UAB „R&R Ideas"
PVM mok. kodas: LT100005107216
Įmonės kodas: 302470133

https://circleplast.lt

Environmental Product Declaration

In accordance with ISO 14025:2006 for:

RECYCLED GENERAL PURPOSE POLYSTYRENE (GPPS) PELLETS

from

UAB “R&R IDEAS”

Programme:	The International EPD System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	EPD-IES- 0024613
Publication date:	2025-06-19
Valid until:	2030-06-19
EPD type:	EPD of multiple products, based on representative product

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

General information

Programme information

Programme:	The International EPD System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	support@environdec.com

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
Product Category Rules (PCR): 2010:16 Plastics in primary forms (version 4.0.0) 2024-07-01
PCR review was conducted by: The Technical Committee of the International EPD System. See www.environdec.com for a list of members. Review chair: Paola Borla, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.
Life Cycle Assessment (LCA)
LCA accountability: Sandra Bagdonaitė and Urtė Valdavičė, UAB "Vesta Consulting"
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: *Mari Kirss, Meetripuu OÜ* Approved by: The International EPD System
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 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: UAB "R&R IDEAS"

Contact: ruta@circleplast.lt; +37061808855; https://circleplast.lt/en/

Description of the organisation: UAB "R&R IDEAS" was founded in 2010. We were the first company in the Baltic States to recycle waste polystyrene and produce pellets for corporate customers.

R&R IDEAS started out as a polystyrene baler in 2010, solving waste and production space problems for several small companies. As the company grew, it set itself the goal to recycle as much polystyrene waste as possible. In 2012, the company started recycling polystyrene by extrusion and has grown organically since then.

As the company continues to grow and expand not only in the Baltics but also in Europe, it decided to rebrand itself as “CIRCLEPLAST” in 2022 to position itself as one of the largest polystyrene recyclers in the region. This rebranding reflects its mission to follow its vision of recycling all polystyrene waste and bringing it back into the circular economy rather than to landfill. Today, the company is working with the EU's largest collectors and suppliers of polystyrene waste and holds an important place in the EU's foam circular economy.

Name and location of production site(s): R. Kalantos 49, Kaunas, Lithuania LT52303

Product information

Product name: Recycled General Purpose Polystyrene (GPPS) pellets

Product description: Recycled General Purpose Polystyrene (GPPS) pellets are a polystyrene polymer shaped in the form of granulate. The product is made from collected, sorted of expandable and rigid polystyrene packing, building or other waste products. Recycled polystyrene pellets are available in two types: light-coloured (transparent) and black recycled GPPS pellets.

Light-coloured recycled GPPS pellets

Black recycled GPPS pellets

Product application: General purpose polystyrene is especially intended for extrusion process of plastic products: XPS panels, profiles, picture frames.

Technical specifications:

Parameter	ISO Standard	Light-coloured recycled GPPS pellets	Black recycled GPPS pellets
Density	1183	1.05 g/cm^3	1.05 g/cm^3
Bulk density	-	0.60 g/cm^3	0.60 g/cm^3
Melt flow rate (condition H)	ISO 1133 (200°C / 5 kg)	10-30 g/10 min	10-40 g/10 min

Product certificates and standards: UAB "R&R IDEAS" holds all necessary certificates and licenses required for polystyrene recycling. The company issues official documents confirming polystyrene processing, including a Pollution Permit, Anlagenzertifikat, Green Dot Certificate, and RecyClass Certification. It is regularly audited and possesses certifications verifying its status as an approved polystyrene recycler across EU countries.

UN CPC code: 3472 - Polymers of styrene, in primary forms

Geographical scope: Europe

LCA information

Declared unit: the declared unit is 1 kg of light-coloured (transparent) recycled GPPS pellets (representative product). The mass of the product per declared unit is 1 kg.

Time representativeness: Primary data was collected internally. The production data refers to the average from the January 2024 to December 2024.

Database(s) and LCA software used: The Ecoinvent database provides the life cycle inventory data for the raw and processed materials obtained from the background system. The used database is Ecoinvent 3.10.1 The LCA software used is One Click LCA.

Data quality: The foreground data collected internally is based on yearly production amounts and extrapolations of measurements on specific machines and plants. Overall, the data quality can be described as good. The primary data collection has been done thoroughly.

Description of system boundaries: The scope for this study is cradle to gate. The system boundaries are illustrated in the figure below and include upstream processes and core processes.

- Upstream processes – pre-production phase

This phase includes collection and transportation of post-consumer EPS waste to manufacturing plant, production of product packaging materials and its transportation to the production plant.

