

Environmental Product Declaration

In accordance with ISO 14025:2006 for:

PET resin from Novapet S.A.



Programme: The International EPD® System, www.environdec.com
Programme operator: EPD International AB
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An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com





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General information

Programa: The International EPD® System

Adress: EPD International AB
Box 210 60
SE-100 31 Stockholm
Sweden

Website: www.environdec.com

E-mail: info@environdec.com

Product Category Rule (PCR):

Product Category Rules 2010:16 Plastics in primary forms, version 3.0.2. Product category classification: UN CPC 347.
DATE 2022-08-17. VALID UNTIL: 2023-06-21.

PCR review was conducted by: The Technical Committee of the International EPD® System.

A full list of members is available at www.environdec.com.

Chair of the PCR review: Paola Borla.

The review panel may be contacted via info@environdec.com

Life Cycle Analysis (LCA)

LCA responsible: José Luis Canga Cabañes

Independent third-party verification:

Independent third-party verification of the declaration and data, according to ISO 14025: 2006:

EPD verification by accredited certification body

Third party verifier: Maria Feced, Tecnalia R&I Certificación, is an accredited certification body for third-party verification.

Certification body accredited by:

ENAC, accreditation N°. 125/C-PR283

Procedure for follow-up of data during EPD validity involves third party verifier:

Yes No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category, but from different programs, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or on fully aligned PCR or PCR versions; considering devices with identical functions, technical performance and use (e.g. declared/functional identical units); have system limits and equivalent data descriptions; apply similar data quality requirements, data collection methods and allocation criteria; apply the same cut-off rules and identical impact assessment methodologies (including the same version of characterization factors); have a similar content of the statement and be in force at the time of comparison.



Company information

Owner of the EPD & location of production site:

Novapet S.A. (SAMCA Group)

<https://novapet.com/>

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22300 Barbastro - Huesca (España)

Tel.: (+34) 974 31 60 65

Contact: Dña. Ana Mir

E-mail: novapet@samca.com

Description of the organisation:

Novapet is a company that produces PET focussed on innovation, quality and sustainability, which was founded at the end of the 1990's from the business vision of the SAMCA Group, in a market, that of PET, that was emerging at that time in Spain.

With offices in Zaragoza and Barbastro, Novapet has a productive plant in Barbastro. It has more than 350 employees and a wide presence, both in the national and international areas, providing service in a stable manner to more than 200 clients in 30 countries and on 4 continents.

The formulation and production of different PET resins, with different applications, and their conversion into preforms constitute for us integrated activities to preserve for our clients all the value of our technical innovations.

Under the Novapet resins and concentrates umbrella will continue marketing the resins and concentrates of virgin PET, of the commodity resins as well as the wide range of special resins for sectors increasingly more different from the traditional ones (containers produced by direct injection, or by PET blown extrusion, engineered pieces, etc.), that will allow continued growth of this fully recyclable material in new applications.

Novapet's injection plant is 100% integrated within our productive chain and PET transformation. It is here where our resins acquire value in preform formats, so that our clients can transform them in high-quality containers, capable of preserving their products in optimal conditions. That is key for obtaining a level of quality appropriate for the requirements of our clients and of the market. Quality begins to be generated in the design of our preforms and ends being transformed in our injection plant. Our preforms offer diverse types of mouths which cover the different needs of the current market.

At Novapet we strictly comply with an endless number of quality regulations. For this reason, we are accredited by the highest bodies in the areas of quality management and food safety, environmental management, energy management and corporate social responsibility.

Certifications related to the product:

UNE-EN-ISO 9001: 2015, UNE-EN-ISO 14001:2015, ISO 50001:2018, FSSC 22000V.5 y ECOVADIS.



ecovadis



Product information

Product name:

PET resin (Polyethylene Terephthalate)

Includes production of PET as homopolymer or copolymer.

Product identification:

Polyethyleneterephthalate (PET) resins, used mainly as raw material for the manufacture of:

- Containers, bottles and trays, food contact safe, recyclable, with good transparency and shine, as well as excellent mechanical properties and gas barrier (CAS no. 24938-04-3).
- Fibers, textile or high tenacity, monofilament, CPET trays (bakeable), and bars/plates for subsequent machining of technical parts (CAS no. 25038-59-9).

UN CPC code:

3474, subclass 34740.

ISO code for polymers (ISO 1043-1:2011 Plastics. Symbols and abbreviated terms. Part 1: Basic polymers and their special characteristics): SPI Code 1: PETE or PET

Ámbito geográfico de aplicación de la DAP:

Global.

