

ENVIRONMENTAL PRODUCT DECLARATION

RECYCLED PP COMPOUND



PRODUCT NAMES:	R-PP compound
PRODUCT CODES:	009699 PP D 009551 PP PRU GR8 009554 PP PRU GR3 009555 PP B 009680 PP CT 20 009696 PP N
SITE PLANTS:	Carpeneda di Vobarno (BS)
PROGRAM OPERATOR	EPDItaly
PUBLISHER	EPDItaly
DECLARATION NUMBER	2024RECYCLED-PP0743
REGISTRATION NUMBER	EPDITALY0743
ISSUE DATE	26/06/2024
VALID TO	26/06/2029

in compliance with ISO 14025 and EN 15804:2012+A2:2019/AC:2021

MADE IN ITALY



valsir[®]
RECYCLING DIVISION

GENERAL INFORMATION

EPD OWNER:

Valsir S.P.A., Località Merlaro, 2 25078 Vestone (BS)

**PLANT INVOLVED
IN THE DECLARATION:**

Valsir Recycling Divison, Via Comunale, 99, 25079 Carpeneda,
Vobarno (BS)



SCOPE OF APPLICATION:

This Environmental Product Declaration (EPD) is valid for Valsir Recycled PP compounds product. The production plant is in Vobarno (BS). This EPD refers to 1 kg of regenerated PP compounds.

The products covered by the declaration are:

- PP PRU GR 8
- PP PRU GR 3
- PP B
- PP CT 20
- PP N
- PP D.

The life cycle assessment is representative for the product introduced in the declaration for the given system boundaries.

PROGRAM OPERATOR:

EPDItaly, via Gaetano De Castillia 10, 20124 Milano, Italia.

This declaration has been developed referring to EPDItaly, following the General Programme Instruction; further information and the document itself are available at: www.epditaly.it. EPD document valid within the following geographical area: Italy and other countries according to sales market conditions.

CEN standard EN 15804 served as the core PCR
(PCR ICMQ-001/15 rev 3.0).
Contact via info@epditaly.it

INDIPENDENT CHECK:

Independent verification of the declaration and data, according to EN ISO 14025:2010.

Third party verifier: ICMQ SpA, via De Castillia, 10 20124 Milano
(www.icmq.it)

EPD process certification (Internal)

EPD verification (External)

Accredited by: Accredia

CPC CODE:

347: Plastic in primary forms

CORPORATE CONTACT:

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Sede legale: Via Vittorio Emanuele II 179, 24033
Calusco d'Adda - Bergamo. tecnico4@greenwichsrl.it

TECHNICAL SUPPORT:

COMPARABILITY:

Environmental statements published within the same product category, but from different programs, may not be comparable. In particular, EPDs of construction products may not be comparable if they do not comply with EN 15804.

ACCOUNTABILITY:

Valsir S.p.A relieves EPDItaly from any non-compliance with environmental legislation. The holder of the declaration will be responsible for the information and supporting evidence; EPDItaly declines all responsibility for the manufacturer's information, data and results of the life cycle assessment.

REFERENCE DOCUMENT:

This declaration was developed following the EPDItalia regulation rev. 6.0 published on 20/10/2023 and available on the website www.epditaly.it.

PRODUCT CATEGORY RULES (PCR):

PCR ICMQ-001/15 rev. 3 Construction products and construction services, EPDItaly. Issue date: 12/02/2019.

COMPANY

COMPANY

Valsir was founded in 1987, on the basis of a precise industrial strategy adopted by the Silmar Group - a holding that is leader in the plumbing and heating market with a sales turnover of over 1,515,810,000 Euro and 3,651 employees - with factories in Italy, in Valle Sabbia to the north of Brescia and abroad in Portugal, Poland, Russia, Romania, the Ukraine, France, South Africa and Australia.

Valsir is today a solid and expanding firm within a group whose true points of cohesion and strength lie within a strong sense of collaboration and the contribution of specific professional skills of each single component.



VALSIR - HEADQUARTERS

Location: Vestone (BS)



VALSIR - VOBARNO PRODUCTION PLANT

Location: Vobarno (BS)



VALSIR - CARPENEDA 2 PRODUCTION PLANT INVOLVED IN THE DECLARATION

Location: Carpeneda, Vobarno (Brescia)



VALSIR - CARPENEDA 2 PRODUCTION PLANT

Location: Carpeneda, Vobarno (Brescia)



VALSIR - ROÈ VOLCIANO PRODUCTION PLANT

Location: Roè Volciano (Brescia)



VALSIR - VEROLANUOVA PRODUCTION PLANT

Location: Verolanuova (Brescia)

THE NUMBERS OF VALSIR (2023)



1,659,192 m²

total surface of which 400,634 m²
indoors



221,265,763 €

turnover



639 Employees



32,634,639 €

investments

MANAGEMENT CERTIFICATIONS



ISO 9001:2015

Quality management system
(In force since 2001)



ISO 50001:2018

Energy management system
(In force since 2017 for the plant
in Vestone and Vobarno)



ISO 14001:2015

Environmental management systems
(In force since 2018 for the plant
in Vestone)

SUSTAINABILITY CERTIFICATIONS OF THE VALSIR RECYCLING DIVISION PLANT



n° IT22/99003703 rilasciato da SGS Italia SpA il 10/01/2023



n° REMADE-2 rilasciato da RINA SpA il 02/05/2022

Our products boast “Remade in Italy®” and “Plastica seconda vita®” certification, which quantifies and certifies the amount of recycled material they contain, and ensures complete traceability throughout the entire transformation process.

GOAL AND SCOPE OF EPD

The entire life cycle of the product is considered (Type of EPD: cradle to gate) and the modules described below are declared in this EPD:






- Modules **A1-A3** include those processes that provide energy and material input for the system (A1), transport up to the factory gate of the plant (A2), manufacturing processes, packaging materials as well as waste processing and emissions to air from molding and extrusion processes (A3).
- Module **C1** considers deconstruction, including dismantling or demolition of the product from the building site. The energy consumption related to such activities is considered.
- Module **C2** considers transportation of the discarded piping system to a recycling or disposal process.
- Module **C3** considers waste processing for products recycling and incineration.
- Module **C4** includes all waste disposal processes, including pre-treatment and management of the disposal site.
- Module **D** includes benefits from all net flows in the end-of-life stage that leave the product boundary system after having passed the end-of-waste stage. Benefits from packaging incineration (electricity and thermal energy) are declared within module D.

The type of EPD is 'from cradle to gate' and is a specific EPD for recycled PP compounds produced at the Valsir S.p.A. plant in Carpeneda di Vobarno (BS). All data refer to 2022 production and sales.

According to the PCR ICMQ-001/15 rev. 3.0 the LCA study and the relative EPD, is "cradle to gate". Modules included are A1, A2, A3 C1-C4 and D. All manufacturing activities and packaging/auxiliary's production are in module A3, while energy production and input materials are in A1. The end-of-life scenarios, C1-C4 and D, are selected based on a study conducted by the statistical office of the European Union (Eurostat), as documented by the European Parliament.

It is specified that the study is conducted according to the 'Polluter Pays' principle, with reference to what is defined in CEN/TR 16970.

The production facility is in Carpeneda di Vobarno (IT).

 PRODUCT STAGE			 CONSTRUCTION PROCESS STAGE		 USE STAGE							 END OF LIFE STAGE				 BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse- Recovery- Recycling- potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
√	√	√	ND	ND	ND	ND	ND	ND	ND	ND	ND	√	√	√	√	√

√ = modules included in the study.

CALCULATION RULES

EPD TYPE	EPD Product Specification. From the cradle to gate with C1-C4 modules and module D” (A1-A3+C1-C4+D)
GEOGRAPHICAL VALIDITY	European, considered the reference market. The production site is in Vobarno (BS)
REFERENCE YEAR	2022.
DATABASE USED:	Ecoinvent 3.9.1
SOFTWARE:	SimaPro 9.5.0.1
DECLARED UNITY	1 kg of product
ALLOCATION	mass basis (quantities produced)

It is specified that for the modeling of grid electricity, the Italian national residual mix for 2021 was used, as available in Ecoinvent 3.9.1, with contributions of 0.614 kg CO₂ eq per kWh used.

EXCLUSION RULES AND CUT-OFFS

Exclusions:

- Personnel movements;
- Ordinary and extraordinary maintenance;
- Manufacture of equipment used in production, buildings, or any other fixed asset;
- Research and development activities;
- Long-term emissions.

|

Cut-offs

- Transport of the finished product packaging.

DATA QUALITY

UPSTREAM phase:

- Site-specific data regarding weight, quantity, raw materials and waste;

CORE phase:

- Site-specific data;.

GENERIC DATA

Criteria for:

- Geographical equivalence;
- Technological equivalence;
- Equivalence with respect to system boundaries.

DISPOSAL SCENARIOS

According to the study conducted by the statistical office of the European Union (Eurostat) as reported by the European Parliament

DATI PROXY

Other ingredients: chemical compounds.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

- Module **C1** (Deconstruction / demolition) has been included and deconstruction impacts have been considered.
- Module **C2, C3** (recycling and incineration with energy recovery) and C4 (landfilling) consider the end of life scenarios of the products. The percentages to the given scenarios have been suggested by Eurostat as shown below:

EOL PHASE	MATERIAL	EOL TREATMENT	SOURCE
C1	Waste management - waste transportation	distance of 100 km	practical and statistical considerations
C2	Recycling	32.5%	Statistical Office of the European Union
	Energy recovery	42.6%	
C3	Waste management - Disposal	24.9%	

- Module **D** consists of loads and benefits beyond the system boundaries.

PRODUCTS DESCRIPTION

1. RECYCLED POLYPROPYLENE COMPOUND

Our recycled PP compounds are the result of continuous and ongoing research to maximise the quality and processability performance equal to that of virgin plastics.

Thanks to the know-how developed over the years, our recycling division is able to produce recycled PP compounds in line with customer specifications, without asking for any compromises.

We are currently present in several industries that use our products in moulding, extrusion and blow moulding processes. Thanks to a careful selection of our supply chain and a thorough analysis of the raw materials used in our processes, we are able to offer tailor-made solutions in different colors: black, natural and white.

Figure Compound PP range.



BLACK PP



WHITE PP



NATURAL PP



IVORY PP

Technical data

Art. 009699 PP D

Table Technical data sheet.

COLOR	Black
PACKAGING	Big Bags
FORM	Pellets 4-5 mm
USE	Injection moulding
SOURCE	Post consumer



Instructions for use and storage:

To avoid any residual humidity, it is advisable to pre-dry the material.

