Environmental Product Declaration

In accordance with ISO 14025 for:

Expandable polystyrene (EPS) from SIBUR Holding

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-02299
Publication date:	2023-08-01
Valid until:	2028-07-31

Programme information

Programme:	The International EPD® System EPD International AB Box 210 60 SE-100 31 Stockholm Sweden www.environdec.com info@environdec.com

Product category rules (PCR): Plastics in primary forms, 2010:16, version 3.01, 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 for a list of Members.
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ EPD process certification ☒ EPD verification
Third party verifier: Dr Hüdai Kara, Metsims Sustainability Consulting (www.metsims.com) Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

Company information

Owner of the EPD:
SIBUR Holding 16/1 Krzhizhanovskogo St., Moscow, 117218
Phone: +7 (495) 777-55-00; +7 (495) 780-55-00
Fax: +7 (495) 777-55-00
E-mail: info@sibur.ru

Description of the organisation:
JSC Sibur-Khimprom is a subsidiary of the SIBUR petrochemical group and produces a wide range of petrochemical products, specializing in the processing of liquid hydrocarbons. It is the largest domestic manufacturer of expanded polystyrene.

Web-site: https://www.sibur.ru/SiburKhimprom/

Name and location of production site:
JSC Sibur-Khimprom
Promyshlennaya st., 98, Perm, Perm region, Russia, 614055
Phone: +7 (342) 290-82-16
E-mail: mail-shp@sibur.ru

Product-related or management system-related certifications:
The SIBUR Integrated Management System complies with the requirements of the following international standards:
ISO 9001 "Quality Management Systems"
ISO 45001 "Occupational health and safety management systems"
ISO 14001 Environmental Management Systems.
For more information see http://www.sibur.ru/ru/sustainability/integrated-management-system/

Product information

Product name:
Expandable polystyrene (EPS)

Product identification:
EPS produced in accordance with the following Specifications (RU):

- 2294-021-00148889-2014
- 2214-019-53505711-2010
- 2214-019-53505711-2017
- 2214-019-53505711-2018
- 2214-019-53505711-2019
- 2214-025-53505711-2013
- 2214-025-53505711-2013

Product description:
Expandable polystyrene (EPS, CAS#9003-53-6) is a product of styrene polymerization with the introduction of a blowing agent (gas) into the polymer.

EPS is used in the process of processing polymer into insulating boards and finished parts by foaming. The material has thermal and sound insulation properties, high impact resistance, vibration resistance, light resistance, water and dust resistance, strength during physical processing. The material is resistant to hydrolysis, fats, acids, solutions of alkalis and acids.

Product properties	
Physical state	Solid, beads
Density (beads)	600 – 650 kg/m^3
Flash point	70 – 109 °C (pentane)
Self-ignition temperature	435 – 475 °C

UN CPC code: 347
Geographical scope: Russia

LCA information

Functional unit / declared unit:

The functional unit used for the EPD is one tonne (1 t) of average EPS granulate.

Reference service life:

The warranty period of storage of EPS from the date of its manufacture in a package closed by the manufacturer and not opened by the consumer at a temperature not exceeding 25 ° C is 6 months. The operational period can reach up to 80 years, which is confirmed by laboratory studies.

Time representativeness:

