

Environmental Product Declaration



In accordance with ISO 14025:2006 for:

Polyethylene terephthalate PET, granulate from

SIBUR

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-07716
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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



Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
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Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
PCR: 2010:16 Plastics in primary forms (3.0.2). Product category classification: UN CPC 347
PCR review was conducted by: The Technical Committee of the International EPD® System. See https://www.environdec.com/about-us/the-international-epd-system-about-the-system
Life Cycle Assessment (LCA)
LCA accountability: LCA and the EPD prepared by CIS Center LCA team
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: <input checked="" type="checkbox"/> EPD verification by individual verifier Third-party verifier: <i>Dr Hüdai Kara, Metsims Sustainability Consulting (www.metsims.com)</i> Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third-party verifier: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

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

EPDs within the same product category but registered in different EPD programmes may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see ISO 14025

Company information

Owner of the EPD:

«SIBUR» LLC is the managing organization of PJSC «SIBUR Holding»
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Description of the organisation:

SIBUR is one of the most dynamically developing companies in the global petrochemical industry, a Russian leader in the production of polymers and rubbers.

SIBUR produces popular products for society and uses advanced technologies to create new opportunities, invests in social infrastructure, improving the quality of life of people. SIBUR develops through partnership and exchange of experience, constant growth, movement towards ambitious goals and commitment to the principles of sustainable development.

The company's products are used in many sectors of the economy around the world: construction, food industry, medicine and pharmaceuticals, agriculture, automotive industry and others.

SIBUR-PET is a modern production site of SIBUR, specializing in the production of polyethylene terephthalate (PET). The main activity of JSC SIBUR-PETF: production of polyethylene terephthalate granulate for use in the production of PET products for various purposes.

JSC Polief is Russia's largest producer of polyethylene terephthalate (PET) and terephthalic acid (PTA). The company is part of the Directorate of Plastics, Elastomers, Organic Synthesis of SIBUR. Since 2022, the company has put into operation a solar power plant with a capacity of 4.9 MW. Polief became the first industrial enterprise of SIBUR to use its' own green electricity in production.

Name and location of production site:

JSC Polief
71 Sotsialisticheskaya St., Blagoveshchensk, 453434, Republic of Bashkortostan

JSC Sibur-PET
170100, Tver region, Tver, sh. Moskovskoe, 20x

Product information

Product name:

Polyethylene terephthalate PET, granulate

Product identification:

Polyethylene terephthalate is produced in accordance with the following basic technical conditions:

POLIEF:

- Polyethylene terephthalate (granulate) 2226-008-39989731-2009;
- Polyethylene terephthalate (granulate) categorized 226-012-39989731-2011.

SIBUR-PETF:

- Polyethylene terephthalate (granulate) categorized 20.16.40-012-55588670-2019;
- Amorphous polyethylene terephthalate (granulate) 226-002-55588670-2007;
- Polyethylene terephthalate HF (granulate) 20.16.40-014-55588670-2020.

A complete list of technical specifications and product standards can be requested directly from the manufacturer.

Product description:

Polyethylene terephthalate is a thermoplastic polyester of terephthalic acid and ethylene glycol. The material is produced by polycondensation method (including esterification reaction). The main raw materials are terephthalic acid and monoethylene glycol.

To produce PET, JSC POLIEF uses terephthalic acid of its own production. Also, terephthalic acid produced at POLIEF is partially supplied to JSC SIBUR-PET for the production of PET.



Product specification:

PET has a transparent structure, is easy to process and can be recycled. It is characterized by high chemical resistance and ductility in both heated and cooled states. Retains properties at temperatures from -40 to +75 °C.

The material can be sawed, drilled, milled. It is resistant to shock loads, alcohols, oils, solvents, and does not deteriorate from moisture. Depending on the source raw material and the processing method, rigid and semi-rigid products are obtained from PET.

Polyethylene terephthalate films made from PET have increased grease resistance, are odorless and do not react with food.

UN CPC code: 347

Geographical scope: Russia, Global

The structure of electricity generation sources used in the main production process of averaged PET corresponds to the structure of generation sources in Russia for 2022.

LCA information

Functional unit / declared unit:

The functional unit used for the EPD is one ton of PET.

Reference service life:

The guaranteed shelf life of PET is two years from the date of manufacture.

Time representativeness:

2022

Database(s) and LCA software used: OpenLCA version 1.9.0 and secondary datasets from the current versions of the “Environmental Footprint” and Ecoinvent databases.

