



**Description**

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 intermediate anti-oxygen barrier of EVOH, thanks to which the modest oxygen quantity that outside permeates inwards the pipe, becomes completely marginal.

**Versions and product codes**

Product code	Size	Packaging [m]
R978Y223	16 x 2	100
R978Y226		240
R978Y227		600
R978Y233	17 x 2	100
R978Y235		240
R978Y237		600
R978Y255	20 x 2	240
R978Y256		400

**Technical Data**

- Application range: class 4 (ISO 22391)
- Density: 0,941 g/cm<sup>3</sup>
- Thermal conductivity: 0,40 W/(m K)
- Linear expansion coefficient: (1,8x10<sup>-4</sup>)/K
- Breaking load: 36 MPa
- Breaking elongation: 760 %
- Elastic modulus: 650 MPa

R978 pipes are dimensioned and verified according to ISO 22391 norm, 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 (S) of pipes      Standard Dimension Ratio (SDR)  
 $S = \frac{d-s}{2 \cdot s}$                        $SDR = 2 \cdot S + 1 \approx \frac{d}{s}$

where **s** is the nominal pipe thickness  
**d** is the nominal pipe diameter

**Regression curves**

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

where **a** is the hydrostatic stress  
**p** is the induced hydrostatic pressure

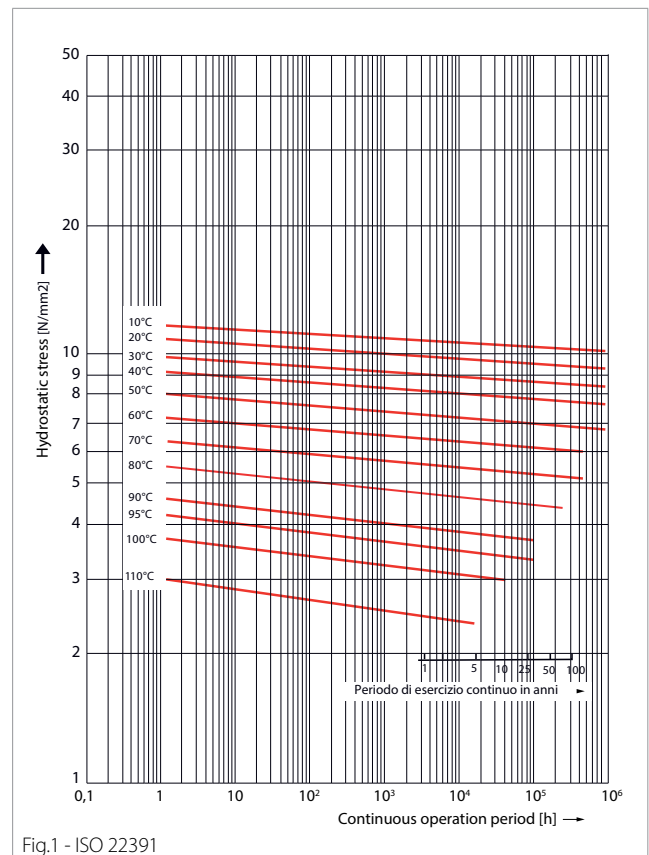


Fig.1 - ISO 22391



**Installation**

For the laying operations of R978 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.

