EN

Solutions for a green future

BIOMUNDIAL

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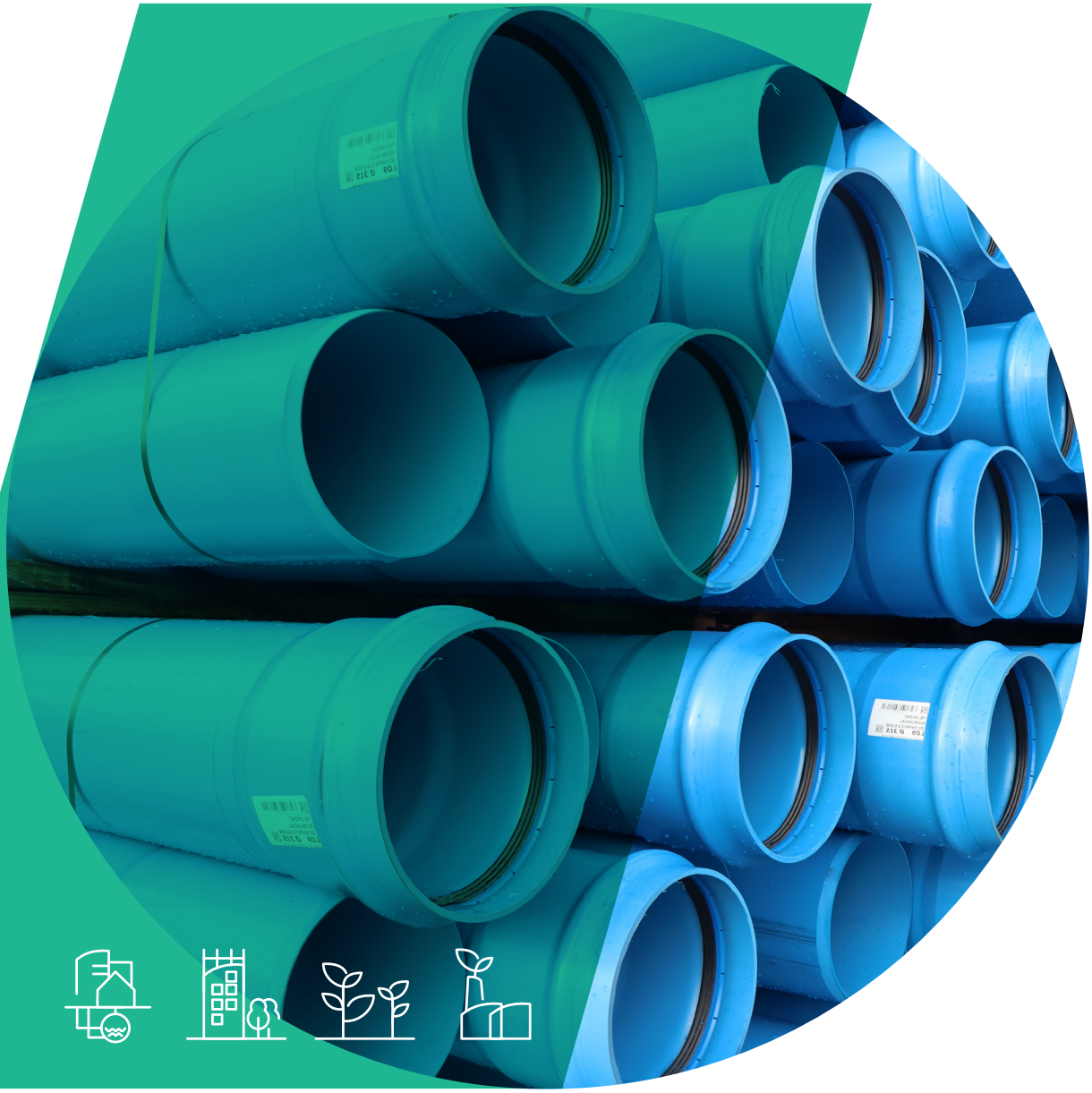

