

Product Specifications

Double Containment Metric Piping System Specifications

1. Scope

This specification covers requirements for the +GF+ Georg Fischer (later named only +GF+) pressure **Double Containment** piping system intended for a wide range of applications including water, waste water and effluent treatment as well as a wide range of chemical applications like follows:

- Recommended for gaseous or liquid media, where any leakage of the piping system would endanger the personnel, the operations or the environment.
- Recommended for application conveying critical liquids.
- For piping systems which must be maintained in operation under all circumstances, in order to guarantee process reliability, even in the case of a leak.

The system shall provide separate joints of inner and outer pipe, guaranteeing a visible control of each fusion or cement joint according to the +GF+ recommendation and the DVS fusion regulations. The inner pipe shall be pressure tested before connecting the outer pipe in order to detect any leakage from the inner pipe immediately. The double containment piping system should start and end with termination fittings, allowing to split the piping system into different leak containment sections.

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The components of the inside piping system shall be selected out of the one of the thermoplastics material manufactured and supplied by +GF+ listed in the table here under. Please refer to the adequate material specification template (PVC-U, PVC-C, PP and PVDF)

Outside pipe in PE 100

Dimension	Inner Pipe										
d * D	Socket cementing				Socket fusion			Butt fusion			
inner x	PVC-U	PVC-U	PVC-C	PVC-C	PP-H	PE-80	PVDF	PP-H	PE 100	PVDF	
outler pipe	Tangit	Dytex	Tangit	Dytex				SDR 11	SDR 11	PN 16	PN 10
20 x 50	X	X	X	X	X	X	X	o	o	o	
25 x 50	X	X	X	X	X	X	X	o	o	o	
32 x 63	X	X	X	X	X	X	X	o	o	o	
40 x 75	X	X	X	X	X	X	X	X	X	X	
50 x 90	X	X	X	X	X	X	X	X	X	X	
63 x 110	X	X	X	X	X	X	X	o	o	o	
75 x 125	X	X	X	X	X	X		o	o	o	
90 x 140	X	X	X	X	X	X		o	o	o	
110 x 160	X	X	X	X	X	X		o	o	o	
125 x 180	X							X	X		X
140 x 200	X							X	X		X
160 x 225	X							X	X		X
200 x 280	X							X	X		X
225 x 315	X							X	X		X

o = Infrared butt fusion IR Plus compatible.

On request PVDF also with BCF welding

The components of the outside piping system shall be either in PE 100 or transparent PVC-U pipes. The entire system shall be finished as a fixed-point installation with a structural certificate as provided by +GF+ on request.

The PE 100 material shall be in accordance with the following standards:

2. Extract of the Material Specification for Polyethylene High Density (PE 100) for the outside pipe work of the Double containment piping system

PE 100 pipes and fittings from +GF+ are manufactured from High Density Polyethylene 100 (MRS 10 MPa) either with SDR 11 or SDR 17,6 version, of which pipes and fittings are designed for 25 years for industrial operation. 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 15494, as supplied by +GF+.

Extract of Material characteristics of PE 100 (Standard Values)

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Characteristic	Value	Units	Test Standards
Density	0.95	g/cm ³	ISO 1183
Charpy notched impact strength at 23 °C	83/p	kJ/m ²	EN ISO 179/1eA
Charpy notched impact strength at -40 °C	13	kJ/m ²	EN ISO 179/1eA
Crystallite melting point	130	°C	ISO 306
Thermal expansion coefficient	0.15-.020	mm/mK	DIN 53752
Colour	9005	-	RAL
Temperature range in °C:	-50 - + 60 in °C		
Operating pressure range for Pipes, Fittings up to d 400 mm:			
- S 5 / SDR 11			PN 16 at 20 °C
- S 8.3 / SDR 17,6			PN 10 at 20 °C

For more detailed physical properties please see +GF+ literature reference GMST 5957/4 (planning fundamentals / 2006).

3. Outside Pipes

All **PE 100** pipes shall be metric sizes d 50 – 315 mm manufactured in accordance with the requirements of DIN 8074 and EN ISO 15494, as supplied by +GF+. Furthermore the pipes are manufactured stress free, without any voids, allowing a high grade of roundness, high degree of straightness. On request the entire PE 100 pipe range can be manufactured with a very smooth surface of r_a -value < 2 µm and and/or with DIBT conform **PE 100** raw materials.

4. Fittings

The specialised double containment fittings **CONTAIN – IT Plus** for the inner and outer pipes are injection moulded manufactured by +GF+ according to the standards EN ISO 15493, 15494 and ISO 7279.

The outer fittings are always manufactured in **PE 100** and shall be metric sizes d 50 – d 315 mm manufactured by +GF+. Their dimensions shall be in tolerances with EN ISO 15493, 15494 and ISO 7279. The outer fitting is already attached to the inner fitting. The inner and outer fitting shall be connected together using rigid support rings, which act as fixed points for the inner pipe. This prevents expansion of the inner pipe in the outer pipe.