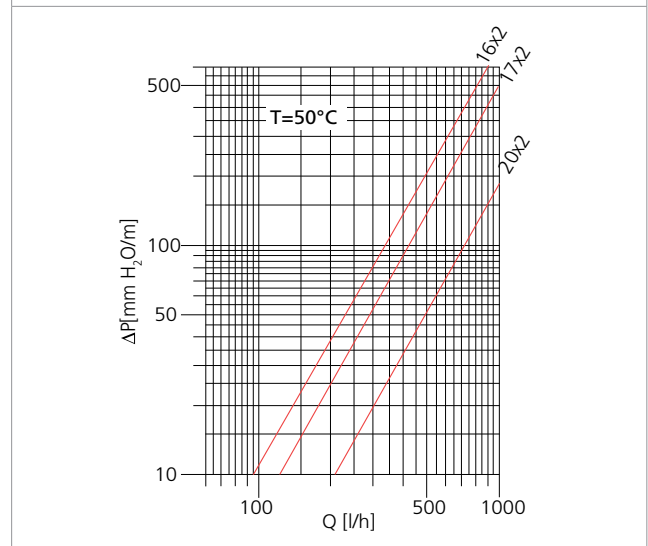
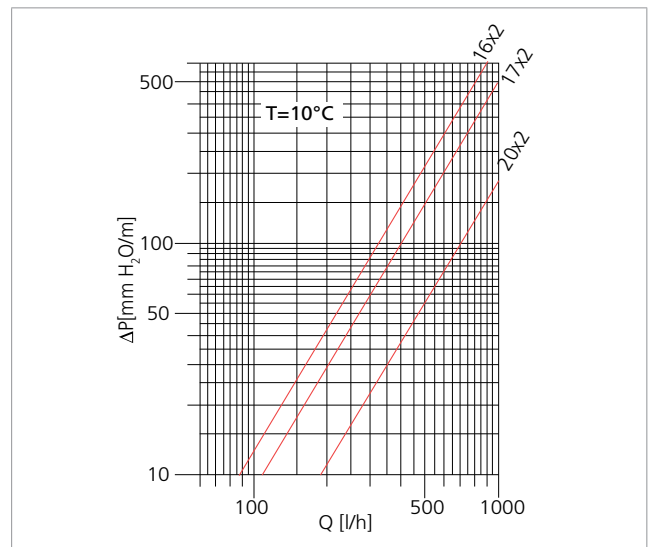
**Precautions**

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

The principal precautions to be followed are:

1. 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.
2. 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.
3. Prevent icing inside the pipes and in the packaging, because the expansions due to the state change could cause cracking.
4. Prevent the pipe from coming into contact with open flames or other heat sources, that could provoke melting, even partial.
5. If a fixing to electrically welded networks is needed, use plastic material instead of metallic bands, to avoid damages to the pipes.
6. Prevent the contact with chemical solvents or paints that can damage the pipes.

**Pressure losses**



**Guarantee**

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.

**Normative references**

- ISO 22391  
Plastics piping systems for hot and cold water installations.  
Polyethylene of raised temperature resistance (PE-RT)