Description of system boundaries:

In accordance with PCR, the product life cycle can be divided into three life cycle stages (PET product system):

- Upstream processes (from “cradle to gate”),
- Core process (from gate to gate),
- Downstream processes (from “gate to grave”).

The collection of upstream, core and downstream processes related to the PET life cycle constitute the boundaries of the PET product system.

Assumptions and excluded lifecycle stages

The following assumptions were made in this study:

- To model the life cycle of PET, only the main inputs and outputs are considered. The mass of flows excluded from the modelling does not exceed 5% of the total mass of PET products and 1% of the mass of flows of the main production process. The contribution to the environmental impacts of excluded flows does not exceed 1% of the total life cycle impacts of PET.
- It was assumed that datasets with a representative year (the year for which the data was collected) different from the representative year for the primary data would be suitable for PET life cycle modelling and would not significantly impact the final study results.

Allocation:

At the production site primary data for PET production was collected. Allocation by mass is applied where necessary.

Content declaration

Product components	kg	%	Environmental / hazardous properties
Polyethylene terephthalate	999	99,9	Non-Hazardous
TOTAL	999		

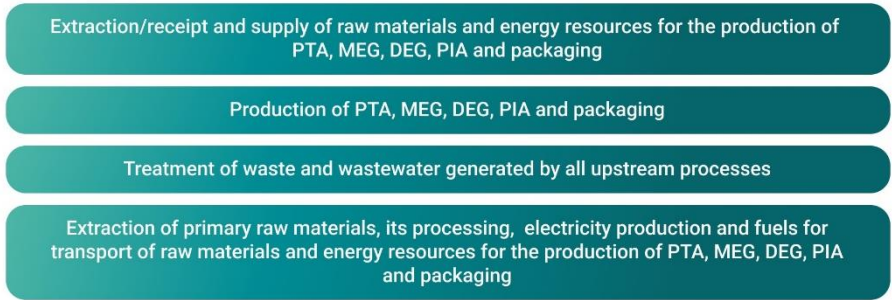
Packaging

PET granules are supplied to consumers in soft containers “big bags”, stored on wooden pallets. The impacts from disposal of the flexible container were taken into account in the life cycle assessment of PET. For wooden pallets, the multiple reuse scenario was taken as the base case.

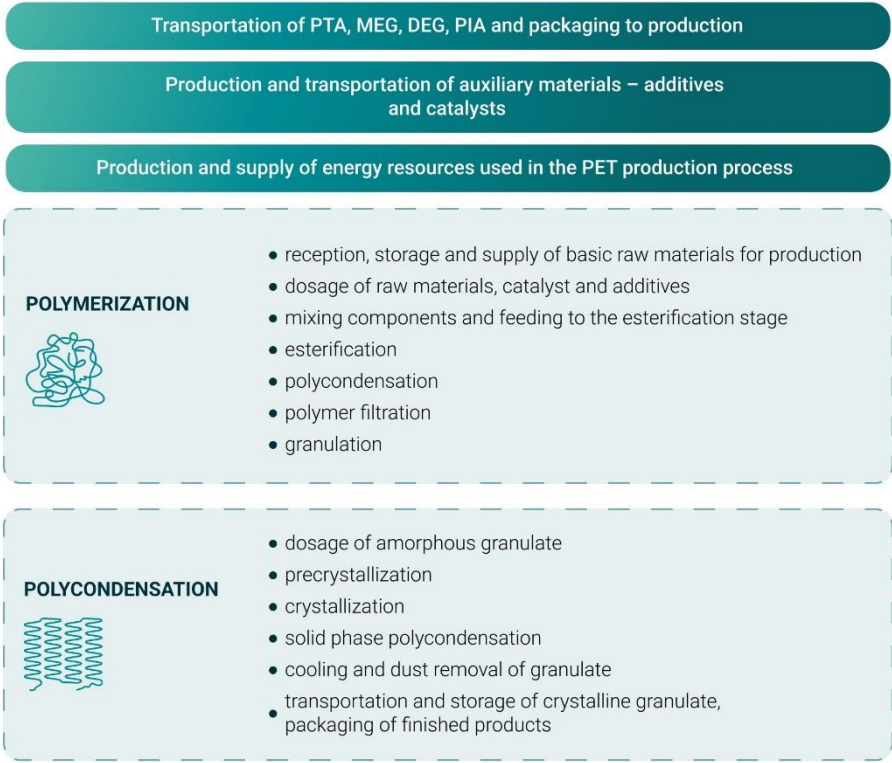
System diagram:



