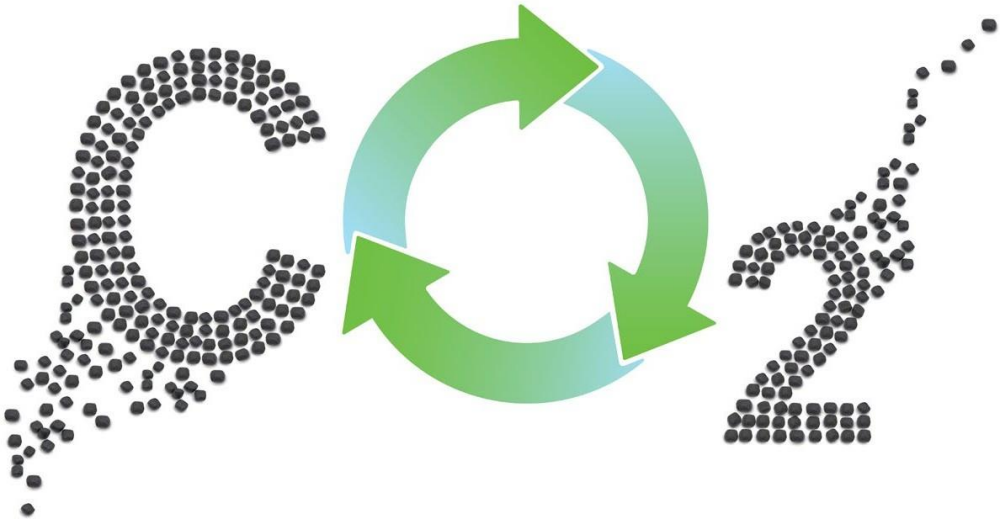
Environmental Product Declaration

In accordance with ISO 14025 for:

ARPRO expanded polypropylene from JSP



Programme:	The International EPD® System, **www.environdec.com**
Programme operator:	EPD International AB
EPD registration number:	S-P-02142
Publication date:	2021-02-01
Revision date:	2022-05-16
Valid until:	2026-01-31

NOT APPLICABLE FOR ANY EPP OTHER THAN ARPRO

ARPRO.COM

Contents

Programme information

The International EPD® System

EPD International AB
Box 210 60
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Product category rules (PCR):	Plastics in primary forms, 2010:16, version 3.01, UN CPC 347
PCR review was conducted by:	Paola Borla
Independent third-party verification of the declaration and data, according to ISO 14025:2006:	○ EPD process certification ☑ EPD verification
Third party verifier:	Hüdai Kara, PhD. 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

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.

Company information

- **Owner of the EPD: JSP | www.ARPRO.com | sustainability@jsp.com**
- **Description of the organisation:** JSP Corporation is the world's largest producer of expanded polypropylene. The company has research and development and manufacturing facilities in the major industrial centres of Americas, Europe and Asia.
- **Product-related or management system-related certifications:** ISO 9001:2015 and 14001:2015
- **Name and location of production site:** JSP Estrées-Saint-Denis (France), JSP Cheb (Czech Republic)

