

R978



Radiant
Systems

Polyethylene pipes PE-RT type II

Datasheet
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R978

R978 PE-RT pipes (polyethylene with enhanced thermal resistance) can be used for the distribution of water in heating and/or cooling systems.

Thanks to the high flexibility of this material, the laying operations of the pipes result extremely easy and quick.

Further advantages represented by the use of synthetic pipes are the absence of welding, and the reduction of chased mechanical joints that in the long term could cause leakage, in addition to the high life time of the material that is not subjected to encrustations and electrochemical phenomenon.

The R978 PE-RT pipes are extruded with an EVOH anti-oxygen barrier, thanks to which the modest oxygen quantity that outside permeates inwards the pipe, becomes completely marginal.

➤ Versions and product codes

PRODUCT CODE	SIZE [mm]	PACK [m]	PIPE COLOR	ANTI-OXYGEN BARRIER
R978Y172	12 x 1,5	240	Red	EVOH 3 layers
R978Y175	12 x 1,5	600	Red	
R978Y114	16 x 1,5	120	Grey	EVOH 5 layers
R978Y116	16 x 1,5	240	Grey	
R978Y117	16 x 1,5	600	Grey	
R978Y223	16 x 2	100	Red	
R978Y226	16 x 2	240	Red	
R978Y227	16 x 2	600	Red	

PRODUCT CODE	SIZE [mm]	PACK [m]	PIPE COLOR	ANTI-OXYGEN BARRIER
R978Y233	17 x 2	100	Red	EVOH 5 layers
R978Y235	17 x 2	240	Red	
R978Y237	17 x 2	600	Red	
R978Y144	20 x 1,9	120	Grey	
R978Y146	20 x 1,9	240	Grey	
R978Y147	20 x 1,9	400	Grey	
R978Y255	20 x 2	240	Red	
R978Y256	20 x 2	400	Red	

