MOLECOR
Smart water

GlobalEPD
A VERIFIED ENVIRONMENTAL DECLARATION

ECO PLATFORM
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Environmental Product Declaration
TR6® PVC-O for irrigation

EN ISO 14025:2010
EN 15804:2012+A2:2020

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Molecor Tecnología S.L.
AENOR

Contents

1. General information.....Page 4

2. The product.....Page 12

3. Information on the LCA.....Page 16

4. System limits, scenarios and additional technical information.....Page 21

5. LCA and LCI environmental parameter declaration.....Page 26

6. Additional environmental information.....Page 31

References.....Page 33

The issuer of this Declaration is responsible for its content and for maintaining, throughout its period of validity, the supporting documentation that justifies the data and statements contained in it.

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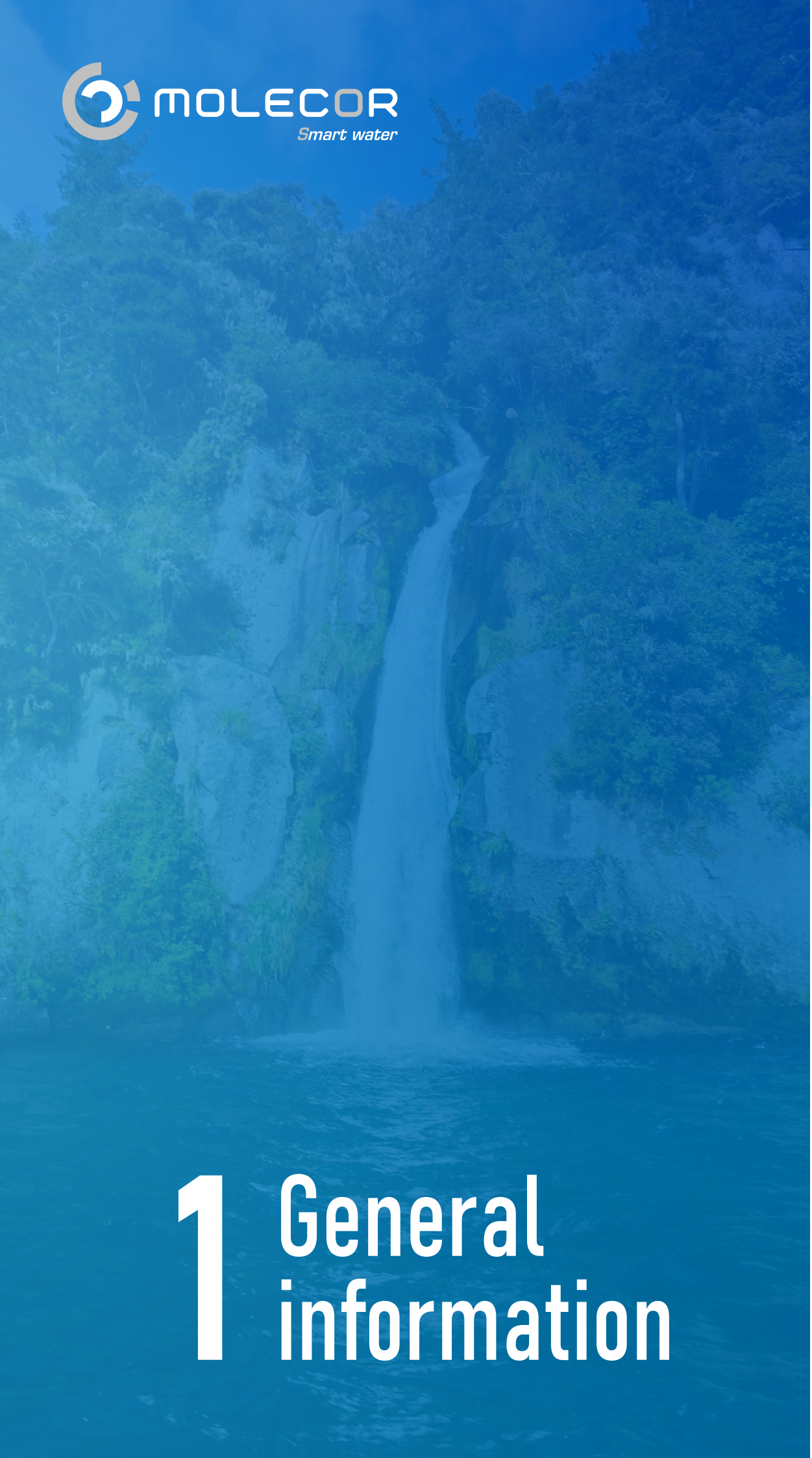


MOLECOR
Smart water

Environmental Product Declaration

TR6® PVC-O for irrigation

1 General information

2 The product

3 Information on the LCA

4 System limits, scenarios and additional technical information

5 LCA and LCI environmental parameter declaration

6 Additional environmental information

1 General information

1. General information

1.1. The organisation

Molecor is a company that specialises in piping and harnessing the entire water cycle, providing innovative, high-quality systems for drainage in buildings, drinking water supplies, reclaimed water distribution, urban drainage and sewage networks or irrigation pipelines.

Molecor Tecnología is a Spanish company specialising in the manufacture of molecularly orientated PVC-O pipes and fittings, and in the development of Molecular Orientation technology applied to pressurised water pipes.

Founded in 2006 by qualified specialists with proven experience in this field, it has grown exponentially and provided efficient, innovative solutions to develop technology in PVC-O pipe and fitting manufacturing, becoming the sector's world leader. Its staff members are extremely well-qualified and are the company's biggest asset, as well as the foundations for its continuous innovation.

In August 2020, the Spanish fund MCH Private Equity acquired a majority stake to grant Molecor more strength to grow and develop its full potential, given that in addition to the monetary contribution, it also offers its industrial and financial experience in the project's organic and inorganic growth.

In September 2021, the acquisition of Adequa's production unit (formerly Uralita Sistemas de Tuberías) was completed.

Since then, the Molecor Group has involved into a larger, more diverse company with more bases for growth thanks to a broader product portfolio that now includes building, sewage and drainage products.

1. General information

Molecor Group

Molecor's main production facility is the Loeches plant in Madrid, where PVC-O products are manufactured: TOM® pipes, produced in all the diameters included in the company's product portfolio, from DN90 to DN1200 mm at pressures ranging from 12.5 to 25 bar, and ecoFITTOM® PVC-O fittings, from DN110 to DN400 mm at PN16 bar. These products are manufactured using technology developed exclusively by the company and exported to the five continents. Thousands of kilometres of PVC-O TOM® pipes have already been installed throughout the world in supply, irrigation, recycling and fire prevention networks, and more.

The Getafe plant manufactures PVC-O technology and is the R&D headquarters. The other production facilities in Spain manufacture solutions for building, sewage, drainage, supply and distribution: SANECOR®, AR®, EVAC+®, etc.

Furthermore, the company also has production centres outside Spain. In Richards Bay (South Africa), a joint venture (JV) with Sizabantu Piping System, Molecor's partner and leading distributor in the South African market, has been in operation since 2016; the Kuantan (Malaysia) plant started operations in 2014; and finally, the Latin American plant in Asuncion (Paraguay) started production in 2017. Molecor also has three marketers: Molecor Morocco, Molecor Peru and Molecor France.

1. General information

Molecor's products offer multiple solutions:

MOLECOR Smart water

TOM ecoFITTOM TR6 SANECOR AR EVAC+ adequa

- **For buildings:** EVAC+® and AR® PVC drainage pipes and fittings, floor drainage (manholes, gutters and drains), gutter systems and siphons.
- **For sewage and drainage:** SANECOR® corrugated PVC sewage system, SANECOR® manhole covers, COMPACT SN4 PVC drainage system.
- **For supply and distribution:** TOM® PVC-O pipes, ecoFITTOM® PVC-O fittings, TR6® irrigation pipes, smooth PVC pressure pipes and fittings, fittings for smooth PE pipes.

