ENVIRONMENTAL PRODUCT DECLARATION ALUMINIUM PACKAGING

» MONOBLOC AEROSOL CANS
» BOTTLES

Registration number:
S-P-02313

Product Category Rules:
Packaging Products
PCR 2019:13 - Version 1.0
Valid until:
2023/11/08

CPC Code:
42931

Registration date:
2021/02/03
Valid until:
2026/02/02

Geographical scope:
Global

Programme Operator:
The International EPD® System
www.environdec.com

This EPD has been developed in conformity to ISO 14025. 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

tecnocapgroup.com Tecnocap Group @tecnocapgroup

OBJECTIVE OF THE ENVIRONMENTAL PRODUCT DECLARATION - EPD®

This document is the Environmental Product Declaration for Aluminum Aerosol Cans and Bottles manufactured by Tecnocap in the Italian plant of Lecco.

The Declaration is registered according to the EPD® Program 3.1 developed by The International EPD® System and the Product Category Rules (PCR) relating to packaging products: Packaging Product Category Classification: multiple CPC - UN – CPC Code 42931 - PCR 2019: 13 - Version 1.0 – Valid until: 2023-11-08.

Tecnocap Spa intends to use this study to understand the critical impacts of its supply chain, improve its processes and communicate what has been achieved by deepening its commitment to economic and environmental sustainability issues related to the development of its products.

TECNOCAP GROUP HIGHLIGHTS

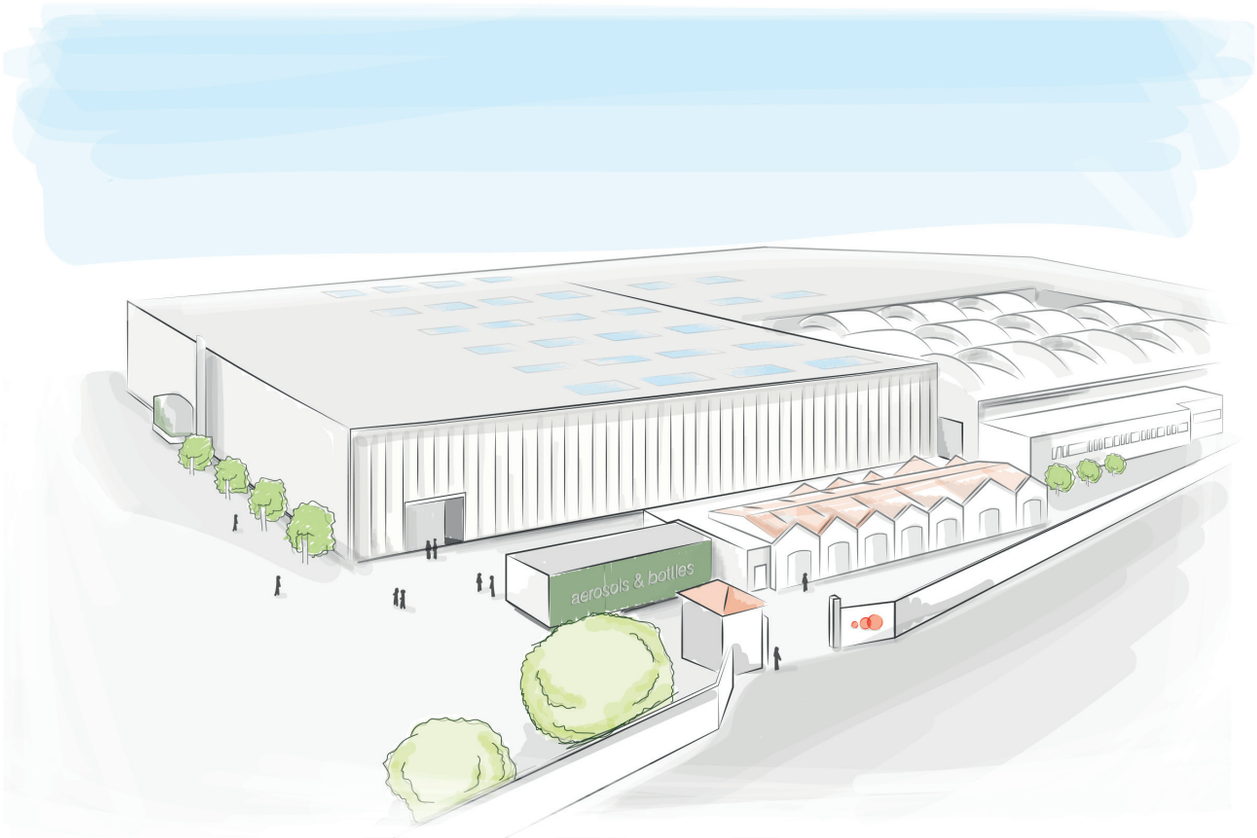
100 Presence in over one hundred countries

