

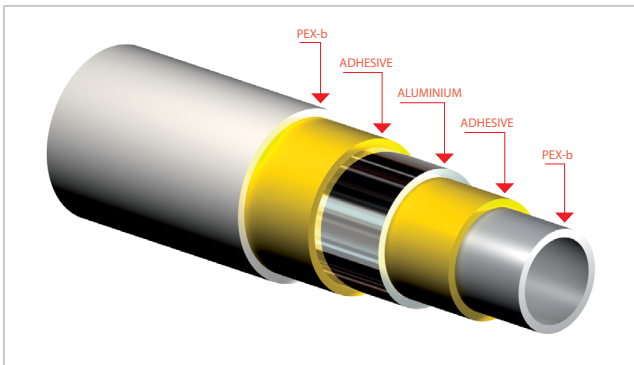


**R999**

**Description**

The R999 multilayer pipe consists of an internal layer of PEX-b (cross-linked polyethylene), an intermediate layer of aluminium welded longitudinally (head-head) with laser technology, and an external layer of white PEX-b. The intermediate layers of adhesive evenly join the layer of aluminium to the layers of PEX-b.

The aluminium layer, welded head-head with laser technology, guarantees a firm barrier against oxygen and other gases, and also provides the product with excellent crush resistance. On the basis of current regulations, the PEX-b/Al/PEX-b multilayer pipe is suitable for carrying drinking water.

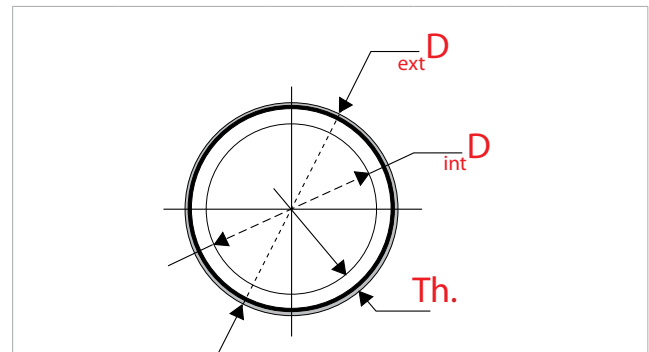


**Technical data**

The PEX-b/Al/PEX-b multilayer pipe can be used for:

- the distribution of hot and cold water for sanitary use
- the creation of radiant panel heating and cooling systems
- the creation of traditional heating systems
- systems with heating elements in cast iron, aluminium or steel

- Linear thermal dilation coefficient at 20 °C:  $(2,4 \times 10^{-5})/K$
- Thermal conductivity of the pipe: 0,40 W/(m K)
- Internal roughness  $\epsilon$ :  $7,0 \times 10^{-6}$  m
- Minimum curve radius, without pipe-bending spring:  $5 \times_{ext} D$



Pipe (in coils)	pipe <sub>ext</sub> D [mm]	pipe <sub>int</sub> D [mm]	pipeth. [mm]	Weight [g/m]	Water contained [l/m]	Minimum curve radius* [mm]
16x2	16	12	2	115	0,113	80
20x2	20	16	2	148	0,201	100
26x3	26	20	3	260	0,314	130
32x3	32	26	3	327	0,531	160

\*Without pipe-bending spring

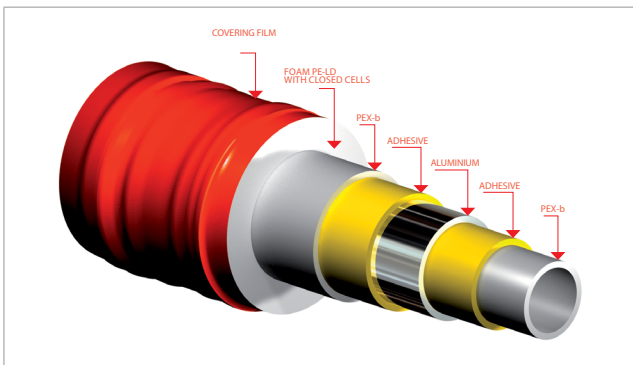
**Versions and product codes**

Product code	Dimensions [mm]	Package [m]
<b>Coil</b>		
R999Y122	16 x 2	100
R999Y123	16 x 2	200
R999Y124	16 x 2	500
R999Y142	20 x 2	100
R999Y143	20 x 2	200
R999Y173	26 x 3	50
R999Y183	32 x 3	50
<b>5 m bars</b>		
R999Y125	16 x 2	24 bars (120 m)
R999Y145	20 x 2	24 bars (120 m)
R999Y174	26 x 3	10 bars (50 m)
R999Y184	32 x 3	10 bars (50 m)
R999GY140	40 x 3,5	5 bars (25 m)
R999GY150	50 x 4	5 bars (25 m)
R999GY163	63 x 4,5	3 bars (15 m)