Product description:

The product manufactured by Novapet has the following technical specifications:

The calculations have been made to the total production of PET. In any case, the product is always 100% PET where the production of PET as homopolymer or copolymer is included and both products are specified as they have different applications.

Information	Explanation	Explanation	Test method
Commercial article description	NOVAPET CR	HT 0.96	N.A.
IUPAC name	Poly(ethyl benzene-1,4-dicarboxylate-co-(ethyl benzene-1,3-dicarboxylate)).	Poly(ethyl benzene-1,4-dicarboxylate)	N.A.
CAS number	24938-04-3	25038-59-9	N.A.
Intended use	Pellets polyethylene terephthalate (PET), used as a raw material mainly for the manufacture of containers, both bottles and trays. Suitable for contact with food, recyclable, has good transparency and brightness, in addition to excellent mechanical properties and gas barrier.	Pellets of polyethylene terephthalate (PET), used as a raw material mainly for the manufacture of fibers, textile or high tenacity, monofilament, CPET trays (bakeable), as well as bars/plates for subsequent machining of technical parts.	N.A.
Polymer classification in accordance with GHS12	Not classified		N.A.
Density	1,39 g/cm ³		ISO 1183-1:2019
Melt Flow Index MFI (285°C – 2,16kg)	26cm ³ /10min	10cm ³ /10min	ISO 1133-2:2011
Tensile properties			
Tensile modulus	2600 MPa		ISO 527-1:2012
Tensile yield strength	60 MPa		ISO 527-2:2012
Tensile elongation at break	> 50%		
Melting temperature			
Crystalline peak melting point (DSC)	241±5°C	250±5°C	ISO 11357-1:2016 ISO 11357-3:2018
Deflection T under load (HDT)	69,2°C		ISO 75-2:2013
Impact properties			
Impact Charpy (notched), 23°C	3,5 kJ/m ²		ISO 179-1:2010 ISO 179-2:2000
Impact Charpy (nothed), -30°C	2,9 kJ/m ²		ISO 179/1eA

Novapet PET resin is a highly balanced multi-purpose product for a wide variety of applications:

- Manufacture of packaging for all types of beverages, food and other types of sectors such as cosmetics, drugstore or pharmacy.
- In technical spinning processes leading to polyester yarn characterized by its high tenacity.

The final product is 100% PET.

4.

LCA information

Name and contact information of LCA author:

Abaleo S.L.

José Luis Canga Cabañes

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info@abaleo.es

Declared unit:

1 kg of PET resin, including distribution packing.

Time representativeness:

The data used in the LCA are from the year 2020.

Databases and LCA software used

Ecoinvent 3.8 database.

Software SimaPro 9.4.0.2.



The following criteria were used to select the most representative processes:

- The data must be representative of the technological development applied in the manufacturing processes. If no information was available, a data representative of an average technology has been chosen.
- Average regionalised data.
- The data should be as up to date as possible.

System diagram

All upstream, core process and downstream stages of the production of PET resin have been studied.

Polyethylene terephthalate (PET) is obtained in polymerization plants from glycols (monoethylene glycol; MEG or diethylene glycol; DEG), terephthalic acid (PTA) and isophthalic acid (IPA/PIA), through two main types of reactions: esterification, for monomer synthesis, and polycondensation of the monomer, to obtain polymer. The process is carried out under the action of catalysts and additives, at high temperature and moderate pressure.

In the first reaction, the monomer or prepolymer is formed by esterification of terephthalic acid with ethylene glycol. This prepolymer is added to the final esterification reactor, separating a mixture of water and ethylene glycol from the condensate. From here it will go to the polycondensation reactor, where a polymer will be obtained, which is then cooled and solidified. Finally, it is cut into small cylindrical granules (called “pellets”), which are reviewed and stored (either in silos or in bigbags).

The PET resin obtained is then subjected to a continuous polycondensation heat treatment (solid state polycondensation, SSP) to improve its qualities, changing its internal structure and its physical characteristics.

The limits of the system studied in the Life Cycle Analysis are shown below in the PET resin production diagram