9 Nine Production Facilities

3 Three R&D and Engineering Centers

1000 Employees

2 Envinronmental Product Declaration

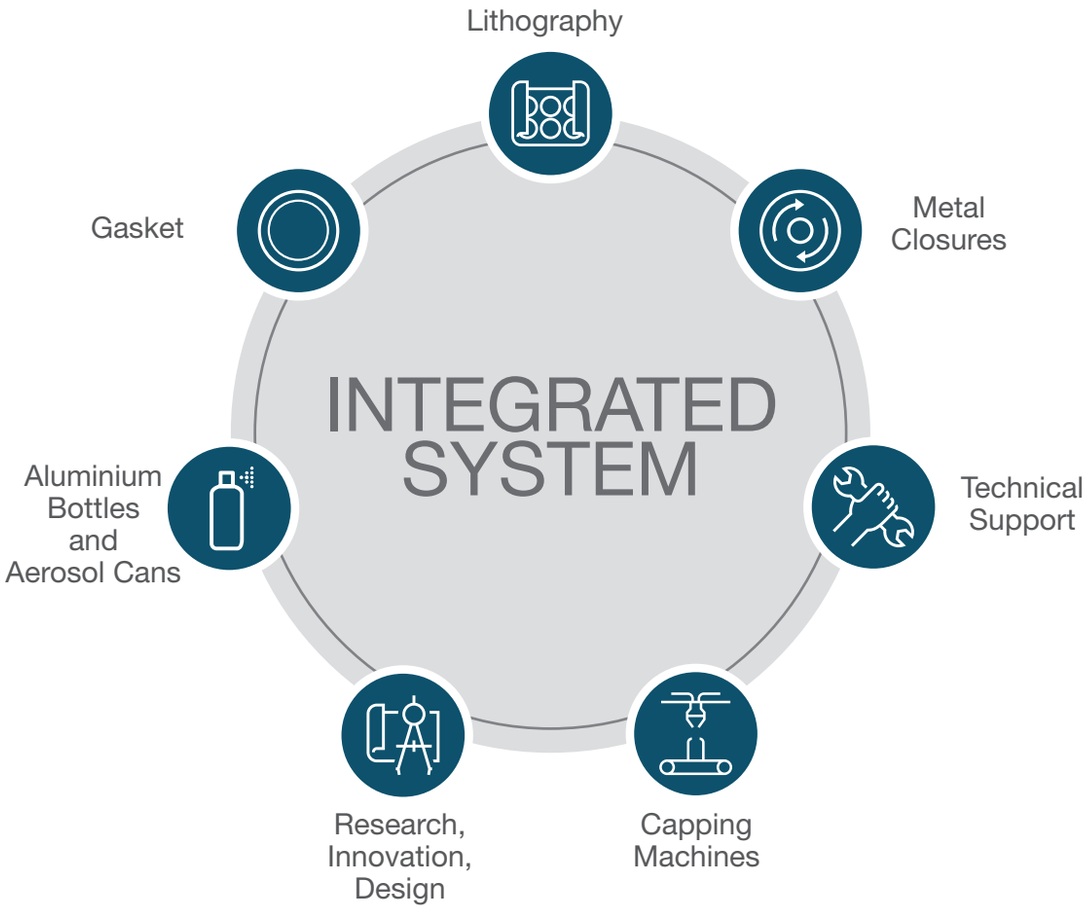


TECNOCAP GROUP

Tecnocap Group is a worldwide metal packaging manufacturer, specialized in Metal Closures for glass jars and plastic containers and in manufacturing aluminum Bottles and Aerosol Cans.

The Group is one of the biggest producers of tinplate and aluminum Closures as well as aluminum monobloc Aerosol Cans and aluminum Bottles for some of the world's best known consumer brands in food, beverages, spirits, cosmetics, nutraceuticals, pharmaceuticals, industrial and household products.

Tecnocap commitment goes beyond providing the best quality product. The company helps its clients succeed by enhancing the identity of their brand and preserving the safety of their product working as a partner and advisor, improving existing products and developing new designs & engineering solutions, taking in account ecodesign principles and guidelines.



MARKETS

- Food & Drink
- Beauty, Personal Care and Hygiene
- Pharmaceuticals & Nutraceuticals
- Candles
- Wine & Alcoholic Beverages
- Professional

TECNOCAP

Constantly evolving technologies and tailored engineering projects are key factors which drive the Tecnocap market reputation and business growth. The group heavily invests in **improving production performance, total quality management and lean manufacturing principles.**

Sustainability is a key point for all Tecnocap activities and strategic decisions.Tecnocap works closely with its customers to support them in reaching their sustainability targets by providing sustainable packaging solutions.

In 2020 Tecnoocap published its first Sustainability Report, prepared in accordance with the Sustainability Reporting Standards of the Global Reporting Initiative (GRI) Standard "Core".

Report is available in pdf format, at:
https://www.tecnocapclosures.com/sustainability-metal-packaging/

CERTIFICATIONS

Tecnocap has developed and implemented an Integrated Management System related to workplace Safety and the Environment and has acquired recognition of compliance with relevant international standards.

ISO 9001 Quality Management Standard	BRC/IOP AIB	ISO 14000 Environmental Standard and SMETA 4 Pillare	ISO 45001:2018
Tecnocap SpA Italy Tecnocap TL Italy Tecnocap Czech Rep. Tecnocap Spain Tecnocap USA Tecnocap Ukraine	Tecnocap Italy Tecnocap USA Tecnocap Czech Rep.	Tecnocap Italy Tecnocap Czech Rep.	Tecnocap Italy

PRODUCTS

Leader in developing and manufacturing Metal Packaging Solutions and Capping Machines.
Tecnocap provides innovative and customized solutions to meet the requirements of the world's best known consumer brands.

Tecnocap plant in Lecco (Italy) produces three categories of aluminum packaging:

- **ALUMINIUM AEROSOL CANS**
- **ALUMINIUM BOTTLES**
- **ALUMINIUM BOTTLES FOR BEER AND SOFT DRINKS**

PRODUCTS: AEROSOL CANS

The monobloc aluminum aerosol cans guarantee excellent barrier properties for product integrity. It can be used for any type of propellant and formulation.

Easy to store, the aerosol can allows safe management throughout the entire supply chain and it is the ideal packaging for a large number of products:

- Cosmetics, body and hair care
- Food industry, with products such as fresh cream and cream toppings
- Dyes, insecticides and chemicals
- Home and car care
- Medical devices and over-the-counter drugs

The monobloc cylinder has no joints.
It is a hermetically sealed container, particularly safe, which guarantees high resistance to internal pressure (standard: 12 and 18 bars).
Painting: 7 colors and even more.
Special finishes and infinite lithographic possibilities.

PRINTING

- **7 colors and more**
  Special finishes and unlimited design possibilities.

OPTIONS

- **Glitter effect**
- **Pearlescent effect**
- **Brushed aluminium effect**
- **Multicolor coatings**

AVAILABLE SHOULDER OPTIONS

PRODUCTS: ALUMINUM BOTTLES

Aluminum Bottles are widely used for the packaging of Personal Care, Beverages, essential oils, aromatic fragrances, perfumes, chemicals and much more.

Why choose Aluminum Bottles:

- Ultralight
- Compact size with small footprint for easy storage and easy carrying
- Unbreakable, safe and shatter-proof
- Chill quickly and allows beverages to stay fresh for longer
- 100% Barrier against light
- 360° printing surface to enhance brand value

Aluminum has the highest recycling rate of any other packaging materials. is a material with a modern look. This packaging solution is Ultralight, safe and **totally recyclable** and lends itself to the design of packaging of products with a high visual impact intended for the young target or premium segments.

PRINTING

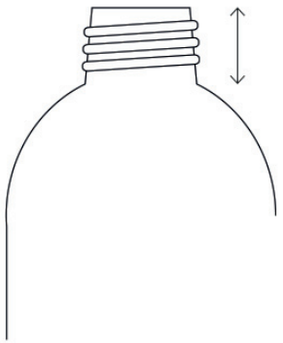
- **7 colors and more**

Special finishes and unlimited design possibilities.

OPTIONS

- **Glitter effect**
- **Pearlescent effect**
- **Brushed aluminium effect**
- **Multicolor coatings**

CUSTOMIZABLE HEIGHTS



GPI&ROPP

Neck finishes available

PRODUCTS: ALUMINUM BOTTLES FOR THE BEVERAGE INDUSTRY

Aluminum Bottles are **the most impacting and elegant packaging for beverage industry**.

The bottles are custom all round printed with the customer's artwork in up to 7 colors, using a very high-quality dry-offset printing process. A variety of other visually striking print effects are available, including matte and gloss finishes, metallic and specialty inks, and a variety of base coating options. The final product is capped using ROPP or crown capping technology.

