

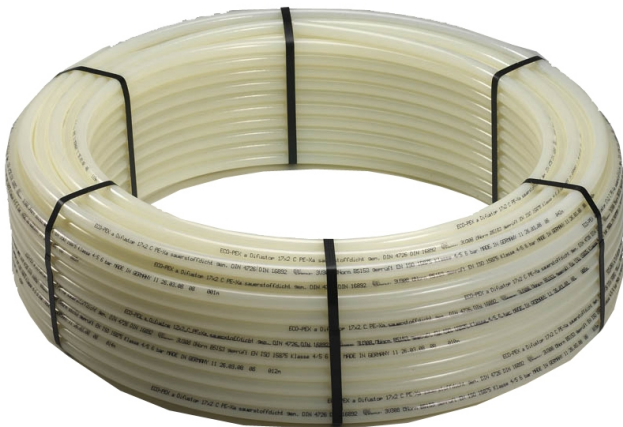


3-layers pipe PE-Xa 3 with EVOH barrier

► IVAR PE-Xa 3

3-layers cross-linked polyethylene pipe PE-Xa with EVOH oxygen barrier.

■ PRESENTATION



IVAR PE-Xa 3 is the cross-linked polyethylene pipe PE-Xa suitable for the transport of drinking water and for the implementation of heating and cooling systems. It is used in residential buildings, hospitals, schools, hotels, offices, shopping centers and industries, both new and under renovation. Cross-linking of IVAR PE-Xa 3 is produced by the "peroxide method" (also known as "Engel method" or "type A"); the minimum cross-linking level is 70%, as required by the UNI EN ISO 15875-2 standard. Cross-linking of the pipe is performed during the extrusion phase, without the need of further treatments. This guarantees cross-linking uniformity in each section of the pipe, with detectable differences of less than 0.5%.

IVAR PE-Xa 3 pipe is made of three layers: inner layer made of high density PE-Xa, intermediate layer made of adhesive polyethylene, outer layer made of EVOH (Ethylene Vinyl Alcohol).

EVOH is a barrier with a thickness of some tens of microns that makes the pipe impermeable to oxygen, reducing the risk of corrosion of metal components of the system and limiting algae and bacteria proliferation.

■ APPLICATION FIELDS

- Hydraulic installations, both civil and industrial
- Radiant heating/cooling systems
- Radiator heating systems
- Ice/snow melting systems

■ PLUS

- High flexibility: easy to bend by hand (without special tools), saving fittings and installation time.
- High temperature resistance: it can work at temperatures up to 90 °C according to the UNI EN ISO 15875 standard.
- Expected lifespan of over 50 years: cross-linking and high build quality guarantee over 50 years of pipe use.
- Low pressure drops: the extremely smooth inner surface contrasts the formation of limescale deposits and reduces pressure drops.
- Lightweight: it weighs 7 times less than copper and 13 times less than iron on equivalent diameters.
- Non-toxic materials: certified materials for the transport of drinking water that do not affect water organoleptic characteristics.
- Thermal insulation: thermal conductivity of polyethylene is hundreds of times less than metals.
- Sound insulation: the elasticity of polyethylene facilitates the absorption of vibrations and therefore reduces noise transmission.

- Ideal for earthquake zone: it supports greater stress than metal pipes thanks to its elasticity.
- Thermal memory: it recovers the original shape when heated with hot air.
- Resistance to corrosion, to building materials and to major chemical compounds: pipes can be installed underfloor.
- Oxygen barrier: it reduces the risk of corrosion of metal components of the system and limits algae and bacteria proliferation.

■ TECHNICAL SPECIFICATIONS

THERMAL CHARACTERISTICS

Maximum operating temperature	90 °C
Maximum temperature	100 °C
Reversible transformation at 120 °C – 1 hour	< 2,5 %
Specific heat at 23 °C	2,3 kJ/kg K
VICAT temperature	130-132 °C
Thermal conductivity	0,35-0,38 W/mK
Oxygen permeability	0,08 g/m ³ d
Coefficient of linear expansion	0,026 mm/m K

PHYSICAL CHARACTERISTICS

Density	951 kg/m ³
Cross-linking level	>70%
Rugosity	0,007 mm
Weight	96 g/m
Volume	0,13 l/m

