Environmental Product Declaration

In accordance with ISO 14025:2006 for:

Aluminum ingots from recycling

from

Albomay d.o.o.

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-10331
Publication date:	2024-01-31
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Valid until:	2029-01-31

This is an EPD for an individual manufacturer.
This EPD covers multiple products with the folowing 5 products: EN AB-46000 EN AB-AlSi9Cu3(Fe), EN AB-47100 EN AB-AlSi12Cu1(Fe), EN AB-42000 EN AB-AlSi7Mg, EN AB-42100 EN AB-AlSi7Mg0,3 & EN AB-43000 EN AB-AlSi10Mg.
This EPD of multiple products is based on worst-case results.

Programme information

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

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
PCR: *Basic Aluminum products and special alloys (version 1, 2022:08)* *UN CPC code: 4153 - Semi-finished products of aluminum or aluminum alloys*
PCR review was conducted by: *Hüdai Kara*
Life Cycle Assessment (LCA)
LCA accountability: *Jaka Jelenc, Greenium poslovno svetovanje S.P.*
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: *<name, organization, and signature of the third-party verifier>* Approved by: The International EPD® System
OR
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by accredited certification body Third-party verification: Odyssefs Papagiannidis, Bureau Veritas HSE Denmark, EPD Lead verifier under Bureau Veritas Certification Sweden AB accredited by SWEDAC is an approved certification body accountable for the third-party verification
OR

Independent third-party verification of the declaration and data, according to ISO 14025:2006 via:

☐ EPD verification by EPD Process Certification*

Internal auditor: <*name, organisation*>

Third-party verification: <*name, organisation*> is an approved certification body accountable for third-party verification

Third-party verifier is accredited by: <*name of accreditation body & accreditation number, where applicable*>

*For EPD Process Certification, an accredited certification body certifies and reviews the management process and verifies EPDs published on a regular basis. For details about third-party verification procedure of the EPDs, see GPI.

Procedure for follow-up of data during EPD validity involves third-party verifier:

☒ Yes ☐ No

[Procedure for follow-up the validity of the EPD is at minimum required once a year with the aim of confirming whether the information in the EPD remains valid or if the EPD needs to be updated during its validity period. The follow-up can be organized entirely by the EPD owner or together with the original verifier via an agreement between the two parties. In both approaches, the EPD owner is responsible for the procedure being carried out. If a change that requires an update is identified, the EPD shall be re-verified by a verifier]

"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"

Company information

Owner of the EPD:
Albomay d.o.o.
Cesta železarjev 8
4270 Jesenice
Slovenija
https://www.albomay.si/sl/

Description of the organization:
Albomay d.o.o. represents a family legacy deeply rooted in foundry tradition. Our company stands as a resilient, forward-thinking entity dedicated to meeting market needs. We prioritize advancing our technological capabilities and modernizing production while placing a strong emphasis on environmental conservation.

We strengthen our market presence through careful investments ensuring stability and delivering top-tier services. Our commitment extends to fostering trust-based relationships with business partners built on respect. Creating a supportive work environment and ensuring the satisfaction of our workforce are central, encouraging creativity and teamwork.

Operating both domestically and internationally across various markets, including Italy, Austria, the Czech Republic, Slovakia, Croatia, Bosnia and Herzegovina, we specialize in secondary non-ferrous metal processing, particularly aluminum scraps transformation and alloy production. We proudly stand as Slovenia's sole foundry specializing in aluminum shavings processing. Our products stand out for their high recycled aluminum content and adaptability to specific customer needs. Adhering strictly to technological standards ensures consistent delivery of high-quality merchandise, while staying updated on industry innovations keeps us progressive.

Our ultimate vision is to lead in the circular economy, actively contributing to environmental preservation through cutting-edge metal waste retrieval and processing technologies.

At the core of ALBOMAY d.o.o. lies a fundamental mission: customer satisfaction and nurturing lasting partnerships. We maintain an environment where employees feel valued and motivated, enhancing production efficiency and fostering innovation.