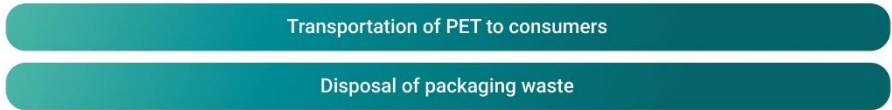
UPSTREAM PROCESSES. SUPPLY OF RAW MATERIALS AND PACKAGING



CORE PROCESS. PET PRODUCTION



DOWNSTREAM PROCESSES. DELIVERY OF FINISHED PRODUCTS



Results of the environmental performance indicators

Impact category indicators per one tonne of PET

PARAMETER		UNIT	Upstream	Core	Downstream		TOTAL
					Lorry, 500 km	Rail, 500 km	
Global warming potential (GWP)	Fossil	kg CO ₂ eq.	1.95E+03	3.69E+02	2.71E+01	6.79E+00	2.34E+03
	Biogenic	kg CO ₂ eq.	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Land use and land transformation	kg CO ₂ eq.	3.53E-01	1.39E-02	6.91E-04	6.04E-03	3.67E-01
	TOTAL	kg CO ₂ eq.	1.95E+03	3.75E+02	2.71E+01	6.82E+00	2.35E+03
Ozone layer depletion (ODP)		kg CFC 11 eq.	1.99E-06	3.46E-08	7.79E-11	2.57E-09	2.03E-06
Acidification potential (AP)		mol H ⁺ eq.	8.41E+00	2.31E+01	9.04E-02	2.05E-02	3.16E+01
Eutrophication potential (EP)	Aquatic freshwater	kg P eq.	7.22E-02	8.08E-02	3.67E-06	1.42E-05	1.53E-01
	Aquatic marine	kg N eq.	8.56E+00	1.69E+00	4.07E-02	3.88E-03	1.03E+01
	Aquatic terrestrial	mol N eq.	1.60E+01	2.59E+00	4.48E-01	4.10E-02	1.90E+01
Photochemical oxidant creation potential (POCP)		kg NMVOC eq.	5.60E+00	7.01E-01	7.85E-02	1.10E-02	6.38E+00
Abiotic depletion potential (ADP)*	Metals and minerals	kg Sb eq.	9.20E-02	2.45E-05	1.68E-06	2.11E-06	9.21E-02
	Fossil resources	MJ, net calorific value	5.95E+04	1.30E+04	3.21E+02	1.17E+02	7.28E+04
Water deprivation potential (WDP)*		m ³ world eq. deprived	9.55E+02	9.37E+00	2.01E-02	9.48E-01	9.65E+02

* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

Resource use indicators per one tonne of PET

PARAMETER		UNIT	Upstream	Core	Downstream		TOTAL
					Lorry, 500 km	Rail, 500 km	
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	1,40E+03	1,75E+02	2,14E+01	7,40E+00	1,59E+03
	Used as raw materials	MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	TOTAL	MJ, net calorific value	1,40E+03	1,75E+02	2,14E+01	7,40E+00	1,59E+03
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	6,34E+04	8,29E+03	5,50E+02	1,17E+02	7,23E+04
	Used as raw materials	MJ, net calorific value	0,00E+00	1,52E+03	6,51E+03	0,00E+00	8,03E+03
	TOTAL	MJ, net calorific value	6,34E+04	9,81E+03	7,06E+03	1,17E+02	8,03E+04
Secondary material (optional)		kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Renewable secondary fuels (optional)		MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-renewable secondary fuels (optional)		MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water (optional)		m ³	1,37E+02	4,25E+01	6,46E-01	0,00E+00	1,80E+02

Waste indicators per one tonne of PET

PARAMETER	UNIT	Upstream	Core	Downstream		TOTAL
				Lorry, 500 km	Rail, 500 km	
Hazardous waste disposed	kg	1,88E+00	1,55E+00	0,00E+00	0,00E+00	3,43E+00
Non-hazardous waste disposed	kg	0,00E+00	6,66E-01	0,00E+00	0,00E+00	6,66E-01
Radioactive waste disposed	kg	0,00E+00	2,32E-02	2,15E-06	7,56E-08	2,32E-02



Additional environmental information

The results per production plants of JSC POLIEF and JSC SIBUR-PETF are also given per plant as additional information in the tables below. Both JSC POLIEF and JSC SIBUR-PETF have an integrated management system for quality, occupational safety and health, and environmental protection. The enterprises are certified for compliance with international standards ISO 9001, ISO 14001, ISO 45001.