Processing temperature 190-220°C should be used as a guideline.

Keep away from atmospheric agents and away from humidity to avoid degradation of the product.

Parameters	Test Method	Test Result	Tolerance range in compliance UNI 10667 standard	Unit
Melt flow rate (MFR)	ISO 1133 (230° - 2.16 kg)	7	+/- 20%	g/10 min
Specific Density	ISO 1183 - 1	B	Type a) ≤ 0.92 Type b) > 0.92	g/cm ³
Melt filtration	N/A	150	Low contamination in accordance with UNI 10667	µm
Tensile Modulus	ISO 527	850	+/- 20%	MPa
Tensile stress at Yield	ISO 527	15	+/- 20%	MPa
Izod notched impact strenght (23°C)	ISO 180	30	+/- 10%	kJ/m ²
Melt temperature	DSC	167	± 3°C	(°C)
PP Presence	DSC	Positive	As agreed	%

In compliance with UNI 10667-3

IMPORTANT: The information and data contained herein are provided as general information which may be of potential use for the product concerned. They are based on our knowledge at the time of publication. Since the product can be used in different ways by our customers, Valsir S.p.A., shall in no way be held responsible for the results that may be obtained from the transformer using the product in their production processes either alone or in combination with other substances. The information contained herein shall in no event be regarded as a guarantee on the part of assumption of Valsir S.p.A.. The end user must always check the specific suitability of the product for the purposes it is intended for and its compatibility to the specific nature of their production processes. Valsir S.p.A. shall in no event be liable if the purchaser fails to fulfill its obligations due to the recommendations indicated herein.

Art. 009551 PP PRU GR8

Table Technical data sheet.

COLOR	Black
PACKAGING	Big Bags
FORM	Pellets 4-5 mm
USE	Injection moulding
SOURCE	Post consumer



Instructions for use and storage:

To avoid any residual humidity, it is advisable to pre-dry the material.

Processing temperature 190-220°C should be used as a guideline.

Keep away from atmospheric agents and away from humidity to avoid degradation of the product.

Parameters	Test Method	Test Result	Tolerance range in compliance UNI 10667 standard	Unit
Melt flow rate (MFR)	ISO 1133 (230° - 2.16 kg)	10	+/- 20%	g/10 min
Specific Density	ISO 1183 - 1	b	Type a) ≤ 0.92 Type b) > 0.92	g/cm ³
Melt filtration	N/A	150	Low contamination in accordance with UNI 10667	µm
Tensile Modulus	ISO 527	850	+/- 20%	MPa
Tensile stress at Yield	ISO 527	15	+/- 20%	MPa
Izod notched impact strength (23°C)	ISO 180	27	+/- 10%	kJ/m ²
Melt temperature	DSC	168	± 3°C	°C
PP Presence	DSC	Positive	As agreed	%

In compliance with UNI 10667-3

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Art. 009554 PP PRU GR3

Table Technical data sheet.

COLOR	Black
PACKAGING	Big Bags
FORM	Pellets 4-5 mm
USE	Injection moulding
SOURCE	Post consumer



Instructions for use and storage:

To avoid any residual humidity, it is advisable to pre-dry the material.

Processing temperature 190-220°C should be used as a guideline.

Keep away from atmospheric agents and away from humidity to avoid degradation of the product.

Parameters	Test Method	Test Result	Tolerance range in compliance UNI 10667 standard	Unit
Melt flow rate (MFR)	ISO 1133 (230° - 2.16 kg)	4	+/- 20%	g/10 min
Specific Density	ISO 1183 - 1	b	Type a) ≤ 0.92 Type b) > 0.92	g/cm ³
Melt filtration	N/A	150	Low contamination in accordance with UNI 10667	µm
Tensile Modulus	ISO 527	950	+/- 20%	MPa
Tensile stress at Yield	ISO 527	22	+/- 20%	MPa
Izod notched impact strength (23°C)	ISO 180	7	+/- 10%	kJ/m ²
Melt temperature	DSC	170	± 3°C	°C
PP Presence	DSC	Positive	As agreed	%

In compliance with UNI 10667-3

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Art. 009555 PP B

Table Technical data sheet.

COLOR	Neutral
PACKAGING	Big Bags
FORM	Pellets 4-5 mm
USE	Injection moulding
SOURCE	Pre consumer



Instructions for use and storage:

To avoid any residual humidity, it is advisable to pre-dry the material.

Processing temperature 200-250°C should be used as a guideline.

Keep away from atmospheric agents and away from humidity to avoid degradation of the product.

Parameters	Test Method	Test Result	Tolerance range in compliance UNI 10667 standard	Unit
Melt flow rate (MFR)	ISO 1133 (230° - 2.16 kg)	6	+/- 20%	g/10 min
Specific Density	ISO 1183 - 1	b	Type a) ≤ 0.92 Type b) > 0.92	g/cm ³
Melt filtration	N/A	150	Low contamination in accordance with UNI 10667	µm
Tensile Modulus	ISO 527	950	+/- 20%	MPa
Tensile stress at Yield	ISO 527	25	+/- 20%	MPa
Izod notched impact strength (23°C)	ISO 180	2	+/- 10%	kJ/m ²
Melt temperature	DSC	167	± 3°C	°C
PP Presence	DSC	Positive	As agreed	%

In compliance with UNI 10667-3

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Art. 009680 PP CT 20

Table Technical data sheet.

COLOR	Black
PACKAGING	Big Bags
FORM	Pellets 4-5 mm
USE	Injection moulding
SOURCE	Post consumer



Instructions for use and storage:

To avoid any residual humidity, it is advisable to pre-dry the material.

Processing temperature 190-220°C should be used as a guideline.

Keep away from atmospheric agents and away from humidity to avoid degradation of the product.

Parameters	Test Method	Test Result	Tolerance range in compliance UNI 10667 standard	Unit
Melt flow rate (MFR)	ISO 1133 (230° - 2.16 kg)	8	+/- 20%	g/10 min
Specific Density	ISO 1183 - 1	b	Type a) ≤ 0.92 Type b) > 0.92	g/cm ³
Melt filtration	N/A	150	Low contamination in accordance with UNI 10667	µm
Tensile Modulus	ISO 527	1100	+/- 20%	MPa
Tensile stress at Yield	ISO 527	15	+/- 20%	MPa
Izod notched impact strength (23°C)	ISO 180	18	+/- 10%	kJ/m ²
Ash Content	ISO 3451	20	+/- 10%	%
Melt temperature	DSC	165	± 3°C	°C
PP Presence	DSC	Positive	As agreed	%

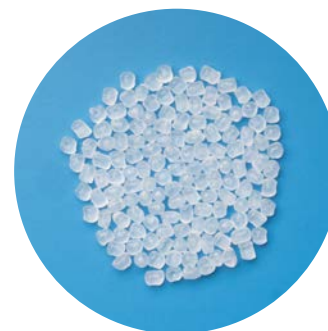
In compliance with UNI 10667-3

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Art. 009696 PP N

Table Technical data sheet.

COLOR	Neutral
PACKAGING	Big Bags
FORM	Pellets 4-5 mm
USE	Injection moulding
SOURCE	Pre consumer



Instructions for use and storage:

To avoid any residual humidity, it is advisable to pre-dry the material.

Processing temperature 200-250°C should be used as a guideline.

Keep away from atmospheric agents and away from humidity to avoid degradation of the product.

Parameters	Test Method	Test Result	Tolerance range in compliance UNI 10667 standard	Unit
Melt flow rate (MFR)	ISO 1133 (230° - 2.16 kg)	8	+/- 20%	g/10 min
Specific Density	ISO 1183 - 1	a	Type a) ≤ 0.92 Type b) > 0.92	g/cm ³
Melt filtration	N/A	80	Low contamination in accordance with UNI 10667	µm
Tensile Modulus	ISO 527	800	+/- 20%	MPa
Tensile stress at Yield	ISO 527	24	+/- 20%	MPa
Izod notched impact strength (23°C)	ISO 180	6	+/- 10%	kJ/m ²
Melt temperature	DSC	165	± 3°C	°C
PP Presence	DSC	Positive	As agreed	%

In compliance with UNI 10667-3

IMPORTANT: The information and data contained herein are provided as general information which may be of potential use for the product concerned. They are based on our knowledge at the time of publication. Since the product can be used in different ways by our customers, Valsir S.p.A., shall in no way be held responsible for the results that may be obtained from the transformer using the product in their production processes either alone or in combination with other substances. The information contained herein shall in no event be regarded as a guarantee on the part of assumption of Valsir S.p.A.. The end user must always check the specific suitability of the product for the purposes it is intended for and its compatibility to the specific nature of their production processes. Valsir S.p.A. shall in no event be liable if the purchaser fails to fulfill its obligations due to the recommendations indicated herein.

2. DESCRIPTION OF THE PRODUCTION PROCESSES OF RECYCLING PP COMPOUND

Recycled PP compounds are produced according to the following production process:

- **In case of rigid plastic waste:**

1. Selection and accreditation of suppliers and materials.
2. Input of raw materials (plastic waste to be treated entirely on our plants or semi-finished products requiring part of our processing).
3. Manual sorting of incoming flows if necessary.
4. Primary shredding of incoming streams if necessary (T*).
5. Secondary grinding, washing, contaminant separation and drying (M+L(1)*).
6. Analysis and characterization of each batch of EOW semi-finished product produced: chemical-mechanical characterization of the batches produced and their selection in the recipe according to the desired final composition.
7. Compounding, through the extrusion process, of the mix of recycled regrind materials together with the necessary additives to obtain a stable and homogeneous compound.
8. Chemical and mechanical analysis and of each silo of the recycled compound produced and verification of the full compliance of the results obtained with the specific customer requests.
9. Packaging of the recycled compound in big bags on wooden pallet and protected by a recycled LDPE black anti UV cover. Each big bag is identified with labels and ensured to the pallet with some LLDPE stretch liner. The labels contains all the product traceability information.
10. Shipment to the customer.

* See the figure on page 18 relating to the workflow.

Figure Rigid plastic material.