The PE 100 outer fittings shall have and integrated joint spigots which also act as the support ring for the inner pipes for connection by means of push-on ELGEF® Plus electrofusion sockets or EPDM rubber sleeves. Electro-fusion sockets shall be type ELGEF® Plus in PE 100 as manufactured and supplied by +GF+. The electrofusion fittings in PE 100 will contain in the fitting wall the heat conductive wire, avoiding any possible contact with the later transported media. These unions will be used to weld the outside pipes. The Sockets shall be pushed over the end of the pipe being connected,

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and/ or over the long end of the fitting. This operation shall be done before the inner pipes are jointed together.

4.1 Fitting Accessories

Special pipe spacers shall be in PP and will maintain the inner pipe in a stable position within the outside pipe. These spaces shall have a simple locking system in order to maintain it on a fix position on the inner pipe.

For leak detection purposes +GF+ supplies electrofusion branch saddles in PE 100 and small monitoring pipes in transparent PVC-U for visual inspections.

5. Valves and instrumentation

The ball valves and instrumentation components will integrate the standard valves and instrumentation manufactured by +GF+ and shall be supplied as one integrated component. The valves shall be available in manual and automated version as supplied by +GF+. For more details please refer to the adequate specification template per material (PVC-U, PVC-C, PP and PVDF)

6. Piping System Pressure Rating

All components in PE 100 in SDR 11 are designed for a maximal operating pressure of 16 bars at 20 °C up to an external dimension of DN 400 mm. All components in PE 100 in SDR 17.6 are designed for a maximal operating pressure of 10 bars at 20 °C from DN 50-400 mm. Binding is continuously updated product information available on our homepage.

7. Marking

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

- Production lot number
- Material
- Dimension
- Pressure rating

8. Welding and assembly

The patented double containment jointing technique allows to install of the double containment pipe to the single pipe according to the same directives and guidelines from the DVS (German association for jointing, linked to the EWF) as for standard thermoplastic piping connections. Therefore the double containment piping system from +GF+ allows a pressure testing of the inner pipe before the outside pipe is welded. This unique and patented technique gives the operational safety that the inner pipe really is leak-tight.

- For the inner pipe:

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a) All solvent cemented fittings in PVC-U and PVC-C as manufactured by +GF+ shall be jointed with the Tangit[®] PVC-U or PVC-C solvent cement and Tangit[®] cleaner for PVC-U or PVC-C as manufactured by Henkel in accordance to EN 1452-3. For some critical media solvent cementing should be executed with Dytex solvent cement and Dytex Cleaning for PVC-U, as manufactured by Henkel. All solvent cementing and cleaner products must be used in accordance with the manufacture instructions.

Installation, including support spacing and expansion considerations, shall be in accordance with the +GF+ written recommendations especially regarding thermal expansion precautions and the installation conditions on site

b) All Butt and Socket welding have to be executed in conformity with the +GF+ recommendation, described in the +GF+ planning fundamentals, chapter jointing technologies and to the DVS standard 2207-part 15. A systematic visual weld beat inspection should to be performed according to the DVS 2202 – part 1.

In case that welds with an increased mechanical and chemical stability then conventional welding methods are chosen, the +GF+ fusion technology IR Plus[®] or BCF Plus shall be selected.

- For the outside pipe:

The outside piping in PE 100 is designed as 16/10 bar pressure system. The welding will be realised with ELGEF[®] Plus PE 100 electrofusion sockets and PE 100 pipes using the +GF+ MSA electrofusion machine to ensure best welding quality. Only authorised welder by +GF+ are allowed to perform fusion on these machines.

The welding and the installation should be in accordance with +GF+ Piping Systems Guide to the Installation and Use of Plastic Pipeline. For further information and training regarding the standard socket and butt fusion techniques or the +GF+ fusion technology of IR[®] Plus, BCF[®] Plus or Electrofusion machine MSA please contact Georg Fischer support under +41 52 631 11 11 or e-mail to info.ps@georgfischer.com.

9. Pipe Support System

Pipe Support System shall be KLIP-IT, sizes d10-400, manufactured by +GF+.

10. Quality

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

11. Uniformity

All Pipes, fittings, valves and cleaner shall be supplied from one manufacturer, namely +GF+, to ensure correct and proper jointing between components and uniform chemical and physical properties of the piping system.

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12. Training, Certification and Installation

Site personnel, involved with the installation of Double containment piping system **CONTAIN-IT Plus**, shall undergo training and certification from an authorised +GF+ representative prior to performing any jointing operations on site. Installation, including support spacing and expansion considerations, shall be in accordance with the +GF+ written recommendations.

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