non-contact radiant heating.

The cooling time for is calculated on the basis of ambient temperature and the bead surface temperature. To increase the cooling capacity, an additional cooling fan is included in the IR-225 Plus and in the IR-315 A.

Only authorised welders by GF Piping Systems are allowed to perform fusion on the IR Plus machines.

As an alternative to IR fusion, conventional butt fusion according to DVS 2207-11 may be used, preferably with automated CNC controllers and weld recorders.

Socket fittings require the use of Socket Fusion welding tools according to DVS 2007-11, with heating bushes System B.

The welding and the installation should be in accordance with GF Piping Systems guidelines.

- System Specification -

8. Measurement & Control / Instrumentation

The following parameters can be measured (Sensors), indicated and/ or transmitted (transmitters) to PLC, PC and other Data Acquisition Systems. All products comply with the CE standard.

Parameter	Technology	Compatible liquids (*)
Flow	Paddlewheel	clean liquids
	Rotameter	clean liquids
	Magmeter	contaminated liquids
Level	Hydrostatic/Ultrasonic/Radar	all liquids
pH-ORP	Glas electrodes	all liquids
Conductivity	Contact	all liquids
Pressure	Piezoresistive	all liquids
Temperature	Pt1000	all liquids

(*) please check first the sensors limitations in material, pressure and temperature (data sheet) and chemical resistance list

8.1 Sensors

The sensors listed hereafter will transfer the measured value to a GF Piping Systems Transmitter, to indicate the measured value and allowing simple calibration and maintenance of the devices. Alternatively the measured values of the sensors can be sent directly to a PLC, PC or other local made electronics using either an analogue signal (4-20mA, open collector or sinusoidal voltage) or a digital signal called S3L (GF Piping Systems Signet serial signal).

8.1.1 Installation Fittings

Depending on the sensor type, special installation fittings shall be used for connection to the pipeline: Installation T-Fitting metric sizes DN15-50 with union ends for socket or butt fusion, Screw-On Saddle metric sizes DN65-300, Weld-On Fitting ("Weld-o-let") metric sizes DN65-600 and Wafer Fittings metric sizes DN65-300. Sensor thread connection for flow- and pH-sensors shall be 1 ¼" NPSM. For all further sensors standard threaded fittings, as well as adaptor sockets or nipples with ½", ¾" ISO, or ¾" NPT thread shall be used.

- System Specification -

8.1.2 Flow sensors

8.1.2.1 Paddlewheel sensors

515 and 525 sensors:

All sensors of this family are “sinusoidal” sensors. This sensor from GF Piping Systems SIGNET requires no external power source to produce a signal. Internal to the body of the sensor is a wire coil which when excited by the rotor assembly produces a small sinusoidal signal. The rotor assembly consists of four paddles; inserted into each of the paddles of the rotor are magnets. As liquid flows past the rotor assembly it rotates each of the four paddles produces a sine wave signal as it passes the centre of the body (two paddles of the rotor produces a full AC sine wave).

The sensors as manufactured by GF Piping Systems SIGNET produce a signal output which is proportional to the flow rate. A K-factor (number of pulses generated by the sensor per 1 liter or 1 gallon of fluid the sensor) is used to define the size of the pipe that the sensor is inserted into.

3-2536 and 3-2537 sensors:

All sensors of this family of sensors are “Hall Effect” sensors. Internal to the GF Piping Systems SIGNET sensors body is an open collector relay. The sensor is supplied with a voltage from the 3-8550 transmitters or an external power supply ranging from 5 to 24 volts. This voltage is switched through the open collector relay as the paddlewheel (rotor) of the sensor rotates. The sensor’s rotor assembly has four paddles. Inserted in two of the paddles is a magnet. As the paddles pass the centre of the sensors body, the magnetic field switches the open collector relay on and off which generates a square wave pulse as manufactured by GF Piping Systems SIGNET. Two pulses indicates a complete rotation (on/off cycle) of the open collector relay. The pulse output is directly proportional to the fluid velocity. A K-factor (number of pulses generated by the sensor per 1 liter or 1 gallon of fluid passing the sensor) is used to define the size of the pipe that the sensor is inserted into.