• **In case of flexible plastic waste:**

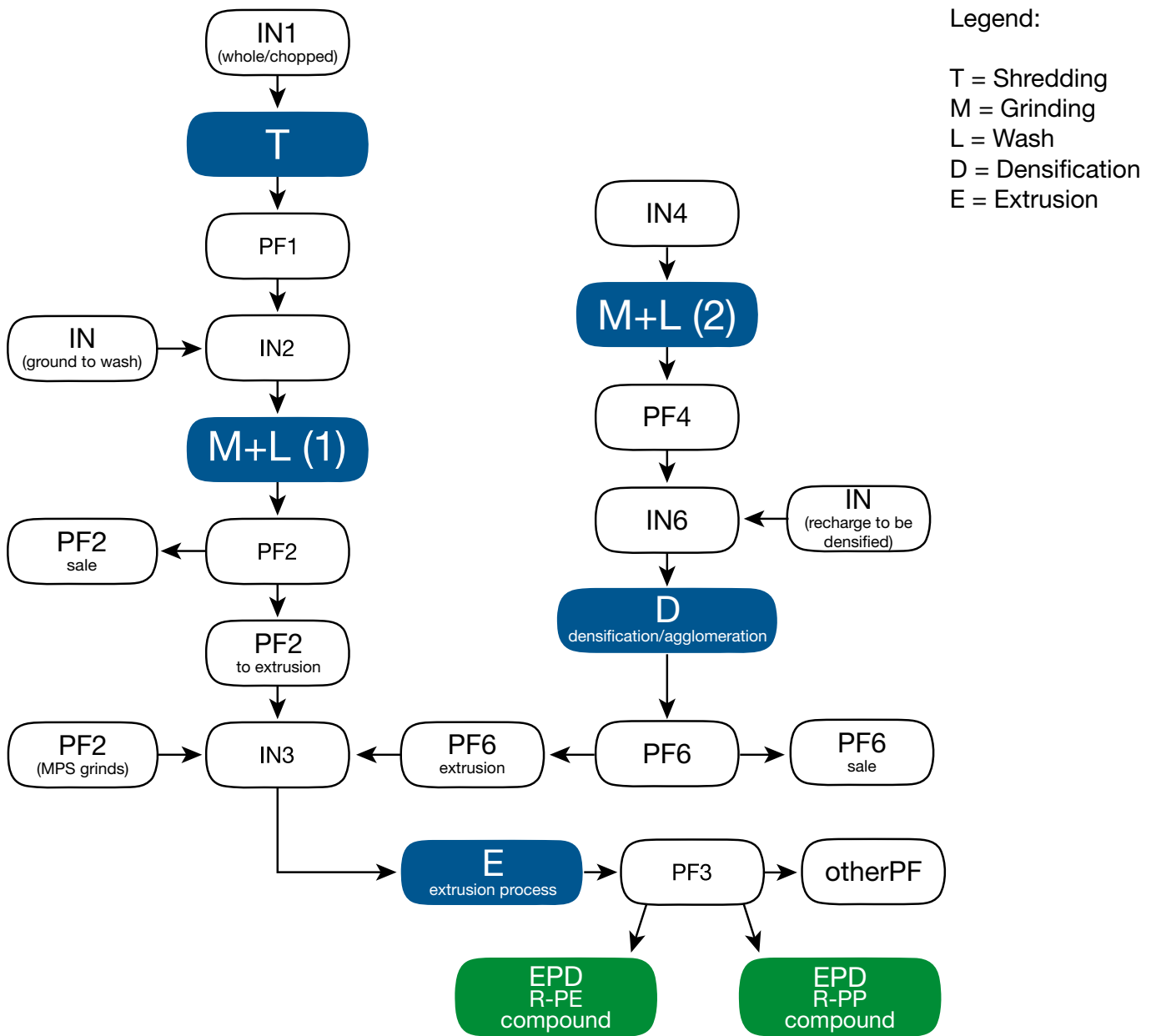
1. Selection and accreditation of suppliers and materials.
2. Input of raw materials (plastic waste to be treated entirely on our plants or semi-finished products requiring part of our processing).
3. Manual sorting of incoming flows if necessary.
4. Primary shredding of incoming streams if necessary and secondary grinding, washing, contaminant separation and drying (M+L(2)*).
5. Analysis and characterization of each batch of EOW semi-finished product produced: chemical-mechanical characterization of the batches produced and their selection in the recipe according to the desired final composition.
6. Densification process (material agglomeration in order to feed the compounding extruders).
7. Compounding, through the extrusion process, of the mix of recycled regrind materials together with the necessary additives to obtain a stable and homogeneous compound.
8. Chemical and mechanical analysis and of each silo of the recycled compound produced and verification of the full compliance of the results obtained with the specific customer requests.
9. Packaging of the recycled compound in big bags on wooden pallet and protected by a recycled LDPE black anti UV cover. Each big bag is identified with labels and ensured to the pallet with some LLDPE stretch liner. The labels contain all the product traceability information.
10. Shipment to the customer.

* See the figure on page 18 relating to the workflow.

Figure Flexible plastic material.



Figure Workflow Recycling division.



3. PRODUCT COMPOSITION

Product PP	% by weight
Recycled polypropylene	93-99
Masterbatch	<5
Additives	<0.5
Virgin PP	0-6

Packaging	% by weight
Wooden packaging (pallet)	<2
Plastic packaging (big bag, recycled LDPE plastic cover, labels and stretch)	<0.2

• **Declared Unit**



The Declared Unit is defined as 1 kg of recycled PP compound.

PP PRU GR8 - LCA RESULTS

The following tables show the results of LCA (Life Cycle Assessment) recycled PP compounds.

Art. 009551 PP PRU GR8

Table Environmental impact per Declared Unit specific - main indicators.




Parameter - Unit										
	A1	A2	A3	A1-A3	C1	C2	C3	C4	C1-C4	D
GWP total [kg CO ₂ -eq.]	4.15E-01	9.94E-02	5.33E-02	5.68E-01	0.00E+00	1.53E-02	9.97E-01	2.37E-02	1.04E+00	-6.60E-01
GWP fossil [kg CO ₂ -eq.]	4.09E-01	9.94E-02	2.83E-02	5.37E-01	0.00E+00	1.53E-02	9.96E-01	2.37E-02	1.04E+00	-6.56E-01
GWP biogenic [kg CO ₂ -eq.]	6.25E-03	2.98E-05	2.50E-02	3.13E-02	0.00E+00	4.61E-06	1.47E-04	1.80E-05	1.69E-04	-3.57E-03
GWP luluc [kg CO ₂ -eq.]	4.85E-05	1.93E-06	4.02E-05	9.07E-05	0.00E+00	2.99E-07	1.77E-05	8.80E-07	1.89E-05	-1.82E-04
ODP [kg CFC-11-eq.]	9.40E-09	2.13E-09	1.45E-09	1.30E-08	0.00E+00	3.30E-10	5.83E-09	1.95E-11	6.18E-09	-3.03E-09
AP [mole of H ⁺ -eq.]	1.11E-03	2.49E-04	2.28E-04	1.58E-03	0.00E+00	3.98E-05	2.35E-04	1.36E-05	2.89E-04	-2.36E-03
EP - freshwater [kg P eq.]	1.20E-05	7.74E-08	1.60E-06	1.37E-05	0.00E+00	1.20E-08	5.20E-07	2.30E-08	5.55E-07	-1.05E-05
EP - marine [kg N eq.]	2.17E-04	9.64E-05	1.21E-04	4.34E-04	0.00E+00	1.56E-05	1.04E-04	3.50E-05	1.55E-04	-4.22E-04
EP - terrestrial [mole of N eq.]	2.42E-03	1.02E-03	6.47E-04	4.09E-03	0.00E+00	1.65E-04	1.12E-03	5.91E-05	1.35E-03	-4.62E-03
POCP [kg NMVOC eq.]	1.07E-03	4.03E-04	2.43E-04	1.72E-03	0.00E+00	6.42E-05	2.89E-04	2.35E-05	3.76E-04	-2.21E-03
ADPF ⁽¹⁾ [MJ]	6.02E+00	1.31E+00	4.61E-01	7.79E+00	0.00E+00	2.03E-01	1.59E-01	1.99E-02	3.81E-01	-2.33E+01
ADPE ⁽¹⁾ [kg Sb eq.]	2.44E-08	3.39E-09	2.24E-07	2.52E-07	0.00E+00	5.25E-10	4.47E-09	5.75E-11	5.05E-09	-7.83E-08
WDP ⁽¹⁾ [m ³ world eq.]	1.03E-01	1.20E-03	-7.17E-04	1.03E-01	0.00E+00	1.86E-04	1.02E-02	8.58E-05	1.04E-02	-2.68E-01

(1) The results of this indicator should be used with caution given their high uncertainty or limited experience with the indicator itself.

- GWP** Global warming potential
- ODP** Depletion potential of the stratospheric ozone layer
- AP** Acidification potential of land and water
- EP** Eutrophication potential
- POCP** Formation potential of tropospheric ozone photochemical oxidants
- ADPE** Abiotic depletion potential for non fossil resources
- ADPF** Abiotic depletion potential for fossil resources
- WDP** Water (user) deprivation potential, deprivation-weighted water consumption

LCA RESULTS

Table Environmental impact per Declared Unit specific - additional indicators.

Parameter - Unit										
	A1	A2	A3	A1-A3	C1	C2	C3	C4	C1-C4	D
PM [disease inc.]	5.99E-09	5.63E-09	3.06E-09	1.47E-08	0.00E+00	1.02E-09	1.52E-09	3.16E-10	2.86E-09	-2.37E-08
IRP ⁽¹⁾ [kBq U235 eq]	1.22E-02	2.08E-04	6.05E-04	1.30E-02	0.00E+00	3.23E-05	4.88E-04	2.36E-05	5.44E-04	-8.33E-03
ETP-fw ⁽²⁾ [CTUe]	1.04E+00	5.78E-01	3.05E-01	1.92E+00	0.00E+00	9.01E-02	2.48E+00	1.02E-01	2.67E+00	-1.01E+00
HTP-nc ⁽²⁾ [CTUh]	1.37E-09	6.02E-10	9.63E-09	1.16E-08	0.00E+00	1.08E-10	1.26E-09	5.33E-11	1.42E-09	-1.66E-09
HTPc ⁽²⁾ [CTUh]	6.26E-11	6.44E-12	1.56E-10	2.25E-10	0.00E+00	1.06E-12	1.83E-10	3.47E-13	1.84E-10	-7.36E-11
SQP ⁽²⁾ [Pt]	4.34E-01	2.49E-03	1.80E+00	2.23E+00	0.00E+00	3.86E-04	1.74E-02	4.38E-02	6.16E-02	-2.48E-01




(1) This impact category deals primarily with the possible impact on human health of low-dose ionizing radiation from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents, occupational exposure or due to the disposal of radioactive waste in underground landfills. Potential ionizing radiation from soil, radon and some building materials are also not assessed by this indicator.