Molecor's product strategy has always focused on developing high-quality, cost-competitive solutions with the aim of adapting to the needs of the sectors in which it operates.

Contemplating water's outlook is synonymous with sustainably and accessibly guaranteeing this resource for the future. At Molecor we know that tackling the challenges we face today means addressing essential issues such as climate change, the energy transition, sustainability and the transformation of the customer experience with an open, innovative attitude, while identifying opportunities and new business models and developing solutions that contribute to society's progress and well-being.

1. General information

Our purpose: To improve people's quality of life, wherever they are in the world, by providing them with accessible water using innovative, efficient, sustainable solutions.

Our values:

Refusing to conform: We strive to exceed previously reached levels (quality, efficiency, innovation, safety, etc.) and we're never fully satisfied with what we achieve.

Global: We're a global company capable of offering services and products to anywhere in the world. To do so, we've created an open, diverse and inclusive environment where talent gets the chance to develop, regardless of nationality, location or origin.

Honesty: We apply integrity in our relationships and decisions at all levels within a tolerant and respectful environment. We do this transparently while always respecting the law, regulatory limits and the principles of confidentiality and privacy.

Commitment: We're committed to, strive for and value commitment to the people in the area around us, the environment and the communities where we are present and where we provide our services.

Attitude: We love challenges and we're ready to actively tackle them, always doing our best and offering maximum collaboration and flexibility in an open, sincere way.

Molecor's business model has three key pillars, enabling it to achieve growth rates well above those of competitors in the sector and an extraordinary international presence.

Innovation **Internationalisation** **Agility**

To assist this "call for climate action", a boost in energy efficiency is required, along with a reduction in emissions and savings made on natural resources, something that our company has considered intrinsic since it was founded in 2006. However, we know there is great social opposition to the industry and we're working to mitigate that with evidence, scientific studies and industry work groups. It's important to note that Molecor's activity directly contributes to a fair, ecological transition supported by data.

With regard to the 2030 Agenda, Molecor is fully committed to the Sustainable Development Goals (SDGs). The company identified the pertinent SDGs in order to focus our efforts and pinpoint opportunities for improvement, as well as potential risks. In this vein, we're particularly involved with SDG 6, clean water and sanitation, as our products allow communities to gain simple access to potable water, as well as drain wastewater that could harm health.

1. General information

Sustainability

For Molecor, being a responsible company means transforming its business model to strike an optimal balance between generating economic value and making a positive impact on the planet and on people's lives. To this end, in addition to the social, environmental and governance initiatives that have been in place since its inception, the company has defined an ESG Strategic Plan up to 2025, which sets out the actions to be implemented in order to achieve an increasingly sustainable business model.

Molecor is fully committed to innovation through the development of new, more sustainable products based on eco-design, promoting the principles of the Circular Economy and the responsible use of resources.

As regards the environment, Molecor is working on:

- Energy management, improving the energy efficiency of production processes by implementing a management system based on the ISO 50001 standard and applying all identified energy saving measures. Renewable energy use has also risen, thanks to the installation of own consumption photovoltaic systems.
- Developing innovative products with improved performance and durability, while making sustainable use of resources and reducing the company's carbon footprint.
- Waste management, with all surplus production being reused to manufacture new pipes and fittings.
- Joining and becoming a certified member of the voluntary Operation Clean Sweep (OCS) programme, which aims to prevent the accidental release of primary microplastics into the environment.
- Emission reductions, with the aim of achieving Net Zero by 2040.

Molecor's commitment to the social dimension is both internal and external. Internally, we work to promote the health and well-being of our employees and ensure their safety through our prevention management system. With our external stakeholders, we promote social actions in Spain and abroad in a wide range of areas, from the promotion of grassroots sport to social inclusion and community development, forging alliances with different stakeholders.

We achieve all this by applying good governance practices through management policies and a compliance model, enabling us to implement a business model that creates shared value and contributes to a positive impact on people's lives and the environment.

1. General information

1.2. Scope of the Declaration

The scope of this LCA is the cradle-to-grave production of the TR6® PVC-O pressurised water supply system for irrigation.

The specific data on the production process of the products included in this LCA study were obtained from Molecor's Antequera plant and reflect production data for 2023, which is considered representative.

1.3. Life cycle and compliance

This EPD has been prepared and verified in accordance with the UNE-EN ISO 14025:2010 and UNE-EN 15804:2012+A2:2020 standards.

INFORMATION ON THE PRODUCT CATEGORY RULES	
Descriptive title	Sustainability in construction. Environmental product declarations. Basic product category rules for construction products.
Registration code and version	UNE-EN 15804:2012 + A2:2020
Date issued	2020-03
Compliance	UNE-EN 15804:2012 + A2:2020
Programme manager	AENOR Internacional S.A.U.

This EPD includes the life cycle stages shown in table 1-1. This is a cradle-to-grave EPD.

1. General information

This EPD is not comparable with EPDs produced under other programmes or according to different reference documents, in particular it is not comparable with EPDs not produced according to the same PCRs.

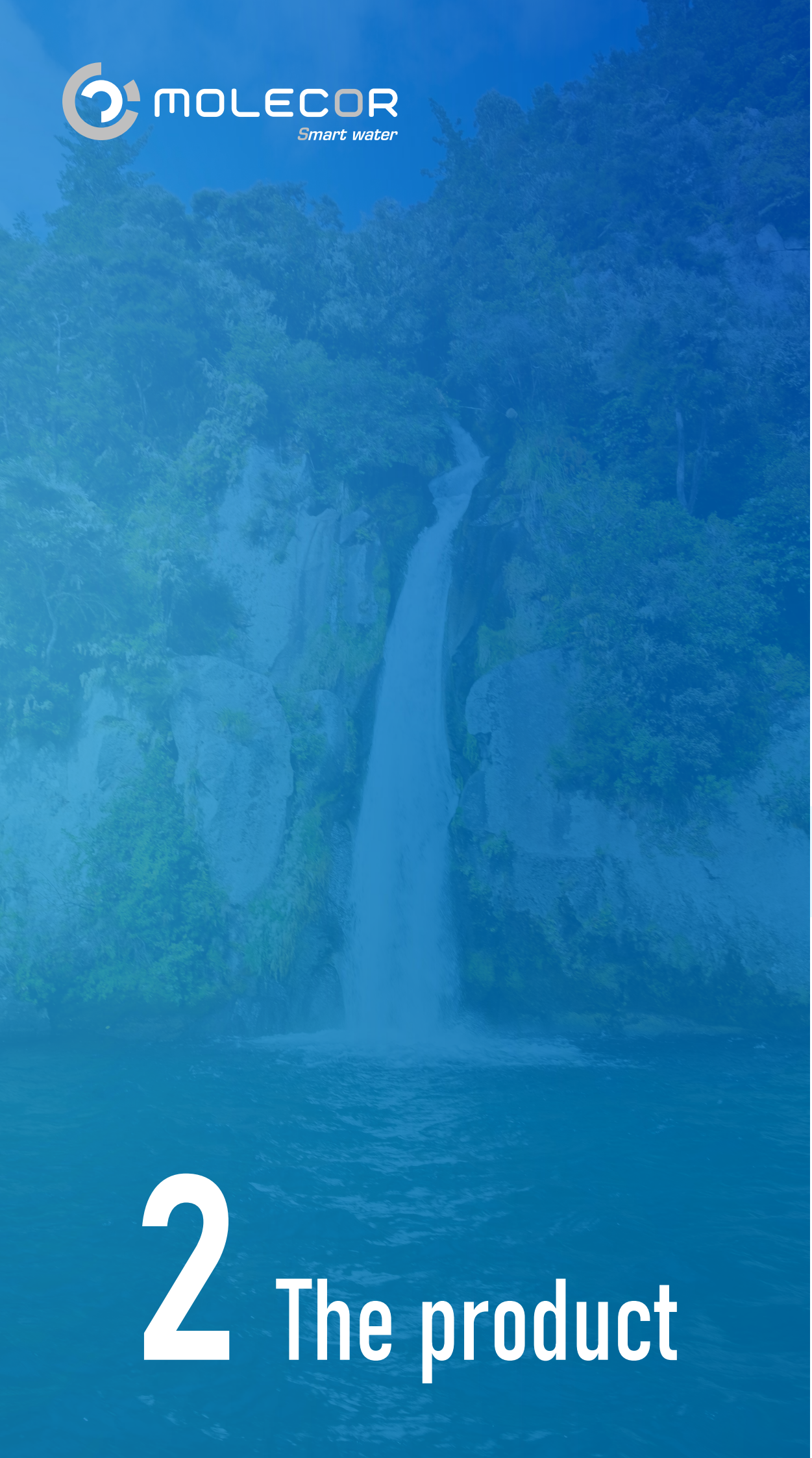
Similarly, EPDs cannot be compared if the origin of the data is different (e.g. databases), if not all relevant information modules are included or if they are not based on the same scenarios.

