

**PIPES IN PEX-b FOR DOMESTIC WATER DISTRIBUTION - R993, R994 (GIACOFLEX)**



**Description**

The pipe in high-density cross-linked polyethylene, R993 and R994 (Giacoflex) range, is used for the distribution of pressurised hot and cold water for domestic use.

Water distribution via PEX pipes is a modern technique that offers notable advantages compared with traditional distribution systems using iron or copper pipes - not least the quick, easy laying with clear labour savings, the lack of welding or mechanical joints and chasing that can develop leaks with the passing of time, the long lifespan of the material that is not subject to encrustations and various electro-chemical phenomena.

Other factors that cannot be ignored include the low degree of thermal conductivity (about 100 times lower than that of iron and 700 times lower compared with copper), and the low noise level of distribution thanks to the excellent acoustic insulation of the cross-linked polyethylene. The PEX pipe is particularly advantageous in distribution systems with low water flow pressure levels, because its limited roughness ensures limited pressure drops and hence minimum flow rates in the devices.

Systems that use the Giacoflex pipe up to DN16 are called "removable" because, if the pipe is obstructed or perforated for accidental reasons, it can be quickly and easily replaced with a new one without damaging the floors or walls.

**Versions and product codes**

**Blue pipe + blue sleeve**

Series	Product code	Size	Packaging
R993	R993Y003	15 x 2,5	50 m
	R993Y009	18 x 2,5	50 m

**Neutral pipe + blue sleeve**

Series	Product code	Size	Packaging
R993	R993Y026	16 x 2,2	50 m
	R993Y032	20 x 2,8	50 m

**Blue pipe + red sleeve**

Series	Product code	Size	Packaging
R994	R994Y003	15 x 2,5	50 m
	R994Y009	18 x 2,5	50 m

**Neutral pipe + red sleeve**

Series	Product code	Size	Packaging
R994	R994Y026	16 x 2,2	50 m
	R994Y032	20 x 2,8	50 m

**Technical data**

- Application range: class 1, 2, 4 and class 5 (EN ISO 15875)
- Density: 0,948 g/cm<sup>3</sup>
- Cross-linking degree > 65 %
- Linear dilation coefficient ... at 20 °C: (1,4 x 10<sup>-4</sup>)/K  
... at 100 °C: (2,0 x 10<sup>-4</sup>)/K
- Thermal conductivity of the pipe: 0,35 W/(m K)
- Linear dispersion of the sleeved pipe in the air (sleeve 25 mm): 0,23 W/(m K)
- Linear dispersion of the sleeved pipe in the air (sleeve 30 mm): 0,21 W/(m K)

The Giacoflex pipe is made of polyethylene cross-linked via the silane method (PEX-b) and verified on the basis of Standard EN ISO 15875. The chemical cross-linking process provides mechanical, chemical and thermal characteristics that make it suitable for use, with an optimum level of quality and reliability. Furthermore, this method creates a product that is entirely non-toxic, making it ideal for domestic water distribution as required by Ministerial Decree 174 of 06/04/2004 (for Italy) and the other European regulations.

**Installation**

The Giacoflex pipe allows you to create domestic water systems with the greatest ease and simplicity. During the laying process, some simple precautions must be observed with regards the connection of the pipe via special adapters, pipe bends, protection against solar rays and against any possible damage involving the crushing of the pipe or its protective sleeve. The connection to distribution manifolds or elbows for tap coupling must be made using adapters of the right size for that specific pipe. To ensure a good connection, it is essential to accurately cut the pipe perpendicular to its axis, using special shears.

The "removability" of the pipe is only guaranteed if the bends have a minimum radius more than 8 times the external pipe diameter. The bend can be applied with the cold or hot method, with the aid of hot air. The pipe must not be heated with naked flames or heat sources of a high temperature, that could provoke areas of fusion on it.

After laying the pipes, it is a good idea to carry out a pressure test on the system to highlight any fluid leaks immediately. Following the pressure test, the sheaths must be protected by covering them with cement so that the pipes cannot be crushed or moved. In visible installations, the pipe must always be protected from ultraviolet rays that could alter its chemical/physical properties. Make sure the pipe is not exposed to solar radiation or fluorescent lamps for long periods.

If the pipe is chased without a protection sleeve, it must be covered with a layer of mortar at least 1,5 cm thick to avoid any cracking of the plaster due to pipe dilation. If a pipe is accidentally damaged and needs to be replaced, use the specific joint of the R576 range (observing the relevant written instructions).