Product information

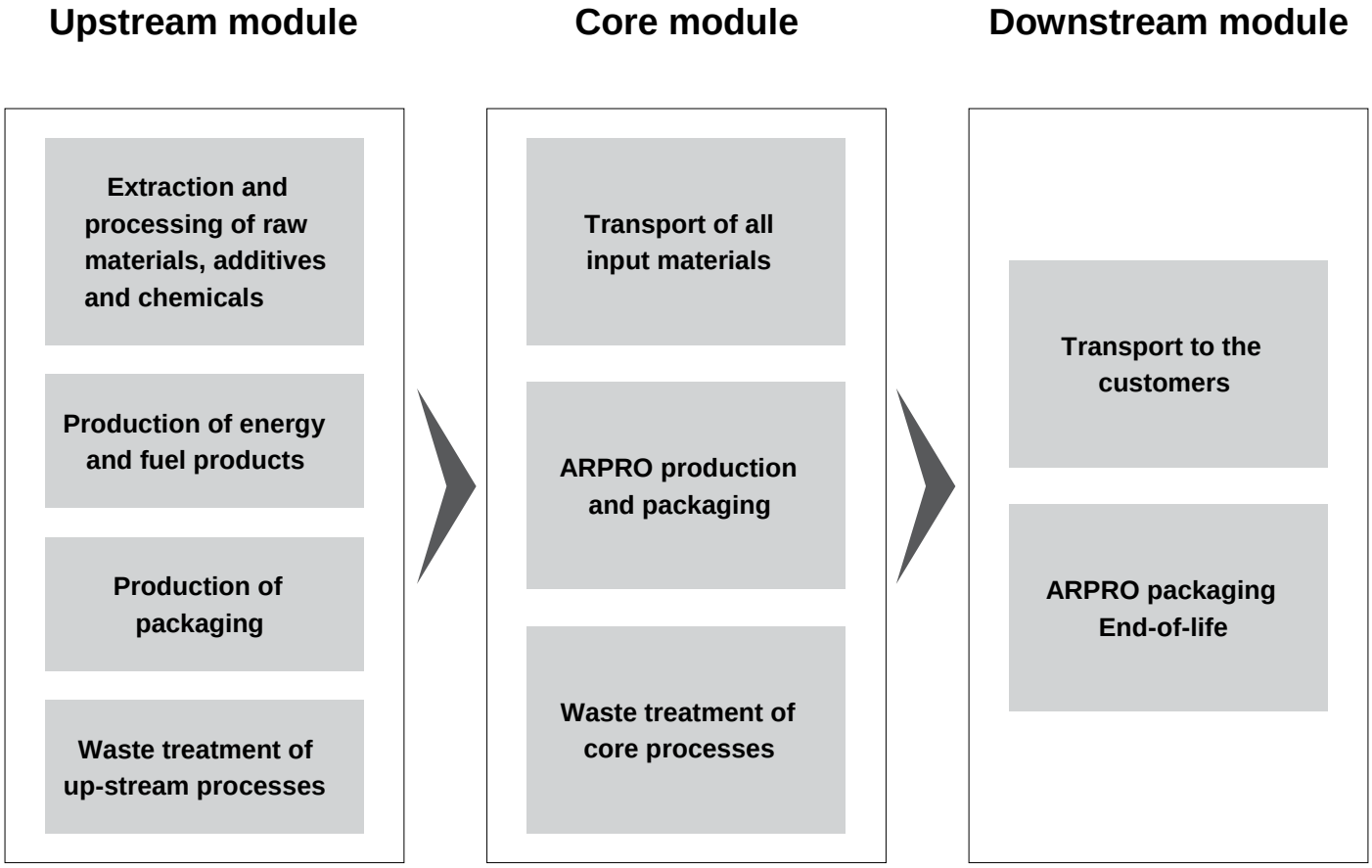
- **Product name:** ARPRO
- **Product identification:** Expanded polypropylene
- **Product description:** ARPRO is a closed-cell bead foam material with a unique combination of properties. It delivers excellent energy absorption and structural strength. It can withstand multiple impacts, is thermally insulated, buoyant, water and chemical resistant. ARPRO has an exceptionally high strength to weight ratio and is 100% recyclable.
- ARPRO is an ideal material for the production of safety components in automotive applications, multi-use transport packaging (dunnage), HVAC housings, food delivery containers and thermo boxes, products for sports and leisure, furniture, toys, domestic appliance and many more. It is suitable for food contact.
- ARPRO is offered in a wide range of bulk densities from 16 to 200 g/l. Using steam-chest moulding, it can be processed into almost any desired shape of foam parts.
- ARPRO manufacturing is a clean process, it does not use any halogenated hydrocarbons or compounds damaging the environment and has low volatile organic emissions.
- **UN CPC code:** 347
- **Geographical scope:** Global

LCA information

JSP is committed to reduce the environmental impact of its production. As a result of optimising processes, carbon footprint coming from the ARPRO production has been significantly reduced.