MECHANICAL CHARACTERISTICS

Minimum bending radius	5 times the outer pipe diameter
Tensile strength	> 22 N/mm ²
Elongation at break	> 400%
Modulus of elasticity at 20 °C	> 800 N/mm ²
Resistance to internal pressure s=4,8 Mpa, 95 °C	> 1 hour
Resistance to internal pressure s=4,7 Mpa, 95 °C	> 22 hours
Resistance to internal pressure s=4,6 Mpa, 95 °C	> 165 hours
Resistance to internal pressure s=4,4 Mpa, 95 °C	> 1000 hours
Resistance to internal pressure s=2,5 Mpa, 110 °C	> 1 anno
EVOH barrier thickness	0,4 ± 0,15 mm

DIAMETERS AVAILABLE

Diameters	16x2 mm - 17x2 mm - 20x2 mm
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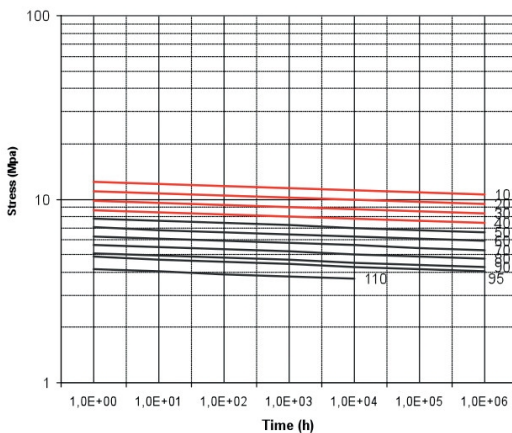
■ CERTIFICATIONS



■ MATERIALS

- PE-Xa cross-linked polyethylene
- Adhesive polyethylene
- EVOH barrier (Ethylene Vinyl Alcohol)

■ REGRESSION CURVES



The maximum admissible stress of Ivar PE-Xa 3 pipe is identified by intersecting the vertical line related to a specific time value with the oblique line of the chosen temperature.

The equivalent pressure value is obtained by the following formula:

$$P_{\max} (\text{bar}) = (20 \cdot \sigma_{\max} \cdot Sp) / (D \cdot Sp)$$

σ_{\max} = maximum admissible stress (MPa)

Sp = pipe thickness (mm)

D = outer pipe diameter (mm).

■ CONSTRUCTIVE PECULIARITIES

IVAR PE-Xa 3 pipe is made of three layers:

1. Inner layer: made of high density cross-linked polyethylene type A (PE-Xa), it has an extremely smooth surface which contrasts the formation of limescale deposits and reduces pressure drops. The inner layer is much of the pipe thickness. Cross-linking transforms the original thermoplastic structure of polyethylene into a thermosetting structure, increasing tensile strength, pressure resistance, high temperature and dimensional stability. Above all, cross-linking ensures that these properties are maintained over time.
2. Intermediate layer: made of a very thin layer of highly adhesive polymeric material, it keeps the inner layer and the outer layer together.
3. Outer layer: it's a barrier made of EVOH (Ethylene Vinyl Alcohol), some tens of μm thick, which drastically reduces oxygen diffusion through the walls of the pipe. Therefore it prevents the oxygenation of the water and the consequent oxidation and corrosion of the metal parts of the system. According to the UNI EN 1264-2 standard, EVOH layer is mandatory when the pipe is used in a radiant system.

■ INSTALLATION

IVAR PE-Xa 3 pipe installation is easy and, respecting the minimum bending radius, it can also be performed without any bending device. It is always necessary to protect the pipe from sunlight.

For a correct installation, cut the pipe with a tool able to make a clean cut, without smudging and perpendicular to the axis.

In a radiant system, fix the pipe to the electro-welded mesh with plastic strips. It is important to avoid any damage, even accidental, of the pipes: avoid that the pipes come into contact with sharp bodies that can scratch or cut them. Even wheelbarrows and workers walking could damage the pipe.

Once the pipes are installed, it is advisable to perform a pressure test of the system, in order to highlight any fluid leaks.

MARKING

In compliance with the UNI EN ISO 15875-1 standard, IVAR PE-Xa 3 pipe has a marking that precisely outlines its field of use, indicating the Application Classes and the related operating pressures.

The Application classes identify the service conditions in terms of temperature and relative maintenance period at that value, as shown below. The field of use is completely defined by the project pressure value associated with the single Application Class.