## ADD ON

### ISO 22391

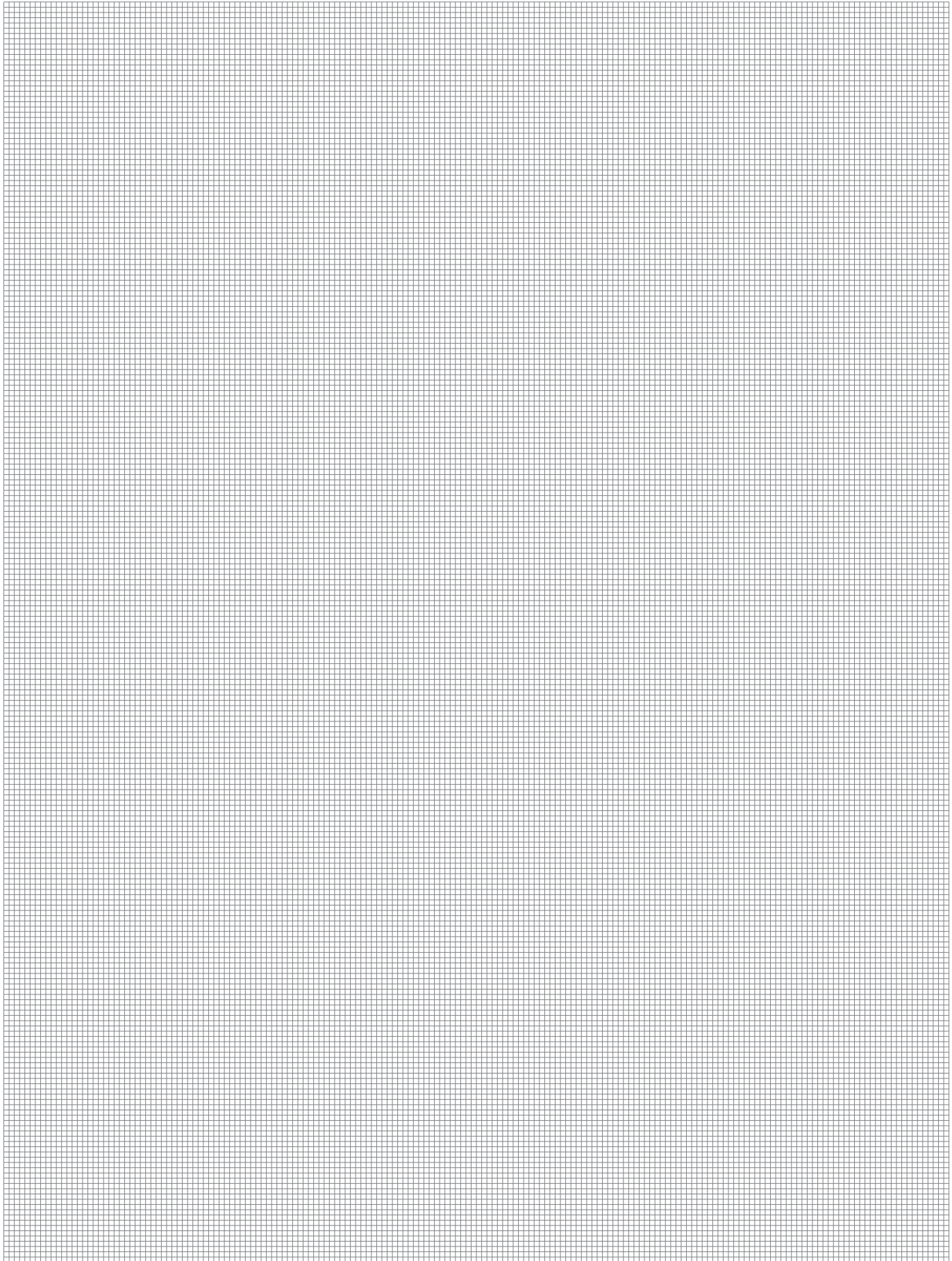
#### Classification of the working conditions

Performance requirements for pipe systems complying with ISO 22391 are specified for an operating lifespan of 50 years.

Application range	T <sub>oper</sub> [°C]	Time at T <sub>oper</sub> [years]	T <sub>max</sub> [°C]	Time at T <sub>max</sub> [years]	T <sub>mal</sub> [°C]	Time at T <sub>mal</sub> [h]
<b>CLASS 4</b> Underfloor heating and low-temperature radiators	20	plus 2,5	70	2,5	100	100
	40	plus 20				
	60	plus 25				

- Operating temperature (T<sub>oper</sub>): operating temperature envisaged for the application range, expressed in °C.
- Max. working temperature (T<sub>max</sub>): the highest value of the operating temperature, only allowed for a short period of time.
- Malfunctioning temperature (T<sub>mal</sub>): the highest temperature value that can occur when the control systems are not working (the time period possible and allowed for this value is 100 h over 50 years of continuous operation).

All the pipes are suitable for transporting water for a period of 50 years at a temperature corresponding at the application range and an operating pressure of 6 bar.  
All 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.



**Additional information**

For additional information please check the website [www.giacomini.com](http://www.giacomini.com) or contact the technical service: ☎ +39 0322 923372 📠 +39 0322 923255 ✉ [consulenza.prodotti@giacomini.com](mailto:consulenza.prodotti@giacomini.com)  
This pamphlet is merely for information purposes. Giacomini S.p.A. retains the right to make modifications for technical or commercial reasons, without prior notice, to the items described in this pamphlet. The information described in this technical pamphlet does not exempt the user from following carefully the existing regulations and norms on good workmanship.  
Giacomini S.p.A. Via per Alzo, 39 - 28017 San Maurizio d'Opaglio (NO) Italy