**Precautions**

The main rules to follow are:

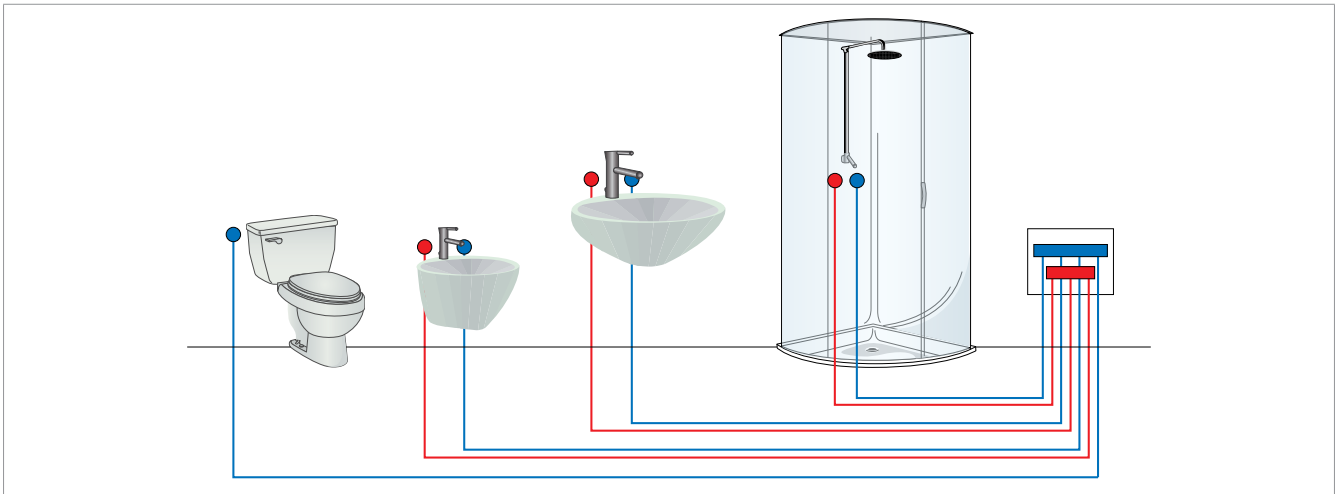
- 1) Keep the pipe in its packaging, avoiding any exposure to direct sunlight.
- 2) Store the pipe in a dry, protected place to avoid any damage caused by dampness.
- 3) Make sure the pipe cannot come into contact with sharp elements that could scratch it and thereby trigger incision problems. Pay special attention during the transport and installation phases.
- 4) Make the cut on the pipe perpendicular to its axis, using special shears that can make a clean cut without any burr.
- 5) Do not allow ice to form, as the dilations caused by the change of status could damage the pipe.
- 6) Under no circumstances must the pipe come into contact with naked flames.
- 7) Fix the pipe with the aid of the plastic ties.  
Do not use metal ties that could damage the pipe.
- 8) Contact with chemical solvents or paints could damage the pipe.

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**Types of system**

**Distribution to individual connection points**

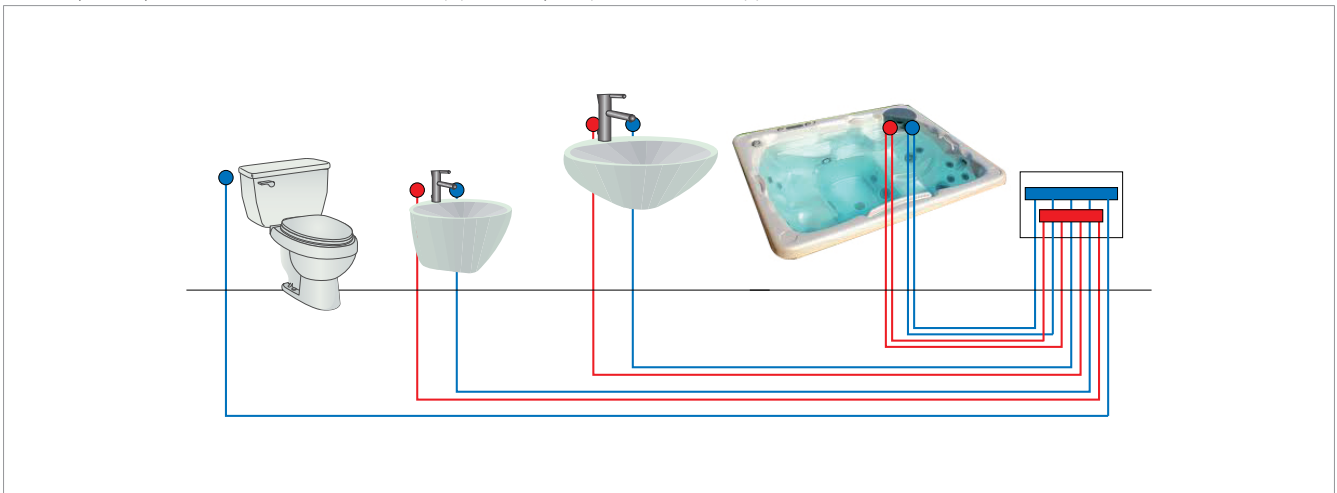
This system uses distribution manifolds fitted with a number of connections equal to the number of dispensing points. Each tap is connected, via two pipes (one for hot water and the other for cold water), directly to the manifolds located in a specific box.



