

# R993, R994, R996

## Giacoflex PEX-b pipes



Water  
Management



Radiant  
Systems



Energy  
Management

Datasheet  
0173EN  05/2023



R993



R994



R996

R993, R994 and R996 Giacoflex pipes made of high-density cross-linked polyethylene are fit for hot and cold pressurized water in domestic and/or heating and cooling systems.

Water distribution through PEX pipes offers great benefits compared to traditional systems where iron or copper pipes are used. To name a few: easy and quick laying, reduced manpower, no welding or embedded mechanic joints that may leak on the long run, highly resistant material not affected by limestone and electrochemical phenomena.

Least but not last, their thermal conductivity is 100 times lower than iron and 700 times lower than copper, and the noise level during distribution is extremely reduced thanks to the enhanced soundproofing properties of cross-linked polyethylene. PEX pipes are the go-to solution for low-pressure water systems as their limited roughness allows only limited losses of pressure while guaranteeing the minimum flow rates to user devices.

Systems with Giacoflex pipes are called "removable" systems as the pipes can be replaced in case of accidental punctures or clogging in a simple and quick way without damaging the floor or walls.

## Versions and product codes

### R993

PRODUCT CODE	SIZE [mm]	PACK [m]	PIPE COLOR	SLEEVE COLOR
R993Y003	15 x 2,5	50	Blue	Blue
R993Y028	16 x 2	50	Neutral	Blue
R993Y009	18 x 2,5	50	Blue	Blue

### R994

PRODUCT CODE	SIZE [mm]	PACK [m]	PIPE COLOR	SLEEVE COLOR
R994Y003	15 x 2,5	50	Blue	Red
R994Y028	16 x 2	50	Neutral	Red
R994Y009	18 x 2,5	50	Blue	Red

### R996

PRODUCT CODE	SIZE [mm]	PACK [m]	PIPE COLOR	SLEEVE COLOR
R996Y043	12 x 1,1	120	Red	-
R996Y063	12 x 1,1	240	Red	-
R996Y182	12 x 2	100	Neutral	-
R996Y044	16 x 1,5	120	Red	-
R996Y071	16 x 1,5	200	Red	-
R996Y046	16 x 1,5	240	Red	-
R996Y094	16 x 1,5	600	Red	-
R996Y184	16 x 2	100	Neutral	-
R996Y026	16 x 2,2	100	Neutral	-
R996Y152	20 x 1,9	4	Neutral	-
R996Y143	20 x 1,9	50	Neutral	-
R996Y095	20 x 1,9	120	Red	-
R996Y078	20 x 1,9	200	Red	-
R996Y079	20 x 1,9	240	Red	-
R996Y186	20 x 2	100	Neutral	-
R996Y032	20 x 2,8	50	Neutral	-
R996Y153	25 x 2,3	4	Neutral	-
R996Y144	25 x 2,3	50	Neutral	-
R996Y154	32 x 2,9	4	Neutral	-
R996Y145	32 x 2,9	50	Neutral	-
R996Y146	40 x 3,7	4	Neutral	-

## ► Technical data

- Class of application (EN ISO 15875): 1, 2, 4, 5
- Density at 23 °C: > 0,948 g/cm<sup>3</sup>
- Cross-link degree > 65 %
- Linear dilation coefficient: 0,026 mm/m K
- Thermal conductivity: 0,35 W/(m K)
- Linear dispersion in air of the sleeved pipe (25 mm sleeve): 0,23 W/(m K)
- Linear dispersion in air of the sleeved pipe (30 mm sleeve): 0,21 W/(m K)

Giacoflex pipes are made by cross-linking polyethylene through the silane chemical process (PEX-b); they are tested according to the EN ISO 15875 standard.

The cross-linking process confers mechanic, chemical and thermal characteristics that make them fit for use with enhanced quality and reliability.

Giacomini's production system guarantees a non-toxic item fit for domestic water distribution in line with Ministerial Decree 174 of 06/04/2004 for Italy and other European provisions.

## ► Thermal expansions

When planning and installing the Giacoflex PEX-b pipes, thermal expansion must be taken into account.

The chart below helps to make proper evaluations.