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Solutions for a green future

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The best thermoplastic solutions for infrastructure networks

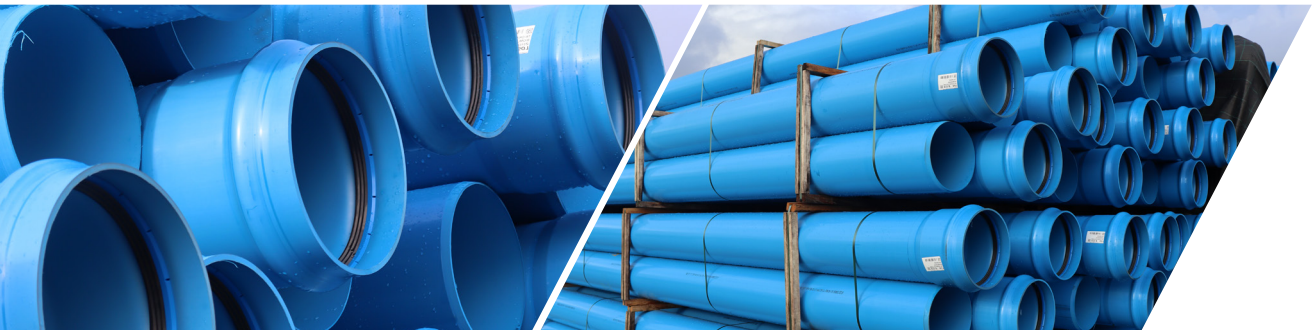
Politejo

Politejo Group was founded in 1978, as an industry specialized in the manufacture of thermoplastic solutions and its main activity is the production of pipes and plastic accessories for the water supply, waste water, irrigation, electricity and telecommunications.

Our strategy is based on the constant innovation of products and services, with a skilled team, able to understand the needs associated with the various sectors and present highly reliable solutions, longevity that allow the conservation of water resources and the environment.

The success of Politejo Group is based on the profile of its employees, with a family-oriented management, due to the strategic location of its manufacturing units and their complete solutions.
This profile enabled a notable growth throughout the last 40 years, and currently Politejo Group is present in Angola, Brazil, Spain, Mozambique and Portugal, with a view to expandingto new locations.

BIOMUNDIAL



1. Molecularly Oriented PVC Pipes

Biomundial (PVC-O) is manufactured in accordance with ISO 16422 standards and results from a production process in which, after extrusion, the pipe undergoes an expansion stage through variations in pressure, temperature, and time. Through this expansion process, its molecular structure is reorganized into a laminar and radial structure.

The success of this solution is based on the reorganization of the molecular structure, allowing an improvement in the pipe's characteristics by providing greater resistance to impact, traction, and fatigue, increased elasticity, and preventing the propagation of longitudinal cracks.

Compared to conventional PVC (PVC-U), Biomundial offers superior mechanical resistance, as well as reduced weight and an increased internal diameter. This ensures greater reliability and easier handling under the challenging installation and operational conditions commonly found on-site, including aggressive soil environments.

Its main application is in water supply and distribution systems, standing out as an ecological solution with a long service life that allows a reduction in installation, operation, and maintenance costs.

2. Main Advantages

2.1. Project Owner

- Longevity;
- Larger effective diameter;
- Reduced operation and maintenance costs.

2.2. Contractor

- Simple and fast installation, lightweight;
- Reduced labor requirements;
- Greater installation safety.

2.3. End User

- Guaranteed water quality;
- Ecological and sustainable solution;
- 100% recyclable and non-corrosive.

