

## GIACOTHERM PIPES MADE OF PE-X WITH ANTI-OXYGEN BARRIER



R996T

### Description

R996T GIACOTHERM pipes in Pe-Xb (polyethylene crosslinked with the silane method - crosslinking degree > 70%) can be used for the water distribution into heating and/or cooling systems.

Due to a compound expressly developed for this product, the R996T GIACOTHERM series combines the known advantages represented by the use of pipes in synthetic material, the feature of high flexibility, a rapid and easy installation and a consistent stress reduction, after the completion of the laying operations. Other distinguishing features of R996T GIACOTHERM pipes are the excellent organoleptic properties and the high brightness, that reduces the inclination to deposit formation.

Finally all R996T GIACOTHERM pipes are extruded with an external anti-oxygen barrier in EVOH, in compliance with EN ISO 15875 and DIN 4726 standards, therefore the modest oxygen quantity that permeates from outside towards the inside of the pipe, becomes quite negligible.

### Sizes and Part numbers

PART NUMBER	SIZE	PACKAGING
R996TY047	16x1,5	100m
R996TY048	16x1,5	240m
R996TY027	16x2	100m
R996TY019	16x2	240m
R996TY064	16x2	600m
R996TY054	17x2	100m
R996TY033	17x2	240m
R996TY052	17x2	600m
R996TY049	18x2	100m
R996TY020	18x2	240m
R996TY050	18x2	500m
R996TY021	20x2	100m
R996TY022	20x2	240m
R996TY053	20x2	400m
R996TY068	25x2,3	320m

R996T GIACOTHERM pipes in Pe-X are distributed in cartons, which makes storage, protection from the rays of the sun and protection from accidental damages safer.

### Technical features

OPERATION FIELD* *ref. EN ISO 15875 - Table 1,	CLASS 4 CLASS 5
Density	0,939 g/cm <sup>3</sup>
Crosslinking degree	> 70%
Thermal conductivity	0,38 W/(m·K)
Coefficient of linear expansion	1,9 *10 <sup>-4</sup> K <sup>-1</sup>
Breaking load	31 MPa
Breaking elongation	520%
Elasticity module at 23°C	540 MPa

R996T GIACOTHERM pipes in Pe-X comply with EN ISO 15875 standard, which defines the physical and dimensional features, and are verified following EN ISO 15875 and DIN 16892 standards, that allow evaluation of the resistance to the combined pressure and temperature stress, with reference to the relevant regression curves.

### Series of pipes Standard Dimension Ratio

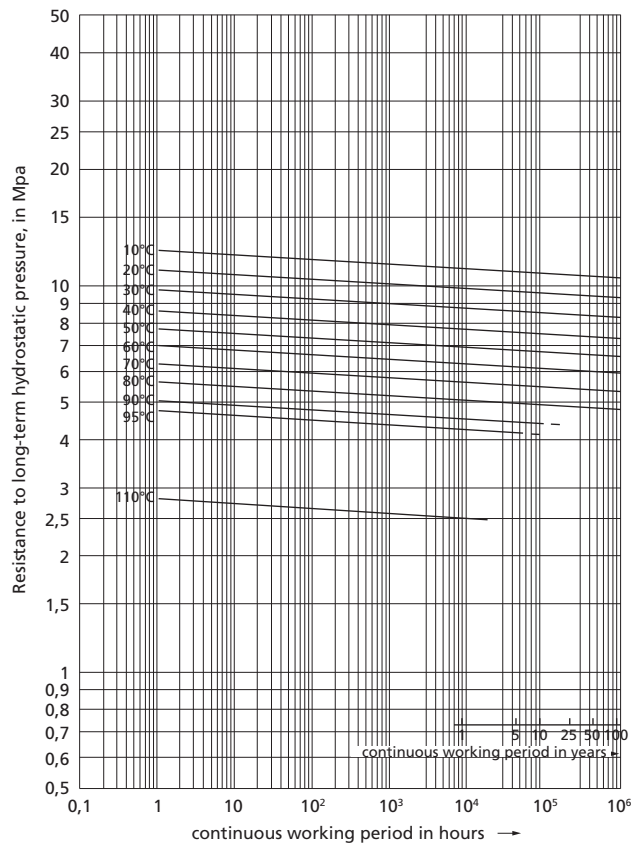
$$S = \frac{d-s}{2 \cdot S} \quad SDR = 2 \cdot S + 1 \approx \frac{d}{S}$$

