1. Product description

Linking system for plumbing and heating, based on the expansion ring technology, composed of brass and PPSU fittings design to be attached to PEX-a crosslinked polyethylene pipes.

The linking system is based on the great elasticity of the PEX-a pipes that, after their expansion and due to their plastic memory effect, they contract until they regain their original shape, pressing the fitting body, so that a safe and long-term union is achieved, without joints and getting higher flow than with other linking systems.

2. Systems components

Pex-a pipes

PEX-a (peroxide-method) cross-linked monolayer pipe, complying to the European Norm EN 15875-2.

Industrial Blansol use the best polyethylene available and the most modern crosslinking technology to offer PEX-a pipes with awesome properties. The modern technology of Blansol is based on the peroxide crosslinking method (PEX-a), by using high-power infrared radiation furnaces.

Technical Specification

Property	Rate	Unit
Linear dilatation	$1,4x10^{-4}$	K^{-1}
Thermal conductivity	0,38	W/mK
T Max. Work Temperature	95	ºC
Peak temperatura	110	ºC
Max. work pressure at 95ºC	6	bar
Roughness	0,007	mm
Density	0,945	gr/cm^2

Advantages of the BARBI PEX-a pipes

- **Simplicity of installation**. No welding or machining operations are necessary. The associated fittings give the system simplicity and savings.
- **Flexibility**.The PEX-a pipes show more flexibility than PEX pipes crosslinked by other methods. They can be cold bent easily, without special tools, saving connections and installation time.
- **Resistance to high temperature**. BARBI pipes are suitable to be used at usual work temperatures up to 95ºC and they are able to withstand accidental temperature peaks up to 110ºC.
- **Resistance to frost**. BARBI pipes don't burst for water freezing inside. The pipe, du to its flexibility,would simply expand.
- **Low heat conductivity coefficient**. Their low heat conductivity coefficient (0'38W/mºC) allows saving energy through the reduction of heat loss as well as the frequent water condensation on copper pipes.
- **Resistance to corrosion**. BARBI pipes can't be attacked by most chemical substances (acid, base, anti-freeze,etc) and are resistant to every kind of corrosion.
- **Higher flow**. Due to their smooth Surface, BARBI pipes show smaller pressure loss than metal ones. With them, it's achieved higher flow with the same inner diameter.
- **Lack of lime and other materials deposits**. Also due to their extremely smooth surface, lime deposits, so frequent in metal pipes, are avoided. BARBI pipes ensure that the original flow will be upheld forever.
- **No electricity conductive**. BARBI pipes don't generate any kind of galvanic corrosion.
- **Lightness**. BARBI pipes are 4 times lighter than copper pipes in equivalent diameters, what makes them easy to handle and transport.
- **Suitable for drinking water**. BARBI pipes don´t modify the organoleptic properties of water.
- **They don´t convey noise**. Due to they are manufactured with polyethylene and it's flexibility, it is achieved low transmission of acoustic waves, even at high water flow speed (up to 2'5m/s),compared with metal pipes.
- **Thermical memory effect**. BARBI pipes regain their original shape when it's applied hot air, what allows to correct installation mistakes and to carry out repairs more easily.
- **Narrow bending radius**. Their largest bending radius is 10 times the external diameter when bent manually and 5 times using the outer foil pipes BARBI.

Plastic Rings

The use of plastic rings, manufactured by injection moulding using special high-tech polymers, enables us to offer better dimensional precision in the rings that, together with a pipe stopping system, facilitates the assembly process. The rings are available in three different colours (red, blue and white) so you can make the pipelines easily distinguishable.

Fittings

Rayper fittings has been designed and manufactured according to the requirements of the standard UNE EN ISO 15875. They are available in metallic (Brass) and plastic (PPSU, Polyphenylsulfone) versions.

The material used for the brass version is exclusively high quality brass (CW617N alloy), which complies the plumbing legislation of the most demanding countries of the UE.

	Composition					
Material	Cu	Al	Fe	Ni	Pb	Sn
Brass CW617N	57,0 – 59,0	max .0,05	max. 0,30	*max. 0,1	*1,6 – 2,2	max. 0,30

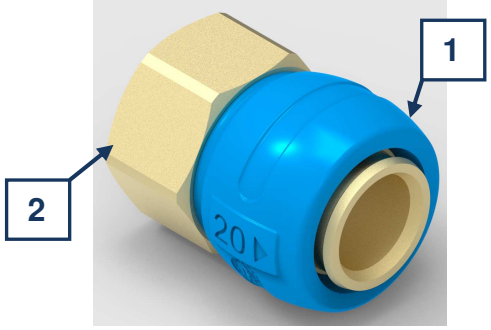
* low lead and nickel content according European Directive 98/83 / CE and German standard DIN 50930