- **Functional unit / declared unit:** 1kg of product
- **Time Parameters:** The study is based on data representing year-round production. The data is from 2021.
- **Database(s) and LCA software used:** Professional database of thinkstep, GaBi software
- **Description of system boundaries:** Cradle-to-gate with options
- **Excluded lifecycle stages:** Use stage, final disposal
- **More information: sustainability@jsp.com**

System diagram



Content declaration

ARPRO | ARPRO 35 Ocean | ARPRO RE | ARPRO REvolution

Materials / chemical substances	[Unit]	%	Environmental / hazardous properties
Expanded polypropylene	1 kg	100	NA / no hazardous properties known

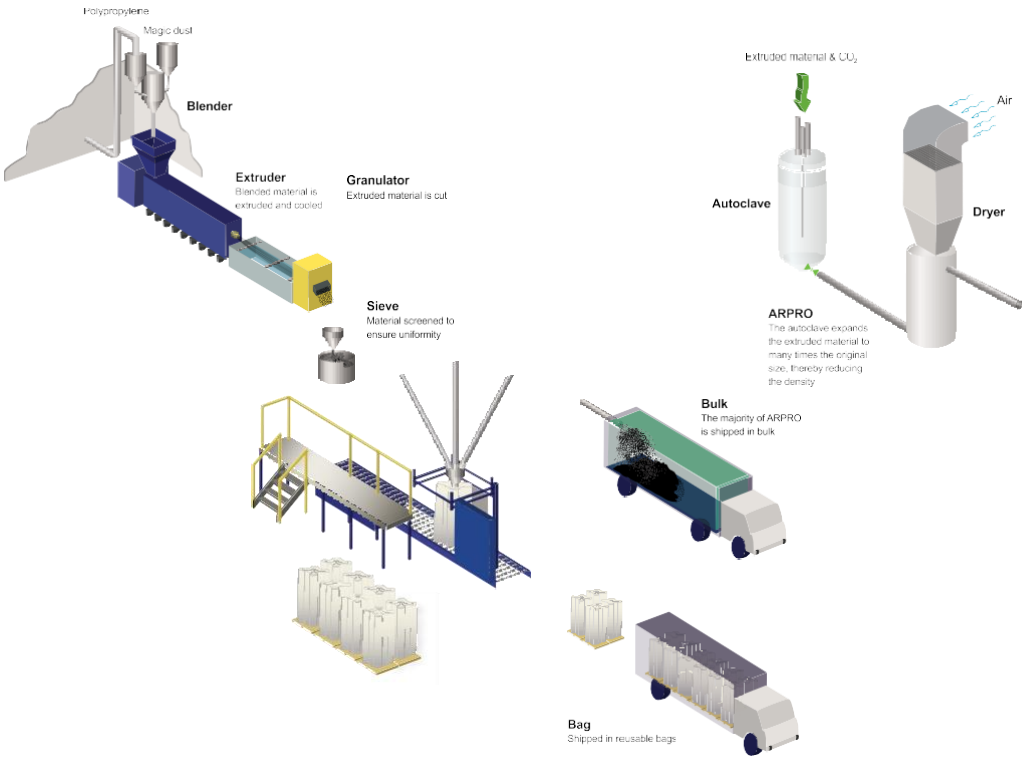
No substances included in the Candidate List of Substances of Very High Concern for authorisation under the REACH Regulations are present in the ARPRO products, either above the threshold for registration with the European Chemicals Agency or above 0.1% (w/w).

Packaging
Distribution packaging: PP big-bags, PP nets
Consumer packaging: No consumer packaging

Recycled material
Provenance of recycled materials (pre-consumer or post-consumer) in the product: Almost 100% end-of life recycled expanded polypropylene is used in ARPRO Revolution. 25% end-of life recycled expanded polypropylene is used in ARPRO Recycled. The ARPRO 35 Ocean product uses 15% recycled plastic, which was obtained by collecting maritime industry waste. There is no recycled material in the ARPRO product; 100% polypropylene is virgin.

