

# Environmental Product Declaration



In accordance with ISO 14025:2006 for:

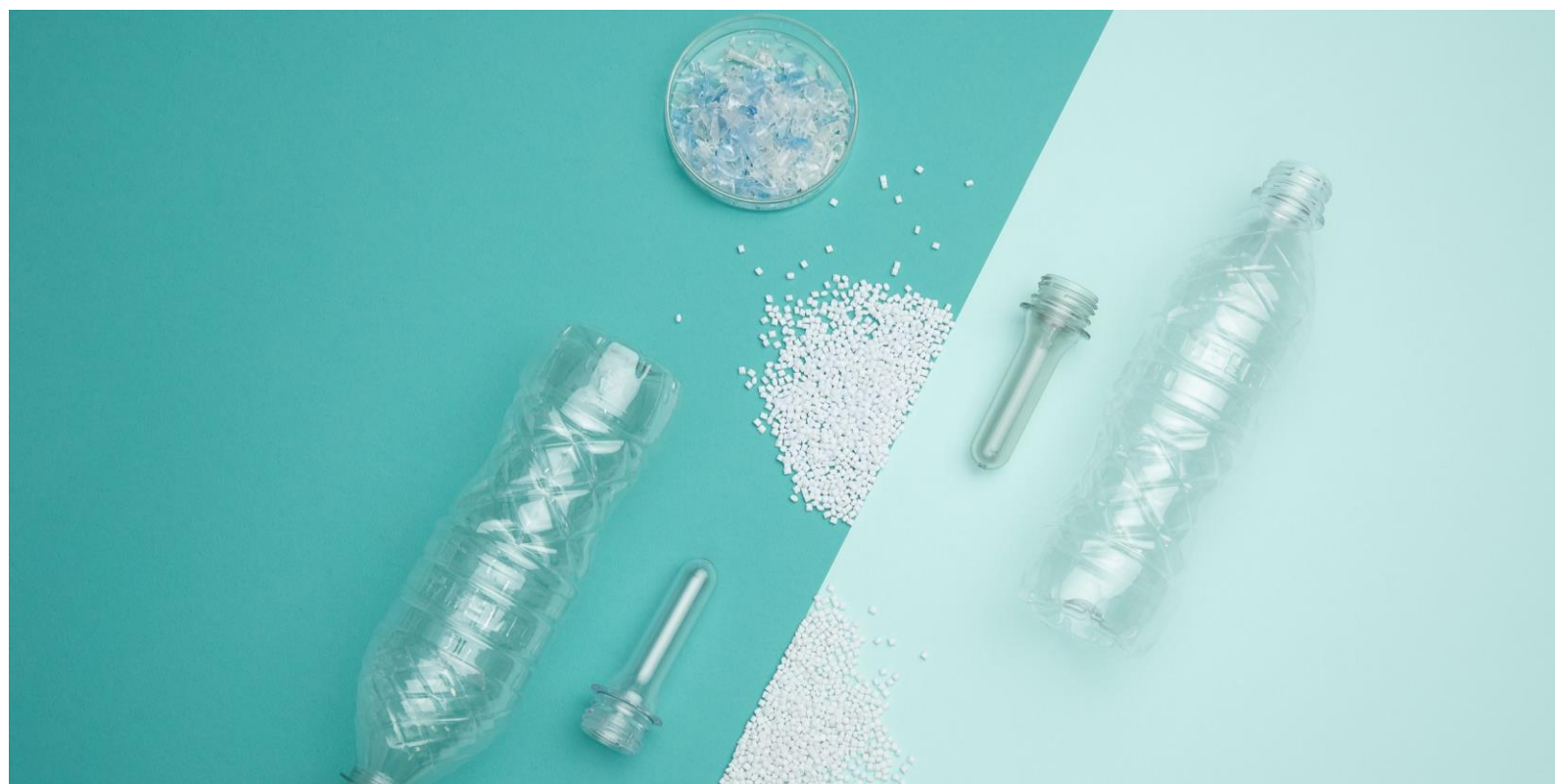
## Polyethylene terephthalate rPET Vivilen, granulate

from

# SIBUR

Programme:	The International EPD® System, <a href="http://www.environdec.com">www.environdec.com</a>
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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](http://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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<b>Accountabilities for PCR, LCA and independent, third-party verification</b>
<b>Product Category Rules (PCR)</b>
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 <a href="https://www.environdec.com/about-us/the-international-epd-system-about-the-system">https://www.environdec.com/about-us/the-international-epd-system-about-the-system</a> .
<b>Life Cycle Assessment (LCA)</b>
LCA accountability: LCA and the EPD prepared by CIS Center LCA team
<b>Third-party verification</b>
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.

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 green electricity in production.