8.1.2.2 Rotameters

As supplied by GF Piping Systems are radially installed dismountable meters for flow rate measuring in industrial piping applications. If needed, minimum or maximum flow can also be monitored via limit switches. Also, analogue flow measurement with a 4...20mA Signal is possible.

The working principle of the rotameter is based in gravity and equilibrium of forces. If a medium flows upwards at a sufficient flow rate through the vertically mounted taper tube, the float is raised to the point at which a state of equilibrium sets in between the lifting force of the medium and the weight of the float. Since the mean rate of flow is proportional to the quantity flowing through per unit of time, this state of equilibrium corresponds to the measurement of the instantaneous flow rate.

Following types and sizes are available:

- Type SK, DN10–65mm
- Type 335, DN25–65mm
- Type 350, DN25–65mm

8.1.2.3 Magmeter

The Magmeter sensor from GF Piping Systems SIGNET consists of two metallic pins that produce a small magnetic field across the inside of the pipe. The The Magmeter measures the velocity of a conductive liquid (20 μ S or greater) as it moves across the magnetic field produced by the Magmeter. A voltage occurs on the sensor tips, which is directly proportional to the flow rate of the fluid. The magnetic signal is conditioned and translated in to a pulse signal. A K-factor (number of pulses generated by the sensor per 1 liter or 1 gallon of fluid passing the sensor) is used to define the size of the pipe that the sensor is inserted into. The Magmeter of GF Piping Systems SIGNET is offered as a blind frequency, 4-20 mA or digital S3L output, or with integral display and control relays.

8.1.2.4 Ultrasonic Flowmeter

The U3000/4000 and PF220/330 from GF Piping system are transit time ultrasonic flow meter designed to work with clamp-on transducers, to provide accurate measurement of liquid flowing within a closed pipe, without the need for any mechanical parts to be inserted through the pipe wall or to protrude into the flow system. It takes just a few minutes to install and there is no need to shut down flow or drain the system! From process control in industrial applications, to water management from raw to deionized water, the Ultraflow 3000/4000 for fixed installation and the PF220/330 for portable flow monitoring cover a wide spectrum of flow monitoring and process control in many industries.

Using ultrasonic transit time techniques enables to be used with pipes having an outside diameter range from d13 to d2000 as standard and up to d5000 as an option. The instruments will also operate over a wide range of fluid temperatures. All of the Ultrasonic Flowmeters have the same basic features.

However, the standard U4000 and PF330 can also perform data logging and allows site details and flow data to be reordered with a memory, that is able to log more than 150 000 separate readings. The standard U4000 and PF330 is also capable of downloading the stored data via the USB or RS232 interface to the Portagraph software supplied with the unit.

8.2 Level Sensor and Level Switches

8.2.1 Hydrostatic Level Sensors

Hydrostatic pressure is the pressure exerted on a column of fluid by the weight of the fluid above it. Internal to the GF Piping Systems SINGET PVDF sensor body is a ceramic diaphragm sensor and capillary tube/cable assembly. The ceramic diaphragm sensor exposed to the fluid senses the hydrostatic pressure of the fluid and compares the pressure to the atmospheric pressure monitored the capillary tube/cable assembly. The hydrostatic level sensor from GF Piping Systems SINGET only senses the hydrostatic pressure of the fluid. The Level Sensor is offered as a blind output 4-20 mA or digital S3L output connected to the GF Piping Systems SINGET Transmitter unit.

8.2.2 Ultrasonic Level

8.2.2.1 Ultrasonic Level Sensors (Series 2260 / 2270)

Ultrasonic level sensors are non-contact devices, using the travel time of sound and its reflection, for measuring the distance to a liquid or solid surface. Based on this information, GF Piping Systems sensors are capable of calculating a liquid level or volume. Their outstanding narrow 5° beam, allow reliable measurement even at the presence of disturbing objects or when space is limited. The GF Piping Systems portfolio contains sensing ranges 4 m, 6 m and 15 m.

