

## - System Specification -

### for PVC-U Metric Piping Systems

#### 1. Scope

This specification covers requirements for the Georg Fischer PVC-U Piping System intended for a wide range of applications including water, wastewater and effluent treatment as well as a wide range of chemical applications. The components of the PVC-U piping systems are in accordance with the following standards.

#### 2. Basic System Data

##### 2.1 Material Specification for Unplasticised Polyvinylchloride (PVC-U)

**PVC-U** pipes, fittings and valves from Georg Fischer Piping Systems shall be manufactured from unplasticised polyvinylchloride, of which pipes and fittings are designed for 25 years of operation with water as medium (20°C). PVC-U has also an optimal chemical resistance against many mineral acids, bases and salt solutions. For detailed information, please refer to the list of chemical resistance provided by Georg Fischer Piping Systems. The raw material used shall be material designed for use with pressure bearing piping systems with long term hydrostatic properties in accordance with EN ISO 15493, as supplied by Georg Fischer Piping Systems.

##### 2.1 Characteristics of PVC-U Material

Characteristic	Value	Test Standards
Density	1.38 g/cm <sup>3</sup>	ISO 1183-1
Tensile E-modules	>2400 N/mm <sup>2</sup>	EN ISO 527-1
Charpy notched impact strength at 23 °C	6 kJ/m <sup>2</sup>	EN ISO 179/1eA
Charpy notched impact strength at 0 °C	3 kJ/m <sup>2</sup>	EN ISO 179/1eA
Vicat heat distortion temp. B/50N	≥76 °C	ISO 306
Chemical resistance	DIBT agreement	based on the medium list 40.1.4
Thermal expansion coefficient	0.07 - 0.08 mm/mK	DIN 53752
Temperature range in °C	0°C - 60°C	
Colour	dark grey; 7011 -RAL	

##### 2.2 PVC-U Dimensional Range & Pressure\*\* (at 20 °C)

Products	bar <sup>d</sup>																										
		6	8	10	12	16	20	25	32	40	50	63	75	90	110	125	140	160	180	200	225	250	280	315	355	400	
Pipe	16																										
	10																										
	6																										
Fittings	16																										
	10																										
	6																										
ball valve*	16																										
butterfly valve*	10																								***	***	
diaphragm valve*	10																										
Flange*	16																										
	10																										
gaskets*	16																										
pipe clips	--																										

\* for detailed information please consult the Georg Fischer Piping Systems online catalog

\*\* values in table at the max. pressure in units of bar, at 20°C

\*\*\* metal butterfly valves

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For more detailed physical properties and product pressure – temperature curves, please consult the Georg Fischer Piping Systems Planning Fundamentals on the Georg Fischer Piping Systems website.

### 2.3 Approvals

This material specification for PVC-U is met by Georg Fischer Piping Systems. Therefore Georg Fischer Piping Systems is approved according to different categories all over the world. For more information please consult our approvals database on the Georg Fischer Piping Systems website.

Approvals	DVGW	DIBT	GOST-R	DGS (ACS)	KIWA	CSTB	IIP	ABS	BV	CCS	DNV	GL	LR	RINA	RMROS	
								ship building								
Raw Material																
Pipe																
Fittings																
Valves*																
Flange																
gaskets																

\*\* For details on which valve (ball, butterfly, diaphragm etc. ...) please contact GF database

### 3. Pipes

Pipes are made of **PVC-U** and processed according to the quality specifications and dimensions according to EN ISO 15493. Pipe formulation has been designed for an enhanced chemical resistance (content of CaCO<sub>3</sub> < 3%), enhanced thermo stabilizer package etc.

Processed pipes are straight and show a very low out-of-roundness. The wall structure is homogeneous and even.

OD-tolerances surpass the requirements of ISO 4065 and are compatible with the fitting programme of Georg Fischer Piping Systems for easy pre-assembly and minimized gaps.

For highly demanding applications in the chemical industry, the application of pressure rating SDR 9 pipes and PN 16 fittings is strongly recommended for OD ≤ 110 mm.

Any installation should follow the Georg Fischer Piping Systems installation guidelines for industrial piping and the guidelines issued by the DVS.

Approved pipes comply with the corresponding quality specifications of DIN Certco ZP 1.1.1.

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### **4. Fittings**

All **PVC-U** fittings shall be metric sizes manufactured by Georg Fischer Piping Systems, and shall be of a type suitable for solvent cementing, with dimensions and tolerances in accordance with EN 1452-1 & 3, EN ISO 15493 and ISO 727-1. They need to be tested according to EN 10204. All threaded connections shall have pipe threads in accordance with the requirements of ISO 7-1.

#### **4.1 PRO-FIT Fittings in PVC-U**

All PRO-FIT fittings (elbows 45 ° and 90 °, tee equal, reducing bushes, and unions) shall be metric sizes from d 20-63 mm in PVC-U as manufactured by Georg Fischer Piping Systems. The PRO-FIT fittings shall have a 45° marking as well as integrated marking for vertical mounting and a spigot-socket design, reducing bushes shall offer the possibility of a spigot and cemented socket connection on each side of the fitting as manufactured by Georg Fischer Piping Systems.

#### **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 ISPM 15

### **5. Accessories**

#### **5.2.1 Flanges**

Backing flanges in metric sizes DN 15-225 mm shall be designed according to EN ISO 15493, 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 Georg Fischer Piping Systems. The flange shall be optimised with a V-groove in the inner diameter to ensure an evenly distributed force on the thermo plastic flange adapter. Connecting dimensions metric according to ISO 7005, EN 1092; Bolt circle diameter PN 10; Inch: ANSI B 16.5, BS 1560; class 150.

Alternatively the backing flanges in metric sizes can be from or unplasticized polyvinyl chloride, PVC-U designed according to EN ISO 15493, in a thermo plastic-oriented design. 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 PN 10; Inch: ANSI B 16.5, BS 1560; class 150.