Construction products should be compared on the basis of the same function, using the same functional unit and at the level of the building (or architectural or engineering work), i.e. including the behaviour of the product throughout its life cycle, as well as the specifications of section 6.7.2 of UNE-EN ISO 14025.

Table 1-1. System limits. Information modules considered

Product stage	A1	Supply of raw materials	X
	A2	Transport to plant	X
	A3	Manufacturing	X
Construction	A4	Transport to works	X
	A5	Installation/construction	X
Use stage	B1	Use	NR
	B2	Maintenance	NR
	B3	Repair	NR
	B4	Replacement	NR
	B5	Refurbishment	NR
	B6	Energy use in service	NR
	B7	Water use in service	NR
End of life	C1	Dismantling/demolition	X
	C2	Transport	X
	C3	Waste processing	X
	C4	Disposal	X
	D	Potential for reuse, recovery and/or recycling	X

X = Module included in LCA; NR = Module not relevant; MNE = Module not evaluated



MOLECOR
Smart water

Environmental Product Declaration

TR6® PVC-O for irrigation

1 General information

2 The product

3 Information on the LCA

4 System limits, scenarios and additional technical information

5 LCA and LCI environmental parameter declaration

6 Additional environmental information

2 The product

2. The product

2.1. Product identification

This EPD covers the manufacture of the PVC pressurised water supply system for irrigation, made up of TR6® pipe.

CPC code: 3632 – Tubes, pipes and hoses, and fittings therefor, of plastics.

The oriented PVC pressurised water supply system for irrigation made up of TR6® pipes is used to transport pressurised water in irrigation networks.

2.2. Production description

Molecor has developed TR6® pipe, the first Oriented PVC (PVC-O) pipe in PN6 bar, specifically designed for the irrigation sector. This pipe has outstanding properties and higher stiffness levels than other products available on the market with the same nominal pressure.

Thanks to its outstanding physical and mechanical properties, by analysing the equivalent thicknesses of PVC-O TR6® and PVC-U pipes in PN6 bar, it can be seen that PVC-O pipes have a modulus of elasticity more than 15% higher than PVC-U, which means that TR6® pipe has a higher level of stiffness.

TR6® is a PVC-O pipe with a PN6 bar pressure rating. The improvements provided by molecular orientation ensure:

- Superior hydrostatic properties to PVC-U PN6.
- Significantly higher impact resistance than conventional PVC pipe.
- Improved fatigue performance.
- Greater flexibility than PVC-U, allowing it to withstand large deformations affecting its inside diameter and immediately regain its original shape.

TR6® pipe is made with is manufactured using the molecular orientation technology developed by Molecor which ensures maximum product traceability thanks to the M.E.S. (Manufacturing Execution System) process monitoring system with 4.0 connectivity.

In addition, the pipe is manufactured under strict quality control and is subjected to an expansion process to detect any defects that may occur during the extrusion process, thus guaranteeing the quality of the pipe manufactured at all times.

The seal consists of a polypropylene ring and a synthetic rubber lip that forms an integral part of the pipe, preventing the seal from curling up during assembly and from sliding out of its housing, achieving complete watertightness.

TR6® PVC-O pipe offers the most sustainable solution on the market for irrigation applications, with a reduced carbon footprint due to lower lifetime energy consumption.

2. The product

Molecor's TR6® PVC-O pressurised water supply system for irrigation is available in the following dimensions:

Reference	Nominal Diameter (DN)	Outside diameter (OD)	Inside diameter (ID)	Average thickness (t)	Nominal pressure (PN)	Length (m)	Joint type
TR6090	90	90	85.2	2.4	6.3	6	Lip gasket with blue PP ring+EPDM 
TR6110	110	110	104.1	3.0	6.3	6	
TR6125	125	125	118.2	3.4	6.3	6	
TR6140	140	140	132.8	3.6	6.3	6	
TR6160	160	160	152.1	4.0	6.3	6	
TR6200	200	200	190.1	5.0	6.3	6	
TR6250	250	250	237.6	6.2	6.3	6	
TR6315	315	315	299.4	7.8	6.3	6	
TR6400	400	400	380.2	9.9	6.3	6	

The total length of TR6® PVC-O pipes (including the cut-off section) is 6 metres.
Inside diameters may vary according to manufacturing tolerances.

(1) The normal number is PN6.3 according to ISO 16422 and pipe marking. This document refers to PN6 for the sake of simplicity.

2.3. Product characteristics

MECHANICAL CHARACTERISTICS - TR6® PVC-O		
Standard ISO 16442 / UNE-EN 17176	Units	Value
Minimum required strength (MRS)	MPa	31.5
Overall service coefficient (C)	-	1.6
Allowable stress (σ)	MPa	19.7
Short-term modulus of elasticity (E)	MPa	4,000
Tangential tensile strength	MPa	60
Shore D hardness at 20°C	-	81 - 85

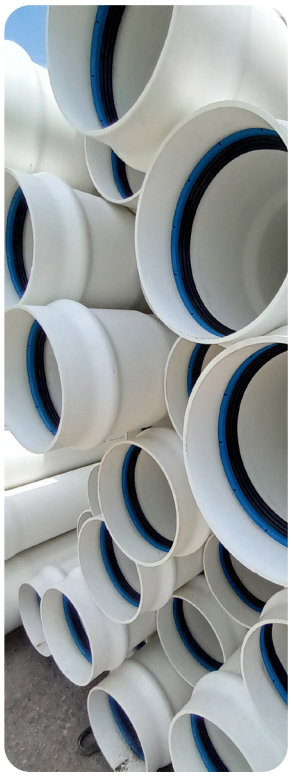
OTHER CHARACTERISTICS - TR6® PVC-O		
	Units	Value
Density	kg/dm^3	1.35 - 1.46
PVC resin K-value	-	>64
Poisson's ratio	-	0.4
Vicat softening temperature	°C	>80
Coefficient of linear expansion	$°C^{-1}$	$7{\cdot}10^{-5}$
Thermal conductivity	Kcal/mh°C	0.14 - 0.18
Specific heat at 20°C	cal/g°C	0.20 - 0.28
Dielectric strength	kV/mm	20 - 40
Dielectric constant at 60 Hz	-	3.2 - 3.6
Transverse resistivity at 20°C	Ω/cm	$>10^{16}$
Absolute roughness (ka)	mm	0.001
Hazen-Williams roughness C	$m^{0.37}/s$	155
Manning's roughness coefficient (n)	$m^{-1/3}s$	0.0074

2. The product

MATERIAL CLASS - TR6® PVC-O pipes	
	PN6.3
Material class	315
MRS (MPa)	31.5
Nominal pressure (bar)	6.3
50-year burst pressure (bar) (1)	10.0
10-hour burst pressure (bar) (1)	>14.8
Maximum test pressure on site (bar) (2)	9.5
Ring stiffness (kN/m²) (3)	5
Colour	white

(1) At a temperature of 20°C.
(2) In accordance with standard UNE-EN 805:2000 with estimated water hammer.
(3) Average pipe stiffness according to established tolerances.