(2) The results of this indicator should be used with caution given their high uncertainty or limited experience with the indicator itself.

- PM** Particulate matter
- IRP** Ionising radiation
- ETP-fw** Ecotoxicity freshwater
- HTP-nc** Human toxicity non cancer
- HTPc** Human toxicity cancer
- SQP** Land use

LCA RESULTS

Table Resource use per Declared Unit.




Parameter - Unit										
	A1	A2	A3	A1-A3	C1	C2	C3	C4	C1-C4	D
PERE [MJ]	2.65E-01	3.44E-03	6.77E-02	3.36E-01	0.00E+00	5.34E-04	1.50E-02	6.91E-04	1.62E-02	-2.72E-01
PERM [MJ]	0.00E+00	0.00E+00	2.71E-01	2.71E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT [MJ]	2.65E-01	3.44E-03	3.39E-01	6.08E-01	0.00E+00	5.34E-04	1.50E-02	6.91E-04	1.62E-02	-2.72E-01
PENRE [MJ]	-4.00E+01	1.31E+00	3.17E-01	-3.84E+01	0.00E+00	2.03E-01	1.59E-01	1.99E-02	3.81E-01	-2.33E+01
PENRM [MJ]	4.60E+01	0.00E+00	1.44E-01	4.61E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT [MJ]	6.02E+00	1.31E+00	4.61E-01	7.79E+00	0.00E+00	2.03E-01	1.59E-01	1.99E-02	3.81E-01	-2.33E+01
SM [kg]	9.94E-01	0.00E+00	0.00E+00	9.94E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF ⁽¹⁾ [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF ⁽¹⁾ [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW [m³]	3.01E-03	5.48E-05	0.00E+00	3.06E-03	0.00E+00	8.49E-06	4.32E-04	3.51E-06	4.44E-04	-3.76E-03

(1) Reference to only foreground system.

- PERE** Use of renewable primary energy as energy carrier
- PERM** Use of renewable primary energy as raw materials
- PERT** Total use of renewable primary energy resources
- PENRE** Use of non-renewable primary energy as energy carrier
- PENRM** Use of non-renewable primary energy as raw materials
- PENRT** Total use of non-renewable primary energy resources
- SM** Use of secondary material
- RSF** Use of renewable secondary fuels
- NRSF** Use of non-renewable secondary fuels
- FW** Use of net fresh water

LCA RESULTS

Table Environmental impact for waste production and output streams.

Parameter - Unit										
	A1	A2	A3	A1-A3	C1	C2	C3	C4	C1-C4	D
HWD [Kg]	1.94E-05	8.64E-06	1.21E-06	2.92E-05	0.00E+00	1.34E-06	8.44E-07	1.03E-07	2.29E-06	-4.59E-06
NHWD [Kg]	8.43E-03	6.39E-05	6.32E-02	7.17E-02	0.00E+00	9.90E-06	6.72E-03	2.49E-01	2.56E-01	-1.32E-02
RWD [Kg]	8.84E-06	1.12E-07	4.21E-07	9.37E-06	0.00E+00	1.74E-08	3.42E-07	1.48E-08	3.74E-07	-6.23E-06
CRU [Kg]	0.00E+00	0.00E+00	3.12E-02	3.12E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR [Kg]	0.00E+00	0.00E+00	1.23E-03	1.23E-03	0.00E+00	0.00E+00	3.25E-01	0.00E+00	3.25E-01	0.00E+00
MER [Kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.26E-01	0.00E+00	4.26E-01	0.00E+00
EEE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

HWD Hazardous waste disposed

NHWD Non-hazardous waste disposed

RWD Radioactive waste disposed

CRU Components for re-use

MFR Materials for recycling

MER Materials for energy recovery

EEE Exported electrical energy

EET Exported thermal energy

• Biogenic carbon




The content of biogenic carbon in the product and in the packaging of the finished product was quantified according to the EN 16449:2014 standard.

Biogenic carbon content	PP compound [kg C]
In the product	0.00
In the packaging of the finished product	0.0068

PP PRU GR3 - LCA RESULTS

Art. 009554 PP PRU GR3

Table Environmental impact per Declared Unit specific - main indicators.




Parameter - Unit										
	A1	A2	A3	A1-A3	C1	C2	C3	C4	C1-C4	D
GWP total [kg CO ₂ -eq.]	4.41E-01	1.02E-01	5.33E-02	5.96E-01	0.00E+00	1.53E-02	9.97E-01	2.37E-02	1.04E+00	-6.60E-01
GWP fossil [kg CO ₂ -eq.]	4.35E-01	1.02E-01	2.83E-02	5.65E-01	0.00E+00	1.53E-02	9.96E-01	2.37E-02	1.04E+00	-6.56E-01
GWP biogenic [kg CO ₂ -eq.]	6.14E-03	3.04E-05	2.50E-02	3.12E-02	0.00E+00	4.61E-06	1.47E-04	1.80E-05	1.69E-04	-3.57E-03
GWP luluc [kg CO ₂ -eq.]	6.06E-05	1.97E-06	4.02E-05	1.03E-04	0.00E+00	2.99E-07	1.77E-05	8.80E-07	1.89E-05	-1.82E-04
ODP [kg CFC-11-eq.]	9.44E-09	2.18E-09	1.45E-09	1.31E-08	0.00E+00	3.30E-10	5.83E-09	1.95E-11	6.18E-09	-3.03E-09
AP [mole of H ⁺ -eq.]	1.15E-03	2.55E-04	2.28E-04	1.63E-03	0.00E+00	3.98E-05	2.35E-04	1.36E-05	2.89E-04	-2.36E-03
EP - freshwater [kg P eq.]	1.15E-05	7.91E-08	1.60E-06	1.32E-05	0.00E+00	1.20E-08	5.20E-07	2.30E-08	5.55E-07	-1.05E-05
EP - marine [kg N eq.]	2.39E-04	9.86E-05	1.21E-04	4.58E-04	0.00E+00	1.56E-05	1.04E-04	3.50E-05	1.55E-04	-4.22E-04
EP - terrestrial [mole of N eq.]	2.65E-03	1.04E-03	6.47E-04	4.34E-03	0.00E+00	1.65E-04	1.12E-03	5.91E-05	1.35E-03	-4.62E-03
POCP [kg NMVOC eq.]	1.14E-03	4.12E-04	2.43E-04	1.80E-03	0.00E+00	6.42E-05	2.89E-04	2.35E-05	3.76E-04	-2.21E-03
ADPF ⁽¹⁾ [MJ]	6.05E+00	1.34E+00	4.61E-01	7.85E+00	0.00E+00	2.03E-01	1.59E-01	1.99E-02	3.81E-01	-2.33E+01
ADPE ⁽¹⁾ [kg Sb eq.]	4.11E-08	3.46E-09	2.24E-07	2.68E-07	0.00E+00	5.25E-10	4.47E-09	5.75E-11	5.05E-09	-7.83E-08
WDP ⁽¹⁾ [m ³ world eq.]	1.02E-01	1.23E-03	-7.17E-04	1.02E-01	0.00E+00	1.86E-04	1.02E-02	8.58E-05	1.04E-02	-2.68E-01

(1) The results of this indicator should be used with caution given their high uncertainty or limited experience with the indicator itself.

- GWP** Global warming potential
- ODP** Depletion potential of the stratospheric ozone layer
- AP** Acidification potential of land and water
- EP** Eutrophication potential
- POCP** Formation potential of tropospheric ozone photochemical oxidants
- ADPE** Abiotic depletion potential for non fossil resources
- ADPF** Abiotic depletion potential for fossil resources
- WDP** Water (user) deprivation potential, deprivation-weighted water consumption

LCA RESULTS

Table Environmental impact per Declared Unit specific - additional indicators.

Parameter - Unit										
	A1	A2	A3	A1-A3	C1	C2	C3	C4	C1-C4	D
PM [disease inc.]	7.87E-09	5.76E-09	3.06E-09	1.67E-08	0.00E+00	1.02E-09	1.52E-09	3.16E-10	2.86E-09	-2.37E-08
IRP ⁽¹⁾ [kBq U235 eq]	1.21E-02	2.13E-04	6.05E-04	1.30E-02	0.00E+00	3.23E-05	4.88E-04	2.36E-05	5.44E-04	-8.33E-03
ETP-fw ⁽²⁾ [CTUe]	1.11E+00	5.91E-01	3.05E-01	2.00E+00	0.00E+00	9.01E-02	2.48E+00	1.02E-01	2.67E+00	-1.01E+00
HTP-nc ⁽²⁾ [CTUh]	1.58E-09	6.16E-10	9.63E-09	1.18E-08	0.00E+00	1.08E-10	1.26E-09	5.33E-11	1.42E-09	-1.66E-09
HTPc ⁽²⁾ [CTUh]	9.38E-11	6.59E-12	1.56E-10	2.56E-10	0.00E+00	1.06E-12	1.83E-10	3.47E-13	1.84E-10	-7.36E-11
SQP ⁽²⁾ [Pt]	4.31E-01	2.54E-03	1.80E+00	2.23E+00	0.00E+00	3.86E-04	1.74E-02	4.38E-02	6.16E-02	-2.48E-01




(1) This impact category deals primarily with the possible impact on human health of low-dose ionizing radiation from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents, occupational exposure or due to the disposal of radioactive waste in underground landfills. Potential ionizing radiation from soil, radon and some building materials are also not assessed by this indicator.

(2) The results of this indicator should be used with caution given their high uncertainty or limited experience with the indicator itself.

- PM** Particulate matter
- IRP** Ionising radiation
- ETP-fw** Ecotoxicity freshwater
- HTP-nc** Human toxicity non cancer
- HTPc** Human toxicity cancer
- SQP** Land use

LCA RESULTS

Table Resource use per Declared Unit.




