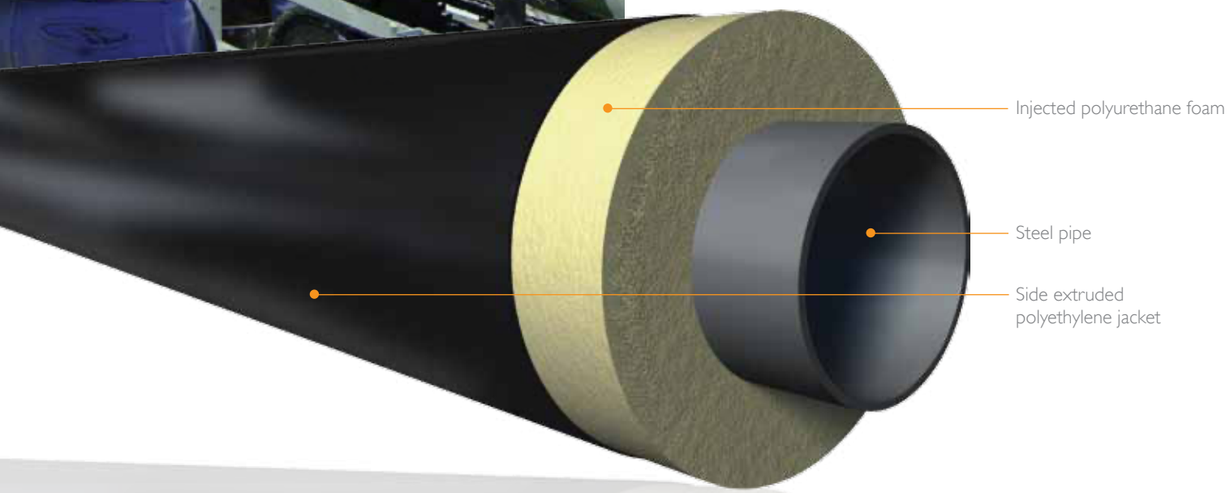
Thermapipe® plant preparation

Thermapipe®

Polyurethane foam with polyethylene jacket thermal coating insulation system.

Thermapipe® is the most advanced solution in the construction of extended underground or above ground pipe networks for the distribution of hot and cold fluids. Therefore, it is frequently used for central district heating or cooling networks.

Thermapipe® is a broad range of thermal insulation coating products based on polyurethane foam, including rigid and flexible solutions. As per these features, it may be applied on steel, galvanized steel, stainless steel, copper, PEX (crosslinked polyethylene) or other materials.



Due to its quick, economical and easy installation, Thermapipe® coated pipes reduce the costs derived from the traditional installation systems by avoiding expensive concrete tunnels and further operations for waterproof results and sealing.

The outer jacket can be both in high density polyethylene, for underground installations, or a spiral sheet (galvanized, aluminium or stainless steel), for above ground installations.

PRODUCTION PROCESS

Usually, the thermal insulation is obtained applying polyurethane foam on a steel pipe previously coated with anti-corrosive epoxy powder*. The polyurethane foam is poured directly into the annular cavity between the steel pipe and the outer jacket which is supported thereon by polypropylene spacers. This technique ensures a thermal conductivity between 0.024 and 0.027 W/m°C for the final product. For temperatures higher than 148 and up to 250°C, a first layer of calcium silicate is applied prior to the polyurethane foam injection.

The production is made according to European Standards EN 253, 448, 488, 489 and as per the specific project requirements. Besides, it may be applied on elbows, tees, valves and all other fittings. Complementarily, Thermapipe® may be installed along with an electronic surveillance system for the detection and localization of moisture or leaks in the pipeline.

* Unless, as per technical specification, anti-corrosive epoxy powder was not required.

Application processes

Thermapipe®

Polyurethane Foam Onshore Thermal Insulation
TECHNICAL DATA

POLYURETHANE PHYSICAL AND MECHANICAL PROPERTIES

Typical Properties[1]	Standard[2]	Unit	Value[3]
PUF Density	ISO 845 ASTM D 792	g/cm³	0.06 to 0.08
PUF Closed Cells Content	ISO 4590-1981 (E) ASTM D 2856	%	≥ 88
PUF Water Absorption	EN 253	%	≤ 10
PUF Compression Resistance	ISO 844	MPa	≥ 0.3

PUF THERMAL INSULATION PROPERTIES

PUF Thermal Conductivity	ASTM C 518	W/m.K	< 0.03

HIGH DENSITY POLYETHYLENE PHYSICAL AND MECHANICAL PROPERTIES

HDPE Density	ISO 1183 Method A ASTM D 792 Method B	g/cm³	0.95 to 0.96
HDPE Melting Point	ASTM D 3418	°C	≥ 123
HDPE Melt Flow Index	CSA Z 245.21	g/10 min	0.3 - 0.7
HDPE Water Absorption	ASTM D 570	%	≤ 0.1
HDPE Flexibility @ -30 °C ± 3 °C, 2,5 °P/D	CSA Z 245.21	-	No cracking of polyethylene
HDPE Hardness	ASTM D 2240	Shore D	≥ 60
HDPE Indentation @ 25 °C @ 50 °C	DIN 30670	mm	 ≤ 0.2 ≤ 0.3
HDPE Elongation at Break @ 23 °C	ASTM D 638	%	≥ 400
HDPE Tensile Strength at Yield @ 23 °C	ASTM D 638	MPa	≥ 17
HDPE Impact Resistance @ -30 °C ± 3 °C	CSA Z 245.21	J/mm	≥ 7
HDPE Coating Resistivity	DIN 30678	Ωm²	≥ 10⁸

FBE + PUF + HDPE COATING SYSTEM MECHANICAL PROPERTIES

Shear Strength Resistance @ 23 °C ± 2 °C Between FBE & PUF @ 23 °C ± 2 °C Between PUF & HDPE	 EN 253 EN 253	 MPa MPa	 ≥ 0.12 ≥ 0.12

(1): Typical properties are listed in this document. Please advice if additional properties are requested.
(2): Each test is performed in accordance to internal procedures which are based on the standards listed in this column.
(3): These are nominal values. They have not to be considered as specification limits.

Polyurethane Foam Offshore Thermal Insulation
TECHNICAL DATA

POLYURETHANE PHYSICAL AND MECHANICAL PROPERTIES

Typical Properties[1]	Standard[2]	Unit	Value[3]
PUF Density	ISO 845 ASTM D 792	g/cm³	0.15 to 0.17
PUF Closed Cells Content	ISO 4590-1981 (E) ASTM D 2856	%	≥ 88
PUF Water Absorption	EN 253	%	≤ 10
PUF Compression Resistance	ISO 844	MPa	≥ 1.2

PUF THERMAL INSULATION PROPERTIES

PUF Thermal Conductivity	ASTM C 518	W/m.K	< 0.04

HIGH DENSITY POLYETHYLENE PHYSICAL AND MECHANICAL PROPERTIES

HDPE Density	ISO 1183 Method A ASTM D 792 Method B	g/cm³	0.95 to 0.96
HDPE Melting Point	ASTM D 3418	°C	≥ 123
HDPE Melt Flow Index	CSA Z 245.21	g/10 min	0.3 - 0.7
HDPE Water Absorption	ASTM D 570	%	≤ 0.1
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