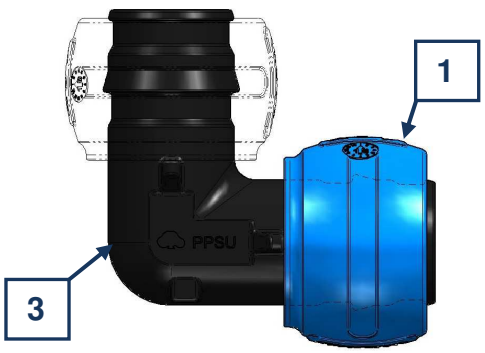
The material used for the PPSU type shows high performance to be used in drinking water installations:

- **Low internal rugosity**: less pressure loss in comparison to brass fittings.
- **High chemical resistance**: this material is not attacked by water chlorine. It doesn't show galvanic corrosion or rusting. Additionally, it is not attacked by building materials.
- **Weight**: PPSU fittings are much lighter than brass fittings.
- **High impact resistance**: PPSU fittings are highly tough and durable. They withstand hard impacts without fracturing.
- **High heat resistance**: the material withstands temperatures up to 134ºC.

Listado Componentes:

Order No.	Name	Material	Manufacturing process
1	Ring	Polimer material	Inyection moulding
2	Brass body	CW617N alloy	Bar cutting and stamping
3	Plastic body	PPSU (Polyphenylsulfone)	Inyection moulding





Advantages of the Rayper System

- Higher water flow and, as a consequence, lower pressure loss
- Sealing without water-resistance seals
- Guaranteed sealing, regardless of the tools condition
- Reliable safety – more than 20 years of experience in expansion techniques
- Total compatibility with the currently available tools
- The same accessory can be used for PEX-a pipes S5 and S3,2

3. Assembly instructions

1. Cut the pipe

   Cut the pipe with an appropiete pair of scissors, making sure that the cut is perpendicular to the pipe, and that it is free of burrs and oil of grease

2. Fit the ring on the pipe

   Insert the pipe in the ring until it gets to the internal stops that the Rayper ring has in one of their ends.

3. Expand the pipe

   Install the apropiate size expansion head on the tool, until the end.
   Open the expander handlers to close the segments of the expansion head.
   Then introduce the expansion head into the pipe and flare the pipe closing the expander handlers totally (slowly, especially at low temperatures). Keep the expander closed for a few seconds.
   Repeat this procedure, rotating (max. 1/8 of a turn) the expander or the pipe between expansions (*), until the pipe makes contact with the end of the expansion head.

(*) In case of using the manual expander. (if it is used the automatic expander, rotating is not necessary, because the tool's head is what rotates)

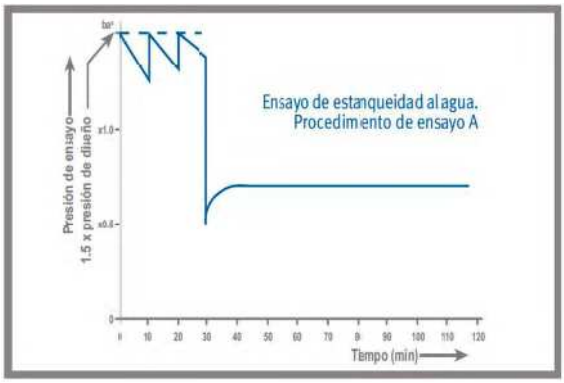
Number of expansions recommended:

Dimensions	16×1,8	16×2,0	20×1,9	25×2,3	32×2,9
No Expansions (manual tool)	4	4	5	7	13

4. Insert the fitting

   Remove the expander from the pipe and introduce the nipple of the fitting inside the pipe-end quickly, keeping the pressure for some seconds until the pipe contracts and grabs the accessory, making sure that the plastic ring makes contact with the end of the nipple of the fitting.

4. Pressure test



According to the current regulations, a sealing test must be performed before starting up an installation. As the unions are based on the plastic memory of PEX-a pipes, which contractions raises some time after the expansion, it is important to delay the pressure test.

Under usual temperatures, the Rayper unions can be tested 30 minutes after their installation. In winter conditions, it is highly recommended to wait for the following time:

Temperature	Above +10ºC	+6ºC to +10ºC	+1ºC to +5ºC	-4ºC to 0ºC	-9ºC to -5ºC	-15ºC to -10ºC
Waiting time	30 min	45 min	2 horas	3 horas	4 horas	12 horas

Test procedure:

1. The piping system should be filled **slowly** with water to ensure complete elimination of air pockets and to avoid pressure surges.
2. Purge the system with water to expel all the air that can be evacuated by this means. Stopping the flow and closing the purge system.
3. Application of the selected hydrostatic test pressure, equal to **1,5 times the design pressure**, by pumping, according to the attached graph during the first 30 min. During this time the inspection should be carried out to detect any leaks on the system.