The final product is capped using ROPP (28 / 30) or Crown capping technology.

The benefits of the Aluminum Bottle include:

- Ultralight
- Compact size with small footprint for easy storage and easy carrying
- Unbreakable, safe and shatter-proof
- Chill quickly and allows beverages to stay fresh for longer
- 100% Barrier against light
- 360° printing surface to enhance brand value

Perfect for:

- Beer, wine and other alcoholic beverage
- Energy and sports drinks
- Iced teas and coffees
- Fruit juices
- Dairy beverages
- Carbonated soft drinks
- Meal replacement and nutritional beverages

PRODUCTS OBJECT OF THE EPD® AND DECLARED UNIT

Object of the study are Aerosol cans and Bottles produced in Tecnocap plant in Lecco (Italy), made with primary aluminium, diameters ranging from 35mm to 74mm and heights from 85mm to 263mm.

The study includes all upstream processes of extraction and transformation of raw materials, Tecnocap plant manufacturing phase ends at the company gate.

The declared unit is 1 ton of aluminium transformed in aerosol bottles/cans and in bottles.

The declared unit includes, per 1 ton, 14.3 kg of corrugated packaging and 21,5 kg of plastic packaging.

This unit (1ton), also indicated by the reference PCR, is considered sufficiently clear for the user in order to evaluate the impacts regardless of the size of the product.

Reference year is 2019.

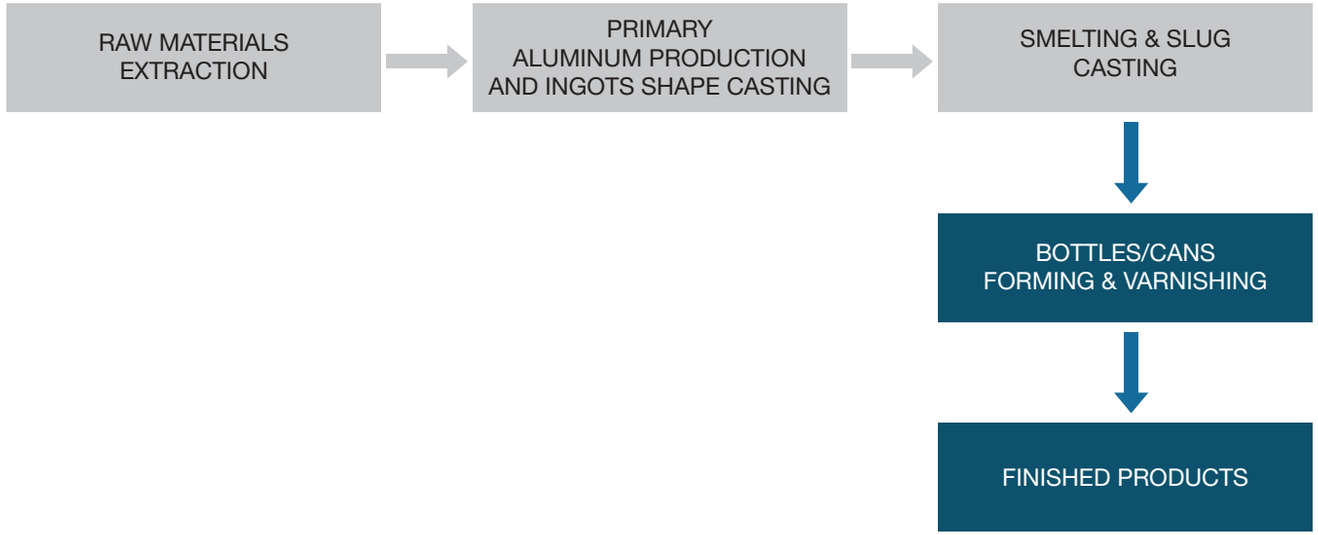
MANUFACTURING PROCESS

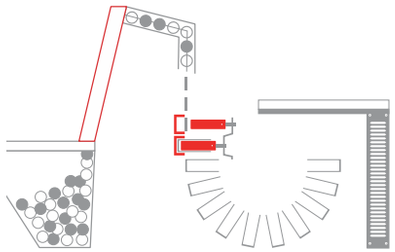
Aluminum is made from a material found in the earth's crust. It occurs naturally in a mineral called bauxite. The aluminum in bauxite is formed when the material is refined to remove impurities. The refining process produces a fine, white powder called alumina or aluminum oxide. Electricity "zaps" the aluminum powder with a continuous electric current, which separates the aluminum from the oxygen.

The electricity melts the aluminum so that it is hot and bubbly, like lava. Next, small amounts of other metals are added to the molten aluminum to add strength and corrosion resistance to the final product (the addition of zinc to aluminum - in conjunction with some other elements, primarily magnesium and/or copper - produces heat-treatable aluminum alloys of the highest strength).

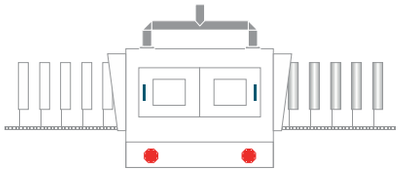
The molten metal is cast into ingots or blocks, which are then melted again and shape-casted into slugs (metal disks that are impact extruded to make aerosol cans, aluminum collapsible tubes and bottles).

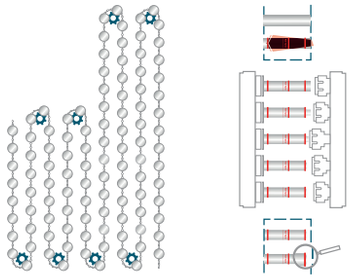
Aerosol cans are made from a process known as impact extrusion. In an impact extrusion process, a hydraulic ram punches an aluminum slug to begin forming the can.
The sides of the can are thinned to approximately 0.40 mm through an ironing process that lengthens the walls of the can. The rough edges of the wall are trimmed and the can is passed through a serves of necking dies to form the top of the can.