Where s is the nominal thickness of the pipe  
d is the nominal diameter of the pipe

### Regression curves

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

Where  $\alpha$  is the hydrostatic stress  
 $\rho$  is the induced hydrostatic pressure



ref. DIN 16892 - Figure 1

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### Ease of laying

By comparing the traction elastic module of R996T GIACOTHERM pipes, calculated at 23°C in room, with an average of the values reported in literature for the different types of Pe-X and considering that " lower is the elastic module, higher is the pipe flexibility", it shows the advantage in terms of obtainable flexibility by using this kind of product.

ELASTIC MODULE AT 23°C (MPa)	
R996T GIACOTHERM	540
Pe-X	623 ÷ 890

At lower temperatures, when the pipe laying is particularly unfavourable, the difference can become even more consistent.

### Installation

For laying operations of the R996T Pe-X GIACOTHERM pipes, it is necessary to follow some easy practical rules concerning the choice of the fittings, the respect of the minimum radius of curvature, the protection from sun rays and from possible accidental damage. The connection to the distribution manifolds and to the system terminals is made by means of Giacomini adaptors for synthetic pipes.

To carry out a correct connection, it is essential to cut off the pipes with tools able to make a clean cut, without deburring and perpendicular to its axis.

In the pipe laying operations, it is necessary to make curves with minimum radius equal to 5 times the external diameter of the pipe itself. After laying the pipe, it is opportune to carry out a pressure test of the system, so as to immediately underline eventual fluid losses.

In case of radiant panel systems, be careful when laying the covering foundation over the pipe, paying attention not to scratch the pipes, or crush them when using other tools or items such as a wheel barrow. You have to avoid the pipes remaining exposed for long periods to the sun radiation or to fluorescent lamps, keeping the unused coils in their cartons, to prevent the ultraviolet rays from altering the chemical and physical characteristics.

In case of radiant panel systems, it is good practise to lay above the pipes a foundation of at least 3 cm, to avoid cracks due to thermal expansion.

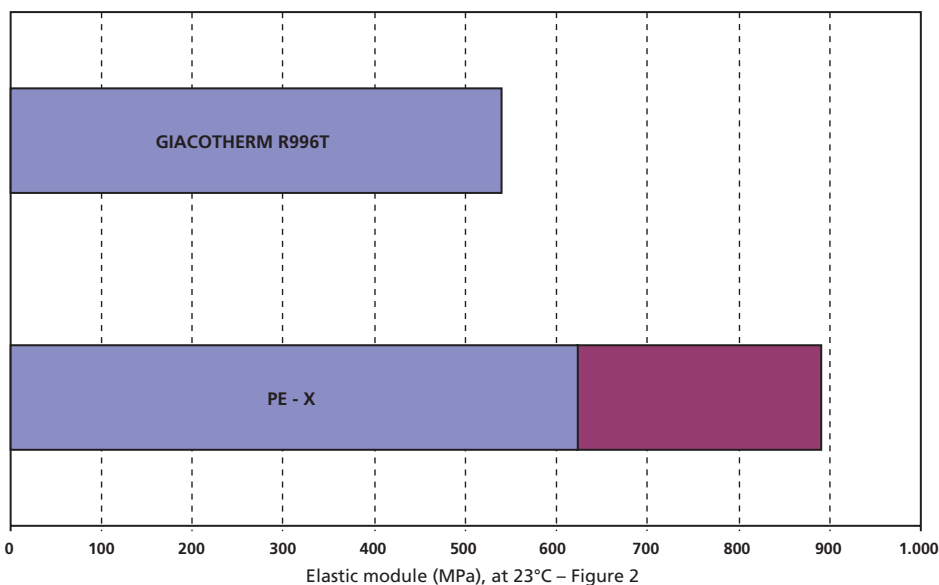
While crossing eventual expansion joints, it is important to protect the pipe with a sleeve, to prevent excessive mechanical stresses.