2.4. Product composition



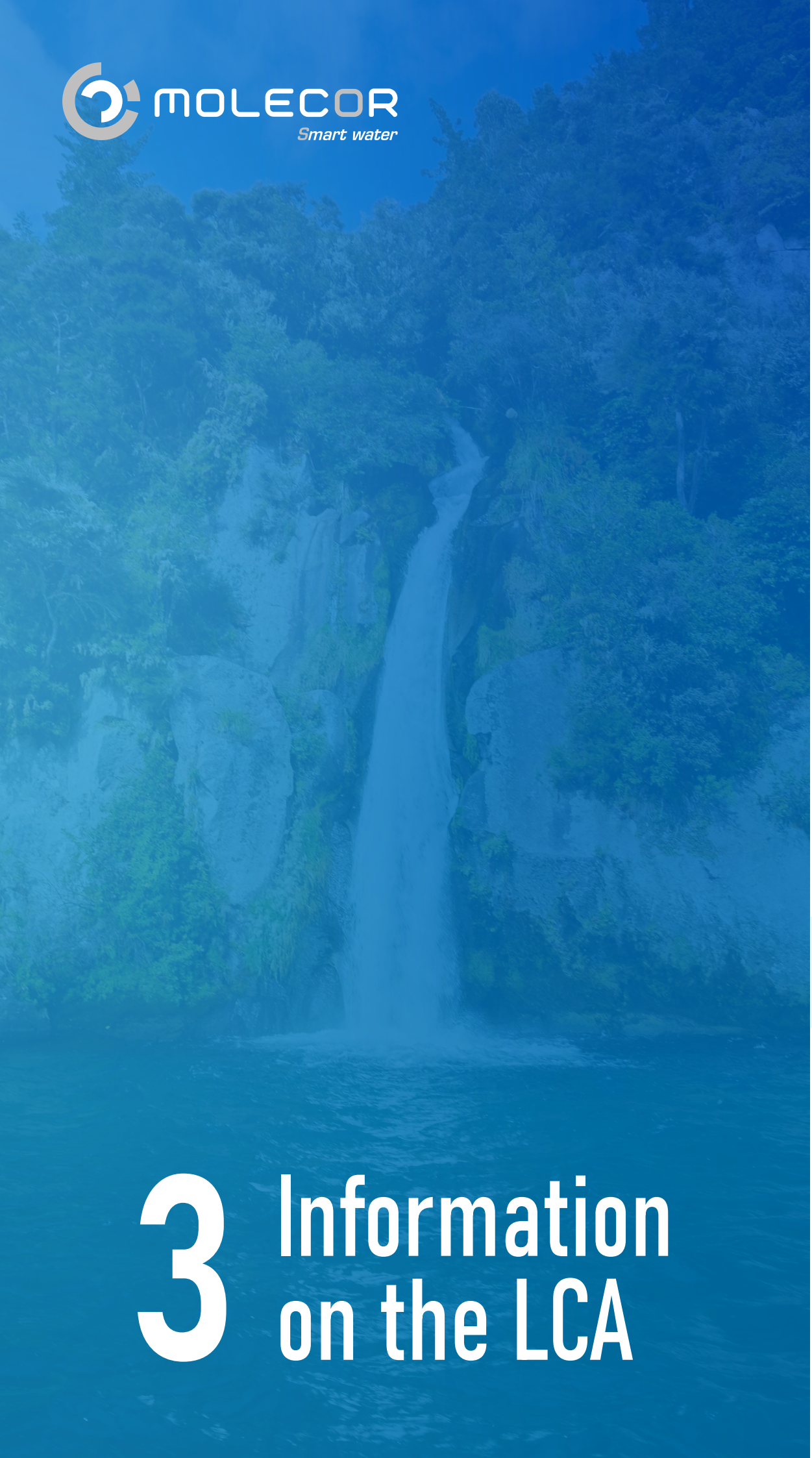
The composition declared by the manufacturer is as follows:

TR6® PVC-O pressurised water supply system	
Material	% of total weight
PVC (pipes and fittings)	99.72%
EPDM (seals)	0.28%

The distribution packaging used for shipping the PVC-O pressurised water supply system, per declared unit, is:

TR6® PVC-O pressurised water supply system	
Material	Kg of packaging/declared unit
Wood	1.94E-01
Polyester	2.59E-04
Steel	8.64E-04
Paper	2.13-04

The manufacturer declares that no hazardous substances included in the *Candidate List of Substances of Very High Concern (SVHC)* for authorisation are used in a percentage higher than 0.1% by weight of the product throughout the product life cycle.



MOLECOR
Smart water

Environmental Product Declaration

TR6® PVC-O for irrigation

1 General information

2 The product

3 Information on the LCA

4 System limits, scenarios and additional technical information

5 LCA and LCI environmental parameter declaration

6 Additional environmental information

3 Information on the LCA

3. Information on the LCA

3.1. Life cycle analysis

The Life Cycle Assessment (LCA) report for the EPD of Molecor's PVC-O pressurised water supply system was carried out by Abaleo S.L. using the Ecoinvent 3.9.1 database and SimaPro 9.5.0.0 software, the latest version available at the time of the LCA.

Data from the Molecor plant in Antequera, Malaga (Spain) were used for the study.

The LCA study follows the recommendations and requirements of the international standards ISO 14040:2006, ISO 14044:2006 and the European standard UNE-EN 15804:2012+A2:2020 as reference LCA.

3.2. Scope of the system

The scope of this LCA is the cradle-to-grave production of the TR6® PVC-O pressurised water supply system for irrigation.

The following stages of the product life cycle were studied:

Product stage

- A1, production of raw materials used in the final product and generation of energy for the production process.
- A2, transportation of raw materials to Molecor's facilities.
- A3, production of pipes at the Antequera plant, including: energy consumption; production of auxiliary materials and their transport to the plant; and transport and management of waste generated.

Construction stage

- A4, transportation from the Molecor factory gate to the customer.
- A5, installation of the PVC-O pressurised water supply system.

Use stage

B1 - B7, use stage: not applicable; the LCA modelling assumes that the water network operates by gravity, so that under normal conditions of use, the Molecor pressurised water supply system does not require the use of materials, water or energy during its lifetime.

End-of-life stage

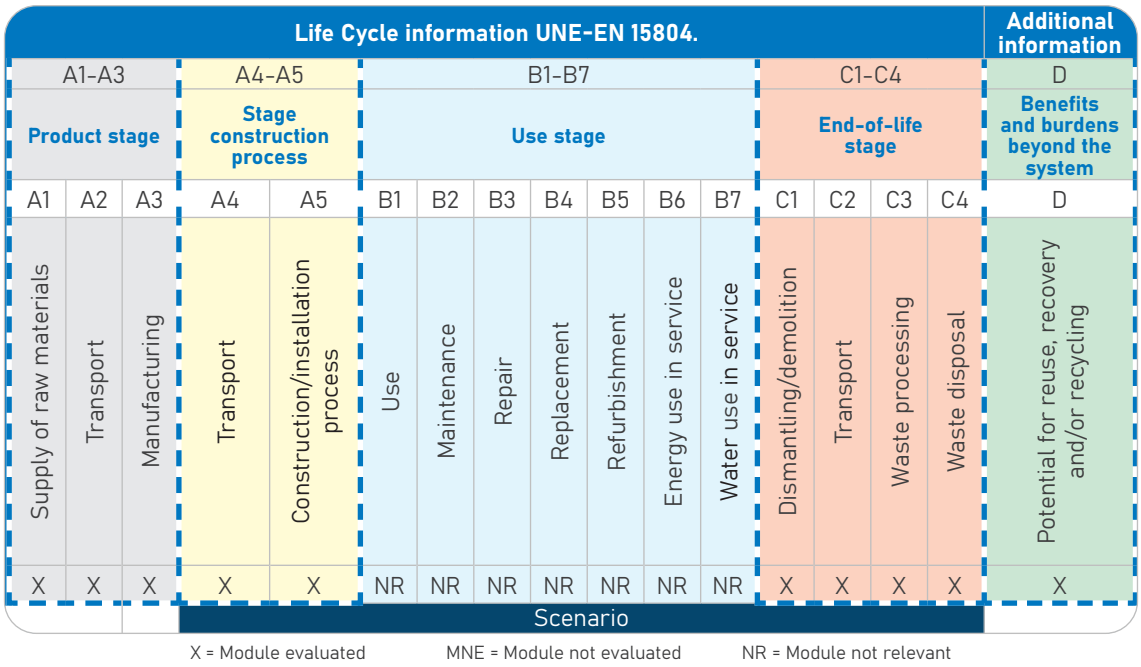
- C1, dismantling or demolition.
- C2, transportation of the dismantled materials to the waste processing or disposal site.
- C3, processing of waste for reuse, recovery and/or recycling.
- C4, waste disposal, including physical pre-treatment and disposal site management, energy and water consumption.