UPSTREAM

RAM MATERIALS
AND PACKAGING
PRODUCTION

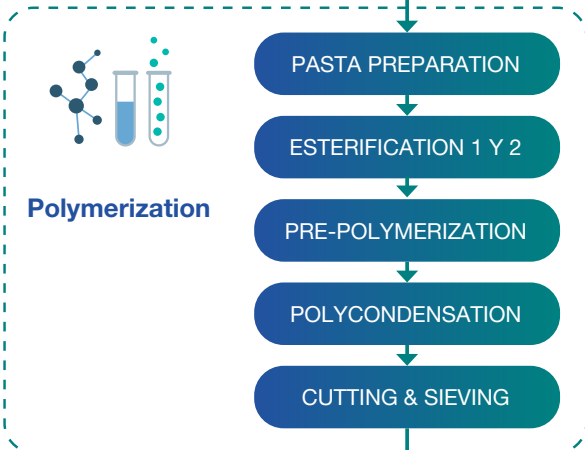


MATERIAL RECEPTION
AND CLASIFICATION

CORE PROCESS

AUXILIARY
MATERIALS AND
CONSUMABLES
PRODUCTION

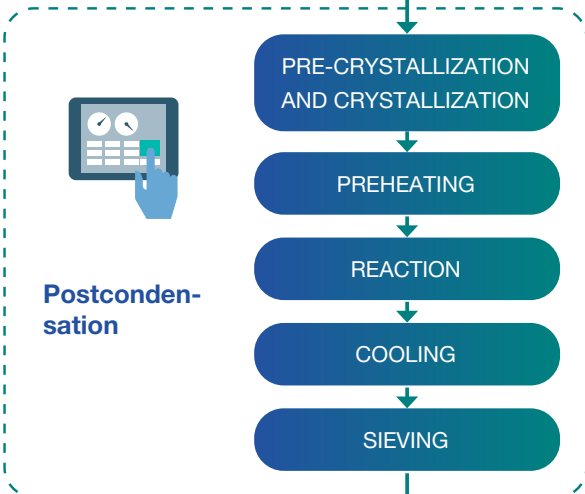
ENERGY
PRODUCTION



STORES AND
AMORPHOUS PELLETS



Waste
transportation
and
management



DOWNSTREAM



TRANSPORTATION TO
CONSUMER

Description of system boundaries:

The EPD is cradle to gate with options; covers the upstream, core process and downstream stages.

Upstream

- Extraction and production of renewable and non-renewable resources used in the manufacturing processes of PET resins, its refining or processing, and storage.
- Production of the additives used in the pellet manufacturing processes.
- Production of the distribution packaging used for the pellets.
- Production of products and materials used in maintenance and general services (fire protection system, offices, laboratory, engineering, management).

Core process

- Production of pellets.
- All material and energy inputs to the core process, including electricity, fuel, compressed air, cooling system, etc.
- The consumption of water.
- The production processes of the energy used in the production of the core process.
- The transport of raw and auxiliary materials to the Novapet plant.
- All emissions to air, water and soil.
- Treatment and transport to management of waste and wastewater generated by all the processes, in the core process.

Downstream:

- Transport of PET resin to customers; 2020 sales data have been used, differentiating type of transport: truck, train or ship.

The polluter pays principle and the modularity principle have been followed (environmental charges are assigned to the stage where the impact occurs).

The use and end of life of the product are not included.

Cut-off criteria:

No cut-off rule has been applied. There has been no exclusion of material and energy consumption.

Data quality assessment:

To assess the quality of the primary data used, the semi-quantitative data quality assessment criteria proposed by the European Union in its Guide to the Environmental Footprint of Products and Organisations were applied, resulting in a Data Quality Rating (DQR) = 1.5, indicating excellent data quality.

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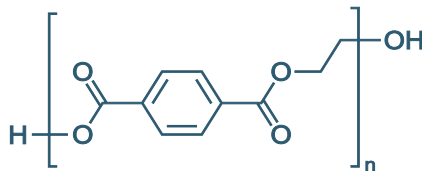
Content declaration

Product

The product is 100% PET.

Formulation used in PET resin manufacture is considered a trade secret and therefore, is confidential information that cannot be made public.

No substances listed in “Candidate List of Substances of Very High Concern (SVHC) for authorisation” are used during the PET resin cycle production in a percentage greater than 0.1% of the weight of the product.



PET

$(\text{C}_{10}\text{H}_8\text{O}_4)_n$



Packaging

Primary and secondary packaging for the shipment of the product (distribution packaging), has been included in the study.

The product is distributed mostly in bulk. When the product is supplied with packaging, the materials are:

Type of packaging	kg packaging/ kg PET resin
BigBag	3,74E-04
Wood	3,45E-03
PE film	8,56E-05
Paper/coreboard	6,39E-05
PP	2,31E-06

Recycled material

Novapet's PET resins do not contain recycled material.



Environmental information

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

The characterisation factors used to convert life cycle inventory data into impact categories are indicated in the GENERAL PROGRAMME INSTRUCTIONS FOR THE INTERNATIONAL EPD. Version 4.0, and in the PCR “Plastics in primary forms”, have been applied using SimaPro 9.4.0.2 software.