Thermal expansion can be determined through the formula below:  $\Delta L = \alpha \times L \times \Delta t$

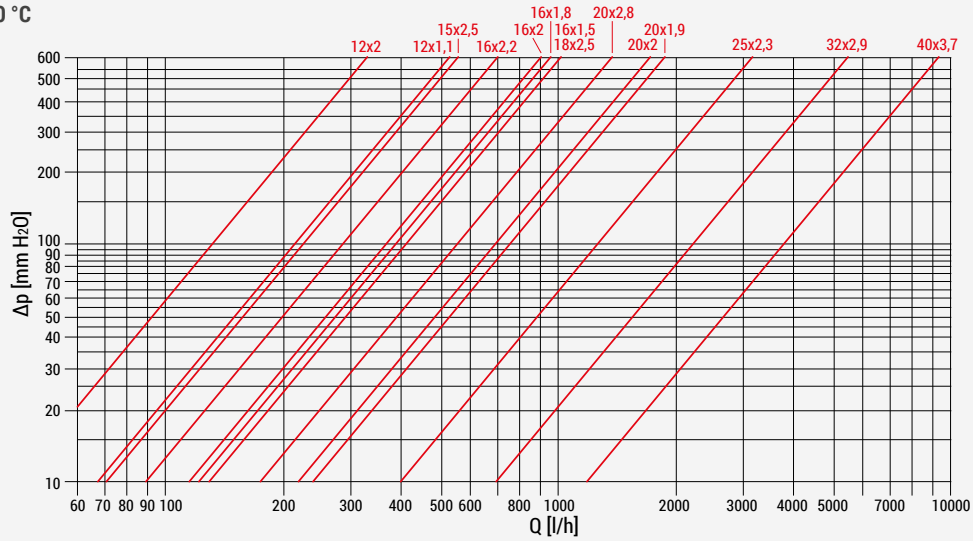
where:

- $\Delta L$  = expansion expressed in mm
- $\alpha$  = linear thermal expansion coefficient corresponding to 0,026 mm/m K
- L = pipe length expressed in m
- $\Delta t$  = temperature variation expressed in Kelvin [K] or Celsius [°C] degrees

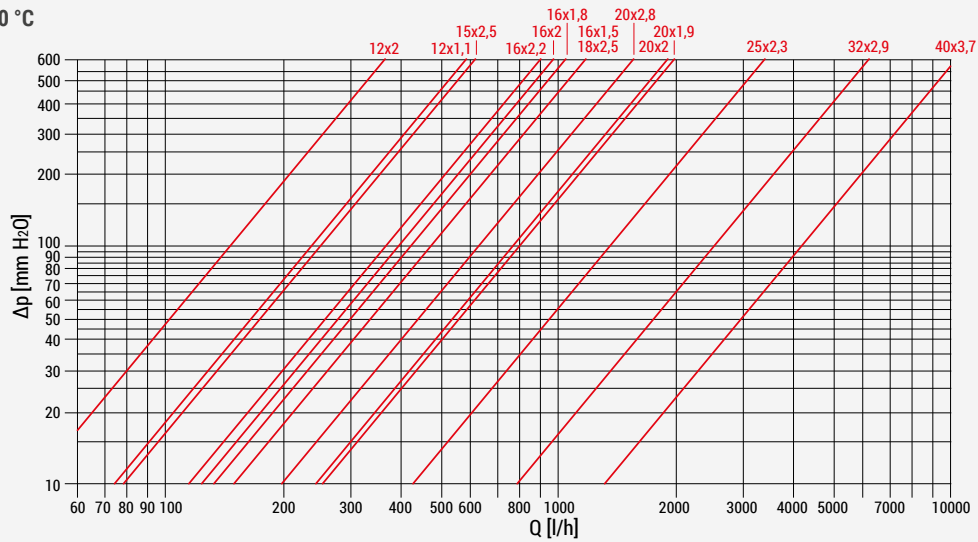
PIPE LENGTH [m]	TEMPERATURE DIFFERENCE [K]							
	10	20	30	40	50	60	70	80
1	0,26	0,52	0,78	1,04	1,3	1,56	1,82	2,08
2	0,52	1,04	1,56	2,08	2,6	3,12	3,64	4,16
3	0,78	1,56	2,34	3,12	3,9	4,68	5,46	6,24
4	1,04	2,08	3,12	4,16	5,2	6,24	7,28	8,32
5	1,3	2,6	3,9	5,2	6,5	7,8	9,1	10,4
6	1,56	3,12	4,68	6,24	7,8	9,36	10,92	12,48
7	1,82	3,64	5,46	7,28	9,1	10,92	12,74	14,56
8	2,08	4,16	6,24	8,32	10,4	12,48	14,56	16,64
9	2,34	4,68	7,02	9,36	11,7	14,04	16,38	18,72
10	2,6	5,2	7,8	10,4	13	15,6	18,2	20,8
LINEAR EXPANSION [mm]								