Application class	Design temperature T_0 °C	Time ^b at T_0 years	T_{max} °C	Time at T_{max} years	T_{mal} °C	Time at T_{mal} h	Typical field of application
1 ^a	60	49	80	1	95	100	Hot water supply (60°C)
2 ^a	70	49	80	1	95	100	Hot water supply (70°C)
4 ^b	20 plus cumulative	2,5	70	2,5	100	100	Underfloor heating and low-temperature radiators
	40 plus cumulative	20					
	60	25					
5 ^b	20 plus cumulative	14	90	1	100	100	High-temperature radiators
	60 plus cumulative	25					
	90	10					

^a A country may select class 1 or class 2 in conformity with its national regulations.
^b Where more than one design temperature for time and associated temperature appears for any class, they should be aggregated.
 "Plus cumulative" in the table implies a temperature profile of the mentioned temperature over time (e.g. the design temperature profile for 50 years for class 5 is 20 °C for 14 years followed by 60 °C for 25 years, 80 °C for 10 years, 90 °C for 1 year and 100 °C for 100 h).
 NOTE: for values of T_0 , T_{max} and T_{mal} in excess of those in the table, this international standard does not apply.

Example of IVAR PE-Xa 3 - I-PEXA3L16R12 pipe marking:

IVAR-PEX Ø16x2,0 - C - PE-Xa/EVOH Oxygen barrier - Tmax 95°C - UNI EN ISO 15875 - Class 1-2-4/10bar Class 5/8bar - 001/007063 AENOR - PiiP 373 [Date] [Hour] [Line][Meter] Made in EU

Article name	IVAR PE-Xa 3
Nominal dimensions	Ø 16x2
Dimensional class	C
Oxygen impermeability of the barrier (EVOH)	PE-Xa/EVOH Oxygen barrier
Maximum temperature	95 °C
Product standard	UNI EN ISO 15875
Application classes combined with operative working pressure	Class 1-2-4/10bar Class 5/8bar
Certifications	001/007063 AENOR - PiiP 373
Date and production references	[Date] [Hour] [Line] [Meter]
Manufacture	Made in EU

STORAGE

Observe the following storage regulations to guarantee the durability and functionality of the product.

IVAR PE-Xa 3 pipe is supplied in packages to be protected during the storage period. In any case, prolonged exposure to sunlight damages the pipe irreparably, altering its chemical and physical characteristics. It is recommended not to leave the product exposed to direct sunlight, to keep the rolls in a covered and dry place and to avoid the formation of ice inside the packaging, because the dilatations due to the passage of state could ruin it. Lastly, avoid that the pipes come into contact with open flames or other sources of heat capable to cause even partial melting.

■ SPECIFICATION SUMMARY

IVAR PE-Xa 3 cod. I-PEXA3L16R12: is the pipe made of PE-Xa cross-linked polyethylene suitable for drinking water and heating and cooling systems. It is used in residential buildings, hospitals, schools, hotels, offices, shopping centers and industries, both new and under renovation. IVAR PE-Xa 3 is composed of three layers: inner layer made of high density PE-Xa; intermediate layer made of adhesive polyethylene; outer layer made of EVOH. The latter is a barrier with a thickness of some tens of microns that makes the pipe impermeable to oxygen, reducing corrosion problems of the heating systems. Maximum operating temperature: 90°C according to the UNI EN ISO 15875 standard. Maximum temperature: 100 °C according to the UNI EN ISO 15875 standard. Density: 951 kg/m³. Level of cross-linking: >70% in weight. Rugosity: 0,007 mm. Weight: 96 g/m. Volume: 0,13 l/m. Specific heat at 23°C: 2,3 kJ/kg K. VICAT temperature: 130-132 °C. Thermal conductivity: 0,35-0,38 W/mK. Oxygen permeability: 0,08 g/m³d. Coefficient of linear expansion: 0,026 mm/m K. Application classes combined with working pressure: Class 1-2-4/10 bar Class 5/8 bar. Outer diameter: 16 mm. Pipe thickness: 2 mm. Package: 120 m.