3. Information on the LCA

Benefits and burdens beyond the system

D, potential for reuse, recovery and/or recycling, expressed as net burdens and benefits.

Figure 1. Stages and information modules for building assessment. Building life cycle.



3.3. Declared unit

The declared unit is 1 kg of product, including distribution packaging.

3.4. Reference service life (RSL)

The Reference Service Life, RSL of the PVC-O pressurised water supply system is 50 years.

3.5. Allocation criteria

In accordance with the criteria of the reference standard, where allocation could not be avoided, the inputs and outputs of the system were allocated on a mass basis. This allocation criterion has been applied to electricity, oil, gas and packaging consumption, as well as waste.

There was no need to apply other allocation criteria, such as financial allocation.

3. Information on the LCA

3.6. Cut-off rule

The LCA includes the gross weight/volume of all materials used in the manufacturing process. The criterion of including at least 99% of the total weight of the products used for the declared functional unit has therefore been met.

3.7. Study limitations

The LCA has not included:

- All equipment with a useful life of more than 3 years.
- The construction of plant buildings and other capital assets.
- Work-related employee travel, nor employees commuting to and from work.

3.8. Data representativeness, quality and selection

Production data for 2023, a period with representative production data, from the plant located in Antequera (Malaga, Spain) was used to model the manufacturing process of Molecor's PVC-O pressurised water supply system. The following data was gathered from this plant: consumption of materials and energy; transport; and waste generation.

The Ecoinvent 3.9.1 database (January 2023), which is the latest version available at the time of the LCA, has been used where necessary. The SimaPro 9.5.0.0 software package (the latest version available at the time of the study) was used to compile the inventory data, model the LCA and calculate the environmental impact categories required by the reference standard.

The most representative processes were selected according to the following criteria:

- The data should reflect the technological development actually applied in the manufacturing processes. In the absence of available information, a data representing an average level of technology has been chosen.
- Geographic data should be as close as possible and, where applicable, average regionalised data.
- The data should be as up to date as possible.

The quality assessment criteria suggested by the European Union's Guide to the Environmental Footprint of Products and Organisations were used to assess the quality of the primary production data for Molecor's TR6® water pipe system.

3. Information on the LCA

The following results were obtained:

- Very good integrity. Rating 1.
- Reasonable methodological appropriateness and coherence. Rating 2.
- Very good time representativeness. Rating 1.
- Good technological representativeness. Rating 2.
- Very good geographic representativeness. Rating 1.
- Low data uncertainty. Rating 2.

Based on the above data, the Data Quality Rating (DQR) is as follows: 9/6 = 1.5, indicating that the data quality is excellent.

For a better understanding of the data quality assessment carried out, the score for each criterion varies from 1 to 5 (the lower the score, the higher the quality) and the following table is used to obtain the final score:

Overall Data Quality Rating (DQR)	Overall Data Quality Rating
≤ 1.6	Excellent quality
1.6 to 2.0	Very good quality
2.0 to 3.0	Good quality
3 to 4.0	Reasonable quality
> 4	Inadequate quality

MOLECOR
Smart water

4 System limits, scenarios and additional technical information

1 General information

2 The product

3 Information on the LCA

4 System limits, scenarios and additional technical information

5 LCA and LCI environmental parameter declaration

6 Additional environmental information

4. System limits, scenarios and additional technical information

4.1. Module A1 - Production of raw materials

This module takes into account the procurement of raw materials and the production of the electricity used in the production process.

4.2. Module A2 - Transport

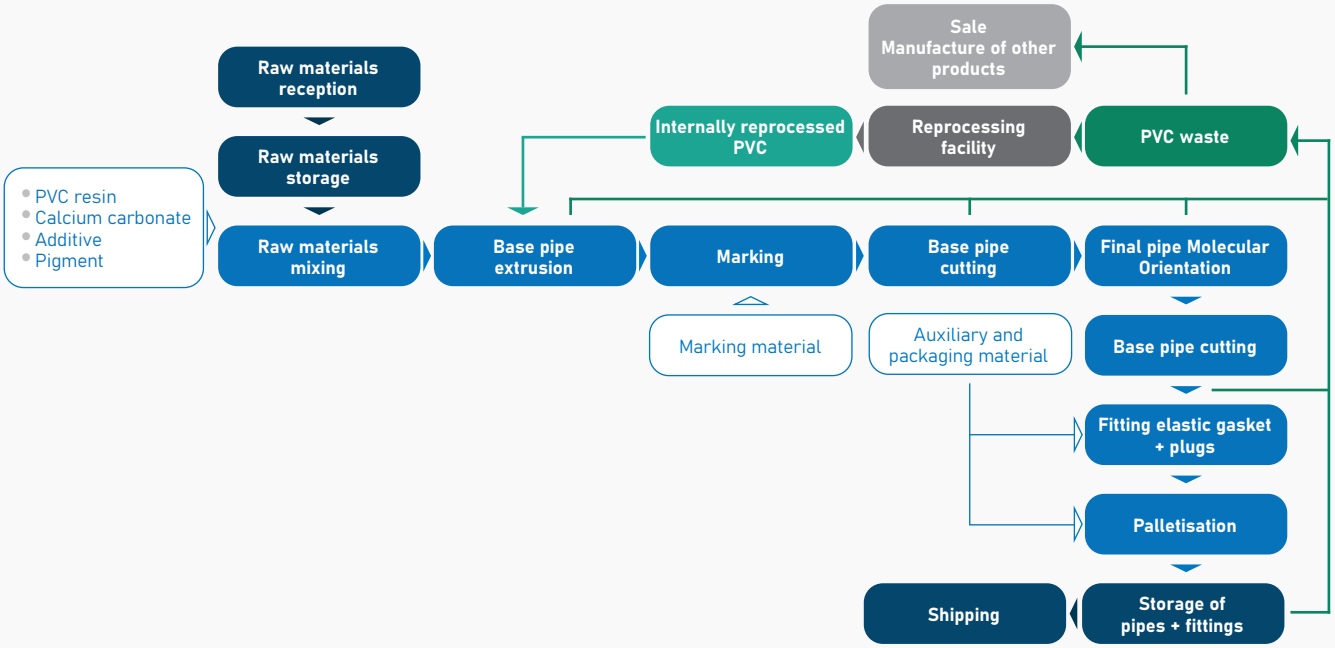
The transport of all raw materials from the production sites (suppliers) to Molecor's facilities has been considered, distinguishing between the mode of transport used: lorry and ship.

4.3. Module A3 - Manufacturing

This module comprises:

- The manufacturing process of TR6® pipes.
- The production of auxiliary materials and their transport to Molecor.
- Packaging manufacture and transport from suppliers to the Molecor plant.
- The processing of the waste generated and its transport from the plant to the waste manager.