Our steadfast commitment to these objectives is evident in our pursuit of:

- Maintaining and strengthening our market position
- Achieving consistent annual growth
- Significantly investing in our workforce's knowledge and expertise
- Implementing processes to reduce environmental impact and energy consumption
- Optimizing excess heat utilization through specialized processes

Product-related or management system-related certifications:
ISO 9001:2015 Quality management systems requirements

Name and location of production site:
Albomay d.o.o.
Cesta železarjev 8
4270 Jesenice
Slovenija

Product information

Product name:
Aluminum ingots from recycling. The following: 5 products are within the scope of this EPD:
EN AB-46000, EN AB-AlSi9Cu3(Fe),
EN AB-47100, EN AB-AlSi12Cu1(Fe),
EN AB-42000, EN AB-AlSi7Mg,
EN AB-42100, EN AB-AlSi7Mg0,3
EN AB-43000, EN AB-AlSi10Mg

Product identification & description: An aluminum ingot represents a specific form of aluminum employed for the uncomplicated conveyance and storage of this metallic element. Notably, our product distinguishes itself through its elevated recycled aluminum content. Aluminum ingots serve as foundational raw materials within the industrial sphere, undergoing a series of intricate transformations to yield a diverse array of final products, including plates, bars, pipes, electronic enclosures, automotive components, and more. Aluminum's widespread acclaim arises from its exceptional attributes, such as its diminished density, robustness, resistance to corrosion, and proficient heat and electricity conductivity. As such, the aluminum ingot plays an indispensable role in the manufacturing of numerous items across diverse industries.

UN CPC code: 4153 - Semi-finished products of aluminum or aluminum alloys.

Geographical scope: Global

LCA information

Functional unit / declared unit: 1kg of aluminum ingots from recycling.
Reference service life: Not applicable
Time representativeness: Data refers to the year 2022.
Database(s) and LCA software used: LCA for Experts version 10.7.0.183, Sphera My professional database EN version 2023.1.

Description of system boundaries: Cradle to gate (upstream and core process). As basic aluminum is a semi-finished/intermediate product that need to be further processed to obtain the final consumer product, it can be physically integrated with other products in subsequent life-cycle processes (i.e. no longer identifiable) and its final use/end-of-life is unknown, system boundaries shall be limited to cradle-to-gate approach.
Upstream process:
Upstream process includes the production of raw and auxiliary materials & products. The parameters included in the upstream process are:

- aluminum and other metals alloy scrap sorting and pre-treatment (where applicable) carried out externally.
- production of raw materials used (e.g., chemical products and auxiliaries)
- generation of electricity and production of fuels, steam and other energy carriers used in upstream processes

Core process:
The core process includes processes within the production plant, where recycled aluminum ingot is produced. The parameters included in the core process are:

- transport of raw materials and scraps from suppliers to the production plant
- generation of electricity (including own photovoltaics), fuels, gasses (e.g., methane, nitrogen, LFO)
- consumption of water for production
- direct air emissions in the production plant
- treatment of water used during the production process;
- end-of-life treatment of waste and packaging materials of the products used in the plant.
- In the production process spillage of 7,5 % is included

Electricity consumption in core process was modelled using the national residual mix for

Slovenia according to the AIB report for year 2022.

Not significant data were neglected. The considered cut-off is under the threshold. of relevance (1% of total inputs), in accordance with the PCR Basic aluminum and special alloys 2022:08, version 1.0.

Excluded lifecycle stages:
Following processes are excluded from the study:

- scrap production i.e. processes from other previous lifecycles that generate (pre or post-consumer) scraps,
- ▪ maintenance of machineries and other operations made occasionally (i.e. > 3 years frequency) or in emergency situations,
- ▪ packaging of raw materials used for the manufacturing of aluminium, as it is considered irrelevant. use and end of life of the product.
- manufacturing of production equipment, buildings and other capital goods,
- ▪ maintenance of machineries and other operations made occasionally (i.e. > 3 years frequency) or in emergency situations,
- ▪ business travel of personnel,
- ▪ travel to and from work by personnel, and
- ▪ research and development activities, including the production and manufacture of laboratory equipment.