# Losses of pressure

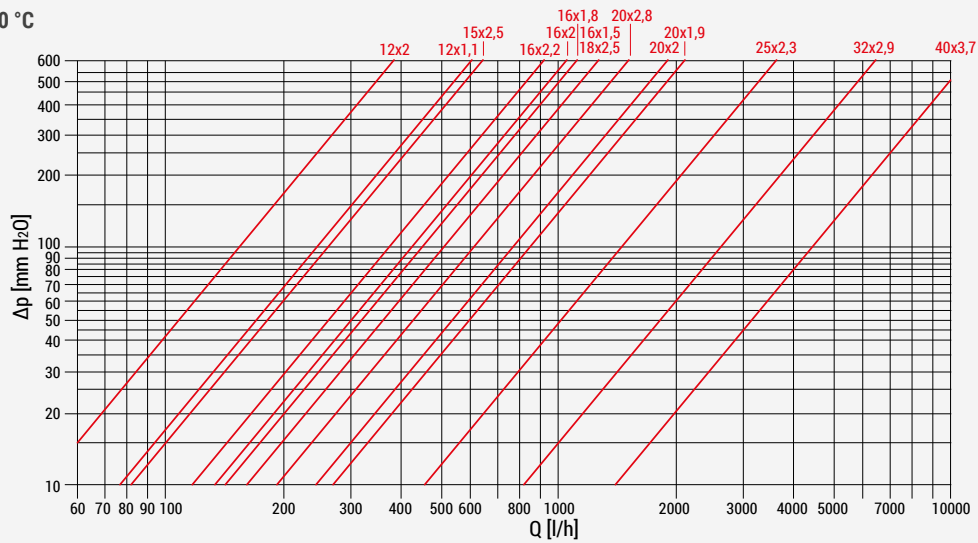
TEMPERATURE = 10 °C



TEMPERATURE = 50 °C



TEMPERATURE = 80 °C



## ➤ Pipe laying

**NOTE.** Given the wide range of fittings available, we recommend referring to the latest version of our catalog to identify the sizes and product codes with their corresponding range of application.

- Giacoflex pipes are the go-to solution to create domestic water systems in an easy and quick way. The installer must follow a few simple precautions to connect the pipes using special adapters, to create the pipe bends, to protect them from sunlight and possible damages caused by crushing the pipe or the protective sleeve.
- Use adapters fit for the pipe size to connect the distribution manifolds or faucet elbows.
- Cut the pipe at 90 degrees to its axis using proper shears for a correct connection.
- The pipe can be slipped out only when the system bends have a min. radius 8 times greater than the external diameter of the pipe.
- Bends can be cold worked or heat worked with hot air.
- Never heat the pipe with open flames or high-temperature sources that may lead to localized melting of the pipe.
- Carry out a pressure test on the system after laying the pipes to promptly identify any leak.
- After the pressure test, cover the pipes with concrete to protect them from crushing and prevent alterations to the pipe layout.
- In exposed installations, the pipe must always be protected from UV rays that may alter their chemical-physical properties.
- Do not leave the pipes exposed to sun radiation or fluorescent lights for extended periods of time.
- When embedding the pipe without a protection sleeve, cover it with at least 1,5 cm of mortar to prevent plaster cracking caused by the pipe expansion.
- When replacing a damaged pipe for accidental reasons, use the R576 special joint and follow the instructions included with the item.

## ➤ Precautions

Below are the main rules to follow:

- Keep the pipes in their package and do not expose to direct sunlight.
- Store the pipes in a sheltered and dry area to prevent humidity from damaging the package.
- Keep the pipe away from sharp items that may scratch or dent them. Install and handle the pipes with great care.
- Cut the pipe using shears that perform a clean cut free of burrs and 90 degrees to its axis.
- Prevent ice build ups as expansions caused by a change of the conditions may damage the pipe;
- Never expose the pipe to open flames;
- Lock the pipe with plastic bands. Do not use metal bands that may damage the pipe.
- Chemical solvents and varnishes may damage the pipe.

