



UPONOR INFRASTRUCTURE

UPONOR PRESSURE
FITTINGS

Pressure
Systems



Pressure Fittings for
Electrofusion and Butt Fusion

6.6 Uponor Pressure Fittings – Characteristics

Uponor PE pressure system fittings are manufactured in different versions, according to the application and the manufacturing method.

Uponor pipe fittings are made of polyethylene PE100, i.e. the same material as the majority of pipes in use today. PE100 fittings can also be used with PE80 pipes. However, pipes and fittings must have the same wall thickness if they are to be joined by butt welding. Alternatively, if they have different wall thicknesses but are made of the same material, they can be joined by electrofusion welding.

Uponor pressure fittings are either segment-welded or die-cast. The segment-welded fittings range comprises ready-welded socket bends and branches. These fittings can be bespoke manufactured to customer requirements.



The Uponor die-cast fittings range is intended for butt- and electrofusion welding and includes bends, T-branches, and reducers. Most of these are long fittings, which enables them to be welded together using electrofusion sockets and fastened to a standard butt fusion welding machine. The fittings range is supplemented with flanges and plastic collars.



Uponor's electrofusion fittings product range includes sockets, reducers, bends, T-branches, drilling saddles and plugs. These fittings are welded using an electrofusion machine, which passes an electrical current to the fitting via resistance wires, thus heating the fitting and fusing it to the pipe. This method is being increasingly adopted, especially for the jointing of small diameter pipes.



Uponor pressure fittings match all other Uponor pipes and components in strength, and have excellent resistance to high mechanical stresses, including pressure fluctuations and surges.

The fittings are also highly resistant to corrosion and most solvents, acids, alkalis

and oils. See Table 2.2 of the introductory section for details of the performance and service life of PE100.

The sizes of Uponor PE100 fittings are the same as those of the Uponor PE pressure system. Segment-welded fittings are available for all SDR classes. Die-cast fittings are available for SDR 17 and SDR 11 pipes, and electrofusion fittings for SDR 11 pipes.

The same electrofusion fittings can be used for both water and gas, with a pressure grade of PN 16 for water and PN 8 for gas.

System and material specifications

Properties	PE100	Unit	Standard/test method
Density	950	kg/m ³	ISO 1183
Melt mass-flow rate (MFR)	0,3 - 0,55	g/10 min.	ISO 1133
Short-term elastic modulus E_0	900 - 1000	MPa	ISO 6259
Long-term elastic modulus E	225 - 250	MPa	ISO 6259
Thermal expansion factor	0,17	mm/m · °C	ASTM D 696 (20 - 90 °C)
Thermal conductivity	0,43	W/m · °C	DIN 52 612 (20 °C)
Specific heat	1,9	J/g · °C	
Yield stress	23	MPa	
Maximum tensile stress, short-term	10	MPa	
MRS value	10	MPa	ISO/DIS 4427 / CEN/TC 155 SS20
Design stress	8	MPa	EN ISO 12201 / EN ISO 13243
Safety factor (water pipe and pressure sewer)	1,25		EN ISO 12201 / EN ISO 13243
Safety factor (gas pipe)	Min. 2		EN 1555

Table 6.6.1

Approvals & markings

Approvals

Uponor PE100 fittings are approved in accordance with the EN 12201 and

EN 1555 standards. For the latest product approvals, visit us at www.uponor.fi.

Markings

Because they are made from pipe segments, segment-welded fittings carry the same markings as pipes.

Die-cast butt fusion and electrofusion fittings carry a stamp indicating the material, size and SDR.

Some examples of fitting markings:



Standard Dimension Ratio (SDR)

The SDR indicates the outside diameter to wall thickness ratio.

The SDR and the material type can be used together to obtain a value which gives a better than normal description of the pressure rating, without knowing the safety factors.

$$\text{SDR} = \frac{\text{Nominal diameter}}{\text{Min. wall thickness}}$$

SDR and pressure rating table

The pressure grades apply to potable water pipes and pressure sewers.

Material	σ	SDR		
Designation	MPa	26	17	11
PE100	8	PN 6,3	PN 10	PN 16

Table 6.6.2

Sigma (σ) is the design stress of the pipe material.

The PN value is the nominal pressure, the maximum operating pressure (bar).

Based on a constant pressure of 20 °C mean temperature for 50 years.

Example for ø110 PE100 PN 10 fittings:

$$\text{SDR} = \frac{D_y}{e} = \frac{110}{6,6} \Rightarrow \text{SDR17}$$

PE100 Pressure Fittings, Installation

Joining/welding

Uponor PE100 fittings are compatible with all standard joining methods.

Detailed butt fusion are given in the pipe-specific sections of this manual.

Electrofusion instructions are also given in the pipe-specific sections of this manual.

PE100 fittings can also be coupled mechanically.

The fittings are compatible with all standard PE pipe installation, extension and maintenance techniques.