Potential environmental impacts

PARAMETER		UNIT	Up-stream	Core	Down-stream	TOTAL
Global warming potential (GWP)	Fossil	kg CO ₂ eq.	2,05E+00	3,13E-01	6,59E-02	2,43E+00
	Biogenic	kg CO ₂ eq.	3,25E-03	1,23E-03	3,85E-06	4,49E-03
	Land use and land use change	kg CO ₂ eq.	8,07E-04	3,36E-04	5,35E-07	1,14E-03
	TOTAL	kg CO ₂ eq.	2,05E+00	3,15E-01	6,59E-02	2,43E+00
Depletion potential of the stratospheric ozone layer (ODP)		kg CFC 11 eq.	1,46E-05	5,16E-08	1,56E-08	1,47E-05
Acidification potential (AP)		mol H ⁺ eq.	6,75E-03	4,85E-04	2,53E-04	7,48E-03
Eutrophication potential (EP)	Freshwater	kg P eq.	4,31E-05	1,03E-06	3,37E-08	4,42E-05
	Marine	kg N eq.	1,21E-03	2,38E-04	8,40E-05	1,53E-03
	Terrestrial	mol N eq.	1,24E-02	1,52E-03	9,24E-04	1,48E-02
Photochemical oxidant formation potential (POFP)		kg NMVOC eq.	5,69E-03	6,99E-04	2,50E-04	6,64E-03
Abiotic depletion potential (ADP)	Minerals & metals	kg Sb eq.	2,82E-06	1,01E-08	2,85E-09	2,84E-06
	Fossil resources	MJ, net calorific value	5,50E+01	5,03E+00	9,30E-01	6,10E+01
Water depletion potential (WDP)		m ³ eq.	1,24E+00	1,19E-01	-9,04E-05	1,36E+00

Use of resources

PARAMETER		UNIT	Up-stream	Core	Down-stream	TOTAL
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	1,62E+00	5,32E-01	1,43E-03	2,15E+00
	Used as raw materials	MJ, net calorific value	1,91E-01	1,73E-01	2,04E-04	3,64E-01
	TOTAL	MJ, net calorific value	1,81E+00	7,05E-01	1,63E-03	2,52E+00
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	6,34E-01	9,23E-01	8,96E-01	2,45E+00
	Used as raw materials	MJ, net calorific value	5,85E+01	5,27E+00	3,58E-02	6,38E+01
	TOTAL	MJ, net calorific value	5,92E+01	6,19E+00	9,32E-01	6,63E+01
Secondary material		kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Renewable secondary fuels		MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-renewable secondary fuels		MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water		m ³	3,33E-02	1,60E-03	2,46E-06	3,49E-02

Waste production and output flows

Waste production

PARAMETER	UNIT	Up-stream	Core	Down-stream	TOTAL
Hazardous waste disposed	kg	1.61E-05	6.46E-06	2.44E-06	2.50E-05
Non-hazardous waste disposed	kg	3.26E-02	3.33E-03	4.88E-05	3.60E-02
Radioactive waste disposed	kg	5.95E-05	2.02E-05	6.67E-06	8.64E-05

Note: The materials generated during the production process that are considered waste are those sent to landfill for final disposal (materials that are not reused, recycled and/or recovered).

Output flows

PARAMETER	UNIT	Up-stream	Core	Down-stream	TOTAL
Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	0.00E+00	1.83E-03	0.00E+00	1.83E-03
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Other environmental indicators

Energy content of the PET resins studied, evaluated with the gross calorific value of the PET material, is 21.34 MJ/kg.

The PET resin total primary energy demand (gross energy requirement) is:

- Non-renewable primary energy resources, measured as higher calorific value (UHV): 71.33 MJ.
- Renewable primary energy resources, measured as energy: 2.15 MJ.

PET resin does not contain biomaterial in its composition.

No recycled material is used for the manufacture of PET resins.

Novapet has environmental indicators that help us define and measure our progress according to our objectives, such as:

- Production of hazardous and non-hazardous waste.
- CO₂ emissions.
- Control of environmental aspects.

Additional environmental information

Novapet is working on the installation of a plant to produce recycled PET resins from flakes from post-consumer PET containers.

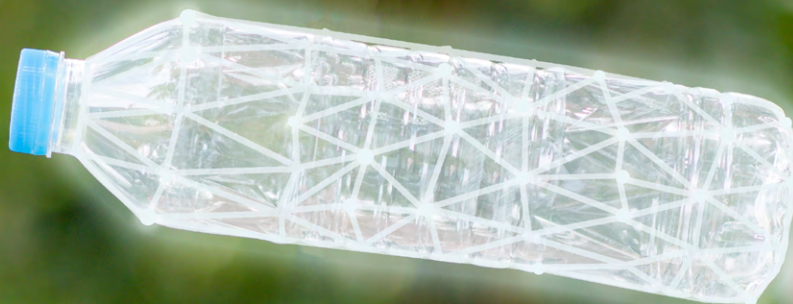
Novapet has a self-consumption photovoltaic solar plant that covers around 25% of the plant's needs.