The maximum test pressure recommended by Blansol is 10 bars.

4. In case of significant water leak, **reduce pressure to 0,5 times the design pressure** according to the attached graph.
5. Closing the drain cock. If it stabilizes at a constant pressure, over 0,5 times the design pressure, it is an indication that the piping system is in good condition. Monitoring of evolution **for 90 min**. Performing a visual check to locate possible leaks. If during this period the pressure tends to drop, this is an indication that there is a leak in the system.
6. The test result should be recorded.

NOTE: Using inappropriate pressure levels for a long time does not speed up leak detection.

Design pressure: maximum pressure to which the installation will be subjected during its operation.

5. Certifications

The Rayper brass and PPSU fittings and the PEX-a pipes have been designed and manufactured under the requirements specified in the standard UNE-EN-ISO15875.

The fittings threads are cylindrical according to the standard ISO 228.

The Rayper brass and PPSU fittings and the PEX-a pipes have the Product Certificate issued by AENOR and the Russian Standard.

The Rayper PPSU fittings and the PEX-a pipes have the Product Certificate issued by KIWA.

6. Presentation

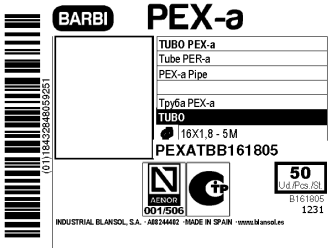
Rayper brass fittings are supplied in bags of 5 units and the Rayper PPSU fittings in bags of 25 or 50 units, inside cardboard boxes. Sales units are indicated in the price booklet.
Rayper rings are supplied separately, inside cardboard boxes. Sales units are indicated in the price booklet.
PEX-a pipe is supplied in rolls or bars. Sales units are indicated in the price booklet.

Labelling of Rayper fittings and rings:

The label includes the piece reference, product description (5 languages), dimensions, certifications, bar-code, units per box and traceability (SAAS).

Labelling of PEX-a pipe:

The label includes the pipe reference, product description (4 languages),dimensions, certifications, bar-code, units per box and traceability (SAAS).



All pipes are labelled with permanent ink on every meter, showing the following message

- AENOR 001/506 – Our quality Brand, according to the AENOR Product Certificate
- BARBI – Our comercial Brand
- PEX-a - PEX-a cross-linked polyethylene pipe
- Diameter x thickness (mm)
- Aplication class and design pressure
- UNE-EN ISO 15875 – Reference norm for pipes production and certification
- Manufacturing date
- Length

7. Guarantee Barbi

Rayper System is guaranteed for 15 years, for damages caused by defects in the product design or manufacturing default in every country in the world excepting USA and Canada (see BARB I warranty conditions). It is mandatory to have performed the pressure test correctly to be covered by the warranty.

8. Installation problems

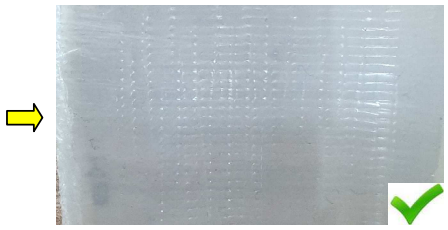
Cut of the pipe

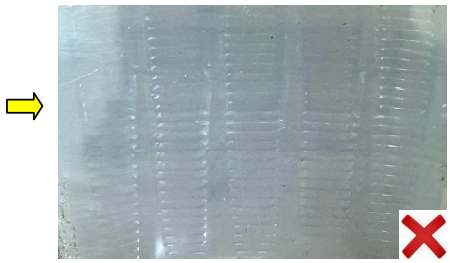
The cut must be perpendicular to the tube.
Make sure there are no burrs inside the tube.

Pipe expansion

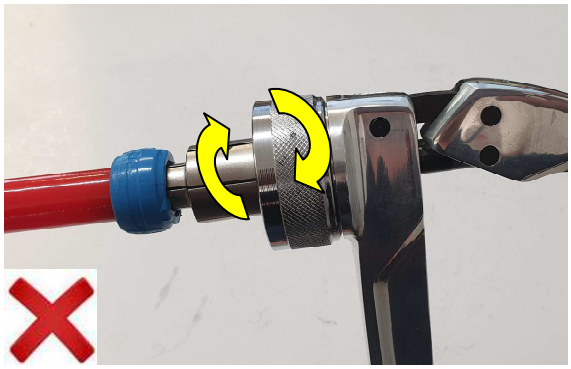
Expand the tube the necessary number of times making sure the expander head rotates between expansions.
If the tool head has not rotated during the expansion of the tube and ring, grooves are generated inside the tube through which leakage occurs.