**Large capacity distribution**

This type of solution is widely adopted with dispensing points needing considerable water flow rates, such as jacuzzi bath-tubs, garden taps, connections for hotel kitchens or canteens.

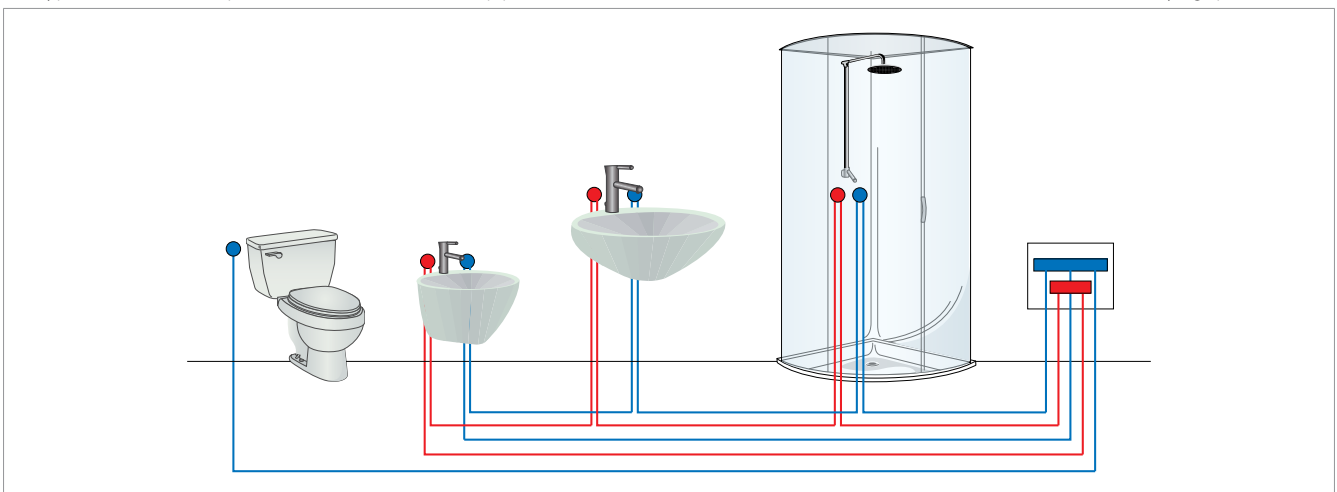
It is handy when you want to use the small-diameter pipes already adopted in the usual applications.



**Closed ring distribution**

In this case, rather than an individual connection pipe on the manifold for each dispensing point, there is one single pipe for hot water and another for cold water. They pass through all the dispensing points, forming a closed ring.

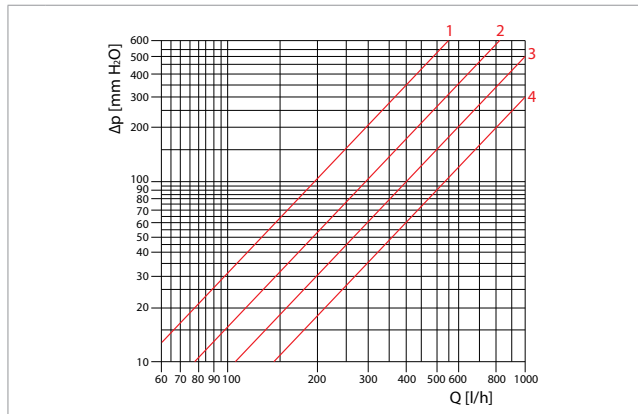
This type of distribution requires the minimum amount of pipes, so it is ideal in the case of renovations or where there is limited underfloor laying space.



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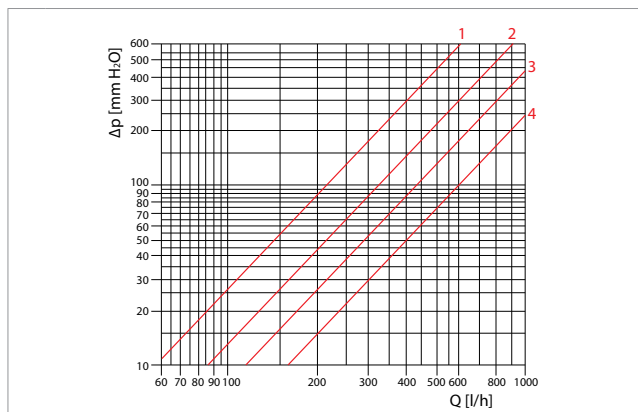
**Losses of pressure**

The following diagrams show the pressure drops of the Giacomflex in relation to the various diameters.