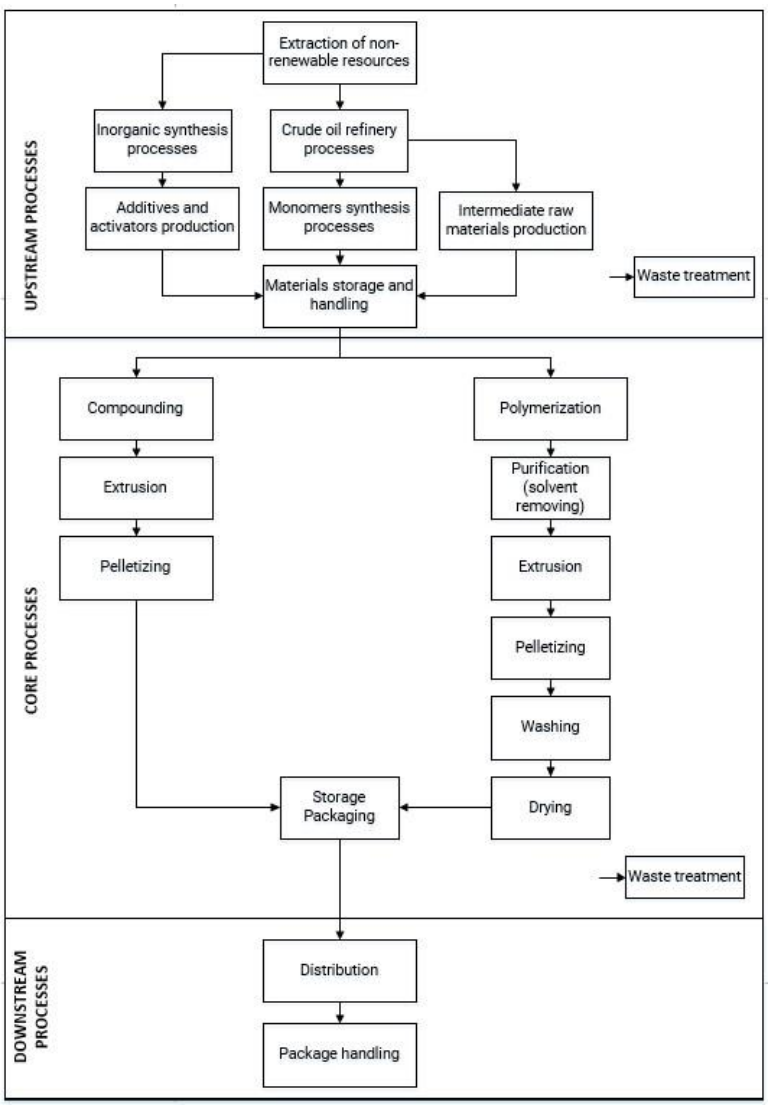
Primary data were collected from the manufacturer for 2021.

Database(s) and LCA software used:

GaBi Software version 10.0.1.92 was used to model the life cycle of TPE
Secondary data from GaBi Database content version 2022.1 was used to perform LCA modelling.
Individual datasets from Ecoinvent 3.8 Database were also taken.

System diagram:

The following processes were included in the EPD boundaries, as shown in the diagram below.



Description of system boundaries:
System boundaries covered by the EPD is “from cradle-to-grave” according to the corresponding PCR.

Estimates and Assumptions:
The mass of flows excluded from the LCA does not exceed 5% of the total mass of the corresponding product system and 1% of the mass of the flows of the main production process. The contribution to the environmental impact of the excluded flows does not exceed 1% of the total life cycle impact of the EPS. Allocation in Core processes was avoided by system expansion. Allocation by mass was applied where it was necessary.

More information:
More information about the company and products could be found at- https://www.sibur.ru/ru/

LCA and the EPD prepared by CIS Center LCA team – Dmitrii Vadivasov, Olga Reshetar, Alexander Derbenev.
CIS Center web-site: https://www.ciscenter.org/

Content declaration

Product

According to CLP Regulation, the product is a mixture of polymer (expandable polystyrene CAS# 9003-53-6) and additives: pentane isomers as blowing agent and a brominated flame retardant. HBCD free.

Materials / chemical substances	[Unit]	%	Environmental / hazardous properties
Polystyrene Index No(CLP): None	kg	≤ 92.0	None
Pentane Index No(CLP): 601-006-00-1	kg	≤ 7.0	H224; H225; H304; H336; H411 according to CLP classification
styrene (monomer) Index No(CLP): 601-026-00-0	kg	< 0.09	H226; H332; H315; H319; H304; H335; H372; H361d according to CLP classification

Packaging

Distribution packaging:

Thermoplastic bags weighing 25±0.5 kg. (40 bags on a pallet 1100*1300*1430); big bags weighing 800 ±8.0 kg, 840±8.4 kg, 880±8.8 kg (optionally can be installed on a pallet size 1000*1200 mm according to GOST 9078).