Impact category indicators per tonne of PET produced by JSC POLIEF

PARAMETER		UNIT	Upstream	Core	Downstream		TOTAL
					Lorry, 500 km	Rail, 500 km	
Global warming potential (GWP)	Fossil	kg CO ₂ eq.	1,99E+03	3,11E+02	2,71E+01	6,79E+00	2,33E+03
	Biogenic	kg CO ₂ eq.	1,15E+00	3,02E-02	1,83E-04	2,38E-02	1,18E+00
	Land use and land transformation	kg CO ₂ eq.	3,63E-01	1,57E-02	6,91E-04	6,04E-03	3,79E-01
	TOTAL	kg CO ₂ eq.	1,99E+03	3,22E+02	2,71E+01	6,82E+00	2,34E+03
Ozone layer depletion (ODP)		kg CFC 11 eq.	2,05E-06	6,88E-08	7,79E-11	2,57E-09	2,12E-06
Acidification potential (AP)		mol H ⁺ eq.	8,57E+00	8,46E-01	9,04E-02	2,05E-02	9,50E+00
Eutrophication potential (EP)	Aquatic freshwater	kg P eq.	7,97E-02	1,62E-01	3,67E-06	1,42E-05	2,41E-01
	Aquatic marine	kg N eq.	1,51E+00	1,62E-01	4,07E-02	3,88E-03	1,71E+00
	Aquatic terrestrial	mol N eq.	1,64E+01	1,96E+00	4,48E-01	4,10E-02	1,88E+01
Photochemical oxidant creation potential (POCP)		kg NMVOC eq.	5,72E+00	5,75E-01	7,85E-02	1,10E-02	6,38E+00
Abiotic depletion potential (ADP)*	Metals and minerals	kg Sb eq.	3,99E-03	2,16E-05	1,68E-06	2,11E-06	4,01E-03
	Fossil resources	MJ, net calorific value	6,08E+04	2,02E+04	3,21E+02	1,17E+02	8,13E+04
Water deprivation potential (WDP)*		m ³ world eq. deprived	4,26E+02	1,03E+01	2,01E-02	9,48E-01	4,36E+02

Impact category indicators per tonne of PET produced by JSC SIBUR-PETF

PARAMETER		UNIT	Upstream	Core	Downstream		TOTAL
					Lorry, 500 km	Rail, 500 km	
Global warming potential (GWP)	Fossil	kg CO ₂ eq.	1,90E+03	4,27E+02	2,71E+01	6,79E+00	2,36E+03
	Biogenic	kg CO ₂ eq.	1,08E+00	4,71E-03	1,83E-04	2,38E-02	1,08E+00
	Land use and land transformation	kg CO ₂ eq.	3,43E-01	1,20E-02	6,91E-04	6,04E-03	3,55E-01
	TOTAL	kg CO ₂ eq.	1,90E+03	4,27E+02	2,71E+01	6,82E+00	2,36E+03
Ozone layer depletion (ODP)		kg CFC 11 eq.	1,94E-06	4,34E-10	7,79E-11	2,57E-09	1,94E-06
Acidification potential (AP)		mol H ⁺ eq.	8,25E+00	4,53E+01	9,04E-02	2,05E-02	5,37E+01
Eutrophication potential (EP)	Aquatic freshwater	kg P eq.	6,47E-02	2,33E-05	3,67E-06	1,42E-05	6,47E-02
	Aquatic marine	kg N eq.	1,44E+00	2,75E-01	4,07E-02	3,88E-03	1,75E+00
	Aquatic terrestrial	mol N eq.	1,56E+01	3,22E+00	4,48E-01	4,10E-02	1,93E+01
Photochemical oxidant creation potential (POCP)		kg NMVOC eq.	5,48E+00	8,27E-01	7,85E-02	1,10E-02	6,38E+00
Abiotic depletion potential (ADP)*	Metals and minerals	kg Sb eq.	1,80E-01	2,75E-05	1,68E-06	2,11E-06	1,80E-01
	Fossil resources	MJ, net calorific value	5,82E+04	5,71E+03	3,21E+02	1,17E+02	6,43E+04
Water deprivation potential (WDP)*		m ³ world eq. deprived	1,48E+03	8,43E+00	2,01E-02	9,48E-01	1,49E+03

References

General Programme Instructions of the International EPD® System. Version 4.0.
PCR 2010:16. Plastics in primary forms. 3.02