### Name and location of production site:

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

## Product information

**Product name:**

Polyethylene terephthalate rPET Vivilen, granulate

**Product identification:**

Polyethylene terephthalate is produced in accordance with the following technical specifications:

- Polyethylene terephthalate VIVILEN 20.16.40-021-39989731-2021.

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

**Product description:**

Vivilen rPET is a polyethylene terephthalate produced by the Inmelt process with the involvement of recycled polyethylene terephthalate up to 30% by esterification of terephthalic acid with ethylene glycol, followed by liquid-phase and solid-phase polycondensation. Isophthalic acid and diethylene glycol are used as co-monomers.



**Product specification:**

rPET Vivilen 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 feedstock and processing method, rPET Vivilen is used to produce rigid and semi-rigid products.

rPET Vivilen is used for the manufacture of packaging containers for food, cosmetics products and other products produced by extrusion and injection molding.

**UN CPC code:** 347

**Geographical scope:** Russia, Global

The structure of electricity generation sources used in the main production process of PTA and primary amorphous 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 tonne (1 t) of rPET Vivilen.

### Reference service life:

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

### Time representativeness:

The life cycle assessment was modeled based on the results of lifecycle inventory within the boundaries of the Vivilen rPET product system, including primary data collected for 2022 on the production of Vivilen rPET and purified terephthalic acid (PTA) produced at JSC "POLIEF" as well.

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 (rPET Vivilen product system):

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

### Assumptions and excluded lifecycle stages

The following assumptions were made in the underlying LCA:

- To model the life cycle of rPET Vivilen, 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 rPET Vivilen 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 rPET Vivilen.
- It is assumed that datasets with a representative year (the year for which data was collected) different from the representative year for the primary data would be suitable for rPET Vivilen life cycle modelling and would not significantly impact the LCIA results.
- It is assumed that the environmental impacts from the secondary PET-flakes were composed only of the impacts of its transportation and processing/treatment at the plant.
- Electricity from the solar power plant at JSC "POLIEF" is distributed to rPET Vivilen production line and packaging processes, as well as partially distributed to the production of primary amorphous PET.

### Allocation

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

System diagram:



**UPSTREAM PROCESSES. SUPPLY OF RAW MATERIALS AND PACKAGING**


- Extraction/receipt and supply of raw materials and energy resources for the production of PTA, MEG, DEG, PIA and packaging
- Production of PTA, MEG, DEG, PIA and packaging
- Treatment of waste and wastewater generated by all upstream processes
- Extraction of primary raw materials, their processing and electricity production and fuels for transport of raw materials and energy resources for the production of PTA, MEG, DEG, PIA and packaging



**CORE PROCESS. rPET VIVILEN PRODUCTION**


- Transportation of PTA, MEG, DEG, PIA, PET flakes and packaging
- Production and transportation of auxiliary materials – additives and catalysts
- Production and supply of energy resources used in the rPET Vivilen production process

**POLYMERIZATION**



- reception, storage and supply of basic raw materials
- PET flakes processing and mixing with primary raw materials
- dosage of raw materials, catalyst and additives
- mixing components and feeding to the esterification stage
- esterification
- polycondensation
- polymer filtration
- granulation

**POLYCONDENSATION**



- dosing of amorphous granulate
- pre-crystallization
- crystallization
- solid-phase polycondensation
- cooling and dedusting of granulate
- transportation and storage of crystalline granulate, packaging of finished products



**DOWNSTREAM PROCESSES. DELIVERY OF FINISHED PRODUCTS**

- Transportation of rPET to consumers
- Disposal of packaging waste



## Content declaration

Product components	kg	%	Environmental / hazardous properties
Polyethylene terephthalate	908	90,8	Non-hazardous
Recycled PET (post-consumer)	92	9.2	Non-hazardous
TOTAL	1000	100	

### Packaging

rPET Vivilen is supplied to consumers in soft containers “big bags”, stored on wooden pallets. Impacts from disposal of the flexible container were taken into account in the life cycle assessment of rPET Vivilen. For wooden pallets, the multiple reuse scenario is considered.

### Recycled material

rPET Vivilen uses recycled polyethylene terephthalate in the form of PET flakes obtained from the shredding and recycling of post-consumer PET bottles and other secondary PET products. In accordance with ISO 14021, the amount of recycled content per functional unit of rPET Vivilen for 2022 is 9.20%.