## ➤ Warranty

The warranty shall be void when:

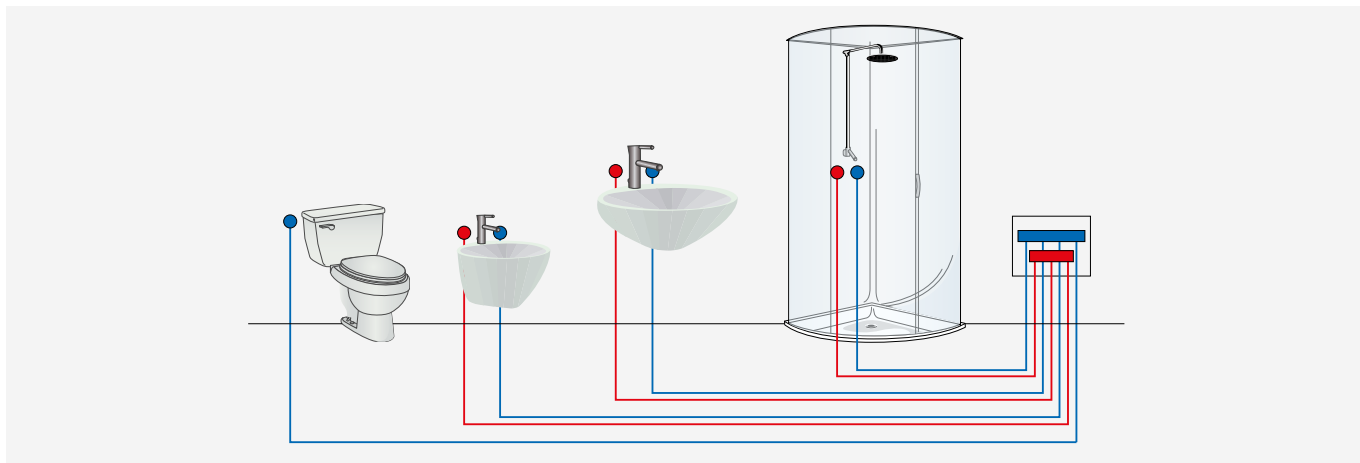
- 1) the working conditions vary from those provided for;
- 2) the pipe is used to transfer fluids not compatible with the construction material;
- 3) the installation instructions are not fully complied with;
- 4) the pipe shows visible defects caused by accidental factors upon installation or when the system is pressurized;
- 5) the pipe is installed using components not produced by Giacomini or different from the ones allowed.

## Types of domestic water systems

### Distribution diagram for single-connection systems

This type of system includes distribution manifolds with a number of connections equal to the number of uses.

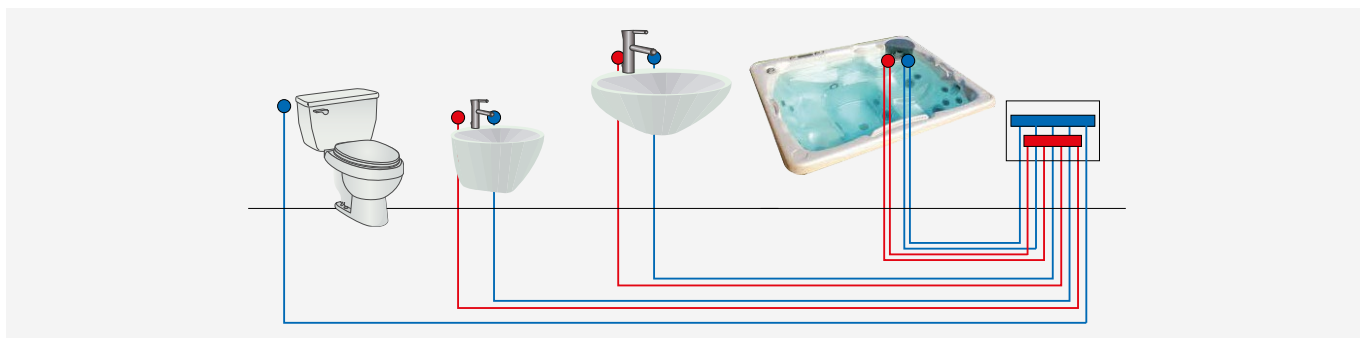
Every faucet is connected directly to the manifolds contained in a special cabinet through two pipes (one for hot water and the other for cold water).



### Distribution diagram for large flow-rate systems

This type of solution is widely used in solutions requiring large flow rates, such as hot water tubs, garden faucets, connections for hotel and canteen kitchens.