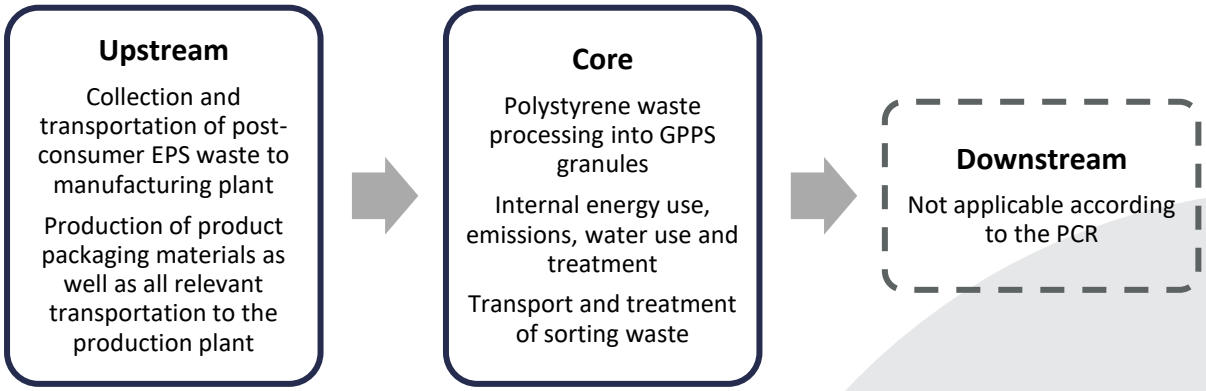
- Core processes – production phase

Core processes include all processing steps. It has considered all the energy consumption and emissions in the production plant, water usage and treatment, transport and end-of-life treatment of manufacturing waste.

- Downstream processes – post-production phase

Not applicable according to the PCR.

System diagram:



Cut-off criteria: The study does not exclude any modules or processes which are stated mandatory in the Standards and PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes for which data is available are included in the calculation. There is no neglected unit process more than 1% of total mass and energy flows. The total excluded input and output flows do not exceed 5% of energy usage or mass.

Allocation, estimates and assumptions: Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. In this study, as per EN 15804:2012+A2:2019, allocation is conducted in the following order:

- Allocation should be avoided
- Allocation should be based on physical properties (e.g. mass, volume) when the difference in revenue is small
- Allocation should be based on economic values

The allocations in the Ecoinvent 3.10.1 datasets used in this study follow the Ecoinvent system model 'Allocation, cut-off, EN15804'. Allocation was necessary for the electricity and fuel consumption, waste from production, water consumption and wastewater treatment inputs since the data was available only at factory process level. The methodological choices for allocation for reuse, recycling and recovery have been set according to the polluter pays principle (PPP).

Scenarios included in the LCA are based on realistic scenarios which are currently in use and are representative for one of the most likely scenario alternatives.

The production and end-of-life processes of infrastructure or capital goods used in the product system are not included within the system boundaries.

Calculation rules for averaging data: The EPD is an EPD of multiple products, based on a representative product. Light-coloured (transparent) polystyrene pellets were selected as the representative product for the group, as they accounted for the highest share of production by mass during the analysed period. Both product groups perform similar functions, are manufactured by a single company at one production site and follow the same primary steps in the core production processes. The only distinction between the products is the source material (EPS colour). This difference does not have a significant impact on the environmental performance indicators; a variation of less than 10% in A1-A3 global warming potential (GWP) values was observed between the two product types.

Accordingly, representative product calculations were applied. These calculations are based on total production inputs divided by total production outputs for the year 2024, resulting in an arithmetic mean derived from actual production data for the representative product.

Content information

The content declaration shows the weight of one unit of product per declared unit and the weight of product packaging per declared unit.

Product components	Weight, kg	Post-consumer material, weight-%	Other information
Polystyrene waste	1.00	100	Post-consumer waste
TOTAL	1.00	100	
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/kg**
Packaging film	0.0002	0.02	0
*EUR-flat pallet	0.0111	1.11	0.0052
FIBC	0.0018	0.18	0
TOTAL	**0.0131**	**1.31**	**0.0052**

* Global Warming Potential biogenic: - 35.9 kg CO2e / unit (Density: 20.768 kg/unit)

Note: The conversion factor for converting kg CO_2e to kg C is 3.67

Product does not contain any of high concern dangerous substances according to the REACH classification list.

Results of the environmental performance indicators

The impact assessment results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

The declared unit is 1 kg of light-coloured (transparent) polystyrene pellets.