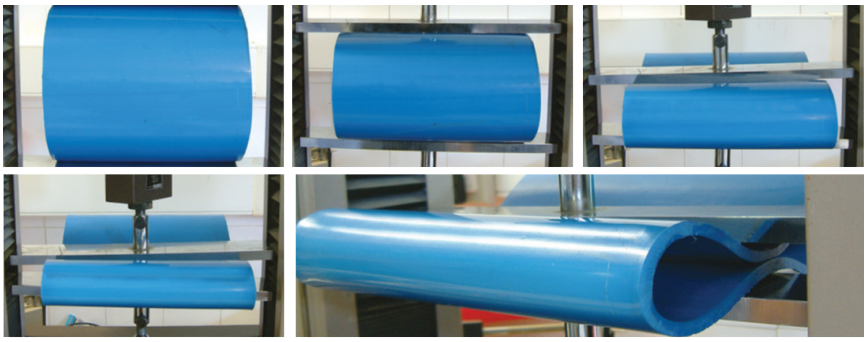
Biomundial (PVC-O) offers several advantages compared to other alternatives throughout its entire lifecycle. It stands out as an ecological and sustainable solution while simultaneously providing greater safety and reliability during installation, ensuring long-term network durability and high performance.

The advantages of this solution come from the improvement of the pipe's mechanical and structural properties, combined with the excellent chemical properties of PVC, which in practice results in:

- Greater impact resistance;
- Higher resistance to internal pressure;
- Greater flexibility;
- Possibility of off-trench assembly;
- Reduction in the number of bends throughout the pipeline route;
- Greater hydraulic capacity;
- Reduced raw material usage;
- Higher energy efficiency throughout the lifecycle.

3. Mechanical Resistance

A compression test carried out on the Biomundial pipe demonstrates its high mechanical resistance. Even after being compressed to its maximum limit, no cracks or ruptures were observed, and the pipe was able to recover its original shape.



4. Impact Resistance

During the transportation, handling, and installation of pipelines, they are subjected to various impact stresses. These are usually caused by improper unloading, poor handling, falling objects striking the pipe, or accidental impacts during installation.

In conventional PVC-U pipes, such impacts can lead to cracks or ruptures after installation, typically with longitudinal crack propagation.

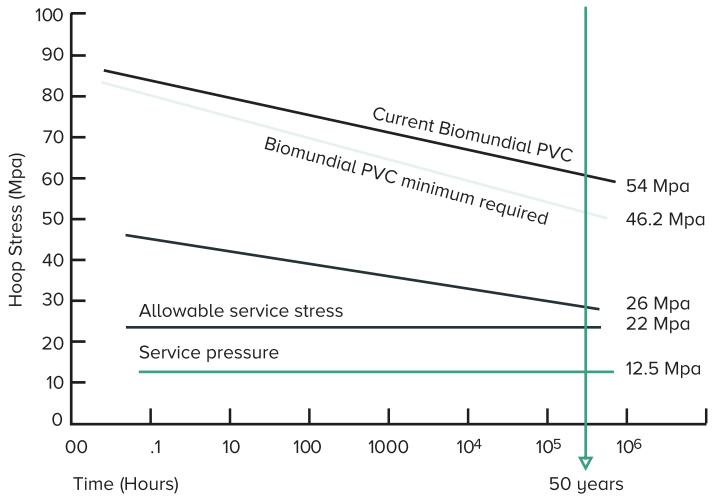
In these situations, repairs usually require replacing the entire pipe section in order to prevent further crack propagation and future maintenance issues.

5. Internal Pressure Resistance

The Biomundial pipe has an allowable working stress of 28 MPa and a minimum 50-year stress resistance of 45 MPa. Its allowable working stress is 2.25 times higher, and its rupture stress is 1.8 times higher than conventional PVC-U piping systems.

These properties enable the pipe to withstand pressure variations, such as water hammer effects, drastically reducing the risk of rupture.

Instantaneous burst tests, including water hammer resistance and cyclic fatigue evaluations, demonstrated that PVC-O pipes have 2.5 times greater resistance than PVC-U pipes.



6. Corrosion Resistance

Like conventional PVC-U, Biomundial does not deteriorate over time due to exposure to natural substances, chemicals present in the soil, or aggressive water conditions, thereby preventing ruptures and scaling. It also offers high chlorine resistance compared to other alternatives.

7. Flexibility

Biomundial features excellent elastic properties and a superior elasticity modulus, allowing it to recover its original shape in the event of impact or pipe compression, significantly reducing the risk of rupture.