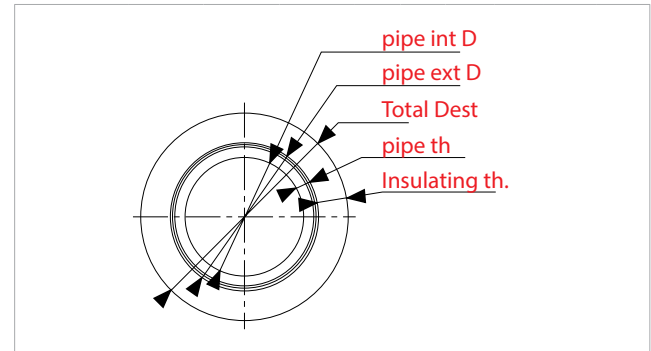
**Description**

The PEX-b/Al/PEX-b multilayer pipe is also available in an insulated version R999I. The layer of insulating material, made of foam polyethylene with closed cells, not only increases the energy efficiency of the installation but also further improves the already limited noise level of systems using synthetic materials. The insulating section is made up of a layer of foam polyethylene with closed cells (CFC-free) protected by a special outer covering film - red for heating systems and light grey for cooling systems.



**Technical insulation data**

- Material: foam PE-LD with closed cells, free of CFCs and HCFCs
- Thermal conductivity: 0,040 W/(m K)
- Resistance to the spread of water vapour:  $\mu > 5000$
- Reaction to fire:
  - "class 1", in accordance with Ministerial Decree 26/06/84
  - "Euroclass E", in accordance with EN 1350-1



Pipe	pipe ext D [mm]	pipe int D [mm]	pipe th. [mm]	Total D est [mm]		Insulating th. [mm]		insulator R [m <sup>2</sup> K/W]	
16x2	16	12	2	28	34	6	10	0,150	0,225
20x2	20	16	2	38	46	10	13	0,225	0,325
26x3	26	20	3	44	52	10	13	0,225	0,325
32x3	32	26	3	50	58	10	13	0,225	0,325

Range recommended for heating systems  
Range recommended for cooling systems

**Versions and product codes**

Product code	Dimensions [mm]	Package, in coils [m]	Insulation thickness [mm]	Insulation color
<b>For heating</b>				
R999IY220	16 x 2	50	6	Red
R999IY222	16 x 2	100	6	Red
R999IY225	16 x 2	50	6	Blue
R999IY227	16 x 2	100	6	Blue
R999IY230	18 x 2	50	6	Red
R999IY240	20 x 2	50	10	Red
R999IY245	20 x 2	50	10	Blue
R999IY270	26 x 3	25	10	Red
R999IY272	26 x 3	50	10	Red
R999IY275	26 x 3	50	10	Blue
R999IY280	32 x 3	25	10	Red
<b>For heating and cooling</b>				
R999IY120	16 x 2	50	10	Grey
R999IY130	18 x 2	50	10	Grey
R999IY140	20 x 2	50	13	Grey
R999IY170	26 x 3	25	13	Grey
R999IY180	32 x 3	25	13	Grey



