

MOLECOR
Smart water

SANOR RECYCLED

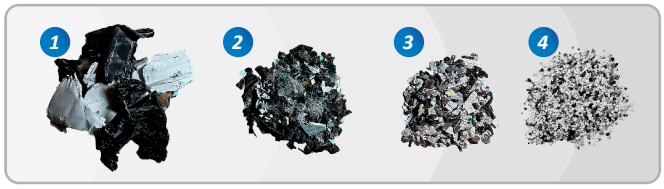
The first oriented PVC pipe for sewage systems made with 60% recycled material

SANOR® pipes **are the first sewege pipes manufactured using the molecular orientation process**, which allows to use post-consumer PVC material and enhance its mechanical properties after the orientation process, resulting in an environmentally sustainable and mechanically superior pipe.

These pipes are designed for gravity sewage systems and applications with pressure up to 6 bar.

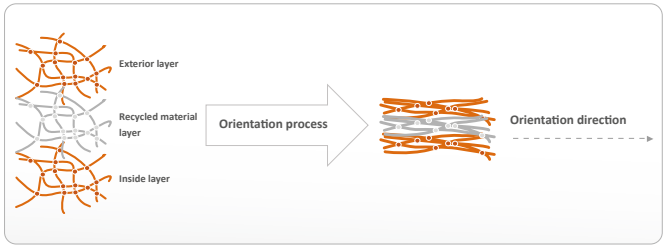
Origin of Recycled PVC

The core of **SANOR®** is manufactured using 100% recycled PVC sourced from post-consumer waste. The material is collected, sorted and processed in facilities operated by **Molecor** to ensure high-quality recycled PVC.



Processing of Recycled Material:
(1) Shredded – (2) Ground – (3) Sorted and cleaned – (4) Micronized

Orientation process in the 3 layers





PVC-O Structure with 60% Recycled Material

SANOR® pipes are composed of three layers: an **outer and inner layer** made from virgin PVC, and a **central core** made from 100% recycled PVC. This configuration allows **the pipe to contain 60% recycled material** while providing a more sustainable solution without compromising its performance or mechanical properties.

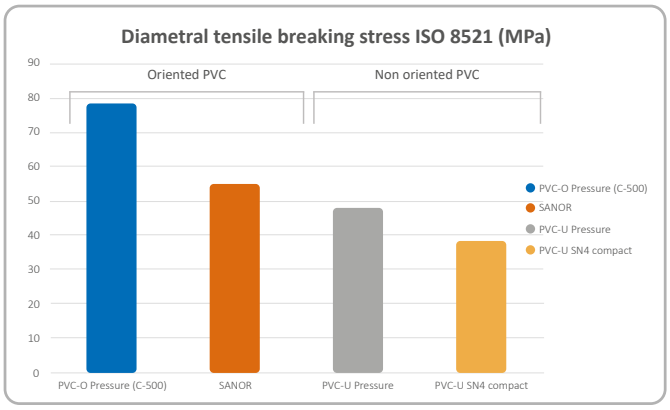
All layers undergo a molecular orientation process, which significantly improves their mechanical properties. Unlike other products, the middle layer is not manufactured using foaming, which provides a compact and sturdy structure.

Molecular orientation: the key to SANOR® performance

Molecular orientation applied to PVC preforms reorganizes the polymer chains—originally arranged at random—by aligning them in the direction of the stretch under controlled conditions.

This process, previously exclusive to pressure pipes, transforms the material **into a laminar structure made up of visible micro-layers**, which enhance the material's strength, stiffness, and ductility.

In **SANOR®**, this laminar structure **develops uniformly across all three layers,** including the central layer made of recycled PVC, allowing for a breaking stress that is even higher than that of grey PVC-U pressure pipes, as shown in the following graph:



Main advantages: Impact resistance

The molecular orientation applied in the manufacture of **SANOR®** pipes significantly increases their **impact resistance. SANOR®** pipes are three times more impact-resistant than solid-wall pipes. This improvement not only provides greater protection against impacts during installation and handling, but also helps extend the service life of the system by reducing the risk of damage and ensuring optimal long-term performance.





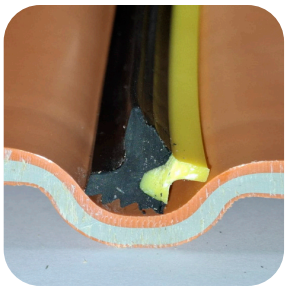
Main advantages: Ductility

SANOR® pipes offer high ductility. Molecular orientation allows the recovery of significant deformations without causing defects in the pipe.