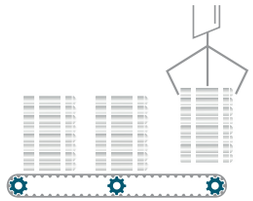


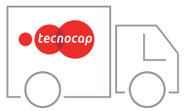
Innovative Packaging to guarantee Quality and Safety

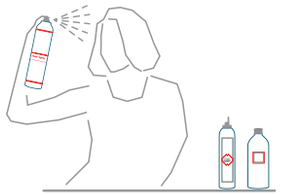




We believe in Sustainable Packaging

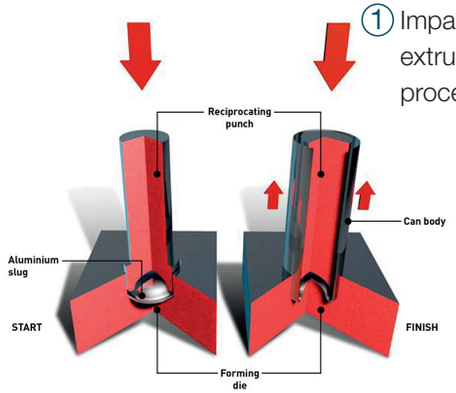






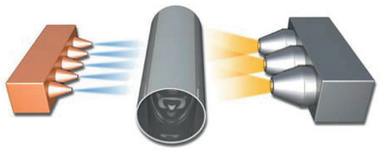
Today and Tomorrow

MANUFACTURING PROCESS

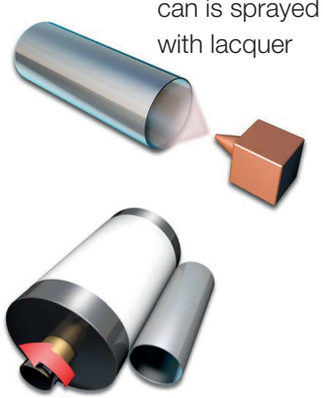


① Impact extrusion process

② Trimming to remove the surplus (the surplus material is recycled)



③ The trimmed can bodies are washed and dried



④ The inside of each can is sprayed with lacquer

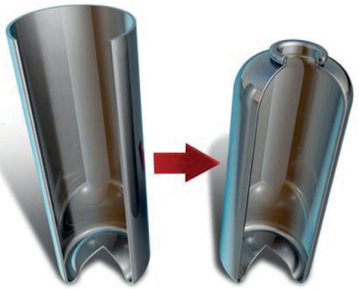
⑤ External coating with a clear or pigmented base coat

⑥ Oven Curing

⑦ Design printing and overvarnish

⑧ Oven to dry the ink and varnish

⑪ Pallettization



⑨ Forming process to form a smooth top and roll flange to accept the aerosol valve/spray mechanism

⑩ Pressure Testing (rejects any cans with pinholes or fractures).

TECNOCAP SPA LCA: AIMS AND PURPOSE OF THE STUDY

Tecnocap intends to use this LCA study to **understand** critical impacts in its supply chain, improve processes and **communicate** what has been achieved by deepening its commitment towards the issues of economic and environmental sustainability linked to the development of its products.

It is planned not to publish the study but to make available an Environmental Product Declaration derived from this analysis according to the international EPD® system (Environmental Product Declaration).

The purpose of this document is to illustrate how the Life Cycle Assessment (LCA) study has been conducted and its results obtained: the study follows a **Cradle-to-Gate** approach.

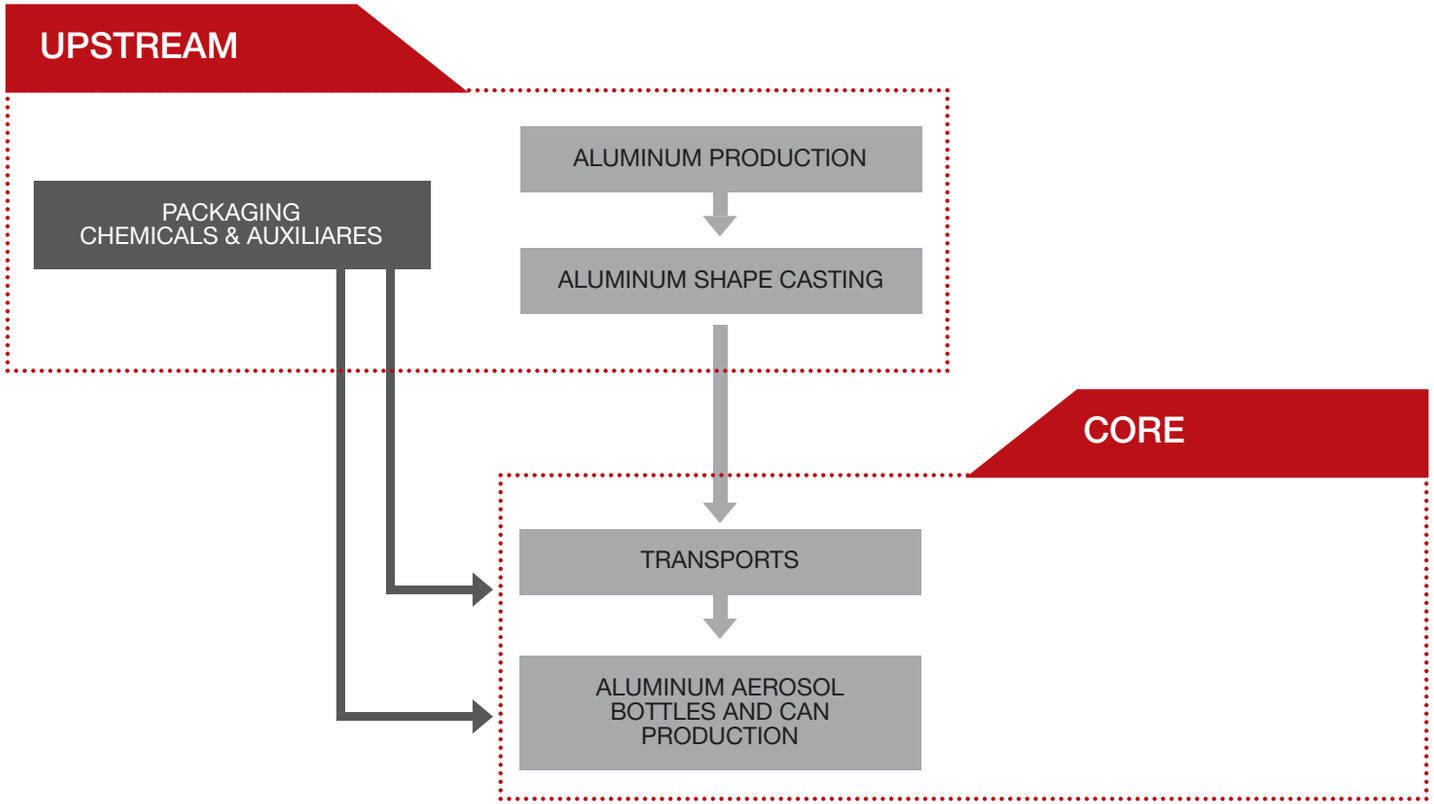
This study was completed on 15 october 2020 and was conducted in accordance with ISO 14044 and considering the reference PCR: Packaging Product Category Classification: multiple CPC - UN – CPC Code 42931 - PCR 2019: 13 - Version 1.0 – Valid until: 2023-11-08.

TECNOCAP LCA

The life cycle phases of the products considered in the system range **from Cradle to Gate**.
Following the General Programme Instructions and the applied PCR, potential benefit gained from recycling of aluminium new scraps cannot be credited or associated to Tecnocap's LCA but will benefit subsequent users.