## Results of the environmental performance indicators

### Impact category indicators per tonne of rPET Vivilen

PARAMETER		UNIT	Upstream	Core	Downstream		TOTAL
					Lorry, 500 km	Rail, 500 km	
Global warming potential (GWP)	Fossil	kg CO <sub>2</sub> eq.	1,78E+03	2,21E+02	2,71E+01	6,79E+00	2,03E+03
	Biogenic	kg CO <sub>2</sub> eq.	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Land use and land transformation	kg CO <sub>2</sub> eq.	8,11E+00	8,97E-03	6,91E-04	6,82E+00	8,12E+00
	TOTAL	kg CO <sub>2</sub> eq.	1,79E+03	2,22E+02	2,71E+01	1,36E+01	2,04E+03
Ozone layer depletion (ODP)		kg CFC 11 eq.	1,83E-06	6,27E-08	7,79E-11	2,57E-09	1,89E-06
Acidification potential (AP)		mol H <sup>+</sup> eq.	7,67E+00	3,43E-01	7,76E-07	1,45E-07	8,02E+00
Eutrophication potential (EP)	Aquatic freshwater	kg P eq.	6,42E-02	1,55E-03	3,67E-06	1,42E-05	6,58E-02
	Aquatic marine	kg N eq.	1,34E+00	7,02E-02	4,07E-02	3,88E-03	1,46E+00
	Aquatic terrestrial	mol N eq.	1,47E+01	9,23E-01	4,48E-01	4,10E-02	1,61E+01
Photochemical oxidant creation potential (POCP)		kg NMVOC eq.	5,14E+00	2,95E-01	7,85E-02	1,10E-02	5,51E+00
Abiotic depletion potential (ADP)*	Metals and minerals	kg Sb eq.	3,32E-03	1,21E-05	1,68E-06	2,11E-06	3,34E-03
	Fossil resources	MJ, net calorific value	5,47E+04	2,75E+03	3,21E+02	1,17E+02	5,78E+04
Water deprivation potential (WDP)*		m <sup>3</sup> world eq. deprived	3,81E+02	3,82E+00	2,01E-02	9,48E-01	3,85E+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 tonne of rPET Vivilen

PARAMETER		UNIT	Upstream	Core	Downstream		TOTAL
					Lorry, 500 km	Rail, 500 km	
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	1,28E+03	6,01E+01	2,14E+01	7,40E+00	1,37E+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	1,27E+03	5,08E+01	0,00E+00	0,00E+00	1,32E+03
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	5,84E+04	2,72E+03	5,50E+02	1,17E+02	6,17E+04
	Used as raw materials	MJ, net calorific value	3,11E+02	3,68E+02	6,51E+03	0,00E+00	7,19E+03
	TOTAL	MJ, net calorific value	5,87E+04	3,09E+03	7,06E+03	0,00E+00	6,89E+04
Secondary material (optional)		kg	0,00E+00	9,23E+01	0,00E+00	0,00E+00	9,23E+01
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 <sup>3</sup>	1,26E+02	1,40E+01	6,46E-01	0,00E+00	1,41E+02



### Waste indicators per tonne of rPET Vivilen

PARAMETER	UNIT	Upstream	Core	Downstream		TOTAL
				Lorry, 500 km	Rail, 500 km	
Hazardous waste disposed	kg	1,72E+00	3,73E-01	2,15E-06	7,56E-08	2,09E+00
Non-hazardous waste disposed	kg	0,00E+00	6,65E-01	8,36E-01	2,23E-01	1,50E+00
Radioactive waste disposed	kg	0,00E+00	4,22E-02	3,76E-03	1,79E-02	4,59E-02

### Additional information

rPET Vivilen obtained the following awards:

1. First place – Green Award (“Industry Companies Initiatives”)
2. Gold – Silver Mercury 2023 (“Best brand communication in the absence of a product”)
3. Silver – Silver Mercury 2023 (“Industry, real estate, construction and building materials”)
4. Silver – Effie Awards Russia 2023 (“Brand Experience”)
5. Silver – Silver Mercury 2023 (“The best strategy with meaning”)
6. Bronze – Silver Mercury 2023 (“Best Integrated Marketing Campaign”)
7. Laureate – Digital Communications AWARDS-2022 (“Digital projects and strategies: campaigns”)
8. Bronze – Effie Awards Russia 2022 (“Environmental protection and sustainable development. Brands / companies”)
9. Gold – Silver Mercury 2022 (“Best Product Launch Campaign”)
10. Gold – Digital Communications AWARDS-2022 (“Digital projects and strategies: B2B campaigns”)
11. Laureate – ECO BEST AWARDS 2022 (“Innovative Product of the Year”)
12. Gold – NPBC 2022 (“Best Marketing Campaign / Social Responsibility / Industry”)
13. Silver – “MIX Russia” 2022 (“Best use of tools”)
14. Bronze – NPBC 2022 (“Best use of tools / Influence”)
15. Bronze – Tagline Awards 2022 (“Best Social Project”)

## References

General Programme Instructions of the International EPD® System. Version 4.0.  
PCR 2010:16. Plastics in primary forms. 3.0.2