Sensors with integrated display or blind sensors are available and provide 4-20 mA, HART protocol or relay outputs. GF Piping Systems ultrasonic level sensors are compatible with GF Piping Systems transmitters, indicators, controllers and valve actuators.

8.3 Radar

8.3.1 Radar 2290

The 25 GHz (K-band) 2290 Pulse Radars are the most progressive non-contact level transmitters for industrial processes. With an excellent accuracy, compact antennas and a user-friendly set-up the 2290 is an effective, simple, low cost choice for demanding level applications. GF's new K-band radar featuring ± 3 mm (± 0.1 inch) accuracy and short dead band excels with its robust full plastic housing. Its antenna range incorporates a stainless steel horn and enclosed plastic tube choices. The enclosed antenna versions can be replaced without removing the antenna enclosure from the process. Local programming of type 2290 is aided by a plug-in display module. The signal processing algorithm of the 2290 is based on years of experience with non-contact level measurement making it an excellent choice for applications simple and challenging alike. Process enclosures are available in PTFE, PP & PE

8.3.2 Radar 2291

With its ability to read accurately when other non-contacting or invasive methods fail, the guided level transmitter type 2291 using GWR (guided wave radar) is the solution to your level needs.

The radar signal is sent down the probe assembly eliminating the interferences caused by low dielectric liquids, heavy fuming, slightly conductive foams, internal tank obstructions, etc. By focusing its energy along the probe, the type 2291 can be installed in tanks with limited space. The type 2291 is also less sensitive to turbulence that would normally upset the readings in ultrasonic and unguided radar technologies. The probes are also available as coated options in FEP & PFA

8.4 Point Level Switches (Series 2280)

The GF Piping Systems portfolio of point level switches contains various different detection technologies, to provide a solution for various liquids and application requirements.

- Type 2280

Vibration Forks detect a liquid level with two vibrating stainless steel wings. In air they vibrate with a specific, calibrated frequency. By the contact with a liquid the frequency changes which forces an electrical output to switch. GF Piping Systems vibration forks are equipped with digital PNP/NPN or relay output. Versions with ATEX or WHG approval are available.

- Type 2281

Conductive Multipoint Switch contains up to 5 stainless steel electrodes, which allow to detect 4 different liquid levels in a tank. Up to 2 external relay pairs allow to switch pumps or valves. GF Piping Systems conductive multipoint switches work with liquids of min. 10 μ S conductivity.

Their four-in-one design allows fast installation and provides attractive solutions concerning costs.

- Type 2282

Guided Float Switches are equipped with an air filled float with embedded magnet. Rising liquid lifts up the float. The magnetic field forces a reed contact to switch. GF Piping Systems guided float switches are available in PP and PVDF to provide best chemical compatibility to corrosive liquids.

- Type 2284

Ultrasonic Gap Switches are equipped with an ultrasonic transducer and receiver in their fork tips. Based on the switch design, the sound waves are damped in air. Thus the output is disabled. In contact with liquid the sound waves start to travel from transmitter to receiver, which enables the output. GF Piping Systems ultrasonic gap switches provide an electronic relay output which allows to control pumps and valves. Thanks to their PPS full-plastic body they provide a very high resistance against mechanical impacts and corrosive liquids. They work with no moving parts, so they do not require any maintenance.

- Type 2285

Float Switches are primarily used in open basins and pump shafts for detecting liquid level. In an empty tank they hang in vertical position, attached to the tank wall at their cable. Rising liquid carry them on the liquid surface. At an angle of approximately 45° an integrated switch is enabled. GF Piping Systems float switches are double chambered and equipped with a mercury-free switch. Hence they may be used for drinking and for waste water applications.