Novapet is a member of the OCS (Operation clean sweep) initiative. It is a global initiative of the plastics sector to prevent the emission to the environment of plastic particles (grain, flakes, dust), which can occur involuntarily at any stage of the plastics value chain: production, handling, transport, processing and recycling.

The OCS is a voluntary program for responsible management, with the aim of helping to ensure that good cleaning and grain control practices are applied in all operations involving handling plastic resins, ensuring that there is no leakage into the environment.

Novapet is preparing a project that will reinforce all the activities planned under the OCS program to avoid even in the event of rain overflows the drag of PET resin chips into water.

Novapet has installed a PRC (PET Reprocessing Centre) plant where waste material is shredded and re-entered into the process, thus saving up to 400 tons of raw material.



References

- Product Category Rules 2010:16 Plastics in primary forms, version 3.0.2. Product category classification: UN CPC 347. DATE 2022-08-17. VALID UNTIL: 2023-06-21.
- Life Cycle Analysis Report for the environmental product declaration of the PET resins of Novapet S.A. (SAMCA Group), carried out by Abaleo S.L. February 2023. Version 2.0
- EPD International (2019). General Programme Instructions for the Internacional EPD® System. Version 4.0. Date 2021-03-29, based on ISO 14025 and ISO 14040/14044.
- Environmental databases and impact methodologies implemented using SimaPro 9.4.0.2.
- Standard UNE-EN ISO 14025:2010. Environmental labels and declarations - Type III environmental declarations - Principles and procedures. (ISO 14025:2006).
- Standard UNE-EN ISO 14040:2006/A1:2021. Environmental Management. Life Cycle Analysis. Principles and reference framework. Amendment 1. (ISO 14040:2006/Amd 1:2020).
- Standard UNE-EN ISO 14044:2006/A1:2021. Environmental management. Life cycle assessment. Requirements and guidelines. Amendment 2. (ISO 14044:2006/Amd 2:2020).



VERIFICATION STATEMENT CERTIFICATE CERTIFICADO DE DECLARACIÓN DE VERIFICACIÓN

Certificate No. / Certificado nº: EPD08101

TECNALIA R&I CERTIFICACION S.L., confirms that independent third-party verification has been conducted of the Environmental Product Declaration (EPD) on behalf of:

TECNALIA R&I CERTIFICACION S.L., confirma que se ha realizado verificación de tercera parte independiente de la Declaración Ambiental de Producto (DAP) en nombre de:

NOVAPET, S.A. (grupo SAMCA)
Paseo Independencia, 21, 3º
50001 ZARAGOZA - SPAIN

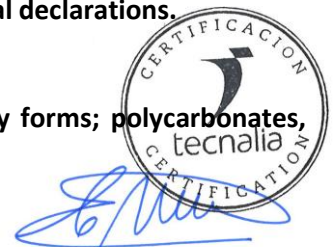
for the following product(s):
para el siguiente(s) producto(s):

PET resin
Granza de PET

with registration number **S-P-07871** in the International EPD® System (www.environdec.com).
con número de registro **S-P-07871** en el Sistema Internacional EPD® (www.environdec.com).

it's in conformity with:
es conforme con:

- **ISO 14025:2010 Environmental labels and declarations. Type III environmental declarations.**
- **General Programme Instructions for the International EPD® System v.4.0.**
- **PCR 2010:16 v3.0.2. Plastics in primary forms.**
- **UN CPC 34740 Polyacetals, other polyethers and epoxide resins, in primary forms; polycarbonates, alkyd resins, polyallyl esters and other polyesters, in primary forms.**



Carlos Nazabal Alsua
Manager

Issued date / Fecha de emisión: 23/03/2023
Update date / Fecha de actualización: 23/03/2023
Valid until / Válido hasta: 20/03/2028
Serial Nº / Nº Serie: EPD0810100-E

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Este certificado no es válido sin su correspondiente EPD.

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This certificate is subject to modifications, temporary suspensions and withdrawals by TECNALIA R&I CERTIFICACION.

El estado de vigencia del certificado puede confirmarse mediante consulta en www.tecnaliacertificacion.com.
The validity of this certificate can be checked through consultation in www.tecnaliacertificacion.com.





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