TR6® PVC-O process diagram



4. System limits, scenarios and additional technical information

4.4. Module A4 – Transport to customer

The transport of the products studied was taken into account, from the production sites to the installations where they are used, distinguishing between the means of transport used: ship or lorry.

Module A4	
Parameter	**Quantity (per unit declared)**
Litres of fuel: - Diesel in EURO 6 lorry (29.96t payload) - Heavy fuel oil in transoceanic ship (43,000 dwt)	 0.0436 l/tkm 0.0026 l/tkm
Average distance: - Lorry - Ship	 627.73 km 9,617.84 km
Capacity utilisation (including empty return)	50% *
Bulk density of the transported products	Product format variability means that no single bulk density can be identified.
Useful load factor	Product format variability means that no useful load factor can be identified.

* Percentage taken from Ecoinvent database

4.5. Module A5 – Product installation

This module covers the material and energy consumption necessary for the correct installation of 1 kg of the TR6® PVC-O pressure water supply system, considering a pipe diameter of 250 mm, as indicated in the draft document *Illustrative calculation of generic EPD scenarios for Sewer and Drainage [plastic] piping system (ref. 2023/SEB/R/2901)*, of February 2023, based on the criteria of TEPPFA (European Plastic Pipes and Fittings Association), as set out in the document *Overview of Plastic Waste from Building and Construction by Polymer and by Recycling, Energy Recovery and Disposal (2019) de Plastics Europe*.

The modelling of the installation scenario assuming a pipe diameter of 250 mm is based on the sales of the year under review, where 82.3% of the total product sold to the customer was 250 mm or less in diameter.

As stated in the above document, the soil removed at this stage is reused as backfill in another product system and is therefore not considered to be waste; and the soil added is recovered from another similar operation and is therefore not considered to be extracted. For both these types of aggregates, transport is considered, with an average distance of 35 km.

The wood used as distribution packaging for the product studied is not managed as waste as it is recovered for subsequent use.

Module A5	
Parameter	**Quantity (per unit declared)**
Auxiliary installation materials - Soap (lubricant) - Sand - Gravel	 5.80E-07 ton 9.06E-02 ton 1.17E+00 ton
Water use	-
Energy consumed during installation process. Diesel for machinery	0.0118 GJ
Material waste on site before waste processing, generated by product installation. - Plastic (packaging) to be recycled. - Steel (packaging) to be recycled	 2.59E-04 kg 8.64E-04 kg
Output of materials as a result of waste processing on the building plot: aggregate	1.21E+00 ton
Direct emissions to ambient air, soil and water	-

4. System limits, scenarios and additional technical information

4.6. Module C1 – Dismantling/demolition

In the LCA, the energy consumption of the dismantling (C1) and removal of 1 kg of the Molecor PVC-O pressurised water supply system has been considered considering a pipe diameter of 250 mm, as indicated in the draft document *Illustrative calculation of generic EPD scenarios for Sewer and Drainage [plastic] piping system (ref. 2023/SEB/R/2901)*, of February 2023, based on the criteria of TEPPFA (European Plastic Pipes and Fittings Association), as set out in the document *Overview of Plastic Waste from Building and Construction by Polymer and by Recycling, Energy Recovery and Disposal (2019) de Plastics Europe*.

The modelling of the demolition scenario assuming a pipe diameter of 250 mm is based on the sales of the year under review, where 82.3% of the total product sold to the customer was 250 mm or less in diameter.

4.7. Module C2 - Transportation to waste processing/recovery site

Based on TEPPFA criteria, as set out in the document *Overview of Plastic Waste from Building and Construction by Polymer and by Recycling, Energy Recovery and Disposal (2019) de Plastics Europe*, waste PVC-O pipes and fittings at the end of their service life are transported over the following distances using 16-32 tonne EURO6 lorries:

- 800 km for recycling.
- 150 km for incineration.
- 50 km to landfill.

4.8. Module C3 – Waste processing, and Module C4 - Waste disposal

TEPPFA criteria are used for modelling the waste disposal and disposal scenarios:

PVC – Plastics Europe 2018	
Recycling ratio	33.96%
Incineration ratio	40.99%
Landfill ratio	25.05%

PE – Plastics Europe 2018	
Recycling ratio	24.00%
Incineration ratio	48.89%
Landfill ratio	27.11%

EPDM – Plastics Europe 2018	
Recycling ratio	7.66%
Incineration ratio	65.53%
Landfill ratio	26.81%

4. System limits, scenarios and additional technical information

The following end-of-life scenario is obtained by applying the values in the tables above to the composition of the TR6® pipe water supply system.

Module C		
Parameter	**Quantity (per unit declared)**	
Demolition energy consumption	0.011 GJ	
Collection process, specified by type	0 kg collected separately 1,000 kg collected as mixed construction waste.	
Collection process, specified by type	0 kg for reuse 0.339 kg of PVC and 0.0002 of EPDM for recycling.	
Disposal specified by type	For final disposal at landfill: - 0.250 kg of PVC - 0.0007 of EPDM	For incineration: - 0.409 kg of PVC - 0.0018 of EPDM
Assumptions for scenario development (transport)	Waste transport in 13-32 EURO6 lorries: - 800 km for recycling; - 150 km for incineration; - 50 km to landfill.	

4.9. Module D - Benefits beyond the system

The recovery coefficient has been applied to each type of waste that is sent for recycling as determined by TEPPFA, in accordance with the document *Overview of Plastic Waste from Building and Construction by Polymer and by Recycling, Energy Recovery and Disposal (2019) de Plastics Europe*:

- 90% of the 0.339 kg of PVC sent for recycling.
- 90% of the 0.0002 kg of EPDM sent for recycling.

MOLECOR
Smart water

Environmental Product Declaration

TR6® PVC-O for irrigation

1 General information

2 The product

3 Information on the LCA

4 System limits, scenarios and additional technical information

5 LCA and LCI environmental parameter declaration

6 Additional environmental information

5 LCA and LCI environmental parameter declaration

5. LCA and LCI environmental parameter declaration

The different environmental parameters obtained from the Life-Cycle Assessment (LCA) for the production of 1 kilogram of AR® product analysed are included below.

The estimated impact results are relative and do not indicate the final value of the impact categories, nor do they refer to thresholds, safety margins or risks.