### Precautions

The use of R996T Pe-X GIACOTHERM pipes requires the observance of certain requirements, needed to guarantee the lifetime and the operation.

The principal precautions to be followed are:

1. Store the pipes in the appropriate packaging, avoiding their direct exposure to sun rays, and store in covered and dry places, preventing the humidity damaging the boxes.
2. Avoid the pipes coming into contact with sharp edges or articles able to scratch them and trigger a cogging phenomenon, paying particular care in the installation and transport phases.
3. Avoid the ice formation inside the pipes and the packaging, because the expansion due to the status passage could cause a crack.
4. Prevent the pipes coming into contact with free flames or with other heat sources, able to provoke fusions, even partial.
5. During the eventual fixing to electrowelded network, use plastic material clamps, instead of metallic, to avoid the pipe damage.
6. Avoid the contact with chemical solvents or paints that could damage the pipes.



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### Guarantee

All products and components supplied by Giacomini S.p.A. are subjected to the European norms in force as regards to guarantee and responsibility (1994/44/CE Directive, 2001/95/CE Directive and CEE 85/374).

The guarantee is not valid in the following cases:

1. If the working conditions are different from the prescribed ones;
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 the pipe shows defects already present at the installation time due to accidental factors, visually perceivable in the laying phase, or at the system pressure test;
5. If the pipe is installed using components not produced by Giacomini S.p.A. or anyway different from the allowed ones.

### Reference standards

ISO 4065

Thermoplastic pipes - Universal wall thickness table

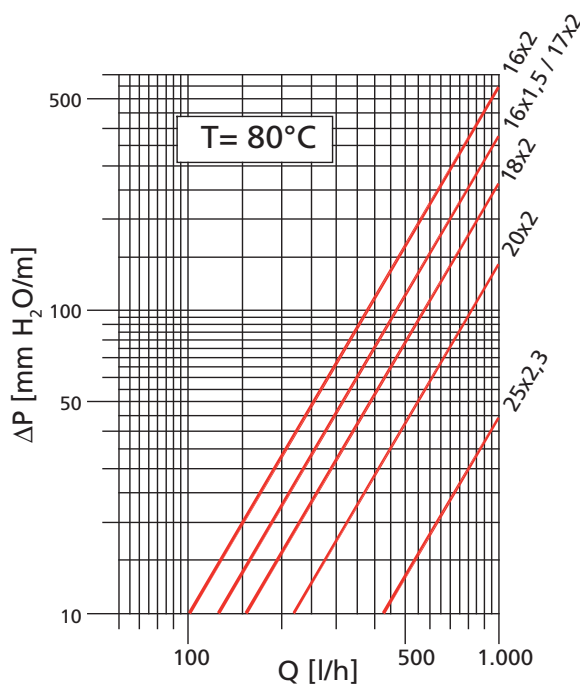
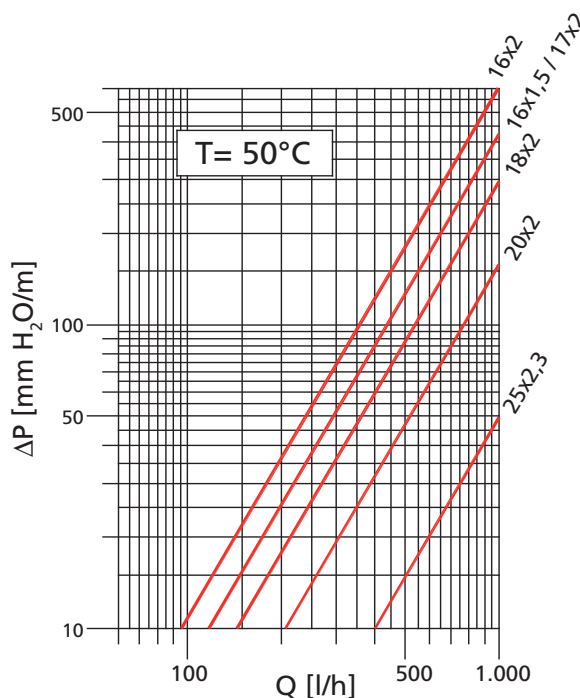
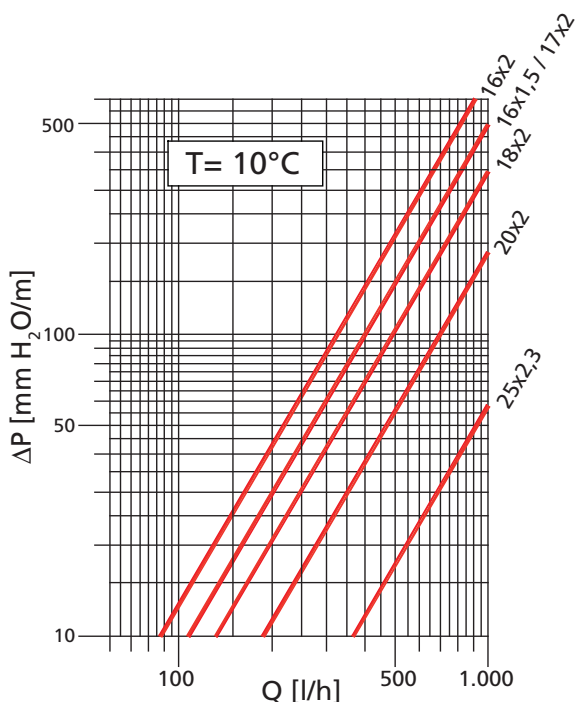
DIN 16892