IVAR PE-Xa 3 cod. I-PEXA3L16R25: is the pipe made of PE-Xa cross-linked polyethylene suitable for drinking water and heating and cooling systems. It is used in residential buildings, hospitals, schools, hotels, offices, shopping centers and industries, both new and under renovation. IVAR PE-Xa 3 is composed of three layers: inner layer made of high density PE-Xa; intermediate layer made of adhesive polyethylene; outer layer made of EVOH. The latter is a barrier with a thickness of some tens of microns that makes the pipe impermeable to oxygen, reducing corrosion problems of the heating systems. Maximum operating temperature: 90°C according to the UNI EN ISO 15875 standard. Maximum temperature: 100 °C according to the UNI EN ISO 15875 standard. Density: 951 kg/m³. Level of cross-linking: >70% in weight. Rugosity: 0,007 mm. Weight: 96 g/m. Volume: 0,13 l/m. Specific heat at 23°C: 2,3 kJ/kg K. VICAT temperature: 130-132 °C. Thermal conductivity: 0,35-0,38 W/mK. Oxygen permeability: 0,08 g/m³d. Coefficient of linear expansion: 0,026 mm/m K. Application classes combined with working pressure: Class 1-2-4/10 bar Class 5/8 bar. Outer diameter: 16 mm. Pipe thickness: 2 mm. Package: 250 m.

IVAR PE-Xa 3 cod. I-PEXA3L16R60: is the pipe made of PE-Xa cross-linked polyethylene suitable for drinking water and heating and cooling systems. It is used in residential buildings, hospitals, schools, hotels, offices, shopping centers and industries, both new and under renovation. IVAR PE-Xa 3 is composed of three layers: inner layer made of high density PE-Xa; intermediate layer made of adhesive polyethylene; outer layer made of EVOH. The latter is a barrier with a thickness of some tens of microns that makes the pipe impermeable to oxygen, reducing corrosion problems of the heating systems. Maximum operating temperature: 90°C according to the UNI EN ISO 15875 standard. Maximum temperature: 100 °C according to the UNI EN ISO 15875 standard. Density: 951 kg/m³. Level of cross-linking: >70% in weight. Rugosity: 0,007 mm. Weight: 96 g/m. Volume: 0,13 l/m. Specific heat at 23°C: 2,3 kJ/kg K. VICAT temperature: 130-132 °C. Thermal conductivity: 0,35-0,38 W/mK. Oxygen permeability: 0,08 g/m³d. Coefficient of linear expansion: 0,026 mm/m K. Application classes combined with working pressure: Class 1-2-4/10 bar Class 5/8 bar. Outer diameter: 16 mm. Pipe thickness: 2 mm. Spessore: 2 mm. Package: 600 m.

IVAR PE-Xa 3 cod. I-PEXA3L17R25: is the pipe made of PE-Xa cross-linked polyethylene suitable for drinking water and heating and cooling systems. It is used in residential buildings, hospitals, schools, hotels, offices, shopping centers and industries, both new and under renovation. IVAR PE-Xa 3 is composed of three layers: inner layer made of high density PE-Xa; intermediate layer made of adhesive polyethylene; outer layer made of EVOH. The latter is a barrier with a thickness of some tens of microns that makes the pipe impermeable to oxygen, reducing corrosion problems of the heating systems. Maximum operating temperature: 90°C according to the UNI EN ISO 15875 standard. Maximum temperature: 100 °C according to the UNI EN ISO 15875 standard. Density: 951 kg/m³. Level of cross-linking: >70% in weight. Rugosity: 0,007 mm. Weight: 96 g/m. Volume: 0,13 l/m. Specific heat at 23°C: 2,3 kJ/kg K. VICAT temperature: 130-132 °C. Thermal conductivity: 0,35-0,38 W/mK. Oxygen permeability: 0,08 g/m³d. Coefficient of linear expansion: 0,026 mm/m K. Application classes combined with working pressure: Class 1-4/10 bar Class 2-5/8 bar. Outer diameter: 17 mm. Pipe thickness: 2 mm. Package: 250 m.

IVAR PE-Xa 3 cod. I-PEXA3L17R60: is the pipe made of PE-Xa cross-linked polyethylene suitable for drinking water and heating and cooling systems. It is used in residential buildings, hospitals, schools, hotels, offices, shopping centers and industries, both new and under renovation. IVAR PE-Xa 3 is composed of three layers: inner layer made of high density PE-Xa; intermediate layer made of adhesive polyethylene; outer layer made of EVOH. The latter is a barrier with a thickness of some tens of microns that makes the pipe impermeable to oxygen, reducing corrosion problems of the heating systems. Maximum operating temperature: 90°C according to the UNI EN ISO 15875 standard. Maximum temperature: 100 °C according to the UNI EN ISO 15875 standard. Density: 951 kg/m³. Level of cross-linking: >70% in weight. Rugosity: 0,007 mm. Weight: 96 g/m. Volume: 0,13 l/m. Specific heat at 23°C: 2,3 kJ/kg K. VICAT temperature: 130-132 °C. Thermal conductivity: 0,35-0,38 W/mK. Oxygen permeability: 0,08 g/m³d. Coefficient of linear expansion: 0,026 mm/m K. Application classes combined with working pressure: Class 1-4/10 bar Class 2-5/8 bar. Outer diameter: 17 mm. Pipe thickness: 2 mm. Package: 600 m.