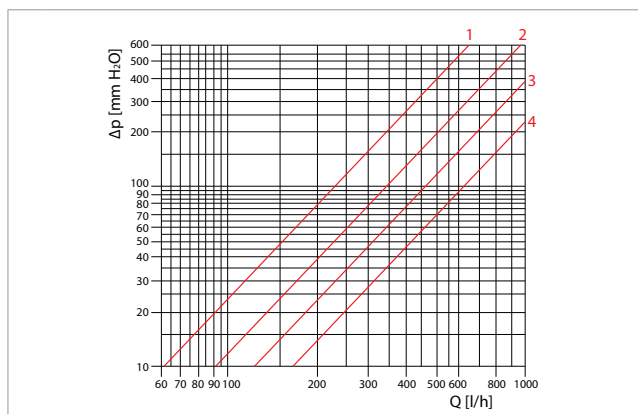
Water temperature 10 °C

1	pipe 15 x 2,5
2	pipe 16 x 2,2
3	pipe 18 x 2,5
4	pipe 20 x 2,8



Water temperature 50 °C

1	pipe 15 x 2,5
2	pipe 16 x 2,2
3	pipe 18 x 2,5
4	pipe 20 x 2,8



Water temperature 80 °C

1	pipe 15 x 2,5
2	pipe 16 x 2,2
3	pipe 18 x 2,5
4	pipe 20 x 2,8

**Guarantee**

The guarantee is not valid in the following cases:

- 1) if the operating conditions differ from those indicated.
- 2) if the pipes are used to distribute fluids that are not compatible with the material.
- 3) if the installation instructions are not respected.
- 4) if the pipe already shows defects at the time of installation, due to accidental factors and visually perceptible at the laying stage or during the pressure test.
- 5) if the pipe is installed using components not produced by Giacomini S.p.A., or in any case different from those permitted.

**Normative References**

• DIN 16892

Cross-linked high-density polyethylene (PEX) pipes. General quality requisites and testing.

• EN ISO 15875

Plastic pipes for hot and cold water installation – Cross-linked polyethylene (PEX).

**Product specifications**

**R993**

Giacoflex pipe in cross-linked polyethylene PEX-b, supplied in blue PE-HD sleeve, for domestic water distribution. Pipe available in blue or neutral colour. Both are ideal for domestic water distribution and are used for Classes 1, 2, 4 and 5. Systems that use the Giacomflex pipe up to DN16 are called "removable" because, if the pipe is obstructed or perforated for accidental reasons, it can be quickly and easily replaced with a new one without damaging the floors or walls.

**R994**

Giacoflex pipe in cross-linked polyethylene PEX-b, supplied in red PE-HD sleeve, for domestic water distribution. Pipe available in red or neutral colour. Both are ideal for domestic water distribution and are used for Classes 1, 2, 4 and 5. Systems that use the Giacomflex pipe up to DN16 are called "removable" because, if the pipe is obstructed or perforated for accidental reasons, it can be quickly and easily replaced with a new one without damaging the floors or walls.

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**ANNEX**

**EN ISO 15875**

**Table 1 – Classification of operating conditions**

The behaviour requisites for pipe systems complying with EN ISO 15875 are specified for an operating lifespan of 50 years.

Application field	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 1</b> Domestic hot water (60 °C)	60	49	80	1	95	100
<b>CLASS 2</b> Domestic hot water (70 °C)	70	49	80	1	95	100
<b>CLASS 4</b> Underfloor heating and radiators at a low temperature	20 plus 40 plus 60	2.5  20  25	70	2,5	100	100
<b>CLASS 5</b> Radiator heating at a high temperature	20 plus 60 plus 80	14  25  10	90	1	100	100

**Operating temperature (T<sub>oper</sub>):** operating temperature envisaged for the application field, expressed in °C.

**Maximum working temperature (T<sub>max</sub>):** the highest value of the working 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 a continuous operating period of 50 years).




For each application class, the maximum usage pressure can be obtained from the following table:

Measurement	CLASS 1	CLASS 2	CLASS 4	CLASS 5
15 x 2,5	10 bar	10 bar	10 bar	10 bar
16 x 2,2	10 bar	10 bar	10 bar	10 bar
18 x 2,5	10 bar	10 bar	10 bar	10 bar
20 x 2,8	10 bar	10 bar	10 bar	10 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 further information, visit the website [www.giacomini.com](http://www.giacomini.com) or contact the technical service:

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