8.5 Analytic

8.5.1 pH Sensors

All pH sensors from GF Piping Systems SIGNET are constructed commonly called combination electrodes. The measuring cell is constructed of hydrogen sensitive glass that can detect the concentration of hydrogen ions (+H) in a solution. The concentration of +H ions directly determines the pH of the fluid. The reference cell is used to provide a stable reference signal. The pH signal is measured against the stable reference signal. The reference junction allows the reference cell to come in contact with the fluid being measured. The measured signals are then conditioned and sent as a blind 4-20 mA or as a digital S3L signal to the GF Piping Systems SIGNET Transmitter unit.

8.5.2 ORP Sensors

All ORP sensors from GF Piping Systems SIGNET are constructed similar to the pH sensors, except that a noble metal like platinum or gold replaces the silver chloride element of the measuring and reference cell of the pH electrode. Temperature compensation is not used in ORP measurements as well. ORP is an abbreviation for Oxidation-Reduction Potential. Oxidation is a term used to denote the occurrence of a molecule losing an electron. Reduction occurs as a molecule gains an electron. The “potential” is simply an indication of a solution’s propensity to contribute or accept electrons. ORP reactions (sometimes referred to as REDOX) always take place simultaneously. There is never oxidation without reduction, and ORP electrodes are used to detect electrons exchanged by molecules as these reactions occur. The measured signals are then conditioned and sent as a blind 4-20 mA or as a digital S3L signal to the GF Piping Systems SIGNET Transmitter unit.

8.5.3 Conductivity Sensors

All Conductivity sensors from GF Piping Systems SIGNET are manufactured using two stainless steel electrodes. Alternative materials are available in case of chemical incompatibility. Conductivity sensors measure the ability of a fluid to conduct an electrical current between two electrodes. The proper term for this ability of a solution is electrolytic conductivity, since only ions conduct electric current in solution. Electrolytic conductivity (or simply conductivity) is therefore an indirect measure of the ionic concentration of a solution. Generally, conductivity increases and decreases with the concentration of ions.

Most conductivity electrodes consist of two measuring half-cells. The geometry of the half-cells can be tailored to provide highly accurate measurements over a specific conductivity range. Cell constants help to describe electrode geometry for the purpose of selecting the appropriate electrode for a given application.

A cell constant is defined as the length between the two half cells divided by the area of the cells. All conductivity sensors have a temperature compensation circuits in order to increase the sensors accuracy.

The measured signals are then conditioned and sent as a blind 4-20mA or as a digital S3L signal to the GF Piping Systems SIGNET Transmitter unit.

8.6 Multi Parameter Instruments

8.6.1 Transmitters

The GF Piping Systems Signet 9900 Transmitter provides a single channel interface for many different parameters including Flow, pH/ORP, Conductivity/Resistivity, Salinity, Pressure, Temperature, Level and other sensors that output a 4 to 20 mA signal. The display shows separate lines for units, main and secondary measurements as well as a dial-type digital bar graph.

The 9900 is offered in both panel or field mount versions. Both configurations can run on 12 to 32 VDC power (24 VDC nominal). The 9900 can also be loop powered with compatible sensors.

Designed for complete flexibility, plug-in modules allow the unit to easily adapt to meet changing customer needs. Optional modules include Relay, Direct Conductivity/Resistivity, H COMM and a PC COMM configuration tool.

- 1 sensor input (Flow, pH/ORP, Conductivity/Resistivity, Salinity, Pressure, Temperature, Level and other sensors that output a 4 to 20 mA signal, Signet 8058 i-Go™ Signal Converter required)
- 1 analogue output (4-20 mA)
- 1 Open Collector output
- Optional relay module with 2 Dry Contact Relay SPDT
- Power supply 12-32 VDC

The GF Piping Systems Signet 8900 Multi-Parameter Controller takes the concept of modularity. Each 8900 is field commissioned with the users specified combination of inputs, outputs, and relays using simple-to-install modular boards into the base unit. Configure the system by selecting either two, four, or six input channels which accepts any of the Signet sensors listed below, and/or other manufacturer's sensors via a 4 to 20 mA signal converter (Signet Model 8058). To complete your unit, choose a power module with universal AC line voltage or 12 to 24 VDC. Analog output and relay modules are available and easily installed. Derived measurements include difference, sum, ratio, percent recovery, percent rejection, percent passage and BTU.