Environmental performance

Potential environmental impact for one tonne (1 t) of average EPS granulate

PARAMETER		UNIT	Upstream	Core	Downstream	TOTAL
Global warming potential (GWP)	Fossil	kg CO_2 eq.	3.03E+03	2.50E+02	1.23E+03	4.51E+03
	Biogenic	kg CO_2 eq.	2.53E+01	1.51E+00	7.92E+00	3.48E+01
	Land use and land transformation	kg CO_2 eq.	1.45E-01	6.25E-03	9.05E-01	1.06E+00
	TOTAL	kg CO_2 eq.	3.05E+03	2.51E+02	1.24E+03	4.54E+03
Ozone depletion potential (ODP)		kg CFC 11 eq.	8.52E-10	3.29E-06	4.71E-11	6.33E-05
Acidification potential (AP)		kg mol H^+ eq.	5.60E+00	5.66E+00	4.61E-01	4.22E+00
Eutrophication potential (EP)		kg PO_4^{3-} eq.	5.88E-01	5,91E-01	4.68E-02	1.41E-02
Photochemical oxidant creation potential (POCP)		kg NMVOC eq.	6.06E+00	6.14E+00	3.64E-01	3.99E+01
Abiotic depletion potential (ADP)	Metals and minerals	kg Sb eq.	9.55E-04	9.57E-06	8.41E-04	1.81E-03
	Fossil resources	MJ, net calorific value	8.51E+04	2.32E+03	8.56E+03	9.60E+04
Water deprivation potential (WDP)		m^3 world eq.	9.28E+03	2.34E+03	1.34E+00	1.16E+04

Use of resources for one tonne (1 t) of average EPS granulate

PARAMETER		UNIT	Upstream	Core	Downstream	TOTAL
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	7.85E+02	9.06E+01	1.02E+02	9.78E+02
	Used as raw materials	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	TOTAL	MJ, net calorific value	7.85E+02	9.06E+01	1.02E+02	9.78E+02
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	8.57E+04	2.48E+03	7.00E+02	8.89E+04
	Used as raw materials	MJ, net calorific value	0.00E+00	0.00E+00	3.98E+02	0.00E+00
	TOTAL	MJ, net calorific value	8.57E+04	2.48E+03	1.10E+03	8.89E+04
Secondary material		kg	0.00E+00	0.00E+00	1.30E-01	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	8.62E+02	1.86E+02	5.47E+00	1.05E+03

Waste production and output flows for one tonne (1 t) of average EPS granulate (optional)

Waste production

PARAMETER	UNIT	Upstream	Core	Downstream	TOTAL
Hazardous waste disposed	kg	2.06E-07	7.89E-06	3.73E-08	8.13E-06
Non-hazardous waste disposed	kg	4.11E-01	1.35E+01	0.00E+00	1.39E+01
Radioactive waste disposed	kg	1.36E-02	3.50E-01	0.00E+00	3.63E-01

Output flows

PARAMETER	UNIT	Upstream	Core	Downstream	TOTAL
Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	1.60E-03	1.60E-03
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

References

General Programme Instructions of the International EPD® System. Version 4.0.
PCR 2010:16. Plastics in primary forms. 3.01
ISO 14025:2006, Environmental labels and declarations – Type III Environmental declarations – Principles and procedures, International Organization for Standardization (ISO)
ISO 14040:2006 Environmental management – Life cycle assessment – Principles and framework, International Organization for Standardization (ISO)
ISO 14044:2017 Environmental management – Life cycle assessment – Requirements and guidelines, International Organization for Standardization (ISO)

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