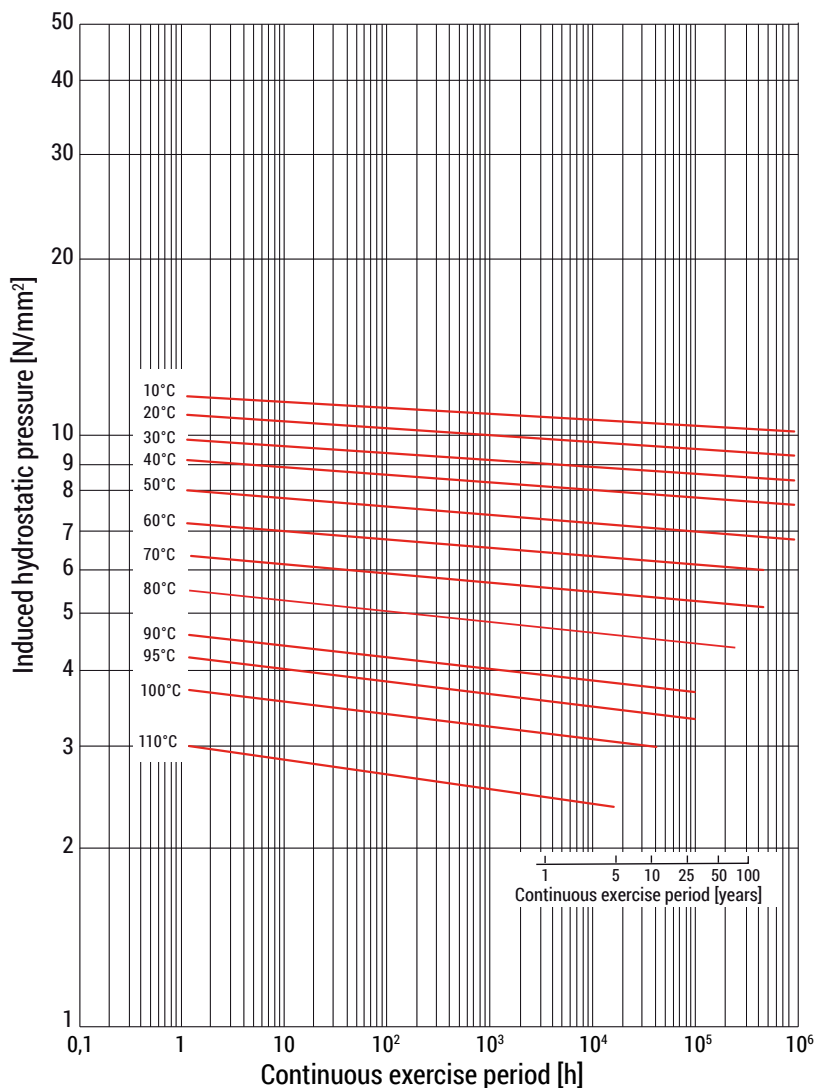
Technical data

- Application classes (ISO 22391): 4
- Not suitable for the transport of domestic water
- Density at 23 °C: > 0,941 g/cm³
- Thermal conductivity: 0,40 W/m K
- Thermal expansion coefficient: (1,8 x 10⁻⁴)/K
- Breaking load: 36 MPa
- Breaking elongation: 760 %
- Elastic modulus: 650 MPa
- External 3-layer EVOH anti-oxygen barrier:
for pipes with size 12 x 1,5
- External 5-layer EVOH anti-oxygen barrier:
for pipes with size 16 x 1,5 - 16 x 2 - 17 x 2 - 20 x 1,9 - 20 x 2

- The pipes are suitable for transporting water for a period of 50 years at a working temperature corresponding to the field of application and an operating pressure of 6 bar (8 bar for 12 x 1,5 mm pipes).
- The pipes are suitable for transporting water for a period of 50 years at a temperature of 20 °C and an operating pressure of 10 bar.

NOTE. R978 PE-RT pipes are designed and verified according to ISO 22391 Standard, that define the physical and dimensional features, as well as the evaluation of the resistance to the combined stress of pressure and temperature, with reference to the related regression curves.

Resistance to combined pressure and temperature stress with respect to regression curves



Series of pipes (S)

$$S = \frac{d - s}{2 \cdot s}$$

Standard Dimension Ratio (SDR)

$$SDR = 2 \cdot S + 1 = \frac{d}{s}$$

s: pipe nominal thickness

d: pipe nominal diameter

Regression curve

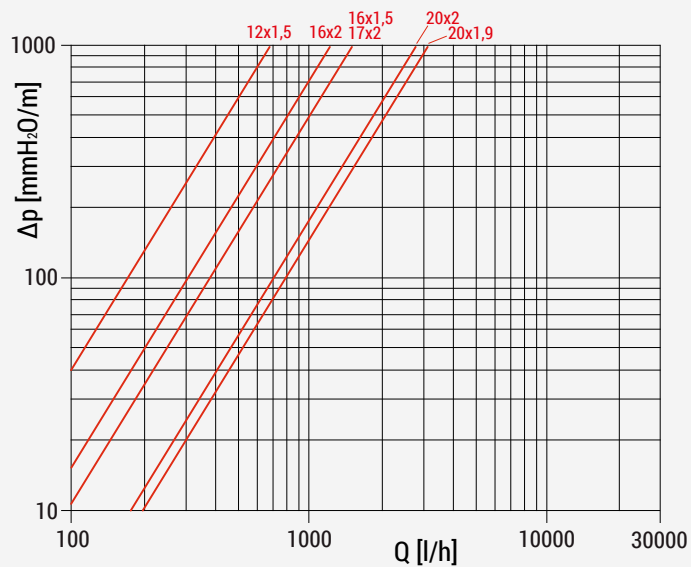
$$\alpha = p \cdot \frac{d - s}{2 \cdot s}$$

α: hydrostatic stress

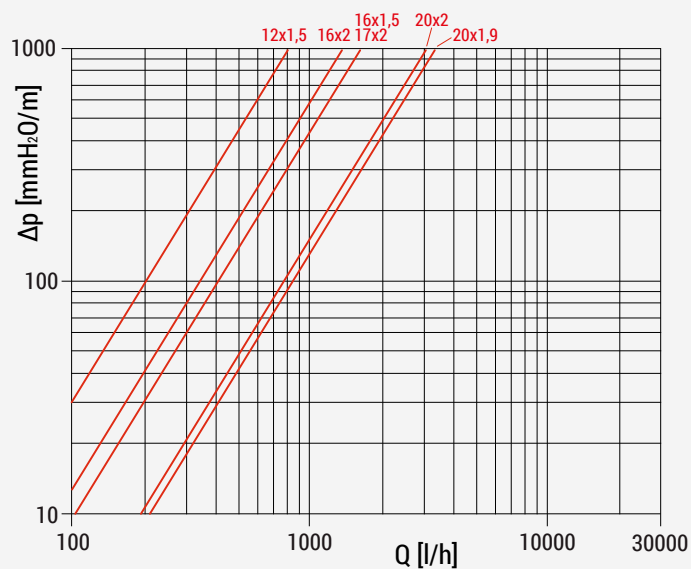
p: induced hydrostatic pressure

Losses of pressure

TEMPERATURE = 10 °C



TEMPERATURE = 50 °C



➤ Pipe laying

For the laying operations of PE-RT pipes, it is necessary to follow some simple practical rules concerning the choice of the fittings, the respect of the minimum radius of curvature and the protection from the sun rays and from possible fortuitous damages.