**Fittings**

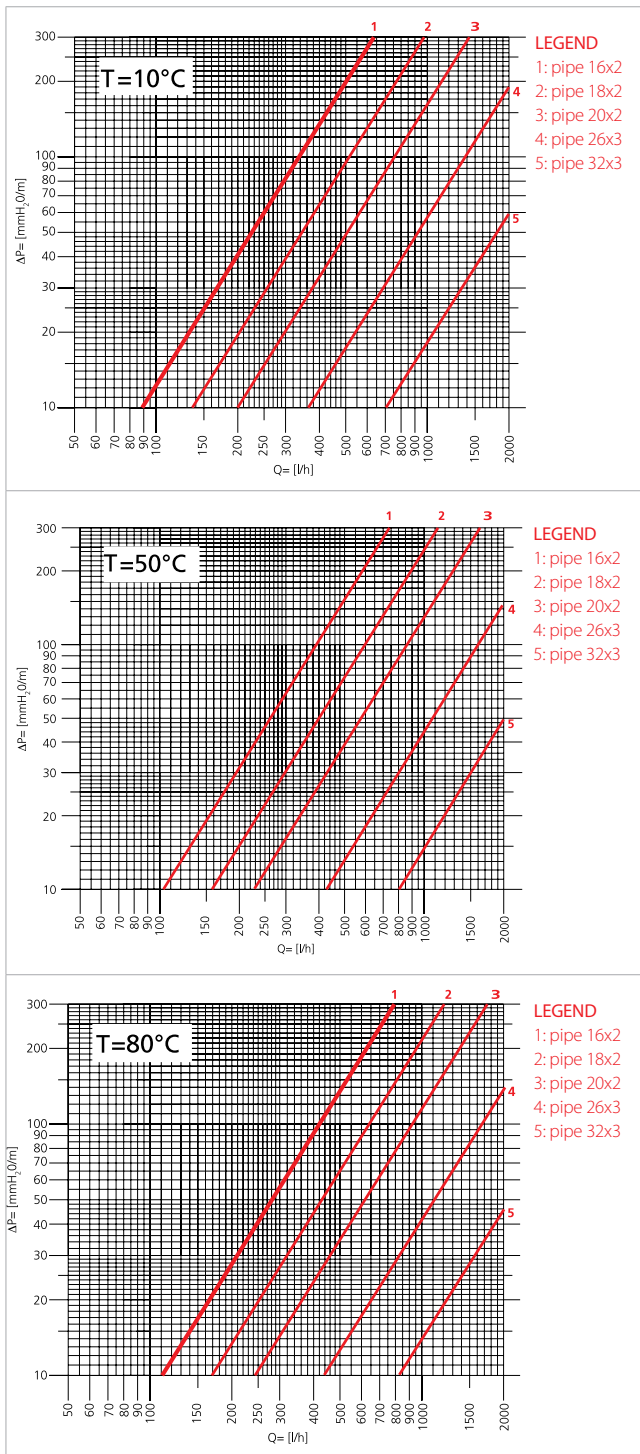
When using the PEX-b/Al/PEX-b multilayer pipe, there are fittings that use mechanical pressure and also compression fittings. In both cases, a divider is used to separate the pipe aluminium from the fitting itself, thereby preventing any risk of galvanic corrosion.

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**Note.**  
Given the wide range of fittings based on both mechanical pressure and compression, you are advised to refer to the latest version of the trade catalogue to identify the available sizes and codes, and their relative field of use.

**Losses of pressure**

The diagrams show the losses of pressure of the PEX-b/Al/PEX-b multilayer pipe for the various sizes.



**Thermal dilation**

During the design and installation of the PEX-b/Al PEX-b multilayer pipes, it is important not to ignore the thermal dilation phenomenon.

Use the table and diagram below to make the necessary evaluations. Remember that thermal dilation can be evaluated by means of the formula:

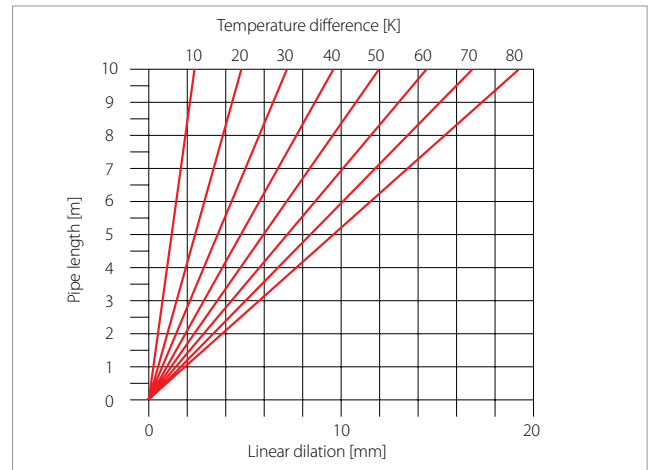
$$\Delta l = \alpha \times L \times \Delta t$$

where:

- $\Delta l$  = dilation expressed in mm
- $\alpha$  = linear thermal dilation coefficient, corresponding to 0,024 mm/(m K)

L = pipe length expressed in m

$\Delta t$  = temperature variation expressed in degrees Kelvin [K] or Celsius [°C]



**Table 1 – Classification of working conditions**

The performance characteristics of the pipe systems are specified for a continuous working life of 50 years.

Field of application	work T [°C]	Time at work T [years]	max T [°C]	Time at max T [years]	mal T [°C]	Time at mal T [h]
Hot sanitary water	60	49	80	1	95	100
Underfloor heating and radiators at a low temperature	20	2,5	70	2,5	100	100
	40	20				
	60	25				
Radiator heating at a high temperature	20	14	90	1	100	100
	60	25				
	80	10				

Working temperature ( $T_{work}$ )

operating temperature envisaged for the application field, expressed in °C

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

the highest value of the working temperature, only allowed for a short period of time

Malfunctioning temperature ( $T_{mal}$ ):

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).

All 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 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.