The menu system can be programmed to display in multi-languages including English, German, French, Spanish, Italian, and Portuguese.

- 2,4 or 6 sensor input (Flow, Level, pH-ORP, Conductivity, Pressure Temperature)
- 0,2 or 4 analogue output (4-20 mA or 0-10 Volts)
- 0,2,4,6 or 8 relay output
- Power supply 12-30 VDC or 110-230 VAC

- System Specification -

8.7 Batch Control

The batch controller manufactured by GF Piping Systems Signet Type 5600 allows batching a pre-selected quantity of liquid. After selection of the quantity to be dosed, a start signal (local or remote) will close a batch controller contact to energize or de-energize a valve and/or switch on a pump. The batch controller count the pulses coming from any Signet sensor with frequency output and stop the batch process as the pre-selected quantity is reached. Advanced features include a user-set security code, an automatic calibration option, and overrun compensation. The batch process is repeatable and is designed for intensive industrial applications.

9. Quality

9.1 Production Conditions

Pipes, fittings, valves and accessories shall be manufactured in an environment operating a Quality Assurance System to ISO 9001 and an Environmental Management System conform to ISO 14001.

9.2 Marking

All components are embossed with a permanent identification during the production process to ensure full traceability. The following information will be mentioned:

- Manufacturer's name or trade mark
- Production lot number
- Material
- Dimension
- Pressure rating

9.3 Uniformity

Pipes, fittings, valves and Fusion IR Plus machines shall be supplied from one manufacturer, namely GF Piping Systems to ensure correct and proper jointing between components and uniform chemical and physical properties of the piping system.

- System Specification -



9.4 CAD/BIM Library

All components shall be available in GF Piping Systems CAD and BIM library.
Available at: <http://cad.georgfischer.com> & <http://bim.gfps.com>

9.5 Training, Certification and Installation

Site personnel, involved with **PROGEF Standard (PP)** piping installation, shall undergo training and certification from an authorised local institution prior to performing any jointing operations on site. For further information and training please contact GF support under

Contact:

GF Piping Systems Ltd.

Phone: +41 52 631 11 11

E-mail: info.ps@georgfischer.com

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

EC Declaration of Conformity**According to the Pressure Equipment Directive 2014/68/EU, category I, module A****Manufacturer:** Georg Fischer Piping Systems Ltd., 8201 Schaffhausen/Switzerland

We herewith confirm that this delivery contains pressure piping components, which are in conformance with the relevant hereafter specified standards and fulfil the Pressure Equipment Directive within the operating limits specified in the standards.

The components are applicable for fluids according to our chemical resistance tables. After their installation, the components may not be put into operation unless conformity with the PED of the entire pressure equipment has been declared.

NOTE: Valves smaller than DN32 and fittings as individual components are excluded from the PED and therefore must not be CE-marked.

Designation of the piping components

Thermoplastic piping, valves made from ABS, PVC-U, PVC-C, PB, PE, PP or PVDF, as marked on the product

Standards in use for materials, pipes and fittings

PB, PE, PP	EN ISO 15494
PVDF	EN ISO 10931
ABS, PVC-C, PVC-U	EN ISO 15493

Standards in use for valves

Butterfly Valves	EN ISO 16136	+GF+Type: 563, 567, 568, 578, 140 to 147, 240 to 244
Ball Valves	EN ISO 16135	+GF+Type: 323-325; 375, 523, 543, 546, 547, 104, 107, 130 to 135, 230 to 235, 167-170; 179 to 188, 285 to 288
Check Valves	EN ISO 16137	+GF+Type: 305, 306, 561, 562, 591, 595, 369
Diaphragm Valves	EN ISO 16138	+GF+Type: 317, 514 to 519, 604, 605, DIASTAR Six, DIASTAR Ten, DIASTAR TenPlus, DIASTAR Sixteen, DIASTAR 025
Globe Valves	EN ISO 21787	+GF+Type: 300
Strainers	ISO 9393-2	+GF+Type: 303-304