Anyway, according to the World Aluminum Association (WAA) and its publication LCI and Environmental Metrics for the Primary Aluminum Industry – 2017, it is possible to take in account and benefit the manufacturer some recycling credit when modeling the aluminum can and bottles recycling system. This topic will be illustrated in the "Additional information chapter" on the potential benefits of environmental impact deriving from recycling credit. (see pag. XY)

In this LCA study all aluminum production phases have been considered, from raw materials extraction to ingots shaping, from subsequent phase of smelting and slug casting to aerosol bottles and cans production. Transport at every stage, management of products, by-products and waste, as well as the use of energy sources are therefore included. The phases of the life cycle of the products were then grouped into upstream and core processes as required by the reference PCR.



PRODUCT LIFE CYCLE ANALYSIS METHODOLOGY

The life cycle analysis was conducted in accordance with ISO 14044 and 14040, following the path that includes the phases of defining the objective, purpose and scope, inventory analysis (LCI), impact assessment (LCIA) and interpretation of results.

The reference year chosen is 2019. The reference guidelines adopted refer to the Product Category Rules (PCR) relating to packaging products: *Packaging Product Category Classification: multiple CPC - UN – CPC Code 42931 - PCR 2019: 13 - Version 1.0 – Valid until: 2023-11-08*.

The environmental indicators were evaluated using the CML-IA Baseline Version 3.02 / EU25 method, Cumulative Energy Demand (CED) v.1.09, WSI (Water Scarcity Index) Pfister el al 2009 v. 1.02: SimaPro software version 9.1.0.8 and the Ecoinvent database version 3.6 were used for the analysis.

ENVIRONMENTAL IMPACTS ASSESSED

The following environmental impacts were analyzed as required by the *General Program Instructions for the International EPD® System 3.0*

- » GWP (FOSSIL, BIOGENIC, LAND USE AND TRANSFORMATION)
- » PHOTOCHEMICAL OXIDATION
- » ACIDIFICATION
- » EUTROPHICATION
- » ABIOTIC DEPLETION (FOSSIL FUELS)
- » ABIOTIC DEPLETION
- » WSF (WATER SCARSITY FOOTPRINT

LCIA METHODS

The CML-IA Baseline Version 3.02 / EU25 method was used to assess the environmental impacts in Simapro software in accordance with the objective of the study and with the reference PCR that requires calculating:

Emissions of climate-changing gases
as the sum of GWP, 100 years, in CO2 equivalent.

Emissions of acidifying gases
(AP - acidification potential), as the sum of the acidification potentials expressed as SO2 - equivalent sulfur dioxide.

Gas emissions that contribute to the creation of ozone levels in the air
(POCP - photochemical ozone creation potential) as the sum of equivalent C2H4 (ethylene) ozone creation potentials.

Emissions of substances in water that contribute to the reduction of aquatic oxygen
as PO4-equivalent phosphates
(EP - eutrophication potential).

Depletion of abiotic resources (elements):
this impact category quantifies the consumption of abiotic resources linked to the extraction of the materials involved in the production process. The characterization factor is expressed in kg Sb eq (antimony) and is a function of the current state of the resource and the extraction rate.

Depletion of abiotic resources (fossils):
the consumption of abiotic resources from fossil fuels is indicated as ADP (abiotic depletion potential) and expresses the consumption of resources by relating it to the lower calorific value (MJ / kg) for each m3 of fuel extracted.

Pfister Water Scarsity Index (WSI):
measures the impact of water consumption in energy production in m^3.

The environmental impacts are those prescribed by the General Program Instructions 3.0 for EPD® and the method is accepted internationally.

ENVIRONMENTAL PRODUCT DECLARATION

» ALUMINIUM MONOBLOC AEROSOL CANS
» ALUMINIUM BOTTLES

ENVIRONMENTAL PRODUCT DECLARATION

ENVIRONMENTAL IMPACTS				
IMPACY CATEGORY	UM	UPSTREAM	CORE	TOTAL
Carbon dioxide (fossil)	kg CO2 eq	10.858	3.782	14.639
Carbon dioxide (land use & transformation)	kg CO2 eq	111,646	16,844	128,491
Carbon dioxide (biogenic)	kg CO2 eq	18,496	1,119	19,615
TOTAL	kg CO2 eq	10.987,661	3.799,497	14.787,159
Other emission factors	kg CO2 eq	2.900,173	346,518	3.246,690
GLOBAL WARMING (GWP100a) TOTAL	kg CO2 eq	13.887,834	4.146,015	18.033,849
Abiotic depletion	kg SO2 eq	109,831	18,956	128,787
Abiotic depletion (fossil fuels)	kg PO4--- eq	5,986	4,405	10,391
Photochemical oxidation	kg C2H4 eq	6,376	1,096	7,472
Acidification	kg Sb eq	0,009	0,001	0,010
Eutrophication	MJ	165.268	64.517	229.785
Water scarcity Footprint	m3	11,947	58,751	70,697

ENVIRONMENTAL PRODUCT DECLARATION

CUMULATIVE ENERGY DEMAND - CED V.1.09				
IMPACT CATEGORY	UNIT	TOTAL	UPSTREAM	CORE
Non renewable, fossil	MJ/ton	229.791	165.274	64.518
Non-renewable, nuclear	MJ/ton	2.194	1.490	704
Non renewable, biomass	MJ/ton	68	68	0
Renewable, biomass	MJ/ton	1.014	1.026	-12
Renewable, wind, solar	MJ/ton	7.343	58	7.285
Renewable, water	MJ/ton	6.328	490	5.839
TOTALS		246.739	168.405	78.334

ENVIRONMENTAL PRODUCT DECLARATION

USE OF RESOURCES					
PARAMETER		UM PER TON	UPSTREAM	CORE	TOTAL
Primary Energy non renewable	Used as energy carrier	MJ, net calorific value	166.831	65.222	232.053
	Used as raw material	MJ, net calorific value	0	0	0
	TOTAL	MJ, net calorific value	166.831	65.222	232.053
Primary Energy renewable	Used as energy carrier	MJ, net calorific value	1.574	13.112	14.686
	Used as raw material	MJ, net calorific value	0	0	0
	TOTAL	MJ, net calorific value	1.574	13.112	14.686
Auxiliary materials		Kg/ton	0	259,523	259,523
Renewable secondary fuels		MJ, net calorific value	0	0	0
Non renewable secondary fuels		MJ, net calorific value	0	0	0
Net use of fresh water WSI		m3/ton	11,947	58,751	70,697

ENVIRONMENTAL PRODUCT DECLARATION

WASTE PRODUCTION				
PARAMETER	UM	UPSTREAM	CORE	TOTAL
Hazardous waste disposed	kg/ton	0	22,494	22,494
Non hazardous waste disposed	kg/ton	0	161,09	161,09
Radioactive waste disposed	kg/ton	0	0	0