- The connection to distribution manifolds and to the system terminals shall be made by means of Giacomini's adaptors for synthetic pipes.
- In order to make a correct connection, it is essential to cut off the pipes with tools that can make a clean cut without deburring and perpendicular to its axis.
- During the pipe laying operations, it is necessary making curvatures with a minimum radius equal to five times the external diameter of the pipe itself. After the pipe laying, it is opportune making a pressure test of the system, in order to underline immediately possible fluid losses.
- In case of radiant panel systems, the laying of the pipe covering shall occur with care, by paying attention not to scratch the pipes with spatulas or crush them in the passages with wheel barrow.
- The pipes must not remain exposed for long time to the sun radiations or to fluorescent lamps. Keep the coils that are not used in the suitable boxes, to avoid that the ultraviolet rays will alter the chemical and physical features.
- In case of radiant panel systems, it is good to lay over the pipes a foundation of 3 cm at least, to avoid cracks due to thermal expansion.
- While crossing possible expansion joints, it is important to protect the pipe with a protecting covering in order to avoid excessive mechanical stress.

➤ Precautions

The use of R978 pipes requires the observance of some prescriptions, needed to guarantee the life time and the functional character.

- Store the pipes in the appropriate packaging, by avoiding their direct exposition to sun rays, and in covered and dry places to prevent damages to the boxes caused by the humidity.
- Prevent the pipes from coming into contact with sharp bodies able to scratch and trigger carving phenomenon – pay particular care during the installation and transport phases.
- Prevent icing inside the pipes and in the packaging, because the expansions due to the state change could cause cracking.
- Prevent the pipe from coming into contact with open flames or other heat sources, that could provoke melting, even partial.
- If a fixing to electrically welded networks is needed, use plastic material instead of metallic bands, to avoid damages to the pipes.
- Prevent the contact with chemical solvents or paints that can damage the pipes.

➤ Warranty

The guarantee is not valid in the following cases:

- 1) if the working conditions are different from those prescribed;
- 2) if the pipes are used to distribute fluids, that are not compatible with the material;
- 3) if the installation instructions are not scrupulously followed
- 4) if at the installation time, during the laying phase or at the pressure testing of the system, the pipe shows visually perceivable defects caused by accidental factors;
- 5) if the pipe is installed by using components not produced by Giacomini S.p.A., or in any case different from the permitted ones.

➤ Classification of working conditions (ISO 22391)

The performance specifications for pipe-based systems complying with ISO 22391 refer to a project with a 50-year operational life.

RANGE OF APPLICATION	WORKING TEMPERATURE T_D [°C]	DURATION OF T_D [years]	MAX WORKING TEMPERATURE T_{MAX} [°C]	DURATION OF T_{MAX} [years]	FAILURE TEMPERATURE T_{FAIL} [°C]	DURATION OF T_{FAIL} [h]
CLASS 4 Floor heating and low-temperature systems	20	2,5	70	2,5	100	100
	+	+				
	40	20				
	+	+				
	60	25				

- Working temperature (T_D): working temperature provided for the range of application, expressed in °C.
- Max. working temperature (T_{MAX}): the working temperature highest value, allowed only for a short time.
- Failure temperature (T_{FAIL}): the highest temperature possible when control systems fail (the time allowed for this value is 100 h over 50 years of uninterrupted operation).

➤ Product specifications

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R978 PE-RT pipes (polyethylene with enhanced thermal resistance) with EVOH anti-oxygen barrier. Application classes (ISO 22397): 4 (radiant floor heating and low temperature systems). Not suitable for the transport of domestic water. Density at 23 °C: > 0,941 g/cm³. Thermal conductivity: 0,40 W/m K. Thermal expansion coefficient: (1,8 x 10⁻⁴)/K. Breaking load: 36 MPa. Breaking elongation: 760 %. Elastic modulus: 650 MPa.

⚠ Safety Warning. Installation, commissioning and periodical maintenance of the product must be carried out by qualified operators in compliance with national regulations and/or local standards. A qualified installer must take all required measures, including use of Individual Protection Devices, for his and others' safety. An improper installation may damage people, animals or objects towards which Giacomini S.p.A. may not be held liable.

♻ Package Disposal. Carton boxes: paper recycling. Plastic bags and bubble wrap: plastic recycling.

ℹ Additional information. For more information, go to giacomini.com or contact our technical assistance service. This document provides only general indications. Giacomini S.p.A. may change at any time, without notice and for technical or commercial reasons, the items included herewith. The information included in this technical sheet do not exempt the user from strictly complying with the rules and good practice standards in force.

♻ Product Disposal. Do not dispose of product as municipal waste at the end of its life cycle. Dispose of product at a special recycling platform managed by local authorities or at retailers providing this type of service.