Parameter - Unit										
	A1	A2	A3	A1-A3	C1	C2	C3	C4	C1-C4	D
PERE [MJ]	2.65E-01	3.52E-03	6.77E-02	3.37E-01	0.00E+00	5.34E-04	1.50E-02	6.91E-04	1.62E-02	-2.72E-01
PERM [MJ]	0.00E+00	0.00E+00	2.71E-01	2.71E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT [MJ]	2.65E-01	3.52E-03	3.39E-01	6.08E-01	0.00E+00	5.34E-04	1.50E-02	6.91E-04	1.62E-02	-2.72E-01
PENRE [MJ]	-3.99E+01	1.34E+00	3.17E-01	-3.83E+01	0.00E+00	2.03E-01	1.59E-01	1.99E-02	3.81E-01	-2.33E+01
PENRM [MJ]	4.60E+01	0.00E+00	1.44E-01	4.61E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT [MJ]	6.05E+00	1.34E+00	4.61E-01	7.85E+00	0.00E+00	2.03E-01	1.59E-01	1.99E-02	3.81E-01	-2.33E+01
SM [kg]	9.95E-01	0.00E+00	0.00E+00	9.95E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF ⁽¹⁾ [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF ⁽¹⁾ [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW [m³]	2.99E-03	5.60E-05	0.00E+00	3.05E-03	0.00E+00	8.49E-06	4.32E-04	3.51E-06	4.44E-04	-3.76E-03

(1) Reference to only foreground system.

- PERE** Use of renewable primary energy as energy carrier
- PERM** Use of renewable primary energy as raw materials
- PERT** Total use of renewable primary energy resources
- PENRE** Use of non-renewable primary energy as energy carrier
- PENRM** Use of non-renewable primary energy as raw materials
- PENRT** Total use of non-renewable primary energy resources
- SM** Use of secondary material
- RSF** Use of renewable secondary fuels
- NRSF** Use of non-renewable secondary fuels
- FW** Use of net fresh water

LCA RESULTS

Table Environmental impact for waste production and output streams.

Parameter - Unit										
	A1	A2	A3	A1-A3	C1	C2	C3	C4	C1-C4	D
HWD [Kg]	2.02E-05	8.84E-06	1.21E-06	3.02E-05	0.00E+00	1.34E-06	8.44E-07	1.03E-07	2.29E-06	-4.59E-06
NHWD [Kg]	1.41E-02	6.53E-05	6.32E-02	7.74E-02	0.00E+00	9.90E-06	6.72E-03	2.49E-01	2.56E-01	-1.32E-02
RWD [Kg]	8.80E-06	1.15E-07	4.21E-07	9.34E-06	0.00E+00	1.74E-08	3.42E-07	1.48E-08	3.74E-07	-6.23E-06
CRU [Kg]	0.00E+00	0.00E+00	3.12E-02	3.12E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR [Kg]	0.00E+00	0.00E+00	1.21E-03	1.21E-03	0.00E+00	0.00E+00	3.25E-01	0.00E+00	3.25E-01	0.00E+00
MER [Kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.26E-01	0.00E+00	4.26E-01	0.00E+00
EEE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

- HWD** Hazardous waste disposed
- NHWD** Non-hazardous waste disposed
- RWD** Radioactive waste disposed
- CRU** Components for re-use
- MFR** Materials for recycling
- MER** Materials for energy recovery
- EEE** Exported electrical energy
- EET** Exported thermal energy

• Biogenic carbon




The content of biogenic carbon in the product and in the packaging of the finished product was quantified according to the EN 16449:2014 standard.

Biogenic carbon content	PP compound [kg C]
In the product	0.00
In the packaging of the finished product	0.0068

PP B - LCA RESULTS

Art. 009555 PP B

Table Environmental impact per Declared Unit specific - main indicators.




Parameter - Unit										
	A1	A2	A3	A1-A3	C1	C2	C3	C4	C1-C4	D
GWP total [kg CO ₂ -eq.]	6.73E-01	1.07E-02	5.33E-02	7.37E-01	0.00E+00	1.53E-02	9.97E-01	2.37E-02	1.04E+00	-6.60E-01
GWP fossil [kg CO ₂ -eq.]	6.63E-01	1.07E-02	2.83E-02	7.02E-01	0.00E+00	1.53E-02	9.96E-01	2.37E-02	1.04E+00	-6.56E-01
GWP biogenic [kg CO ₂ -eq.]	9.38E-03	3.19E-06	2.50E-02	3.44E-02	0.00E+00	4.61E-06	1.47E-04	1.80E-05	1.69E-04	-3.57E-03
GWP luluc [kg CO ₂ -eq.]	9.30E-05	2.07E-07	4.02E-05	1.33E-04	0.00E+00	2.99E-07	1.77E-05	8.80E-07	1.89E-05	-1.82E-04
ODP [kg CFC-11-eq.]	1.49E-08	2.28E-10	1.45E-09	1.66E-08	0.00E+00	3.30E-10	5.83E-09	1.95E-11	6.18E-09	-3.03E-09
AP [mole of H ⁺ -eq.]	2.11E-03	2.67E-05	2.28E-04	2.36E-03	0.00E+00	3.98E-05	2.35E-04	1.36E-05	2.89E-04	-2.36E-03
EP - freshwater [kg P eq.]	1.77E-05	8.30E-09	1.60E-06	1.93E-05	0.00E+00	1.20E-08	5.20E-07	2.30E-08	5.55E-07	-1.05E-05
EP - marine [kg N eq.]	3.82E-04	1.03E-05	1.21E-04	5.13E-04	0.00E+00	1.56E-05	1.04E-04	3.50E-05	1.55E-04	-4.22E-04
EP - terrestrial [mole of N eq.]	4.25E-03	1.09E-04	6.47E-04	5.01E-03	0.00E+00	1.65E-04	1.12E-03	5.91E-05	1.35E-03	-4.62E-03
POCP [kg NMVOC eq.]	1.89E-03	4.32E-05	2.43E-04	2.17E-03	0.00E+00	6.42E-05	2.89E-04	2.35E-05	3.76E-04	-2.21E-03
ADPF ⁽¹⁾ [MJ]	1.19E+01	1.40E-01	4.61E-01	1.25E+01	0.00E+00	2.03E-01	1.59E-01	1.99E-02	3.81E-01	-2.33E+01
ADPE ⁽¹⁾ [kg Sb eq.]	1.00E-07	3.63E-10	2.24E-07	3.24E-07	0.00E+00	5.25E-10	4.47E-09	5.75E-11	5.05E-09	-7.83E-08
WDP ⁽¹⁾ [m ³ world eq.]	1.77E-01	1.29E-04	-7.17E-04	1.77E-01	0.00E+00	1.86E-04	1.02E-02	8.58E-05	1.04E-02	-2.68E-01

(1) The results of this indicator should be used with caution given their high uncertainty or limited experience with the indicator itself.

- GWP** Global warming potential
- ODP** Depletion potential of the stratospheric ozone layer
- AP** Acidification potential of land and water
- EP** Eutrophication potential
- POCP** Formation potential of tropospheric ozone photochemical oxidants
- ADPE** Abiotic depletion potential for non fossil resources
- ADPF** Abiotic depletion potential for fossil resources
- WDP** Water (user) deprivation potential, deprivation-weighted water consumption

LCA RESULTS

Table Environmental impact per Declared Unit specific - additional indicators.

Parameter - Unit										
	A1	A2	A3	A1-A3	C1	C2	C3	C4	C1-C4	D
PM [disease inc.]	1.36E-08	6.04E-10	3.06E-09	1.73E-08	0.00E+00	1.02E-09	1.52E-09	3.16E-10	2.86E-09	-2.37E-08
IRP ⁽¹⁾ [kBq U235 eq]	1.81E-02	2.23E-05	6.05E-04	1.87E-02	0.00E+00	3.23E-05	4.88E-04	2.36E-05	5.44E-04	-8.33E-03
ETP-fw ⁽²⁾ [CTUe]	1.82E+00	6.20E-02	3.05E-01	2.18E+00	0.00E+00	9.01E-02	2.48E+00	1.02E-01	2.67E+00	-1.01E+00
HTP-nc ⁽²⁾ [CTUh]	2.27E-09	6.46E-11	9.63E-09	1.20E-08	0.00E+00	1.08E-10	1.26E-09	5.33E-11	1.42E-09	-1.66E-09
HTPc ⁽²⁾ [CTUh]	6.27E-11	6.91E-13	1.56E-10	2.19E-10	0.00E+00	1.06E-12	1.83E-10	3.47E-13	1.84E-10	-7.36E-11
SQP ⁽²⁾ [Pt]	1.21E+00	2.67E-04	1.80E+00	3.01E+00	0.00E+00	3.86E-04	1.74E-02	4.38E-02	6.16E-02	-2.48E-01




(1) This impact category deals primarily with the possible impact on human health of low-dose ionizing radiation from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents, occupational exposure or due to the disposal of radioactive waste in underground landfills. Potential ionizing radiation from soil, radon and some building materials are also not assessed by this indicator.

(2) The results of this indicator should be used with caution given their high uncertainty or limited experience with the indicator itself.

- PM** Particulate matter
- IRP** Ionising radiation
- ETP-fw** Ecotoxicity freshwater
- HTP-nc** Human toxicity non cancer
- HTPc** Human toxicity cancer
- SQP** Land use

LCA RESULTS

Table Resource use per Declared Unit.




Parameter - Unit										
	A1	A2	A3	A1-A3	C1	C2	C3	C4	C1-C4	D
PERE [MJ]	4.05E-01	3.69E-04	6.77E-02	4.73E-01	0.00E+00	5.34E-04	1.50E-02	6.91E-04	1.62E-02	-2.72E-01
PERM [MJ]	0.00E+00	0.00E+00	2.71E-01	2.71E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT [MJ]	4.05E-01	3.69E-04	3.39E-01	7.44E-01	0.00E+00	5.34E-04	1.50E-02	6.91E-04	1.62E-02	-2.72E-01
PENRE [MJ]	-3.41E+01	1.40E-01	3.17E-01	-3.37E+01	0.00E+00	2.03E-01	1.59E-01	1.99E-02	3.81E-01	-2.33E+01
PENRM [MJ]	4.60E+01	0.00E+00	1.44E-01	4.61E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT [MJ]	1.19E+01	1.40E-01	4.61E-01	1.25E+01	0.00E+00	2.03E-01	1.59E-01	1.99E-02	3.81E-01	-2.33E+01
SM [kg]	9.30E-01	0.00E+00	0.00E+00	9.30E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF ⁽¹⁾ [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF ⁽¹⁾ [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW [m³]	4.83E-03	5.87E-06	0.00E+00	4.84E-03	0.00E+00	8.49E-06	4.32E-04	3.51E-06	4.44E-04	-3.76E-03

(1) Reference to only foreground system.