WASTE AND ENERGY OUTPUT FLOWS				
PARAMETER	UM	UPSTREAM	CORE	TOTAL
Components for reuse	kg/ton	0	0	0
Materials for recycling	kg/ton	0	332,36	332,36
Materials for energy recovery	kg/ton	0	0	0
Exported energy: electricity	MJ/ton	0	0	0
Exported energy: thermal	MJ/ton	0	0	0

ENVIRONMENTAL PRODUCT DECLARATION

INVENTORY ANALISYS				
RESOURCES - NON RENEWABLES				
ENERGY	UM	TOTAL	UPSTREAM	CORE
Energy	kg/ton	901,299	96,033	805,266
Coal	m3/ton	2.904,147	1.716,865	1.187,281
Gas, natural, 35 MJ per m3	kg/ton	888,066	819,677	68,389
MATERIALS	UM	TOTAL	UPSTREAM	CORE
Bauxite	kg/ton	5.857,776	5.857,776	0,000
Calcite	kg/ton	94,485	60,282	34,203
Gravel	kg/ton	361,272	72,886	288,386
Limestone	kg/ton	190,190	190,190	0,000
Nitrogen	kg/ton	8,475	5,664	2,811
Sodium chloride	kg/ton	204,362	202,421	1,941
Oxygen	kg/ton	83,932	11,888	72,044
Gangue, bauxite, in ground	kg/ton	13,889	7,967	5,922
Clay, unspecified	kg/ton	18,584	11,351	7,234
Potassium chloride	kg/ton	4,471	4,464	0,006
Barite	kg/ton	3,971	0,375	3,596

ENVIRONMENTAL PRODUCT DECLARATION

INVENTORY ANALISYS				
RESOURCES - RENEWABLES				
ENERGY	UM	TOTAL	UPSTREAM	CORE
Energy, biomass	MJ/ton	878	890	-12
Energy, potential (hydrpwr resev)	MJ/ton	6.086	247	5.839
Energy, geothermal, converted	MJ/ton	6.643	24	6.620
Energy, kinetic (in wind), converted	MJ/ton	691	26	665
NET USE OF FRESH WATER	UM	TOTAL	UPSTREAM	CORE
WSI	m3/ton	70,697	58,750	11,947

ENVIRONMENTAL PRODUCT DECLARATION

Sensitivity analisys were conducted to evaluate the behavior of the system under study according to the variation of the following parameters:

- Distances and type of vehicles used
- 50% recycled raw material
- 100% recycled raw material

A sensitivity analysis was conducted by replacing all Euro 5 transport with Euro 3 vehicles and assuming a double distance (2459 km by truck and 572 nm by ship) for raw materials transports). The GWP increase was only 0,6%.

SENSITIVITY ANALISYS				
PARAMETER	UNIT	UPSTREAM	CORE	TOTAL
Sensitivity hypothesis	kg CO2e/ton	13.887,830	4.263,965	18.151,800
Actual LCA study	kg CO2e/ton	13.887,834	4.146,015	18.033,849
Delta	kg CO2e/ton	0	117,950	+117,950
Delta GWP %	kg CO2e/ton			+0,6%

ENVIRONMENTAL PRODUCT DECLARATION

A sensitivity analisys was conducted replacing the primary aluminium raw material with a 50% recycled content one.

		LCA ALUMINIUM AEROSOL CANS AND BOTTLES			SENSITIVITY ANALISYS 50% RECYCLED CONTENT			
PARAMETER	UM	UPSTREAM	CORE	TOTAL	UPSTREAM	CORE	TOTAL	DELTA
Carbon dioxide (fossil)	kg CO2 eq	10.858	3.782	**14.639**	9.113	3.782	**12.895**	-11,92%
Carbon dioxide (biogenic)	kg CO2 eq	111,646	16,844	**128,491**	106,399	16,844	**123,243**	-4,08%
Carbon dioxide (land use & transformation)	kg CO2 eq	18,496	1,119	**19,615**	18,491	1,119	**19,610**	-0,03%
TOTAL	kg CO2 eq	10.987,661	3.799,497	**14.787,159**	9.237,876	3.799,497	**13.037,374**	-11,83%
Other emission factors	kg CO2 eq	2.900,173	346,518	**3.246,690**	2.271,478	346,518	**2.617,996**	-19,36%
GWP TOTAL	kg CO2 eq	13.887,834	4.146,015	**18.033,849**	11.509,355	4.146,015	**15.655,370**	**-13,19%**
Acidification (AP)	kg SO2 eq	109,831	18,956	**128,787**	102,120	18,956	**121,076**	-5,99%
Eutrophication (EP)	kg PO4--- eq	5,986	4,405	**10,391**	4,524	4,405	**8,929**	-14,07%
Photochemical oxidation	kg C2H4 eq	6,376	1,096	**7,472**	5,945	1,096	**7,040**	-5,78%
Abiotic depletion	kg Sb eq	0,009	0,001	**0,010**	0,004	0,001	**0,005**	-49,72%
Abiotic depletion (fossil fuels)	MJ	165.268	64.517	**229.785**	158.507	64.517	**223.025**	-2,94%
Water scarcity Index	m3	11,947	58,751	**70,697**	11,516	58,751	**70,266**	-0,61%

ENVIRONMENTAL PRODUCT DECLARATION

A sensitivity analisys was conducted replacing the primary aluminium raw material with a 100% recycled content one.

		LCA ALUMINIUM AEROSOL CANS AND BOTTLES			SENSITIVITY ANALISYS 100% RECYCLED CONTENT			
PARAMETER	UM	UPSTREAM	CORE	TOTAL	UPSTREAM	CORE	TOTAL	DELTA
Carbon dioxide (fossil)	kg CO2 eq	10.858	3.782	**14.639**	3.910	3.782	**3.857**	-73,65%
Carbon dioxide (biogenic)	kg CO2 eq	111,646	16,844	**128,491**	105,173	16,844	**122,017**	-5,04%
Carbon dioxide (land use & transformation)	kg CO2 eq	18,496	1,119	**19,615**	18,491	1,119	**19,610**	-0,03%
TOTAL	kg CO2 eq	10.987,661	3.799,497	**14.787,159**	4.033,524	3.799,497	**3.998,974**	-72,96%
Other emission factors	kg CO2 eq	2.900,173	346,518	**3.246,690**	307,929	346,518	**4.488,494**	38,25%
GWP TOTAL	kg CO2 eq	13.887,834	4.146,015	**18.033,849**	4.341,453	4.146,015	**8.487,468**	**-52,94%**
Acidification (AP)	kg SO2 eq	109,831	18,956	**128,787**	38,952	18,956	**57,909**	-55,04%
Eutrophication (EP)	kg PO4--- eq	5,986	4,405	**10,391**	2,097	4,405	**6,502**	-37,43%
Photochemical oxidation	kg C2H4 eq	6,376	1,096	**7,472**	2,452	1,096	**3,548**	-52,52%
Abiotic depletion	kg Sb eq	0,009	0,001	**0,010**	0,004	0,001	**0,005**	-49,72%
Abiotic depletion (fossil fuels)	MJ	165.268	64.517	**229.785**	70.946,280	64.517,305	**135.464**	-41,05%
Water scarcity Index	m3	11,947	58,751	**70,697**	11,516	58,751	**70,266**	-0,61%