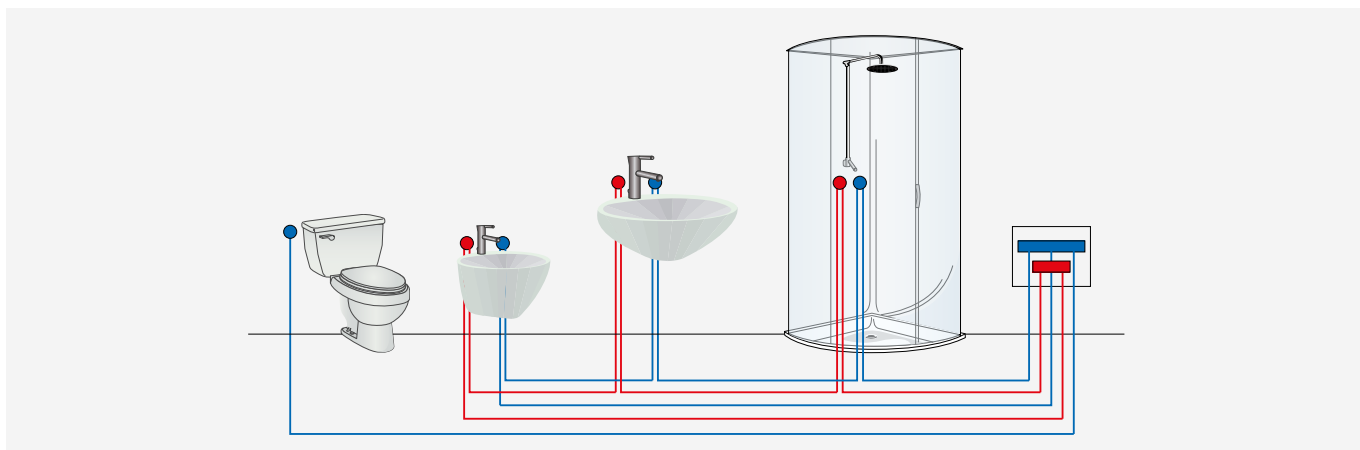
They are fit for pipes with small diameters used in common applications.



### Distribution diagram for closed-loop systems

This type of system does not have a pipe for each manifold connection but only a single pipe for hot water and one for cold water that runs along every connection creating a closed loop.

It requires a reduced number of pipes and is therefore perfect for renovation works or when there is limited floor space for pipe laying.



## ➤ Classification of working conditions (EN ISO -15875)

The performance specifications for pipe-based systems complying with EN ISO 15875 are specified for 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 $T_{MAL}$ [°C]	DURATION OF $T_{MAL}$ [h]
CLASS 1 Domestic hot water (60 °C)	60	49	80	1	95	100
CLASS 2 Domestic hot water (70 °C)	70	49	80	1	95	100
CLASS 4 Floor heating and low-temperature systems	20	2,5	70	2,5	100	100
	+	+				
	40	20				
	+	+				
CLASS 5 Radiator heating and high-temperature systems	60	25	90	1	100	100
	+	+				
	20	14				
	80	10				

- 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 period of time.
- Failure temperature ( $T_{MAL}$ ): 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

### R993

Giacoflex PEX-b cross-linked polyethylene pipe with blue PE-HD sleeve. Blue, white or neutral pipe. Class of application (EN ISO 15875): 1, 2, 4, 5 (fit for drinking water distribution). Thermal conductivity: 0,35 W/(m K). Linear dilation coefficient: 0,026 mm/m K. Systems with Giacoflex pipes are called "removable" systems as the pipes can be replaced with new ones in case of accidental punctures or clogging in a simple and quick way without damaging the floor or walls.

### R994

Giacoflex PEX-b cross-linked polyethylene pipe with red PE-HD sleeve. Blue, white or neutral pipe. Class of application (EN ISO 15875): 1, 2, 4, 5 (fit for drinking water distribution). Thermal conductivity: 0,35 W/(m K). Linear dilation coefficient: 0,026 mm/m K. Systems with Giacoflex pipes are called "removable" systems as the pipes can be replaced with new ones in case of accidental punctures or clogging in a simple and quick way without damaging the floor or walls.

### R996

Giacoflex PEX-b cross-linked polyethylene pipe, red or neutral pipe. Class of application (EN ISO 15875): 1, 2, 4, 5 (fit for drinking water distribution). Thermal conductivity: 0,35 W/(m K). Linear dilation coefficient: 0,026 mm/m K.

**⚠ 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](http://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.