Environmental impacts

PVC-O - TR6®
Declared unit: 1 kilogram

Parameter	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	1.58E+00	1.36E-01	-3.38E-01	1.38E+00	9.72E-02	1.47E+01	1.03E+00	5.16E-02	7.98E-02	2.12E-01	-4.91E-01
GWP-fossil	kg CO_2 eq	1.56E+00	1.36E-01	1.81E-02	1.72E+00	9.72E-02	1.43E+01	1.03E+00	5.16E-02	7.04E-02	2.12E-01	-4.92E-01
GWP-biogenic	kg CO_2 eq	1.06E-02	8.90E-06	-3.56E-01	-3.45E-01	6.32E-06	3.57E-01	6.75E-05	3.37E-06	9.26E-03	8.80E-06	1.65E-03
GWP-luluc	kg CO_2 eq	4.96E-03	2.79E-06	2.00E-04	5.16E-03	1.94E-06	2.26E-03	4.20E-05	1.01E-06	1.44E-04	2.11E-06	-3.07E-04
ODP	kg CFC-11 eq	7.93E-07	2.91E-09	4.52E-09	8.01E-07	2.08E-09	3.18E-07	1.62E-08	1.11E-09	1.36E-09	5.72E-10	-3.22E-07
AP	mol H+ eq	6.04E-03	2.19E-04	8.59E-05	6.35E-03	1.94E-04	4.50E-02	9.83E-03	6.49E-05	3.03E-04	1.16E-04	-1.64E-03
EP-freshwater	kg P eq	5.45E-05	1.08E-07	3.10E-06	5.77E-05	7.62E-08	3.21E-05	8.79E-07	4.05E-08	5.97E-06	1.42E-07	-1.68E-05
EP-marine	kg N eq	1.13E-03	6.65E-05	3.71E-05	1.23E-03	4.83E-05	1.84E-02	4.62E-03	1.61E-05	5.58E-05	5.43E-05	-3.19E-04
EP-terrestrial	mol N eq	1.13E-02	6.78E-04	3.54E-04	1.24E-02	4.96E-04	1.96E-01	5.02E-02	1.57E-04	4.94E-04	5.58E-04	-3.24E-03
POCP	kg NMVOC eq	4.78E-03	3.91E-04	1.52E-04	5.32E-03	2.79E-04	7.14E-02	1.48E-02	1.22E-04	1.64E-04	1.42E-04	-1.44E-03
ADP-minerals & metals [2]	kg Sb eq	1.51E-06	4.76E-09	3.21E-09	1.52E-06	3.30E-09	5.36E-07	4.33E-08	1.78E-09	3.06E-08	3.04E-09	-6.75E-08
ADP-fossil [2]	MJ, v.c.n.	3.58E+01	1.80E+00	1.76E-01	3.77E+01	1.28E+00	1.90E+02	1.35E+01	6.82E-01	7.48E-01	9.72E-02	-1.26E+01
WDP [2]	m^3 eq	5.01E+00	1.67E-03	4.55E-03	5.02E+00	1.17E-03	2.81E-01	1.73E-02	6.22E-04	1.55E-02	3.25E-02	-9.80E-01

GWP - total: Global warming potential.
GWP - fossil: Global warming potential of fossil fuels.
GWP - biogenic: Biogenic global warming potential.
GWP - luluc: Global warming potential of land use and land use change.
ODP: Stratospheric ozone depletion potential.
AP: Acidification potential, accumulated surplus.
EP-freshwater: Eutrophication potential, fraction of nutrients reaching the final freshwater compartment.
EP-marine: Eutrophication potential, fraction of nutrients reaching the final marine water compartment.
EP-terrestrial: Eutrophication potential, accumulated surplus.
POCP: Photochemical ozone creation potential.
ADP-minerals & metals: Abiotic depletion potential for non-fossil resources.
APD-fossil: Abiotic depletion potential for fossil resources.
WDP: Water deprivation potential (user), weighted water deprivation consumption.

5. LCA and LCI environmental parameter declaration

Additional environmental impacts

PVC-O - TR6®
Declared unit: 1 kilogram

Parameter	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	Incidence of illnesses	4.92E-08	9.41E-09	3.97E-09	6.25E-08	5.77E-09	1.18E-06	2.77E-07	3.10E-09	2.81E-09	1.01E-09	-1.33E-08
IRP [1]	kBq U235 eq	1.22E-01	2.85E-04	8.06E-04	1.23E-01	2.04E-04	3.21E-02	1.59E-03	1.09E-04	1.21E-02	9.11E-05	-2.30E-02
ETP-fw [2]	CTUe	7.04E+00	8.07E-01	1.15E-01	7.97E+00	5.74E-01	8.50E+01	6.46E+00	3.04E-01	2.41E-01	8.58E-01	-2.07E+00
HTP-c [2]	CTUh	5.28E-10	8.63E-12	3.12E-11	5.68E-10	6.39E-12	9.89E-10	5.76E-11	3.28E-12	1.95E-11	5.11E-11	-1.50E-10
HTP-nc [2]	CTUh	1.40E-08	9.36E-10	1.71E-10	1.51E-08	6.80E-10	9.51E-08	1.44E-09	3.67E-10	5.39E-10	2.03E-09	-4.35E-09
SQP [2]	Pt	1.90E+00	3.44E-03	1.73E+01	1.92E+01	2.44E-03	8.49E-01	2.56E-02	1.30E-03	1.75E-01	3.29E-02	-3.92E-01

PM: Potential for incidence of disease due to particulate matter emissions.
IRP: Potential Human exposure efficiency relative to U235
ETP-fw: Potential comparative toxic unit for ecosystems - freshwater.
HTP-c: Potential comparative toxic unit for ecosystems - carcinogenic effects.
HTP-nc: Potential comparative toxic unit for ecosystems - non-carcinogenic effects.
SQP: Soil quality potential index

Note 1. This impact category is mainly concerned with the potential effects on human health of low doses of ionising radiation from the nuclear fuel cycle. It does not take into account the effects of possible nuclear accidents or occupational exposure resulting from the disposal of radioactive waste in underground facilities. The ionising radiation potential of the soil due to radon or certain building materials is also not measured in this parameter.
Note 2. The results of this environmental indicator should be used with caution due to the high uncertainty of the results and the limited experience with this parameter.

5. LCA and LCI environmental parameter declaration

Use of resources

PVC-O - TR6® Declared unit: 1 kilogram												
Parameter	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ, v.c.n.	3.16E+00	4.71E-03	3.22E+00	6.39E+00	3.36E-03	6.70E-01	2.63E-02	1.80E-03	2.91E-01	3.24E-03	-5.27E-01
PERM*	MJ, v.c.n.	0.00E+00	0.00E+00	3.49E+00	3.49E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ, v.c.n.	3.16E+00	4.71E-03	6.72E+00	9.88E+00	3.36E-03	6.70E-01	2.63E-02	1.80E-03	2.91E-01	3.24E-03	-5.27E-01
PENRE	MJ, v.c.n.	4.24E+01	1.81E+00	2.20E-01	4.45E+01	1.29E+00	1.91E+02	1.35E+01	6.86E-01	1.41E+00	1.02E-01	-1.41E+01
PENRM*	MJ, v.c.n.	1.73E+01	0.00E+00	6.51E-03	1.73E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ, v.c.n.	5.97E+01	1.81E+00	2.27E-01	6.18E+01	1.29E+00	1.91E+02	1.35E+01	6.86E-01	1.41E+00	1.02E-01	-1.41E+01
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ, v.c.n.	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, v.c.n.	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m3	7.96E-02	7.67E-05	1.58E-04	7.98E-02	5.41E-05	9.80E-03	6.76E-04	2.88E-05	1.07E-03	4.33E-04	-7.46E-03

PERE: Use of renewable primary energy excluding renewable primary energy resources used as raw material.
PERM: Use of renewable primary energy used as raw material.
PERT: Total use of renewable primary energy.
PENRE: Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw material.
PENRM: Use of non-renewable primary energy used as raw material.
PENRT: Total use of non-renewable primary energy.
SM: Use of secondary materials.
RSF: Use of renewable secondary fuels.
NRSF: Use of non-renewable secondary fuels.
FW: Net use of freshwater resources.

** Energy used as raw material is declared in accordance with Option B of the PCR 2019:14 - the indicator for energy used as raw material reflects the energy used as raw material in the product and packaging and is not transferred in a useful form to another product system.*

Waste categories

PVC-O - TR6® Declared unit: 1 kilogram												
Parameter	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	6.08E-05	1.20E-05	2.34E-06	7.51E-05	8.46E-06	1.26E-03	9.03E-05	4.53E-06	1.97E-06	6.47E-07	-1.74E-05
NHWD	kg	5.82E-02	9.13E-05	4.17E-03	6.24E-02	6.39E-05	1.88E-02	1.00E-03	3.38E-05	1.22E-02	3.60E-01	-1.04E-02
RWD	kg	8.68E-05	1.53E-07	6.39E-07	8.76E-05	1.09E-07	1.75E-05	6.58E-07	5.88E-08	9.72E-06	6.52E-08	-1.85E-05

HWD: Hazardous waste disposed.
NHWD: Non-hazardous waste disposed.
RWD: Radioactive waste disposed.