- PERE** Use of renewable primary energy as energy carrier
- PERM** Use of renewable primary energy as raw materials
- PERT** Total use of renewable primary energy resources
- PENRE** Use of non-renewable primary energy as energy carrier
- PENRM** Use of non-renewable primary energy as raw materials
- PENRT** Total use of non-renewable primary energy resources
- SM** Use of secondary material
- RSF** Use of renewable secondary fuels
- NRSF** Use of non-renewable secondary fuels
- FW** Use of net fresh water

LCA RESULTS

Table Environmental impact for waste production and output streams.

Parameter - Unit										
	A1	A2	A3	A1-A3	C1	C2	C3	C4	C1-C4	D
HWD [Kg]	3.02E-05	9.27E-07	1.21E-06	3.23E-05	0.00E+00	1.34E-06	8.44E-07	1.03E-07	2.29E-06	-4.59E-06
NHWD [Kg]	2.71E-02	6.85E-06	6.32E-02	9.03E-02	0.00E+00	9.90E-06	6.72E-03	2.49E-01	2.56E-01	-1.32E-02
RWD [Kg]	1.30E-05	1.20E-08	4.21E-07	1.35E-05	0.00E+00	1.74E-08	3.42E-07	1.48E-08	3.74E-07	-6.23E-06
CRU [Kg]	0.00E+00	0.00E+00	3.12E-02	3.12E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR [Kg]	0.00E+00	0.00E+00	1.73E-03	1.73E-03	0.00E+00	0.00E+00	3.25E+01	0.00E+00	3.25E+01	0.00E+00
MER [Kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.26E+01	0.00E+00	4.26E+01	0.00E+00
EEE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

- HWD** Hazardous waste disposed
- NHWD** Non-hazardous waste disposed
- RWD** Radioactive waste disposed
- CRU** Components for re-use
- MFR** Materials for recycling
- MER** Materials for energy recovery
- EEE** Exported electrical energy
- EET** Exported thermal energy

• Biogenic carbon




The content of biogenic carbon in the product and in the packaging of the finished product was quantified according to the EN 16449:2014 standard.

Biogenic carbon content	PP compound [kg C]
In the product	0.00
In the packaging of the finished product	0.0068

PP CT 20 - LCA RESULTS

Art. 009680 PP CT 20

Table Environmental impact per Declared Unit specific - main indicators.




Parameter - Unit										
	A1	A2	A3	A1-A3	C1	C2	C3	C4	C1-C4	D
GWP total [kg CO ₂ -eq.]	4.23E-01	8.30E-02	5.33E-02	5.60E-01	0.00E+00	2.02E-09	9.97E-01	2.37E-02	1.02E+00	-6.60E-01
GWP fossil [kg CO ₂ -eq.]	4.17E-01	8.30E-02	2.83E-02	5.29E-01	0.00E+00	2.02E-09	9.96E-01	2.37E-02	1.02E+00	-6.56E-01
GWP biogenic [kg CO ₂ -eq.]	5.78E-03	2.48E-05	2.50E-02	3.08E-02	0.00E+00	6.10E-13	1.47E-04	1.80E-05	1.65E-04	-3.57E-03
GWP luluc [kg CO ₂ -eq.]	6.16E-05	1.61E-06	4.02E-05	1.03E-04	0.00E+00	3.96E-14	1.77E-05	8.80E-07	1.86E-05	-1.82E-04
ODP [kg CFC-11-eq.]	9.05E-09	1.78E-09	1.45E-09	1.23E-08	0.00E+00	4.36E-17	5.83E-09	1.95E-11	5.85E-09	-3.03E-09
AP [mole of H ⁺ -eq.]	1.11E-03	2.08E-04	2.28E-04	1.54E-03	0.00E+00	5.26E-12	2.35E-04	1.36E-05	2.49E-04	-2.36E-03
EP - freshwater [kg P eq.]	1.15E-05	6.46E-08	1.60E-06	1.32E-05	0.00E+00	1.59E-15	5.20E-07	2.30E-08	5.43E-07	-1.05E-05
EP - marine [kg N eq.]	2.34E-04	8.05E-05	1.21E-04	4.35E-04	0.00E+00	2.06E-12	1.04E-04	3.50E-05	1.39E-04	-4.22E-04
EP - terrestrial [mole of N eq.]	2.60E-03	8.52E-04	6.47E-04	4.10E-03	0.00E+00	2.18E-11	1.12E-03	5.91E-05	1.18E-03	-4.62E-03
POCP [kg NMVOC eq.]	1.11E-03	3.37E-04	2.43E-04	1.69E-03	0.00E+00	8.49E-12	2.89E-04	2.35E-05	3.12E-04	-2.21E-03
ADPF ⁽¹⁾ [MJ]	5.78E+00	1.09E+00	4.61E-01	7.33E+00	0.00E+00	2.69E-08	1.59E-01	1.99E-02	1.78E-01	-2.33E+01
ADPE ⁽¹⁾ [kg Sb eq.]	4.19E-08	2.83E-09	2.24E-07	2.69E-07	0.00E+00	6.94E-17	4.47E-09	5.75E-11	4.53E-09	-7.83E-08
WDP ⁽¹⁾ [m ³ world eq.]	9.63E-02	1.00E-03	-7.17E-04	9.66E-02	0.00E+00	2.46E-11	1.02E-02	8.58E-05	1.03E-02	-2.68E-01

(1) The results of this indicator should be used with caution given their high uncertainty or limited experience with the indicator itself.

- GWP** Global warming potential
- ODP** Depletion potential of the stratospheric ozone layer
- AP** Acidification potential of land and water
- EP** Eutrophication potential
- POCP** Formation potential of tropospheric ozone photochemical oxidants
- ADPE** Abiotic depletion potential for non fossil resources
- ADPF** Abiotic depletion potential for fossil resources
- WDP** Water (user) deprivation potential, deprivation-weighted water consumption

LCA RESULTS

Table Environmental impact per Declared Unit specific - additional indicators.

Parameter - Unit										
	A1	A2	A3	A1-A3	C1	C2	C3	C4	C1-C4	D
PM [disease inc.]	8.00E-09	4.70E-09	3.06E-09	1.58E-08	0.00E+00	1.35E-16	1.52E-09	3.16E-10	1.84E-09	-2.37E-08
IRP ⁽¹⁾ [kBq U235 eq]	1.15E-02	1.74E-04	6.05E-04	1.23E-02	0.00E+00	4.27E-12	4.88E-04	2.36E-05	5.11E-04	-8.33E-03
ETP-fw ⁽²⁾ [CTUe]	1.13E+00	4.83E-01	3.05E-01	1.91E+00	0.00E+00	1.19E-08	2.48E+00	1.02E-01	2.58E+00	-1.01E+00
HTP-nc ⁽²⁾ [CTUh]	1.54E-09	5.03E-10	9.63E-09	1.17E-08	0.00E+00	1.43E-17	1.26E-09	5.33E-11	1.31E-09	-1.66E-09
HTPc ⁽²⁾ [CTUh]	9.44E-11	5.38E-12	1.56E-10	2.56E-10	0.00E+00	1.40E-19	1.83E-10	3.47E-13	1.83E-10	-7.36E-11
SQP ⁽²⁾ [Pt]	4.04E-01	2.08E-03	1.80E+00	2.20E+00	0.00E+00	5.10E-11	1.74E-02	4.38E-02	6.12E-02	-2.48E-01




(1) This impact category deals primarily with the possible impact on human health of low-dose ionizing radiation from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents, occupational exposure or due to the disposal of radioactive waste in underground landfills. Potential ionizing radiation from soil, radon and some building materials are also not assessed by this indicator.

(2) The results of this indicator should be used with caution given their high uncertainty or limited experience with the indicator itself.

- PM** Particulate matter
- IRP** Ionising radiation
- ETP-fw** Ecotoxicity freshwater
- HTP-nc** Human toxicity non cancer
- HTPc** Human toxicity cancer
- SQP** Land use

LCA RESULTS

Table Resource use per Declared Unit.




Parameter - Unit										
	A1	A2	A3	A1-A3	C1	C2	C3	C4	C1-C4	D
PERE [MJ]	2.52E-01	2.87E-03	6.77E-02	3.23E-01	0.00E+00	7.06E-11	1.50E-02	6.91E-04	1.57E-02	-2.72E-01
PERM [MJ]	0.00E+00	0.00E+00	2.71E-01	2.71E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT [MJ]	2.52E-01	2.87E-03	3.39E-01	5.94E-01	0.00E+00	7.06E-11	1.50E-02	6.91E-04	1.57E-02	-2.72E-01
PENRE [MJ]	-4.02E+01	1.09E+00	3.17E-01	-3.88E+01	0.00E+00	2.69E-08	1.59E-01	1.99E-02	1.78E-01	-2.33E+01
PENRM [MJ]	4.60E+01	0.00E+00	1.44E-01	4.61E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT [MJ]	5.77E+00	1.09E+00	4.61E-01	7.33E+00	0.00E+00	2.69E-08	1.59E-01	1.99E-02	1.78E-01	-2.33E+01
SM [kg]	8.51E-01	0.00E+00	0.00E+00	8.51E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF ⁽¹⁾ [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF ⁽¹⁾ [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW [m³]	2.84E-03	4.57E-05	0.00E+00	2.89E-03	0.00E+00	1.12E-12	4.32E-04	3.51E-06	4.36E-04	-3.76E-03

(1) Reference to only foreground system.

- PERE** Use of renewable primary energy as energy carrier
- PERM** Use of renewable primary energy as raw materials
- PERT** Total use of renewable primary energy resources
- PENRE** Use of non-renewable primary energy as energy carrier
- PENRM** Use of non-renewable primary energy as raw materials
- PENRT** Total use of non-renewable primary energy resources
- SM** Use of secondary material
- RSF** Use of renewable secondary fuels
- NRSF** Use of non-renewable secondary fuels
- FW** Use of net fresh water

LCA RESULTS

Table Environmental impact for waste production and output streams.