ADDITIONAL ENVIRONMENTAL IMPACT INFORMATION ABOUT TECNOCAP: ALUMINIUM AEROSOL CANS/BOTTLE AND ALUMINIUM BOTTLES RECYCLING CREDIT APPROACH

The life cycle phases of the products considered in the system range from cradle to gate. Following the General Programme Instructions and the applied PCR, potential benefit gained from recycling of aluminium new scraps cannot be credited or associated to Tecnocap's LCA but will benefit subsequent users.

Anyway, according to the World Aluminium Association (WSA) and its publication *LCI and Environmental Metrics for the Primary Aluminium Industry – 2017*, it is possible to assign a recycling credit to manufacturer by means of two approaches when modeling the aluminium can and bottles recycling system (closed loop recycling approach and recycled content approach).

In this chapter we will study the effects on Tecnocap environmental impact using **The closed loop approach** for company's productions based on primary aluminium only. The method is based on product life cycle and material stewardship perspective.

ADDITIONAL ENVIRONMENTAL IMPACT INFORMATION ABOUT TECNOCAP: ALUMINIUM AEROSOL CANS/BOTTLE AND ALUMINIUM BOTTLES RECYCLING CREDIT APPROACH

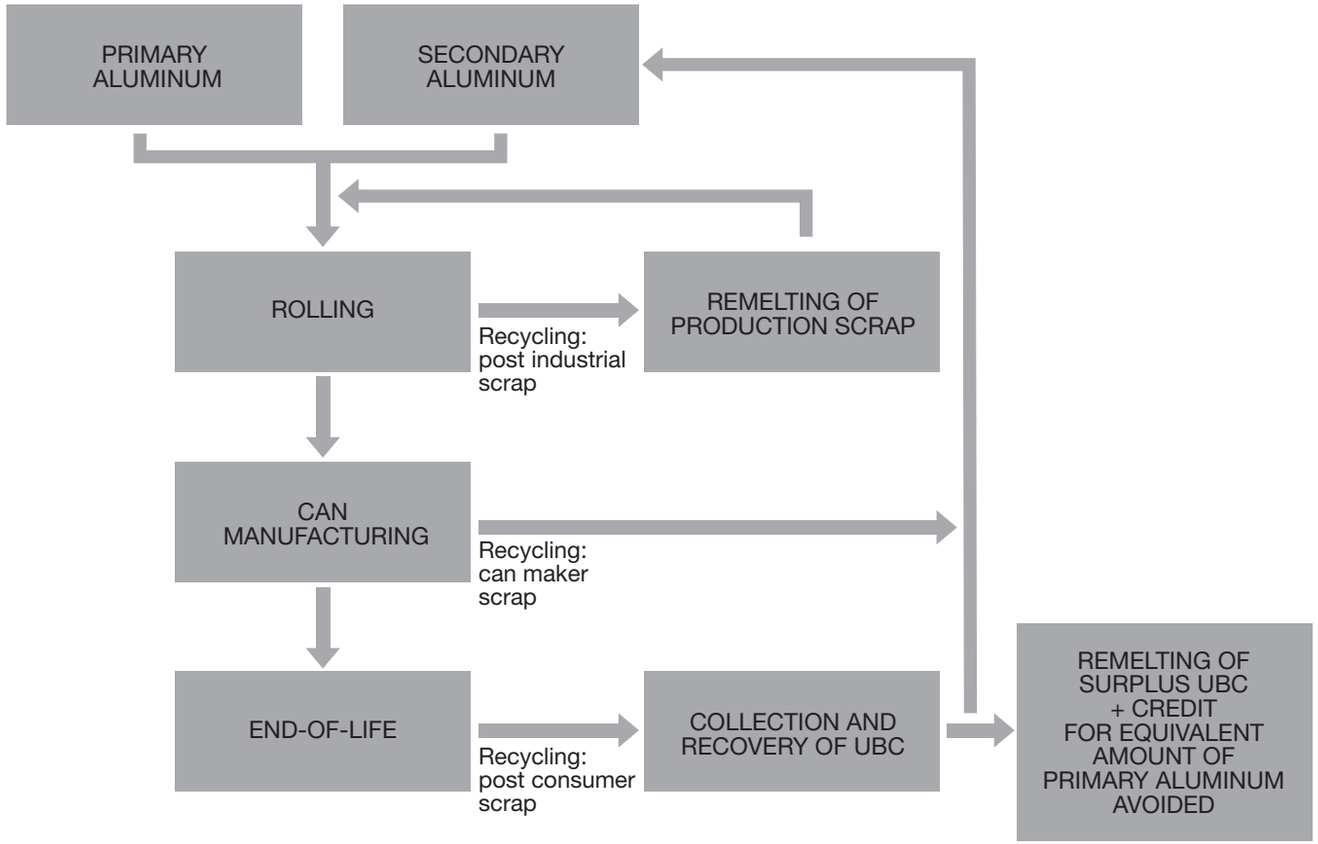
It considers the fate of products after their use phase and the resultant material output flows.

Under this framework, the product being examined is considered to be completely recycled once it reaches the EoL (End Of Life) phase. Material losses during the collection and processing of UBC as well as those associated with the production of secondary material feedstock out of UBC are taken into account. Consistent with ISO 14044, these losses are considered to be replaced by primary material feedstock.

If the amount of UBC scrap generated is less than what the product system requires, then the environmental burdens associated with meeting the secondary raw material feedstock demand are included in this closed-loop model, i.e. the environmental implications associated with supplementary raw material production is considered. If, however, the amount of UBC scrap is larger than what the product system requires (zero), then the product system receives a net credit, equivalent to the sum of environmental impacts from primary material extraction and re-melting of surplus post-consumer scrap.

The flow chart highlights the recycling of post-industrial can scrap (from rolling and can manufacturing) as well as the recycling of postconsumer (UBC) scrap (from the EoL phase).