Quality management system for all our products and production sites:

EN ISO 9001

Environmental management system for all our production sites:

EN ISO 14001

Instructions for assembly:

are given in our technical literature

Schaffhausen, 2019-04-17

Helmut Hilger
Head of Technology Center
Thomas Küssner
Head of Product Management Valves

EU Konformitätserklärung

gemäss EG-Druckgeräterichtlinie 2014/68/EU, Kategorie I, Modul A

Hersteller: Georg Fischer Rohrleitungssysteme AG, 8201 Schaffhausen/Schweiz

Hiermit bestätigen wir, dass diese Lieferung Bauteile für Druckrohrleitungen enthält, die mit den anschliessend aufgeführten relevanten Normen konform sind und die Anforderungen der EG-Druckgeräterichtlinie innerhalb der Betriebsgrenzen der Normen erfüllen.

Die Bauteile sind ausschliesslich einsetzbar für Medien gemäss unserer chemischen Beständigkeitsliste. Nach ihrem Einbau dürfen die Bauteile erst dann in Betrieb genommen werden, wenn die Konformität der Gesamtanlage mit der Druckgeräterichtlinie bestätigt wurde.

ANMERKUNG: Armaturen kleiner als DN32 und Fittings als Einzelteile sind vom Umfang der DGR ausgeschlossen und dürfen nicht mit dem CE- Zeichen gekennzeichnet werden.

Bezeichnung der Rohrleitungsteile

Armaturen aus den thermoplastischen Kunststoffen ABS, PVC-U, PVC-C, PB, PE, PP oder PVDF, wie auf dem Produkt angegeben

Angewandte Normen für Werkstoffe, Rohre und Fittings

PB, PE, PP	EN ISO 15494
PVDF	EN ISO 10931
ABS, PVC-C, PVC-U	EN ISO 15493

Angewandte Normen für Armaturen

Absperrklappen	EN ISO 16136	+GF+Type: 563, 567, 568, 578, 140 to 147, 240 to 244
Kugelhähne	EN ISO 16135	+GF+Type: 323-325; 375, 523, 543, 546, 547, 104, 107, 130 to 135, 230 to 235, 167-170; 179 to 188, 285 to 288
Rückflussverhinderer	EN ISO 16137	+GF+Type: 305, 306, 561, 562, 591, 595, 369
Membranventile	EN ISO 16138	+GF+Type: 317, 514 to 519, 604, 605, DIASTAR Six, DIASTAR Ten, DIASTAR TenPlus, DIASTAR Sixteen, DIASTAR 025
Ventile	EN ISO 21787	+GF+Type: 300
Strainers	ISO 9393-2	+GF+Type: 303-304

Qualitäts-Management und Qualitäts-Sicherung unserer Produkte und Produktionsstätte: EN ISO 9001

Umwelt-Management unserer Produktionsstätte: EN ISO 14001

Einbau- und Betriebsanleitungen: siehe unsere technischen Unterlagen

Schaffhausen, 2019-04-17

Helmut Hilger
Head of Technology Center

Thomas Küssner
Head of Product Management Valves

Declaration de Conformite de la CE.**En accord avec la directive PED 2014/68/EU, catégorie I, module A****Fabricant:** Georg Fischer Piping Systems Ltd., 8201 Schaffhausen/Suisse

Nous confirmons par la présente que cette livraison contient des composants travaillant sous pression, en conformité avec les normes ci-après indiquées et respecte la directive d'équipement sous pression dans les limites de fonctionnement indiquées dans ces normes.

Les composants sont utilisés pour des fluides compatibles avec notre table de résistance chimique. Après leurs installations, les composants ne seront rendus opérationnels que si la conformité avec le PED de l'équipement entier ait été validée.

NOTE: Les vannes et raccords inférieurs au DN32 sont exclues du PED et ne sont donc pas marqués CE.

Liste des composants concernés

Tuyauteries et vannes thermoplastiques fabriqués en ABS, PVC-U, PVC-C, PB, PE, PP ou PVDF, selon marquage sur le produit.