Parameter - Unit										
	A1	A2	A3	A1-A3	C1	C2	C3	C4	C1-C4	D
HWD [Kg]	1.93E-05	7.22E-06	1.21E-06	2.77E-05	0.00E+00	1.77E-13	8.44E-07	1.03E-07	9.47E-07	-4.59E-06
NHWD [Kg]	1.42E-02	5.33E-05	6.32E-02	7.74E-02	0.00E+00	1.31E-12	6.72E-03	2.49E-01	2.56E-01	-1.32E-02
RWD [Kg]	8.33E-06	9.38E-08	4.21E-07	8.85E-06	0.00E+00	2.30E-15	3.42E-07	1.48E-08	3.56E-07	-6.23E-06
CRU [Kg]	0.00E+00	0.00E+00	3.12E-02	3.12E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR [Kg]	0.00E+00	0.00E+00	1.07E-03	1.07E-03	0.00E+00	0.00E+00	3.25E-01	0.00E+00	3.25E-01	0.00E+00
MER [Kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.26E-01	0.00E+00	4.26E-01	0.00E+00
EEE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

- HWD** Hazardous waste disposed
- NHWD** Non-hazardous waste disposed
- RWD** Radioactive waste disposed
- CRU** Components for re-use
- MFR** Materials for recycling
- MER** Materials for energy recovery
- EEE** Exported electrical energy
- EET** Exported thermal energy

• Biogenic carbon




The content of biogenic carbon in the product and in the packaging of the finished product was quantified according to the EN 16449:2014 standard.

Biogenic carbon content	PP compound [kg C]
In the product	0.00
In the packaging of the finished product	0.0068

PP N - LCA RESULTS

Art. 009696 PP N

Table Environmental impact per Declared Unit specific - main indicators.




Parameter - Unit										
	A1	A2	A3	A1-A3	C1	C2	C3	C4	C1-C4	D
GWP total [kg CO ₂ -eq.]	5.95E-01	2.26E-01	5.33E-02	8.75E-01	0.00E+00	2.02E-09	9.97E-01	2.37E-02	1.02E+00	-6.60E-01
GWP fossil [kg CO ₂ -eq.]	5.89E-01	2.26E-01	2.83E-02	8.44E-01	0.00E+00	2.02E-09	9.96E-01	2.37E-02	1.02E+00	-6.56E-01
GWP biogenic [kg CO ₂ -eq.]	5.60E-03	6.78E-05	2.50E-02	3.07E-02	0.00E+00	6.10E-13	1.47E-04	1.80E-05	1.65E-04	-3.57E-03
GWP luluc [kg CO ₂ -eq.]	1.36E-04	4.39E-06	4.02E-05	1.80E-04	0.00E+00	3.96E-14	1.77E-05	8.80E-07	1.86E-05	-1.82E-04
ODP [kg CFC-11-eq.]	9.83E-09	4.85E-09	1.45E-09	1.61E-08	0.00E+00	4.36E-17	5.83E-09	1.95E-11	5.85E-09	-3.03E-09
AP [mole of H ⁺ -eq.]	1.46E-03	5.68E-04	2.28E-04	2.25E-03	0.00E+00	5.26E-12	2.35E-04	1.36E-05	2.49E-04	-2.36E-03
EP - freshwater [kg P eq.]	1.33E-05	1.76E-07	1.60E-06	1.51E-05	0.00E+00	1.59E-15	5.20E-07	2.30E-08	5.43E-07	-1.05E-05
EP - marine [kg N eq.]	3.61E-04	2.20E-04	1.21E-04	7.02E-04	0.00E+00	2.06E-12	1.04E-04	3.50E-05	1.39E-04	-4.22E-04
EP - terrestrial [mole of N eq.]	3.91E-03	2.33E-03	6.47E-04	6.88E-03	0.00E+00	2.18E-11	1.12E-03	5.91E-05	1.18E-03	-4.62E-03
POCP [kg NMVOC eq.]	1.58E-03	9.19E-04	2.43E-04	2.74E-03	0.00E+00	8.49E-12	2.89E-04	2.35E-05	3.12E-04	-2.21E-03
ADPF ⁽¹⁾ [MJ]	8.11E+00	2.98E+00	4.61E-01	1.16E+01	0.00E+00	2.69E-08	1.59E-01	1.99E-02	1.78E-01	-2.33E+01
ADPE ⁽¹⁾ [kg Sb eq.]	1.19E-07	7.71E-09	2.24E-07	3.50E-07	0.00E+00	6.94E-17	4.47E-09	5.75E-11	4.53E-09	-7.83E-08
WDP ⁽¹⁾ [m ³ world eq.]	1.33E-01	2.73E-03	-7.17E-04	1.35E-01	0.00E+00	2.46E-11	1.02E-02	8.58E-05	1.03E-02	-2.68E-01

(1) The results of this indicator should be used with caution given their high uncertainty or limited experience with the indicator itself.

- GWP** Global warming potential
- ODP** Depletion potential of the stratospheric ozone layer
- AP** Acidification potential of land and water
- EP** Eutrophication potential
- POCP** Formation potential of tropospheric ozone photochemical oxidants
- ADPE** Abiotic depletion potential for non fossil resources
- ADPF** Abiotic depletion potential for fossil resources
- WDP** Water (user) deprivation potential, deprivation-weighted water consumption

LCA RESULTS

Table Environmental impact per Declared Unit specific - additional indicators.

Parameter - Unit										
	A1	A2	A3	A1-A3	C1	C2	C3	C4	C1-C4	D
PM [disease inc.]	1.82E-08	1.28E-08	3.06E-09	3.41E-08	0.00E+00	1.35E-16	1.52E-09	3.16E-10	1.84E-09	-2.37E-08
IRP ⁽¹⁾ [kBq U235 eq]	1.21E-02	4.75E-04	6.05E-04	1.32E-02	0.00E+00	4.27E-12	4.88E-04	2.36E-05	5.11E-04	-8.33E-03
ETP-fw ⁽²⁾ [CTUe]	1.73E+00	1.32E+00	3.05E-01	3.36E+00	0.00E+00	1.19E-08	2.48E+00	1.02E-01	2.58E+00	-1.01E+00
HTP-nc ⁽²⁾ [CTUh]	2.56E-09	1.37E-09	9.63E-09	1.36E-08	0.00E+00	1.43E-17	1.26E-09	5.33E-11	1.31E-09	-1.66E-09
HTPc ⁽²⁾ [CTUh]	2.40E-10	1.47E-11	1.56E-10	4.10E-10	0.00E+00	1.40E-19	1.83E-10	3.47E-13	1.83E-10	-7.36E-11
SQP ⁽²⁾ [Pt]	4.16E-01	5.67E-03	1.80E+00	2.22E+00	0.00E+00	5.10E-11	1.74E-02	4.38E-02	6.12E-02	-2.48E-01




(1) This impact category deals primarily with the possible impact on human health of low-dose ionizing radiation from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents, occupational exposure or due to the disposal of radioactive waste in underground landfills. Potential ionizing radiation from soil, radon and some building materials are also not assessed by this indicator.

(2) The results of this indicator should be used with caution given their high uncertainty or limited experience with the indicator itself.

- PM** Particulate matter
- IRP** Ionising radiation
- ETP-fw** Ecotoxicity freshwater
- HTP-nc** Human toxicity non cancer
- HTPc** Human toxicity cancer
- SQP** Land use

LCA RESULTS

Table Resource use per Declared Unit.




Parameter - Unit										
	A1	A2	A3	A1-A3	C1	C2	C3	C4	C1-C4	D
PERE [MJ]	2.81E-01	7.84E-03	6.77E-02	3.57E-01	0.00E+00	7.06E-11	1.50E-02	6.91E-04	1.57E-02	-2.72E-01
PERM [MJ]	0.00E+00	0.00E+00	2.71E-01	2.71E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT [MJ]	2.81E-01	7.84E-03	3.39E-01	6.28E-01	0.00E+00	7.06E-11	1.50E-02	6.91E-04	1.57E-02	-2.72E-01
PENRE [MJ]	-3.79E+01	2.98E+00	3.17E-01	-3.46E+01	0.00E+00	2.69E-08	1.59E-01	1.99E-02	1.78E-01	-2.33E+01
PENRM [MJ]	4.60E+01	0.00E+00	1.44E-01	4.61E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT [MJ]	8.11E+00	2.98E+00	4.61E-01	1.16E+01	0.00E+00	2.69E-08	1.59E-01	1.99E-02	1.78E-01	-2.33E+01
SM [kg]	9.95E-01	0.00E+00	0.00E+00	9.95E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF ⁽¹⁾ [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF ⁽¹⁾ [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW [m³]	3.35E-03	1.25E-04	0.00E+00	3.47E-03	0.00E+00	1.12E-12	4.32E-04	3.51E-06	4.36E-04	-3.76E-03

(1) Reference to only foreground system.

- PERE** Use of renewable primary energy as energy carrier
- PERM** Use of renewable primary energy as raw materials
- PERT** Total use of renewable primary energy resources
- PENRE** Use of non-renewable primary energy as energy carrier
- PENRM** Use of non-renewable primary energy as raw materials
- PENRT** Total use of non-renewable primary energy resources
- SM** Use of secondary material
- RSF** Use of renewable secondary fuels
- NRSF** Use of non-renewable secondary fuels
- FW** Use of net fresh water

LCA RESULTS

Table Environmental impact for waste production and output streams.

Parameter - Unit										
	A1	A2	A3	A1-A3	C1	C2	C3	C4	C1-C4	D
HWD [Kg]	2.31E-05	1.97E-05	1.21E-06	4.40E-05	0.00E+00	1.77E-13	8.44E-07	1.03E-07	9.47E-07	-4.59E-06
NHWD [Kg]	3.99E-02	1.45E-04	6.32E-02	1.03E-01	0.00E+00	1.31E-12	6.72E-03	2.49E-01	2.56E-01	-1.32E-02
RWD [Kg]	8.86E-06	2.56E-07	4.21E-07	9.54E-06	0.00E+00	2.30E-15	3.42E-07	1.48E-08	3.56E-07	-6.23E-06
CRU [Kg]	0.00E+00	0.00E+00	3.12E-02	3.12E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR [Kg]	0.00E+00	0.00E+00	1.86E-03	1.86E-03	0.00E+00	0.00E+00	3.25E-01	0.00E+00	3.25E-01	0.00E+00
MER [Kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.26E-01	0.00E+00	4.26E-01	0.00E+00
EEE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

- HWD** Hazardous waste disposed
- NHWD** Non-hazardous waste disposed
- RWD** Radioactive waste disposed
- CRU** Components for re-use
- MFR** Materials for recycling
- MER** Materials for energy recovery
- EEE** Exported electrical energy
- EET** Exported thermal energy

• Biogenic carbon




The content of biogenic carbon in the product and in the packaging of the finished product was quantified according to the EN 16449:2014 standard.

Biogenic carbon content	PP compound [kg C]
In the product	0.00
In the packaging of the finished product	0.0068

PP D - LCA RESULTS

Art. 009699 PP D

Table Environmental impact per Declared Unit specific - main indicators.