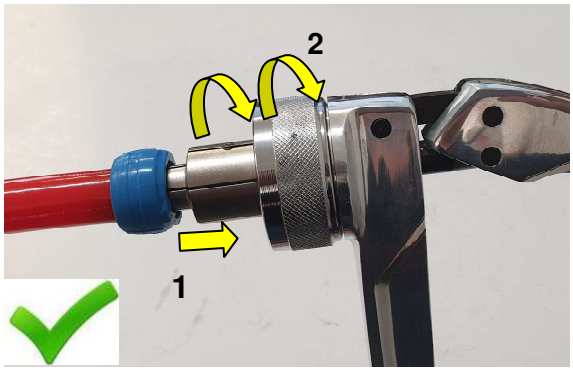
Section of the Pex-a pipe after correct/ incorrect expansion	
	**Correct**
	**Incorrect**





The expander head have to move freely without touching the walls of the pipe. This is achieved separating slightly the head of the expander tool from the tube after each expansion.





Avoid performing multiple expansions: it can cause non-uniform expansion of the tube/ring, causing grooves to appear inside the tube.

Do not apply excessive pressure between the tube and the tool head.

Mounting the Rayper ring on the tube

Insert the tube into the Rayper ring until it contacts the ring stops.

Inserting the fitting into the tube

Insert the fitting into the tube until it contacts the stops of the piece. A maximum separance of 1.6 mm is acceptable.

Recover of fittings once assembled

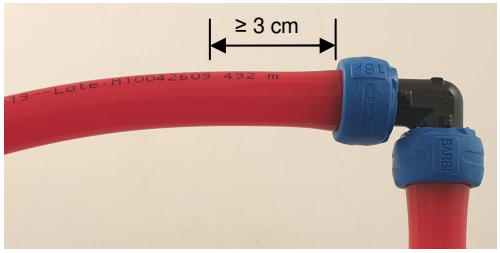
To recover Rayper accessories if they have already been mounted on the pipe, the following precautions should be taken:
PPSU Rayper fittings cannot be reused, please reject them immediately.
Rayper rings cannot be reused, please reject them immediately.

Rayper brass fittings can be reused by using a **heat gun** (stripper type) to recover the body of the part, taking care to discard the ring and cut off the end of the heated piece of tubing. Inspect the accessory for possible damage.

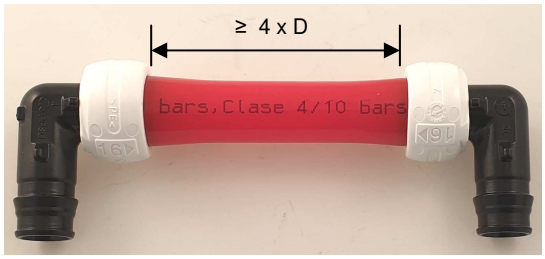
It is not recommended to recover the fitting by cutting the ring with scissors or a saw, because it is quite probable that the piece may be damaged, what can cause leakage.

Installation recommendations

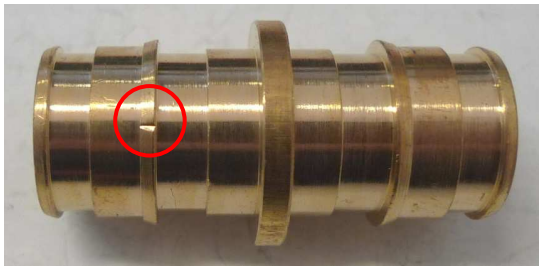
Avoid bending the pipe too close to the fitting: we recommend leaving at least 3 cm of straight pipe length.



Avoid Rayper joints very close to each other: we recommend leaving at least a distance between Rayper joints of four times the diameter of pipe.



Cracks in the harpoon of the nipple of the accessory: they can cause loss of tightness in the union.



Chemicals. Avoid contact or exposure to vapors from PPSU fittings with the following products: **PVC glues, gels and solvents, polyurethane foams, liquid metal sealants, mineral greases and lubricants, paints, disinfectants and bleach.**

Avoid contact of EPDM gaskets with mineral greases.

Sunlight: Protect PPSU fittings and Pex pipes from UV rays.

Flame: Protect PPSU accessories from contact with fire or excessive heat.

Installation of threaded accessories: we recommend using PTFE (Teflon) tape or thread as sealing material for the male threads; avoid using hemp tape.