Production flow-chart of JSP International

ARPRO Production scheme



Version 02

Environmental performance

Virgin material

ARPRO Grades - Potential environmental impacts, 1 kg

PARAMETER		UNIT	Upstream	Core	Downstream	TOTAL
Global warming potential (GWP)	Fossil	kg CO_2 eq.	1.90	0.21	0.032	2.14
	Biogenic	kg CO_2 eq.	0.015	0.0075	-5.02E-05	0.022
	Land use and land transformation	kg CO_2 eq.	1.07E-3	1.47E-06	1.75E-4	1,25E-3
	TOTAL	**kg CO_2 eq.**	**1.91**	**0.22**	**0.032**	**2.16**
Depletion potential of the stratospheric ozone layer (ODP)		kg CFC 11 eq.	4.14E-10	2.47E-15	3.23E-15	4.14E-10
Acidification potential (AP)		kg SO_2 eq.	0.0046	4.07E-06	2.35E-05	0.0047
Eutrophication potential (EP)		kg PO_4^{3-} eq.	0.0020	9E-06	6E-06	0.0020
Eutrophication, freshwater (EP)		kg P eq.	6.04E-05	2.24E-07	2.14E-07	6.09E-05
Formation potential of tropospheric ozone (POCP)		kg C_2H_4 eq.	8.29E-4	5.01E-06	1.00E-07	8.34E-4
Abiotic depletion potential – Elements		kg Sb eq.	5.19E-07	1.06E-10	2.67E-09	5.21E-07
Abiotic depletion potential – Fossil resources		MJ, net calorific value	76.72	0.018	0.42	77.16
Water scarcity potential		m^3 eq.	1.58	0.17	2.75E-4	1.75

Environmental performance

Virgin material

ARPRO Grades - Use of resources, 1 kg

PARAMETER		UNIT	Upstream	Core	Downstream	TOTAL
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	14.84	0.0017	0.025	14.87
	Used as raw materials	MJ, net calorific value	0	0	0	0
	TOTAL	**MJ, net calorific value**	**14.84**	**0.0017**	**0.025**	**14.87**
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	77.04	0.018	0.43	77.49
	Used as raw materials	MJ, net calorific value	0	0	0	0
	TOTAL	**MJ, net calorific value**	**77.39**	**0.018**	**0.43**	**77.84**
Secondary material		kg	0	0	0	0
Renewable secondary fuels		MJ, net calorific value	0	0	0	0
Non-renewable secondary fuels		MJ, net calorific value	0	0	0	0
Net use of fresh water		m^3	0.048	0.0039	2.71E-05	0.051

Environmental performance

Virgin material

ARPRO Grades - Waste production, 1 kg

PARAMETER	UNIT	Upstream	Core	Downstream	TOTAL
Hazardous waste disposed	kg	1.97E-06	0	3.43E-12	1.97E-06
Non-hazardous waste disposed	kg	0.0071	0.02	0.0091	0.037
Radioactive waste disposed	kg	-0.00057	2.18E-07	6.30E-07	-0.00057

ARPRO Grades - Output flows, 1 kg

PARAMETER	UNIT	Upstream	Core	Downstream	TOTAL
Components for reuse	kg	0	0	0	0
Material for recycling	kg	0	0.0031	0	0.0031
Materials for energy recovery	kg	0	0	0	0
Exported energy, electricity	MJ	0	0.0022	0	0.0022
Exported energy, thermal	MJ	0	0	0	0

Environmental performance

Material with 15% recycled content

ARPRO Ocean - Potential environmental impacts, 1 kg

PARAMETER		UNIT	Upstream	Core	Downstream	TOTAL
Global warming potential (GWP)	Fossil	kg CO_2 eq.	1.74	0.21	0.032	1.98
	Biogenic	kg CO_2 eq.	0.016	0.0075	-5.02E-05	0.023
	Land use and land transformation	kg CO_2 eq.	0.0011	1.47E-06	0.00017	0.0013
	TOTAL	**kg CO_2 eq.**	**1.76**	**0.22**	**0.032**	**2.01**
Depletion potential of the stratospheric ozone layer (ODP)		kg CFC 11 eq.	4.12E-10	2.47E-15	3.23E-15	4.12E-10
Acidification potential (AP)		kg SO_2 eq.	0.0042	4.07E-06	2.35E-05	0.0042
Eutrophication potential (EP)		kg PO_4^{3-} eq.	0.0017	8.71E-06	6.10E-06	0.0018
Eutrophication freshwater (EP)		kg P eq.	5.37E-05	2.24E-07	2.14E-07	5.42E-05
Formation potential of tropospheric ozone (POCP)		kg C_2H_4 eq.	0.00073	5.01E-06	1.00E-07	0.00074
Abiotic depletion potential – Elements		kg Sb eq.	5.09E-07	1.06E-10	2.67E-09	5.12E-07
Abiotic depletion potential – Fossil resources		MJ, net calorific value	67.76	0.018	0.42	68.2
Water scarcity potential		m^3 eq.	1.38	0.17	0.00028	1.55