ENVIRONMENTAL IMPACT CATEGORY INDICATORS

Parameter		Unit	Upstream	Core	Downstream	Total
Global warming potential (GWP)	Fossil	kg CO_2 eq.	1.25E-01	3.70E-01	ND	4.95E-01
	Biogenic[1)]	kg CO_2 eq.	0.00E+00	0.00E+00	ND	0.00E+00
	Land use and land transformation	kg CO_2 eq.	5.59E-05	1.85E-04	ND	2.41E-04
	TOTAL	kg CO_2 eq.	1.25E-01	3.70E-01	ND	4.95E-01
Ozone layer depletion (ODP)		kg CFC 11 eq.	1.90E-09	6.11E-09	ND	8.00E-09
Acidification potential (AP)		mol H^+ eq.	8.01E-04	1.03E-03	ND	1.83E-03
Eutrophication potential (EP)	Aquatic freshwater	kg P eq.	8.95E-06	5.02E-05	ND	5.92E-05
	Aquatic marine	kg N eq.	2.31E-04	2.38E-04	ND	4.70E-04
	Aquatic terrestrial	mol N eq.	2.54E-03	2.20E-03	ND	4.74E-03
Photochemical oxidant creation potential (POCP)		kg NMVOC eq.	8.81E-04	1.36E-03	ND	2.24E-03
Abiotic depletion potential (ADP)	Metals and minerals	kg Sbe	3.22E-07	5.20E-07	ND	8.42E-07
	Fossil resources	MJ	1.79E+00	5.13E+00	ND	6.91E+00
Water deprivation potential (WDP)*		m^3 world eq. deprived	8.43E-03	4.36E-02	ND	5.20E-02

ND – not declared; 1) Since stage C is not included, the GWP-biogenic and primary energy indicators have been accounted for within the upstream or core stages. 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.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS

Parameter	Unit	Upstream	Core	Downstream	Total
GWP-GHG[2)]	kg CO2e	1.25E-01	3.70E-01	ND	4.95E-01
Particulate matter	Incidence	1.15E-08	6.92E-09	ND	1.84E-08
Ionizing radiation[3)]	kBq U235e	1.52E-03	3.97E-02	ND	4.12E-02
Ecotoxicity (freshwater)	CTUe	2.37E-01	5.56E-01	ND	7.93E-01
Human toxicity, cancer	CTUh	2.13E-11	7.42E-11	ND	9.55E-11
Human tox. non-cancer	CTUh	1.08E-09	1.84E-09	ND	2.92E-09
SQP[4)]	-	1.63E+00	1.95E+00	ND	3.58E+00

2) This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero; 3) EN 15804+A2 disclaimer for

Ionizing radiation, human health. This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator; 4) SQP = Land use related impacts/soil quality

RESOURCE USE INDICATORS

Parameter		Unit	Upstream	Core	Downstream	Total
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	2.36E-02	4.61E-01	ND	4.85E-01
	Used as raw materials	MJ, net calorific value	0.00E+00	0.00E+00	ND	0.00E+00
	TOTAL	MJ, net calorific value	2.36E-02	4.61E-01	ND	4.85E-01
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	1.79E+00	3.42E+00	ND	5.21E+00
	Used as raw materials	MJ, net calorific value	0.00E+00	0.00E+00	ND	0.00E+00
	TOTAL	MJ, net calorific value	1.79E+00	3.42E+00	ND	5.21E+00
Secondary material (optional)		kg	1.20E+00	1.67E-03	ND	1.20E+00
Renewable secondary fuels (optional)		MJ, net calorific value	8.88E-06	5.63E-03	ND	5.64E-03
Non-renewable secondary fuels (optional)		MJ, net calorific value	0.00E+00	0.00E+00	ND	0.00E+00
Net use of fresh water (optional)		m^3	2.49E-04	5.42E-03	ND	5.67E-03

WASTE INDICATORS

Parameter	Unit	Upstream	Core	Downstream	Total
Hazardous waste disposed	kg	2.91E-03	1.56E-02	ND	1.85E-02
Non-hazardous waste disposed	kg	5.30E-02	6.05E-01	ND	6.58E-01
Radioactive waste disposed	kg	3.72E-07	9.33E-06	ND	9.70E-06

OUTPUT FLOW INDICATORS

Parameter	Unit	Upstream	Core	Downstream	Total
Components for reuse	kg	0.00E+00	0.00E+00	ND	0.00E+00
Material for recycling	kg	0.00E+00	9.00E-04	ND	9.00E-04
Materials for energy recovery	kg	0.00E+00	0.00E+00	ND	0.00E+00
Exported energy, electricity	MJ per energy carrier	0.00E+00	0.00E+00	ND	0.00E+00
Exported energy, thermal	MJ per energy carrier	0.00E+00	0.00E+00	ND	0.00E+00

Additional environmental information

Manufacturing energy scenario documentation

Scenario parameter	Value, CO_2eq/kWh	Source
Electricity, high voltage, residual mix	0.64	Data source: ecoinvent 3.10.1 Country: Lithuania
Propane, burned in building machine	0.03	Data source: ecoinvent 3.10.1 Country: world

References

Standards and PCR

1. ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations Principles and procedures.
2. ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.
3. ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.
4. ISO 14020:2022 Environmental statements and programmes for products. Principles and general requirements
5. General Programme Instructions of the International EPD® System. Version 4.0.
6. PCR 2010:16 Plastics in primary forms (version 4.0.0) 2024-07-01
7. General purpose polystyrene (recycled) pellets LCA background report

Data references:

1. Ecoinvent database v3.10.1 (2024)
2. One Click LCA database