IVAR PE-Xa 3 cod. I-PEXA3L20R25: is the pipe made of PE-Xa cross-linked polyethylene suitable for drinking water and heating and cooling systems. It is used in residential buildings, hospitals, schools, hotels, offices, shopping centers and industries, both new and under renovation. IVAR PE-Xa 3 is composed of three layers: inner layer made of high density PE-Xa; intermediate layer made of adhesive polyethylene; outer layer made of EVOH. The latter is a barrier with a thickness of some tens of microns that makes the pipe impermeable to oxygen, reducing corrosion problems of the heating systems. Maximum operating temperature: 90°C according to the UNI EN ISO 15875 standard. Maximum temperature: 100 °C according to the UNI EN ISO 15875 standard. Density: 951 kg/m³. Level of cross-linking: >70% in weight. Rugosity: 0,007 mm. Weight: 96 g/m. Volume: 0,13 l/m. Specific heat at 23°C: 2,3 kJ/kg K. VICAT temperature: 130-132 °C. Thermal conductivity: 0,35-0,38 W/mK. Oxygen permeability: 0,08 g/m³d. Coefficient of linear expansion: 0,026 mm/m K. Application classes combined with working pressure: Class 1-4/8 bar Class 2-5/6 bar. Outer diameter: 20 mm. Pipe thickness: 2 mm. Package: 250 m.

IVAR PE-Xa 3 cod. I-PEXA3L20R50: is the pipe made of PE-Xa cross-linked polyethylene suitable for drinking water and heating and cooling systems. It is used in residential buildings, hospitals, schools, hotels, offices, shopping centers and industries, both new and under renovation. IVAR PE-Xa 3 is composed of three layers: inner layer made of high density PE-Xa; intermediate layer made of adhesive polyethylene; outer layer made of EVOH. The latter is a barrier with a thickness of some tens of microns that makes the pipe impermeable to oxygen, reducing corrosion problems of the heating systems. Maximum operating temperature: 90°C according to the UNI EN ISO 15875 standard. Maximum temperature: 100 °C according to the UNI EN ISO 15875 standard. Density: 951 kg/m³. Level of cross-linking: >70% in weight. Rugosity: 0,007 mm. Weight: 96 g/m. Volume: 0,13 l/m. Specific heat at 23°C: 2,3 kJ/kg K. VICAT temperature: 130-132 °C. Thermal conductivity: 0,35-0,38 W/mK. Oxygen permeability: 0,08 g/m³d. Coefficient of linear expansion: 0,026 mm/m K. Application classes combined with working pressure: Class 1-4/8 bar Class 2-5/6 bar. Outer diameter: 20 mm. Pipe thickness: 2 mm. Package: 500 m.

■ CODES

I-PEXA3L16R12	3-layers pipe PE-Xa 3 with EVOH barrier. Diameter: 16 mm. Package: 120 meters.
I-PEXA3L16R25	3-layers pipe PE-Xa 3 with EVOH barrier. Diameter: 16 mm. Package: 250 meters.
I-PEXA3L16R60	3-layers pipe PE-Xa 3 with EVOH barrier. Diameter: 16 mm. Package: 600 meters.
I-PEXA3L17R25	3-layers pipe PE-Xa 3 with EVOH barrier. Diameter: 17 mm. Package: 250 meters.
I-PEXA3L17R60	3-layers pipe PE-Xa 3 with EVOH barrier. Diameter: 17 mm. Package: 600 meters.
I-PEXA3L20R25	3-layers pipe PE-Xa 3 with EVOH barrier. Diameter: 20 mm. Package: 250 meters.
I-PEXA3L20R50	3-layers pipe PE-Xa 3 with EVOH barrier. Diameter: 20 mm. Package: 500 meters.

IVAR S.p.A.

Via IV Novembre, 181

25080 Prevalle (BS), Italy

T. +39 030 68028 – F. +39 030 68 01 329

info@ivar-group.com – www.ivar-group.com

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