8. Hydraulic Capacity

For the same pressure and nominal diameter, PVC-O provides a larger effective internal diameter compared to other alternatives. Combined with the pipe's smooth internal surface, this reduces head losses and allows a higher water flow rate with improved energy efficiency throughout the network.

	Nominal diameter (mm)	Minimum wall thickness (mm)	Maximum internal diameter (mm)	Flow rate (l/s)	Number of pipes per pallet (units)
PN 12,5 bar	110	2,2	105,6	13,1	60
	160	3,2	153,6	27,8	33
	200	3,9	192,2	43,5	14
	250	4,9	240,2	67,9	8
	315	6,2	302,6	107,8	6
	400	7,9	384,2	173,8	6
PN 16 bar	110	2,7	104,6	12,9	60
	160	4,0	152,0	27,2	33
	200	4,9	190,2	42,6	14
	250	6,2	237,6	66,5	8
	315	7,7	299,6	105,7	6
	400	9,8	380,4	170,4	6
PN 20 bar	110	3,4	103,2	12,5	60
	160	4,9	150,2	26,6	33
	200	6,2	187,6	41,5	14
	250	7,7	234,6	64,8	8
	315	9,7	295,6	102,9	6
	400	12,3	375,4	166,0	6

9. Junta mecânica (duplo efeito)

The sealing ring is housed inside the pipe socket and installed in accordance with EN 681 standards.

This type of socket design provides:

- Guaranteed correct positioning of the sealing ring during transportation, installation, and operation;
- Reduced force required for pipe connection;
- Improved performance under soil movement conditions;
- Permitted deflection of 1° (100 mm over a 6-meter pipe length);
- Prevention of sealing ring removal.

10. PVC-O / PVC-U / Ductile Iron Comparison

A comparison between Biomundial and commonly used solutions is presented below:

	Biomundial	PVC-U	HFD
Weight	1	1,4	7
Equipment Required	No	Yes Ø>200	Yes
Corrosion	No	No	Requires coating
Impact Resistance	4x > PVC (localized rupture)	Good (longitudinal rupture)	Good (coating crack)
On-site Cutting	Easy	Easy	Difficult
Installation Cost	Low	Medium	High

11. Water Quality

Chemically inert, with no corrosion or material degradation. Fully watertight, ensuring water is preserved under optimal conditions throughout the system's lifecycle.

12. Sustainability

Biomundial is the ideal solution from a resource optimization perspective throughout its entire lifecycle.

It is considered an ideal solution due to:

- Reduced raw material consumption;
- 50-year service life;
- Reduced transportation consumption and consequently lower CO_2 emissions;
- Lower energy consumption during installation and operation;
- 100% recyclable at the end of its service life.

13. Installation

In terms of installation, Biomundial offers:

- Reduced labor and mechanical equipment requirements;
- 2x lighter compared to PVC-U and HDPE;
- No machinery required up to DN 315;
- Lightweight and flexible pipe, allowing easy transportation and installation without the need for highly specialized labor;
- Reduced installation time, enabling higher productivity in meters per hour;
- Greater reliability during installation, reducing risks caused by impacts.

14. Technical Characteristics

The technical characteristics of Biomundial are presented below:

Characteristics	Average Value	Unit
Density	1,4	g/cm
Minimum Required Strength (MRS)	45	MPa
Safety Coefficient (C)	1,4	MPa
Allowable Stress	22,5	KN/m
Circumferential Stiffness	8,65	MPa
Axial Tensile Strength	50	Mpa
Circumferential Tensile Strength	82	%
Axial Elongation at Break	194	MPa
Axial Elasticity Modulus	2921	MPa
Circumferential Elasticity Modulus	3632	MPa
Compression Strength	50,48	°C
Linear Expansion Coefficient	5x10	°C
VICAT Temperature	84	Cal/°C
Specific Heat	0,25	/cm
Resistivity	1x10	Years
Minimum Service Life	50	Medium

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