Environmental performance

Material with 15% recycled content

ARPRO Ocean - Use of resources, 1 kg

PARAMETER		UNIT	Upstream	Core	Downstream	TOTAL
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	14.59	0.0017	0.025	14.62
	Used as raw materials	MJ, net calorific value	0	0	0	0
	TOTAL	**MJ, net calorific value**	**14.59**	**0.0017**	**0.025**	**14.62**
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	68.22	0.019	0.43	68.66
	Used as raw materials	MJ, net calorific value	0	0	0	0
	TOTAL	**MJ, net calorific value**	**68.22**	**0.018**	**0.43**	**68.66**
Secondary material		kg	0.081	0	0	0.081
Renewable secondary fuels		MJ, net calorific value	0	0	0	0
Non-renewable secondary fuels		MJ, net calorific value	0	0	0	0
Net use of fresh water		m^3	0.042	0.0039	2.71E-05	0.046

Environmental performance

Material with 15% recycled content

ARPRO Ocean - Waste production, 1 kg

PARAMETER	UNIT	Upstream	Core	Downstream	TOTAL
Hazardous waste disposed	kg	1.97E-06	0	3.43E-12	1.97E-06
Non-hazardous waste disposed	kg	0.013	0.020	0.0091	0.043
Radioactive waste disposed	kg	-0.00043	2.18E-07	6.30E-07	-0.00043

ARPRO Ocean - Output flows, 1 kg

PARAMETER	UNIT	Upstream	Core	Downstream	TOTAL
Components for reuse	kg	0	0	0	0
Material for recycling	kg	0	0.0031	0	0.0031
Materials for energy recovery	kg	0	0	0	0
Exported energy, electricity	MJ	0	0.0022	0	0.0022
Exported energy, thermal	MJ	0	0	0	0

Environmental performance

Material with 25% recycled content

ARPRO RE - Potential environmental impacts, 1 kg

PARAMETER		UNIT	Upstream	Core	Downstream	TOTAL
Global warming potential (GWP)	Fossil	kg CO_2 eq.	1.66	0.21	0.032	1.90
	Biogenic	kg CO_2 eq.	0.016	0.0075	-5.02E-05	0.024
	Land use and land transformation	kg CO_2 eq.	0.0011	1.47E-06	0.00018	0.0013
	TOTAL	**kg CO_2 eq.**	**1.68**	**0.22**	**0.032**	**1.93**
Depletion potential of the stratospheric ozone layer (ODP)		kg CFC 11 eq.	4.11E-10	2.47E-15	3.23E-15	4.11E-10
Acidification potential (AP)		kg SO_2 eq.	0.0039	4.07E-06	2.35E-05	0.0039
Eutrophication potential (EP)		kg PO_4^{3-} eq.	0.0016	8.71E-06	6.10E-06	0.0016
Eutrophication freshwater (EP)		kg P eq.	4.96E-05	2.24E-07	2.14E-07	5.00E-05
Formation potential of tropospheric ozone (POCP)		kg C_2H_4 eq.	0.00067	5.01E-06	1.00E-07	0.00067
Abiotic depletion potential – Elements		kg Sb eq.	5.06E-07	1.06E-10	2.67E-09	5.09E-07
Abiotic depletion potential – Fossil resources		MJ, net calorific value	61.81	0.018	0.42	62.25
Water scarcity potential		m^3 eq.	1.25	0.17	0.00028	1.41