5. LCA and LCI environmental parameter declaration

Output flows

PVC-O - TR6® Declared unit: 1 kilogram												
Parameter	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.21E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	2.04E-02	2.04E-02	0.00E+00	2.11E-02	0.00E+00	0.00E+00	3.39E-01	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.11E-01	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.61E+00	0.00E+00

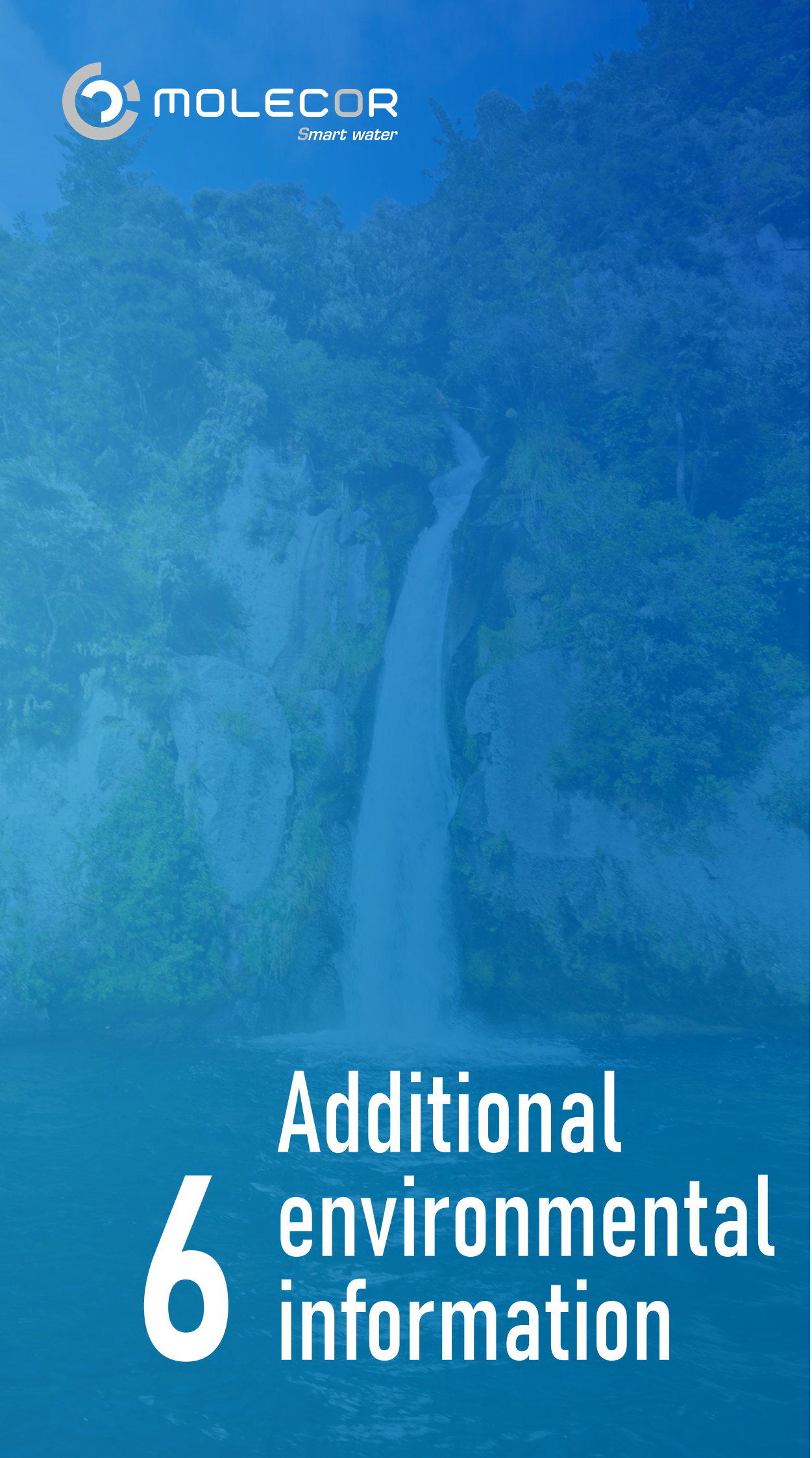
CRU: Components for reuse.
MFR: Materials for recycling.
MER: Materials for energy recovery.
EE: Energy exported.

Biogenic carbon content

The manufacturer declares that the TR6® pressurised water supply system tested does not contain any materials with biological content.

The biogenic carbon material used as packaging for the distribution of the elements under study is wood and cardboard.

Biogenic carbon content	Quantity per functional unit
Product biogenic carbon content	0
Packaging biogenic carbon content	9.71E-02 kg C



MOLECOR
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Environmental Product Declaration

TR6® PVC-O for irrigation

1 General information

2 The product

3 Information on the LCA

4 System limits, scenarios and additional technical information

5 LCA and LCI environmental parameter declaration

6 Additional environmental information

6 Additional environmental information

6. Additional environmental information

6.1. Other indicators

The production of the components that make up Molecor's PVC-O pressurised water piping system does not generate by-products.

6.2. Indoor air emissions

The manufacturer declares that the Molecor PVC-O pressurised water supply system generates no indoor air emissions during its lifetime.

6.3. Emissions to soil and water

The manufacturer declares that the Molecor PVC-O pressurised water supply system generates no emissions to soil and water during its lifetime.

6.4. Electrical mix used.

The energy mix in 2023 is made up of:

- 17.48% of energy from the energy supplier EDP CLIENTES S.A.U. (GWP - IPCC 2021: 0.260 kgCO2e/kWh)
- 49.07% of energy from energy supplier without guarantees of origin (GWP - IPCC 2021: 0.259 kgCO2e/kWh)
- 33.44% of 100% hydropower renewable mix with guarantees of origin (GWP – IPCC 2021: 0 kgCO2e/kWh)

6.5. Other environmental issues

There are no known environmental or health problems associated with the manufacture, installation, use and end-of-life of PVC pipes.

Molecor formulations are free of lead stabilisers and do not contain substances of very high concern (SVHC) such as phthalates or bisphenol A.

The PVC pipes and fittings are resistant to chemicals commonly found in water and sewerage systems, preventing any leaching or release into ground and surface water during the life of the pipe system.

For pressurised applications, the products have various health certifications in accordance with the legislation in force in the various countries, certifying their suitability for use in the supply of water for human consumption, thus demonstrating the absence of chemical substances released into the piped water.

While certain product regulations may not permit the use of recycled materials in manufacturing, some new products are being developed that do allow the use of recycled materials, thus improving their environmental impact. In all cases, all the excess materials from the production processes are reused to manufacture new pipes and fittings, thus achieving virtually no PVC waste at all the production plants.

PVC is a 100% recyclable material, so all installed products can be recycled into other plastic materials at the end of their long life span, estimated at over 100 years.

References

[1] Standard UNE-EN 15804:2012+A2:2020. Sustainability in construction. Environmental product declarations. Basic product category rules for construction products.

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[3] General Instructions of the GlobalEPD Programme 3rd revision 09-10 2023.

[4] Environmental impact assessment database and methodologies applied using SimaPro 9.5.0.0.

[5] Standard UNE-EN ISO 14025:2010. Environmental labels and declarations. Type III environmental declarations. Principles and procedures. (ISO 14025:2006).

[6] Standard UNE-EN ISO 14040:2006/A1:2021. Environmental Management. Life Cycle Analysis. Principles and reference framework. Modification 1. (ISO 14040:2006/Amd 1:2020).

[7] Standard UNE-EN ISO 14044:2006/A1:2021. Environmental Management. Life cycle analysis. Requisites and guidelines. Modification 2. (ISO 14044:2006/Amd 2:2020).

[8] COMMISSION RECOMMENDATION (EU) 2021/2279 of 15 December 2021 on the use of common methods to measure and communicate the life cycle environmental performance of products and organisations (Published in OJEU 30/12/2021).

[9] Life Cycle Assessment Report for the EPD of the PVC pressurised water supply system for irrigation, consisting of the TR6® pipe made by Molecor Tecnología S.L. Drawn up by Abaleo S.L., September 2024. Version 4.

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