Normes utilisés pour les tuyauteries et raccords

PB, PE, PP EN ISO 15494

PVDF EN ISO 10931

ABS, PVC-C, PVC-U EN ISO 15493

Normes utilisés pour les vannes

Vannes Papillon EN ISO 16136 +GF+Type: 563, 567, 568, 578, 140 to 147, 240 to 244

Vannes à bille EN ISO 16135 +GF+Type: 323-325; 375, 523, 543, 546, 547, 104, 107, 130 to 135, 230 to 235, 167-170; 179 to 188, 285 to 288

Clapets de retenu EN ISO 16137 +GF+Type: 305, 306, 561, 562, 591, 595, 369

Vannes à membrane EN ISO 16138 +GF+Type: 317, 514 to 519, 604, 605, DIASTAR Six, DIASTAR Ten, DIASTAR TenPlus, DIASTAR Sixteen, DIASTAR 025

Globe Valves EN ISO 21787 +GF+Type: 300

Strainers ISO 9393-2 +GF+Type: 303-304

Système de management de la qualité pour tous nos produits et sites de productions:

EN ISO 9001

Système de management environnemental pour tous nos sites de productions:

EN ISO 14001

Instruction pour l'assemblage:

contenu dans notre documentation technique

Schaffhausen, 2019-04-17

Helmut Hilger
Head of Technology Center
Thomas Küssner
Head of Product Management Valves

**EU-conformiteitsverklaring
volgens de Richtlijn Drukapparatuur 2014/68/EU, categorie I, module A**

Fabrikant: Georg Fischer Piping Systems AG, 8201 Schaffhausen / Zwitserland

We bevestigen hierbij dat deze levering componenten voor drukleidingsystemen bevat die voldoen aan de relevante onderstaande normen en aan de vereisten van de EG-Richtlijn Drukapparatuur binnen de in de normen genoemde grenzen.

De componenten mogen alleen worden gebruikt voor vloeistoffen volgens onze chemische bestendigheidstijdslijst. Pas na verklaring dat de installatie conform de Richtlijn Drukapparatuur is mag deze in gebruik worden genomen.

OPMERKING: Afsluiters kleiner dan DN32 en fittingen als afzonderlijk onderdeel zijn uitgezonderd van de PED en daarom niet CE-gekeurd.

Benamingen van de drukleidingsystemen

Afsluiters gemaakt van thermoplastische kunststoffen ABS, PVC-U, PVC-C, PB, PE, PP of PVDF, zoals aangegeven op het product.

Toegepaste normen voor materialen, buizen en fittingen

PB, PE, PP	EN ISO 15494
PVDF	EN ISO 10931
ABS, PVC-C, PVC-U	EN ISO 15493

Toegepaste normen voor materialen, buizen en fittingen

Vlinderkleppen	EN ISO 16136	+GF+Type: 563, 567, 568, 578, 140 to 147, 240 to 244
Kogelkranen	EN ISO 16135	+GF+Type: 323-325; 375, 523, 543, 546, 547, 104, 107, 130 to 135, 230 to 235, 167-170; 179 to 188, 285 to 288
Terugslagkleppen	EN ISO 16137	+GF+Type: 305, 306, 561, 562, 591, 595, 369
Membraanafsluiters	EN ISO 16138	+GF+Type: 317, 514 to 519, 604, 605, DIASTAR Six, DIASTAR Ten, DIASTAR TenPlus, DIASTAR Sixteen, DIASTAR 025
Vrijstroomafsluiters	EN ISO 21787	+GF+Type: 300
Vuilvanglers	ISO 9393-2	+GF+Type: 303-304

Kwaliteitsbeheer en –borging van onze producten en productiefaciliteiten: EN ISO 9001

Milieubeheer van onze productiefaciliteiten: EN ISO 14001

Installatie- en bedieningsinstructies: zie onze technische documentatie

Schaffhausen, 17. april 2019


Helmut Hilger
Head of Technology Center


Thomas Küssner
Head of Product Management Valves