**Linear dilation in mm**

Pipe length [m]	Temperature difference [K]							
	10	20	30	40	50	60	70	80
0,5	0,12	0,24	0,36	0,48	0,60	0,72	0,84	0,96
1,0	0,24	0,48	0,72	0,96	1,20	1,44	1,68	1,92
1,5	0,36	0,72	1,08	1,44	1,80	2,16	2,52	2,88
2,0	0,48	0,96	1,44	1,92	2,40	2,88	3,36	3,84
2,5	0,60	1,20	1,80	2,40	3,00	3,60	4,20	4,80
3,0	0,72	1,44	2,16	2,88	3,60	4,32	5,04	5,76
3,5	0,84	1,68	2,52	3,36	4,20	5,04	5,88	6,72
4,0	0,96	1,92	2,88	3,84	4,80	5,76	6,72	7,68
4,5	1,08	2,16	3,24	4,32	5,40	6,48	7,56	8,64
5	1,20	2,40	3,60	4,80	6,00	7,20	8,40	9,60
5,5	1,32	2,64	3,96	5,28	6,60	7,92	9,24	10,56
6,0	1,44	2,88	4,32	5,76	7,20	8,64	10,08	11,52
6,5	1,56	3,12	4,68	6,24	7,80	9,36	10,92	12,48
7,0	1,68	3,36	5,04	6,72	8,40	10,08	11,76	13,44
7,5	1,80	3,60	5,40	7,20	9,00	10,80	12,60	14,40
8,0	1,92	3,84	5,76	7,68	9,60	11,52	13,44	15,36
8,5	2,04	4,08	6,12	8,16	10,20	12,24	14,28	16,32
9,0	2,16	4,32	6,48	8,64	10,80	12,96	15,12	17,28
9,5	2,28	4,56	6,84	9,12	11,40	13,68	15,96	18,24

**Precautions**

Like all pipes, the PEX-b/AL/PEX-b multilayer pipes require certain precautions to guarantee their long and effective working life:

- keep the pipes in their packaging and store them in a dry, covered place to avoid any damage caused by moisture
- to not expose them to direct sunlight
- always cut the pipes with the appropriate tools to ensure a clean cut perpendicular to the pipe axis and without any burr
- after every cutting operation, and before applying the fitting, make the calibration using the appropriate tool and lubricate the seal elements on the pipe-holder
- do not allow ice to form inside the pipe, as the dilations caused by the change of status could damage the pipe permanently
- do not store at temperatures below -30° C
- under no circumstances must the pipe come into contact with naked flames
- after completing the installation, perform a test at a pressure level equal to 1,5 times the working pressure

**Guarantee**

The guarantee is not valid in the following cases:

- 1) if the operating conditions differ from those indicated
- 2) if the pipe is used to distribute fluids that are not compatible with the material
- 3) if the installation instructions are not fully respected
- 4) if, at the time of installation, the pipe already shows defects due to accidental factors and visually perceptible at the laying stage or during the system pressure test
- 5) if the pipe is installed using components not manufactured by Giacomini, or anyway differing from those allowed

**Product specifications**

**R999**

Pipe in metal multilayer PEX-b/AL/PEX-b. White external layer. Internal layer in PE-X/b (cross-linked polyethylene), intermediate layer in aluminium welded lengthways (head-head) with TIG laser technology, external layer in PE-X/b. The intermediate layers of adhesive evenly join the layer of aluminium to the layers of PE-X. The aluminium layer guarantees a firm barrier against oxygen and other gases, and also provides the product with excellent crush resistance. Suitable for carrying drinking water. Application classes 1, 2, 4 and 5. Thermal conductivity of the pipe: 0,40 W/(m K). Linear thermal dilation coefficient at 20° C: (2,4x10<sup>-5</sup>)/K.

**R999I**

Metal multilayer PEX-b/AL/PEX-b pipe with thermal insulation. Suitable for carrying drinking water. Classes of use 1, 2, 4 and 5. The layer of insulating material, made of foam polyethylene with closed cells (free of CFCs and HCFCs), not only increases the energy efficiency of the installation but also further improves the already limited noise level of systems using synthetic materials. The insulating layer is protected by a special outer covering film that is red or blue for the heating pipe and light grey for the cooling pipe. Version for heating: insulating thickness 6 mm for sizes 14x2-16x2; insulating thickness 10 mm for sizes 20x2-26x3-32x3; Version for heating and cooling: insulating thickness 10 mm for size 16x2; insulating thickness 13 mm for sizes 20x2-26x3-32x3; Reaction to fire: "class 1", in accordance with Ministerial Decree 26/06/84; "Euroclass E", in accordance with EN 1350-1.

**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)  
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