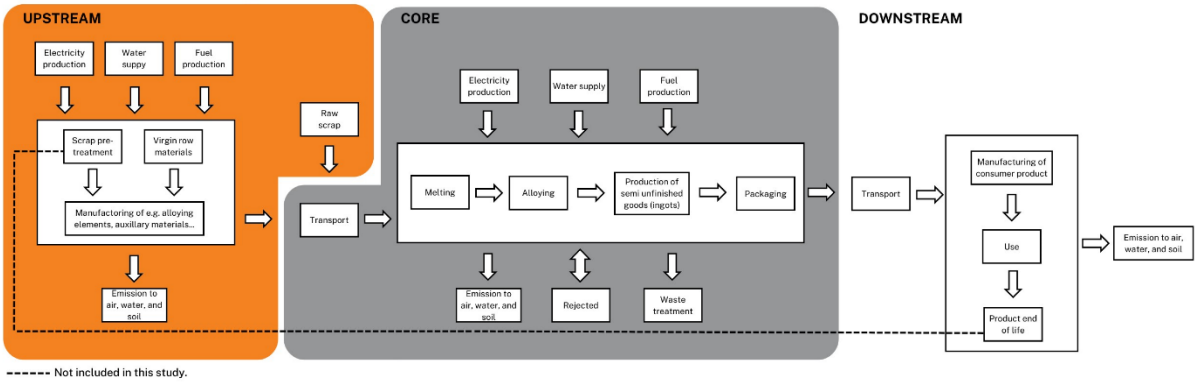
More information:
The LCA has been performed in compliance with ISO 14040:2021 and ISO 14044:2021, ISO 14025:2006. It is also in compliance with the GPI General Programme Instructions for the International EPD System, version 4,0 2021-03-29 v.4.0 and PCR Basic Aluminum products and special alloys (version 1, 2022:08)

Name and contact information of LCA practitioner: Jaka Jelenc, Greenium poslovno svetovanje S.P.

Assumptions used:

- If primary data was not received for metal (aluminum and other metals) alloy scrap sorting and pre-treatment if was assumed is has zero burdens.
- Internally recycled aluminum (own production waste) re-enters the system burden free but it is not part of recycled content.

System diagram:



Content declaration

Product

Product components	[kg]	%	Environmental / hazardous properties
Recycled aluminum (Secondary)	9,50E-01	95	/
Aluminum (internal recycling)	1,80E-02	2	/
Alloying elements (Si, Ti, Mn)	3,25E-02	3	/
TOTAL	1,00E+00	100	/

Results in this EPD are calculated for this composition (EN AB-42000 AlSi7Mg), the results for this composition are the highest in the studied 5 products (based on worst case results) and are valid for all 5 products under study.

Packaging

Plastic packaging:

- Foil 3,95E-05 kg
- Tape 2,70E-14 kg
- Clips 8,23E-05 kg
- Total 3,92E-04 (0,04 % of the mass of the product)

Recycled material

Provenience of recycled materials (pre-consumer or post-consumer) in the product: Recycled aluminum (secondary) is made from 100 % Post industrial aluminum scrap.

Results of the environmental performance indicators

Impact category indicators

PARAMETER		UNIT	Upstream	Core	TOTAL
Global warming potential (GWP)	Fossil	kg CO_2 eq.	3,22E-01	6,48E-01	9,69E-01
	Biogenic	kg CO_2 eq.	8,61E-03	1,28E-03	9,89E-03
	Land use and land transformation	kg CO_2 eq.	4,81E-04	6,14E-06	4,87E-04
	TOTAL	kg CO_2 eq.	3,31E-01	6,49E-01	9,79E-01
Ozone layer depletion (ODP)		kg CFC 11 eq.	1,09E-09	4,81E-12	1,10E-09
Acidification potential (AP)		mol H^+ eq.	1,27E-03	4,73E-04	1,75E-03
Eutrophication potential (EP)	Aquatic freshwater	kg P eq.	4,91E-06	1,24E-07	5,03E-06
	Aquatic marine	kg N eq.	2,54E-04	1,40E-04	3,94E-04
	Aquatic terrestrial	mol N eq.	2,69E-03	1,54E-03	4,23E-03
Photochemical oxidant creation potential (POCP)		kg NMVOC eq.	1,03E-03	5,11E-04	1,54E-03
Abiotic depletion potential (ADP)	Metals and minerals	kg Sb eq.	6,06E-08	2,46E-08	8,52E-08
	Fossil resources	MJ, net calorific value	4,36E+00	8,88E+00	1,32E+01
Water deprivation potential (WDP)		m^3 world eq. deprived	7,90E-02	8,01E-03	8,70E-02