Main advantages: Watertightness with elastic gasket up to 6 bar



Cross-section view of the gasket

The connection is made using an elastic joint, certified according to the **EN 681-2** standard. It consists of a thermoplastic elastomer joint reinforced with a polypropylene ring. This joint ensures a very secure spigot-to-socket connection with no risk of rolling. The joint is supplied pre-assembled. For the pipe to slide smoothly, we recommend applying a special lubricant or neutral soap. This will make it easier to connect the pipes without displacing the elastic ring.

The combination of the greater hydraulic resistance and the elastic joint makes **SANOR® Recycled** pipes suitable for sewage systems with **pressure up to 6 bar.**

Other advantages

- **High hydraulic capacity,** optimising system performance.
- Outstanding **compatibility** with standard fittings.
- **Sustainability**: uses recycled materials and formulated with a low carbon footprint.



Applications



- Non-pressure sewage / pressurised sewage systems up to 6 bar.
- Urban sewerage networks.
- Wastewater and rainwater pipes.
- Drains.
- Industrial pipelines.
- Irrigation (e.g. replacing ditches).
- Wastewater pumping.

Range

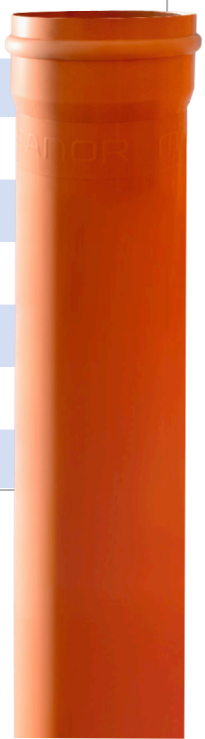
Nominal diameter (mm)	Outer diameter (mm)	Inner diameter (mm)	Max. out. diam. socket mouth (mm)	Length (m)	Effective length (m)	Average thickness (mm)	Minimum ring stiffness (kN/ m²)
160	160	150.7	184.0	5.95	5,824	4.6	4.0
200	200	189.2	227.2	5.95	5,816	5.4	4.0
250	250	237.4	286.1	5.95	5,797	6.3	4.0
315	315	299.1	355.2	5.95	5,775	8.0	4.0
400	400	379.8	447.2	5.95	5,740	10.1	4.0

Packaging

Nominal diameter (mm)	Pipes/ Palette	Palettes/ Truck	Pipes/Truck	Meters/Truck (m)	Palette Width (mm)	Palette Height (mm)	Palette Lenght (mm)
160	33	12	396	2356	1220	800	6150
200	23	12	276	1642	1170	950	6395
250	11	12	132	785	1100	800	6215
315	13	8	104	619	2200	700	6260
400	11	6	66	393	2400	850	6325

Main features

Ring stiffness SN4	≥ 4 kN/m², according to UNE-EN ISO 9969 standard
Creep coefficient at 2 years	< 2.5, according to UNE-EN ISO 9967 standard
Impact resistance	TIR = 0%, according to UNE-EN ISO 3127 standard
Vicat softening temperature	≥ 79ºC, according to UNE-EN ISO 2507 standard
Longitudinal shrinkage	≤ 5%, according to UNE-EN ISO 2505 standard
Resistance to dichloromethane	No attack, according to UNE-EN 580 standard
Flexibility	30%, according to UNE-EN ISO 13968 standard
Joint watertightness	No leak in test at 0.5 bar, with diametral deformation and angular deflection, according to ISO 13259 standard
Diametral tensile strength	> 50 MPa, according to ISO 8521 standard
Equivalent roughness (Prandtl-Colebrook)	k = 0.01 mm (for clean water) k = 0.1- 0.25 mm (for wastewater)
Hazen-Williams roughness C	150
Manning's roughness coefficient (n)	0.007



Regulations and certifications

The **SANOR®** molecularly oriented PVC pipe, for non-pressure and pressurised systems up to 6 bar, is manufactured in accordance with the **UNE-EN 13476-2** standard *on structured wall sewage pipes*. The production centre where the pipe is manufactured has the following certificates:

- **ISO 9001** Quality Management System.
- **ISO 14001** Environmental Management System.
- **ISO 50001** Energy Management System.