Parameter - Unit										
	A1	A2	A3	A1-A3	C1	C2	C3	C4	C1-C4	D
GWP total [kg CO ₂ -eq.]	4.26E-01	1.00E-01	5.33E-02	5.80E-01	0.00E+00	2.02E-09	9.97E-01	2.37E-02	1.02E+00	-6.60E-01
GWP fossil [kg CO ₂ -eq.]	4.20E-01	9.99E-02	2.83E-02	5.49E-01	0.00E+00	2.02E-09	9.96E-01	2.37E-02	1.02E+00	-6.56E-01
GWP biogenic [kg CO ₂ -eq.]	5.98E-03	2.99E-05	2.50E-02	3.10E-02	0.00E+00	6.10E-13	1.47E-04	1.80E-05	1.65E-04	-3.57E-03
GWP luluc [kg CO ₂ -eq.]	5.39E-05	1.94E-06	4.02E-05	9.61E-05	0.00E+00	3.96E-14	1.77E-05	8.80E-07	1.86E-05	-1.82E-04
ODP [kg CFC-11-eq.]	9.12E-09	2.14E-09	1.45E-09	1.27E-08	0.00E+00	4.36E-17	5.83E-09	1.95E-11	5.85E-09	-3.03E-09
AP [mole of H ⁺ -eq.]	1.13E-03	2.51E-04	2.28E-04	1.61E-03	0.00E+00	5.26E-12	2.35E-04	1.36E-05	2.49E-04	-2.36E-03
EP - freshwater [kg P eq.]	1.02E-05	7.78E-08	1.60E-06	1.19E-05	0.00E+00	1.59E-15	5.20E-07	2.30E-08	5.43E-07	-1.05E-05
EP - marine [kg N eq.]	2.31E-04	9.70E-05	1.21E-04	4.49E-04	0.00E+00	2.06E-12	1.04E-04	3.50E-05	1.39E-04	-4.22E-04
EP - terrestrial [mole of N eq.]	2.57E-03	1.03E-03	6.47E-04	4.24E-03	0.00E+00	2.18E-11	1.12E-03	5.91E-05	1.18E-03	-4.62E-03
POCP [kg NMVOC eq.]	1.12E-03	4.06E-04	2.43E-04	1.77E-03	0.00E+00	8.49E-12	2.89E-04	2.35E-05	3.12E-04	-2.21E-03
ADPF ⁽¹⁾ [MJ]	6.09E+00	1.32E+00	4.61E-01	7.86E+00	0.00E+00	2.69E-08	1.59E-01	1.99E-02	1.78E-01	-2.33E+01
ADPE ⁽¹⁾ [kg Sb eq.]	3.50E-08	3.40E-09	2.24E-07	2.62E-07	0.00E+00	6.94E-17	4.47E-09	5.75E-11	4.53E-09	-7.83E-08
WDP ⁽¹⁾ [m ³ world eq.]	9.84E-02	1.21E-03	-7.17E-04	9.89E-02	0.00E+00	2.46E-11	1.02E-02	8.58E-05	1.03E-02	-2.68E-01

(1) The results of this indicator should be used with caution given their high uncertainty or limited experience with the indicator itself.

- GWP** Global warming potential
- ODP** Depletion potential of the stratospheric ozone layer
- AP** Acidification potential of land and water
- EP** Eutrophication potential
- POCP** Formation potential of tropospheric ozone photochemical oxidants
- ADPE** Abiotic depletion potential for non fossil resources
- ADPF** Abiotic depletion potential for fossil resources
- WDP** Water (user) deprivation potential, deprivation-weighted water consumption

LCA RESULTS

Table Environmental impact per Declared Unit specific - additional indicators.

Parameter - Unit										
	A1	A2	A3	A1-A3	C1	C2	C3	C4	C1-C4	D
PM [disease inc.]	7.71E-09	5.66E-09	3.06E-09	1.64E-08	0.00E+00	1.35E-16	1.52E-09	3.16E-10	1.84E-09	-2.37E-08
IRP ⁽¹⁾ [kBq U235 eq]	1.17E-02	2.10E-04	6.05E-04	1.26E-02	0.00E+00	4.27E-12	4.88E-04	2.36E-05	5.11E-04	-8.33E-03
ETP-fw ⁽²⁾ [CTUe]	1.03E+00	5.81E-01	3.05E-01	1.91E+00	0.00E+00	1.19E-08	2.48E+00	1.02E-01	2.58E+00	-1.01E+00
HTP-nc ⁽²⁾ [CTUh]	1.48E-09	6.06E-10	9.63E-09	1.17E-08	0.00E+00	1.43E-17	1.26E-09	5.33E-11	1.31E-09	-1.66E-09
HTPc ⁽²⁾ [CTUh]	8.11E-11	6.48E-12	1.56E-10	2.43E-10	0.00E+00	1.40E-19	1.83E-10	3.47E-13	1.83E-10	-7.36E-11
SQP ⁽²⁾ [Pt]	4.15E-01	2.50E-03	1.80E+00	2.22E+00	0.00E+00	5.10E-11	1.74E-02	4.38E-02	6.12E-02	-2.48E-01




(1) This impact category deals primarily with the possible impact on human health of low-dose ionizing radiation from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents, occupational exposure or due to the disposal of radioactive waste in underground landfills. Potential ionizing radiation from soil, radon and some building materials are also not assessed by this indicator.

(2) The results of this indicator should be used with caution given their high uncertainty or limited experience with the indicator itself.

- PM** Particulate matter
- IRP** Ionising radiation
- ETP-fw** Ecotoxicity freshwater
- HTP-nc** Human toxicity non cancer
- HTPc** Human toxicity cancer
- SQP** Land use

LCA RESULTS

Table Resource use per Declared Unit.




Parameter - Unit										
	A1	A2	A3	A1-A3	C1	C2	C3	C4	C1-C4	D
PERE [MJ]	2.57E-01	3.46E-03	6.77E-02	3.28E-01	0.00E+00	7.06E-11	1.50E-02	6.91E-04	1.57E-02	-2.72E-01
PERM [MJ]	0.00E+00	0.00E+00	2.71E-01	2.71E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT [MJ]	2.57E-01	3.46E-03	3.39E-01	5.99E-01	0.00E+00	7.06E-11	1.50E-02	6.91E-04	1.57E-02	-2.72E-01
PENRE [MJ]	-3.99E+01	1.32E+00	3.17E-01	-3.83E+01	0.00E+00	2.69E-08	1.59E-01	1.99E-02	1.78E-01	-2.33E+01
PENRM [MJ]	4.60E+01	0.00E+00	1.44E-01	4.61E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT [MJ]	6.09E+00	1.32E+00	4.61E-01	7.86E+00	0.00E+00	2.69E-08	1.59E-01	1.99E-02	1.78E-01	-2.33E+01
SM [kg]	9.24E-01	0.00E+00	0.00E+00	9.24E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF ⁽¹⁾ [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF ⁽¹⁾ [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW [m³]	2.89E-03	5.51E-05	0.00E+00	2.94E-03	0.00E+00	1.12E-12	4.32E-04	3.51E-06	4.36E-04	-3.76E-03

(1) Reference to only foreground system.

- PERE** Use of renewable primary energy as energy carrier
- PERM** Use of renewable primary energy as raw materials
- PERT** Total use of renewable primary energy resources
- PENRE** Use of non-renewable primary energy as energy carrier
- PENRM** Use of non-renewable primary energy as raw materials
- PENRT** Total use of non-renewable primary energy resources
- SM** Use of secondary material
- RSF** Use of renewable secondary fuels
- NRSF** Use of non-renewable secondary fuels
- FW** Use of net fresh water

LCA RESULTS

Table Environmental impact for waste production and output streams.

Parameter - Unit										
	A1	A2	A3	A1-A3	C1	C2	C3	C4	C1-C4	D
HWD [Kg]	1.98E-05	8.69E-06	1.21E-06	2.97E-05	0.00E+00	1.77E-13	8.44E-07	1.03E-07	9.47E-07	-4.59E-06
NHWD [Kg]	1.21E-02	6.42E-05	6.32E-02	7.54E-02	0.00E+00	1.31E-12	6.72E-03	2.49E-01	2.56E-01	-1.32E-02
RWD [Kg]	8.52E-06	1.13E-07	4.21E-07	9.05E-06	0.00E+00	2.30E-15	3.42E-07	1.48E-08	3.56E-07	-6.23E-06
CRU [Kg]	0.00E+00	0.00E+00	3.12E-02	3.12E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR [Kg]	0.00E+00	0.00E+00	1.26E-03	1.26E-03	0.00E+00	0.00E+00	3.26E-01	0.00E+00	3.26E-01	0.00E+00
MER [Kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.26E-01	0.00E+00	4.26E-01	0.00E+00
EEE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

- HWD** Hazardous waste disposed
- NHWD** Non-hazardous waste disposed
- RWD** Radioactive waste disposed
- CRU** Components for re-use
- MFR** Materials for recycling
- MER** Materials for energy recovery
- EEE** Exported electrical energy
- EET** Exported thermal energy

• Biogenic carbon

The content of biogenic carbon in the product and in the packaging of the finished product was quantified according to the EN 16449:2014 standard.

Biogenic carbon content	PP compound [kg C]
In the product	0.00
In the packaging of the finished product	0.0068

REFERENCES

ISO 14040:2021	Environmental management - Life cycle assessment - Principles and framework.
ISO 14044:2021	Environmental management - Life cycle assessment - Requirements and guidelines.
ISO 14025:2010	Environmental labels and declarations - Type III environmental declarations - Principles and procedures.
EN 16449:2014	Calculation of the biogenic carbon content of wood and conversion to carbon dioxide.
EN 15804:2012 +A2:2019/AC:2021	Sustainability of constructions - Environmental product declarations - Fundamental development rules by product category.
REPORT LCA_ REV.01	"Life cycle analysis of PE compounds e recycled PP compounds" Valsir recycling 19/06/2024. Written by Greenwich S.r.l.
PCR ICMQ 3.0	PCR for construction products: ICMQ-001/15 rev 3 (compliant with EN 15804:2012+A2:2019/AC:2021).
REGOLAMENTO EPDITALY V.6	Regulations of the EPDItaly program Revision 6.0. Issue date 10/30/2023.
EUROSTAT	https://www.europarl.europa.eu/topics/it/article/20181212STO21610/rifiuti-di-plastica-e-riciclaggio-nell-ue-i-numeri-e-i-fatti





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