Statement that the estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

Global warming potential breakdown

The biggest GWP impact is being generated in the core process (66 %), this is mainly due to the use of natural gas (52 %) to generate heat for production. The second biggest contributor in the core process is the consumption of electricity from the grid (8 %). Scrap pretreatment accounts for 1 % of the GWP total.

The Upstream process generates 34 % of the total GWP. The biggest part is being generated in the production of virgin Silicon. (32 %)

The GWP total for 1 kg of aluminum ingots from recycling is 0,98 kgCO_2eq.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, 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 characterization factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025."

Resource use indicators

PARAMETER		UNIT	Upstream	Core	TOTAL
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	4,03E+00	8,85E-01	4,91E+00
	Used as raw materials	MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00
	TOTAL	MJ, net calorific value	4,03E+00	8,85E-01	4,91E+00
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	4,36E+00	8,87E+00	1,32E+01
	Used as raw materials	MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00
	TOTAL	MJ, net calorific value	4,36E+00	8,87E+00	1,32E+01
Secondary material		kg	1,12E+00	0,00E+00	1,12E+00
Renewable secondary fuels		MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00
Non-renewable secondary fuels		MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water		m^3	3,74E-03	3,20E-04	4,06E-03

Waste indicators (optional)

PARAMETER	UNIT	Upstream	Core	TOTAL
Hazardous waste disposed	kg	-1,42E-10	1,19E-09	1,05E-09
Non-hazardous waste disposed	kg	9,62E-02	7,82E-03	1,04E-01
Radioactive waste disposed	kg	2,61E-04	1,85E-04	4,46E-04

Output flow indicators

PARAMETER	UNIT	Upstream	Core	TOTAL
Components for reuse	kg	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ per energy carrier	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ per energy carrier	0,00E+00	0,00E+00	0,00E+00

*Disclaimer for ADP (metals and minerals), ADP (fossil resources) & WDP, the results of these environmental impact indicators, shall be used with care as the uncertainties on these results are high or as there is limited experienced with indicator/s.

Additional environmental information

Our organization attained ISO 9001 certification in 2011 and ISO 14001 certification in 2024.

Tabel below shows the product compositions of the best-case Aluminium ingot:

Product components	[kg]	%
Recycled aluminum (Secondary)	9,90E-01	99,0
Aluminum (internal recycling)	6,46E-03	0,6
Alloying elements (Si, Ti, Mn, Sr)	3,23E-03	0,3
TOTAL	1,00E+00	100

The table below shows the GWPT results for the best-case ingot:

PARAMETER		UNIT	Upstream	Core	TOTAL
Global warming potential (GWP)	Total	kg CO_2 eq.	3,89E-02	6,31E-01	6,70E-01

Differences versus previous versions

- *Company description and ISO certification information updated.*

References

General Programme Instructions of the International EPD® System. Version 4.0. 2021-03-29

PCR: *Basic Aluminum products and special alloys Version 1, 2022:08*

ISO 14025:2006, Environmental labels and declarations – Type III Environmental declarations – Principles and procedures.

ISO 14040:2006, Environmental management – Life cycle assessment – Principles and framework
.
ISO 14044:2006, Environmental management – Life cycle assessment – Requirements and guidelines

LCA for experts LCA program (Sphera – LCA FE) version: 10.7.0.183 https://sphera.com/life-cycle-assessment-lca-software/

My professional database EN database version: 2023.1 https://sphera.com/life-cycle-assessment-lca-database/

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