AENOR

Certificado AENOR de Producto

001/007762

MOLECOR CANALIZACIONES S.L.

AENOR Product certificate (001/007762)

For unplasticized poly(vinyl chloride) structured-wall pipes for non-pressure underground sewege applications. Smooth internal and external surface.

Environmental commitment and circularity

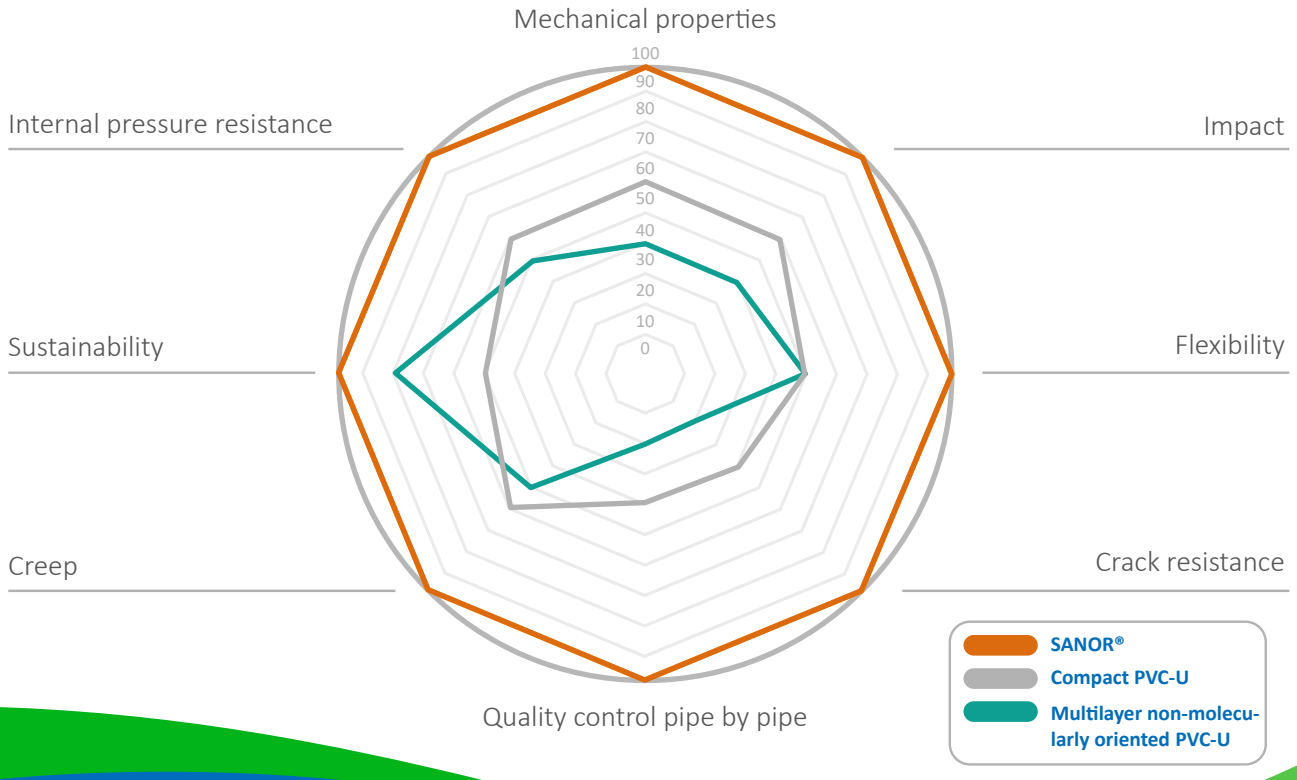
60% of materials used in the **SANOR®** pipe range are recycled.

Recyclability: Molecor's molecularly oriented PVC products are recyclable, so the material can be reused in subsequent production cycles without a significant loss of quality.

Sustainability: Molecor technology reduces resource consumption and emissions during manufacturing, improving energy efficiency and promoting sustainable development in water conveyance.

Circularity: With its focus on the circular economy, **Molecor** facilitates the continuous use of materials, promoting a more responsible resource management system.

Properties of SANOR® vs alternative PVC-U products



MOLECOR
Smart water

MOLECOR
Ctra. M-206 Torrejón-Loeches Km 3.1 - 28890 Loeches, Madrid, España
T: +34 910 79 62 18 | info@molecor.com | www.molecor.com

© Molecor March 2026 Molecor® and SANOR® are registered trademarks