Environmental performance

Material with 25% recycled content

ARPRO RE - Use of resources, 1 kg

PARAMETER		UNIT	Upstream	Core	Downstream	TOTAL
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	14.66	0.0017	0.025	14.69
	Used as raw materials	MJ, net calorific value	0	0	0	0
	TOTAL	**MJ, net calorific value**	**14.66**	**0.0017**	**0.025**	**14.69**
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	62.49	0.0185	0.43	62.93
	Used as raw materials	MJ, net calorific value	0	0	0	0
	TOTAL	**MJ, net calorific value**	**62.76**	**0.018**	**0.43**	**63.2**
Secondary material		kg	0.23	0	0	0.23
Renewable secondary fuels		MJ, net calorific value	0	0	0	0
Non-renewable secondary fuels		MJ, net calorific value	0	0	0	0
Net use of fresh water		m^3	0.039	0.0039	2.71E-05	0.043

Environmental performance

Material with 25% recycled content

ARPRO RE - Waste production, 1 kg

PARAMETER	UNIT	Upstream	Core	Downstream	TOTAL
Hazardous waste disposed	kg	1.97E-06	0	3.43E-12	1.97E-06
Non-hazardous waste disposed	kg	0.037	0.020	0.0091	0.067
Radioactive waste disposed	kg	-0.00028	2.18E-07	6.30E-07	-0.00028

ARPRO RE - Output flows, 1 kg

PARAMETER	UNIT	Upstream	Core	Downstream	TOTAL
Components for reuse	kg	0	0	0	0
Material for recycling	kg	0	0.0031	0	0.0031
Materials for energy recovery	kg	0	0	0	0
Exported energy, electricity	MJ	0	0.0022	0	0.0022
Exported energy, thermal	MJ	0	0	0	0

Environmental performance

Material with close to 100% recycled content

ARPRO REvolution - Potential environmental impacts, 1 kg

PARAMETER		UNIT	Upstream	Core	Downstream	TOTAL
Global warming potential (GWP)	Fossil	kg CO_2 eq.	0.96	0.21	0.032	1.20
	Biogenic	kg CO_2 eq.	0.020	0.0075	-5.02E-05	0.028
	Land use and land transformation	kg CO_2 eq.	0.0013	1.47E-06	0.00017	0.0019
	TOTAL	**kg CO_2 eq.**	**0.98**	**0.22**	**0.032**	**1.23**
Depletion potential of the stratospheric ozone layer (ODP)		kg CFC 11 eq.	4.01E-10	2.47E-15	3.23E-15	4.01E-10
Acidification potential (AP)		kg SO_2 eq.	0.0014	4.07E-06	2.35E-05	0.0014
Eutrophication potential (EP)		kg PO_4^{3-} eq.	0.0004	8.71E-06	6.10E-06	0.00042
Eutrophication freshwater (EP)		kg P eq.	1.58E-05	2.24E-07	2.14E-07	1.62E-05
Formation potential of tropospheric ozone (POCP)		kg C_2H_4 eq.	0.00017	5.01E-06	1.00E-07	0.00018
Abiotic depletion potential – Elements		kg Sb eq.	4.69E-07	1.06E-10	2.67E-09	4.72E-07
Abiotic depletion potential – Fossil resources		MJ, net calorific value	15.44	0.018	0.42	15.88
Water scarcity potential		m^3 eq.	0.20	0.15	0.00028	0.35

Environmental performance

Material with close to 100% recycled content

ARPRO REvolution - Use of resources, 1 kg

PARAMETER		UNIT	Upstream	Core	Downstream	TOTAL
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	14.11	0.0017	0.025	14.14
	Used as raw materials	MJ, net calorific value	0	0	0	0
	TOTAL	**MJ, net calorific value**	**14.11**	**0.0017**	**0.025**	**14.14**
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	17.23	0.019	0.43	17.68
	Used as raw materials	MJ, net calorific value	0	0	0	0
	TOTAL	**MJ, net calorific value**	**17.25**	**0.018**	**0.43**	**17.70**
Secondary material		kg	0.96	0.96	0	0.96
Renewable secondary fuels		MJ, net calorific value	0	0	0	0
Non-renewable secondary fuels		MJ, net calorific value	0	0	0	0
Net use of fresh water		m^3	0.012	0.0034	2.71E-05	0.016