Cross-linked high density polyethylene (Pe-X) pipes. General quality requirements and testing.

EN ISO 15875

Plastic piping for hot and cold water installation - Crosslinked polyethylene (Pe-X).

### Loss of pressure



### Additional information

For additional information please check the Giacomini website at the following address: [www.giacomini.com](http://www.giacomini.com)

+39 0322 923372

+39 0322 923255

[consulenza.prodotti@giacomini.com](mailto:consulenza.prodotti@giacomini.com)

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**ADD ON**

**EN ISO 15875**

**Table 1 - Classification of the working conditions**

The performance requirements for pipe systems complying with EN ISO 15875 are specified for a project operation lifetime of 50 years.

APPLICATION FIELD	Oper. Time (°C)	Time at $T_{oper. T}$ (years)	$T_{max}$ (°C)	Time at $T_{max}$ (years)	$T_{mal T}$ (°C)	Time at $T_{mal T}$ (h)
Class 4 Floor heating and low temperature radiators	20	2,5	70	2,5	100	100
	plus 40	plus 20				
	plus 60	plus 25				
Class 5 Heating with high temperature radiators	20	14	90	1	100	100
	plus 60	plus 25				
	plus 80	plus 10				

Working temperature ( $T_{oper. T}$ ).

Operating temperature expected for the application field, expressed in °C.

Max working temperature ( $T_{max}$ ).

Higher value of the temperature, allowed for a short period of time only.

Malfunctioning time ( $T_{mal T}$ ).

The highest temperature value that you can have when the control systems are in breakdown (the possible and permitted time period for that value is 100 h in a period of 50 years of continuous operation).

For each application, the parts involved shall agree with in the selection of the class. Each application class shall moreover be associated to a working pressure.

SIZE	CLASS 4	CLASS 5
16 x 1,5	8 bar	6 bar
16 x 2,0	10 bar	8 bar
17 x 2,0	10 bar	8 bar
18 x 2,0	10 bar	8 bar
20 x 2,0	8 bar	6 bar
25 x 2,3	8 bar	6 bar

All pipes are suitable to the transport of water for a period of 50 years at a temperature of 20°C and a working pressure of 10 bar.

All heating systems shall use as transfer fluid only water or treated water.