Environmental performance

Material with close to 100% recycled content

ARPRO REvolution - Waste production, 1 kg

PARAMETER	UNIT	Upstream	Core	Downstream	TOTAL
Hazardous waste disposed	kg	1.97E-06	0	3.43E-12	1.97E-06
Non-hazardous waste disposed	kg	0.13	0.020	0.0091	0.16
Radioactive waste disposed	kg	0.00064	2.18E-07	6.30E-07	0.00064

ARPRO REvolution - Output flows, 1 kg

PARAMETER	UNIT	Upstream	Core	Downstream	TOTAL
Components for reuse	kg	0	0	0	0
Material for recycling	kg	0	0.0031	0	0.0031
Materials for energy recovery	kg	0	0	0	0
Exported energy. electricity	MJ	0	0.0022	0	0.0022
Exported energy. thermal	MJ	0	0	0	0

Additional information

- JSP is the first EPP supplier incorporating up to 25% recycled content in the product to produce ARPRO Recycled. This helps to reduce the amount of plastic waste that pollutes our environment and conserves resources.
- ARPRO 35 Ocean is made from 15% recycled maritime industry waste content. It has comparable physical properties and performance to ARPRO made from new material.
- ARPRO REvolution is the first EPP made with close to 100% recycled content. It is perfectly targeted for non-technical application such as packaging, leisure and furniture applications.
- ARPRO ESDP (electrostatic discharge protection) is ideal for the protection of electro-sensitive goods. ARPRO ESDP dissipates the electrical charge, therefore protecting goods packed with this material.
- ARPRO Porous provides energy absorption and has the ability to absorb and dampen sounds over a 400 to 10,000Hz frequency range.
- ARPRO FR (fire retardant) reduces flammability and delays combustion. It is self-extinguishing without the use of environmentally harmful halogenated chemicals.
- The on-site expansion grades allow for the material to be shipped at its bulk density and then expanded at the moulding site. This results in transport cost savings and efficient moulding due to tailored densities.
- ARPRO Colours – ARPRO is offered in five vibrant colours: Blueberry, Dragon Fruit, Orange, Lemon and Lime.
- JSP is committed to reduce the environmental impact of its production. As a result of optimizing processes, carbon footprint coming from the ARPRO production has been reduced by 52% over the last 10 years.
- Electricity for ARPRO production is only purchased from renewable sources. JSP is looking to reduce the ARPRO carbon footprint further and actively participates in the development of Green Energy.

Verification related information

See PCR for detailed requirements.

Published:	2022-05-16
Valid until:	2026-01-31
Product Category Rules:	Plastics in primary forms, 2010:16, version 3.01, UN CPC 347
Product group classification:	UN CPC 347, Plastics in primary forms
Reference year for data:	2021
Geographical scope:	Europe, Global

Independent verification of the declaration and data, according to ISO 14025:2006:	○ EPD Process Certification (internal)	✓ EPD Verification (external)
Third-party verifier:	Hüdai Kara, PhD Metsims Sustainability Consulting Turkey/United Kingdom	

Mandatory statements

The LCA for this EPD is conducted according to the guidelines of ISO 14040 and ISO 14044, the requirements given in Product Category Rules - Plastics in primary forms, 2010:16, version 3.01.
The inventory for the LCA study is based on the 2021 production. The production plants are located in JSP International, Z. I. Le Bois Chevalier, Route de Francières, 60190 Estrées-Saint-Denis, France and in JSP International, Průmyslový park 11/158, 350 02 Cheb, Czech Republic.
For the development of this declaration, GaBi software with the latest version of characterization factors (May 2022) and the Ecoinvent database were used.
This EPD covers the Cradle to Gate stage with options – transport to customer in average distance.
The EPD certificate, its background data and the results will be used for business-to-business communications and are expected to be a reliable document for any customer of JSP International. “EPDs within the same product category but from different programmes may not be comparable.”

Contact information

EPD owner:	JSP	JSP, www.ARPRO.com, sustainability@jsp.com
LCA author:	LCA Studio	Vladimír Kočí, PhD, Šárecká 5, 16000 Prague 6, Czech Republic, www.lcastudio.cz

References

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The International EPD® System The International EPD® System is a programme for type III environmental declarations, maintaining a system to verify and register EPD®s as well as keeping a library of EPD®s and PCRs in accordance with ISO 14025. www.environdec.com.

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