FLOW CHART INDICATING THE SYSTEM BOUNDARY FOR ALUMINUM BEVERAGE CAN UNDER CLOSED LOOP RECYCLING CONDITIONS

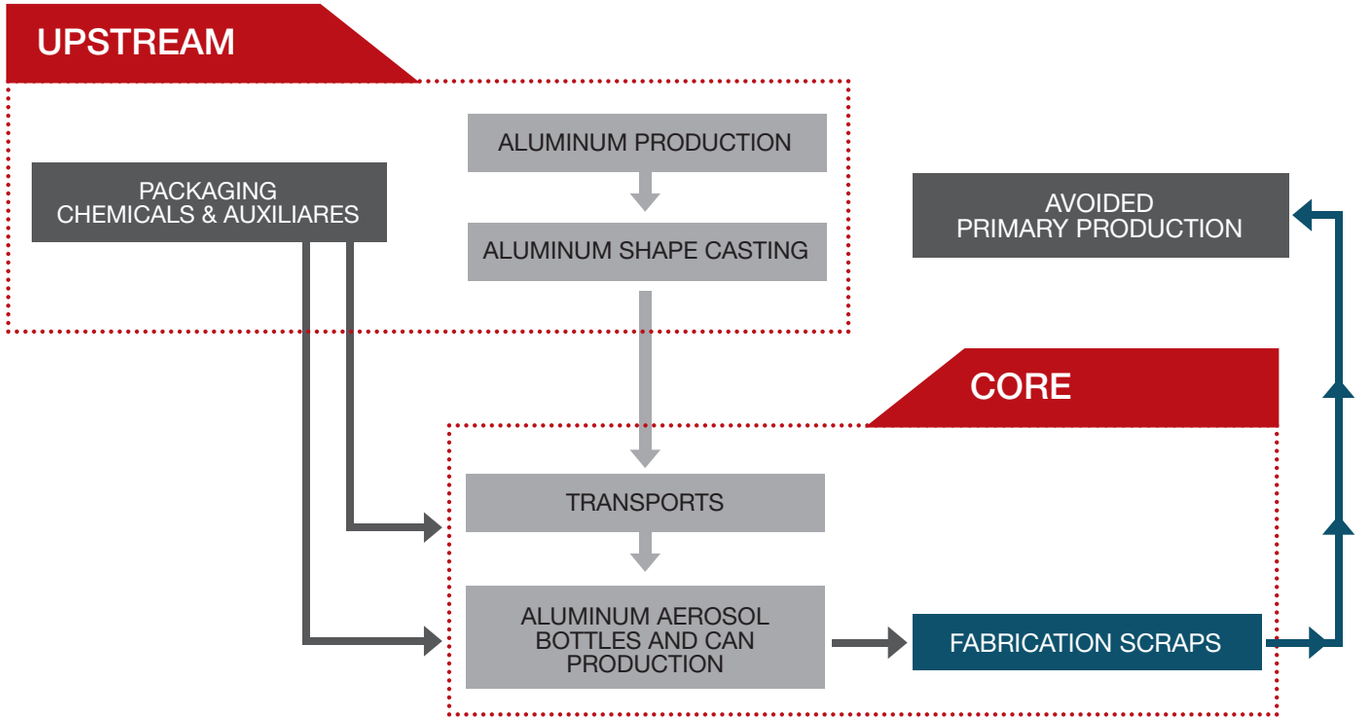


ADDITIONAL ENVIRONMENTAL IMPACT INFORMATION ABOUT TECNOCAP: ALUMINIUM AEROSOL CANS/BOTTLE AND ALUMINIUM BOTTLES RECYCLING CREDIT APPROACH

For its productions Tecnocap uses only primary aluminum and no scraps along the process can be melted again in the process.

Benefits related to scrap recycling (330kg/ton) will be associated to Tecnocap as avoided product using the Ecoinvent dataset *"Aluminium, primary, ingot (GLO) market for – Alloc. Rec, S"* , considering 80,2% of final scraps (national percentage of aluminum recycling – Rapporto CIAL 2018).

SYSTEM DIAGRAM LCA STUDY: CRADLE TO GATE WITH RECYCLING CREDIT



ADDITIONAL ENVIRONMENTAL IMPACT INFORMATION ABOUT TECNOCAP: ALUMINIUM AEROSOL CANS/BOTTLE AND ALUMINIUM BOTTLES RECYCLING CREDIT APPROACH

The following table summarizes the changes in environmental impact obtained taking into account the recycling credit:

		LCA ALUMINIUM AEROSOL CANS AND BOTTLES			LCA WITH RECYCLING CREDIT			
PARAMETER	UM	UPSTREAM	CORE	TOTAL	UPSTREAM	CORE	TOTAL	DELTA
Carbon dioxide (fossil)	kg CO2 eq	10.858	3.782	**14.639**	10.858	-552	**10.306**	-29,60%
Carbon dioxide (biogenic)	kg CO2 eq	111,646	16,844	**128,491**	111,647	-3,642	**108,004**	-15,94%
Carbon dioxide (land use & transformation)	kg CO2 eq	18,496	1,119	**19,615**	18,496	-16,192	**2,304**	-88,25%
TOTAL	kg CO2 eq	10.987,661	3.799,497	**14.787,159**	10.987,662	-571,826	**10.415,835**	-29,56%
Other emission factors	kg CO2 eq	2.900,173	346,518	**3.246,690**	2.900,172	-292,650	**2.607,524**	-19,69%
GWP TOTAL	kg CO2 eq	13.887,834	4.146,015	**18.033,849**	13.887,834	-864,476	**13.023,358**	-27,78%
Acidification (AP)	kg SO2 eq	109,831	18,956	**128,787**	109,831	-26,301	**83,530**	-35,14%
Eutrophication (EP)	kg PO4--- eq	5,986	4,405	**10,391**	5,986	-2,602	**3,384**	-67,43%
Photochemical oxidation	kg C2H4 eq	6,376	1,096	**7,472**	6,376	-1,342	**5,035**	-32,62%
Abiotic depletion	kg Sb eq	0,009	0,001	**0,010**	0,009	-0,001	**0,007**	-27,06%
Abiotic depletion (fossil fuels)	MJ	165.268	64.517	**229.785**	165.268	16.747	**182.015**	-20,79%
Water scarcity Index	m3	11,947	58,751	**70,697**	11,947	47,637	**59,584**	-15,72%

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ISPRA	Report – 2019
CIAL	Report – 2018
GENERAL PROGRAMME INSTRUCTIONS FOR THE INTERNATIONAL EPD® SYSTEM	Version 3.0 — 2017-12-11
PACKAGING PRODUCT CATEGORY CLASSIFICATION	Multiple CPC — PCR 2019:13 — Version 1.0 — Valid until: 2023-11-08

INFORMATION VERIFICATION AND REFERENCE PCR

Product Category Rule (PCR): Packaging Product Category Classification: multiple CPC - UN – CPC Code 42931 - PCR 2019: 13 - Version 1.0 – Valid until: 2023-11-08

PCR review was carried out by the Technical Committee of the International EPD® System;
Contacts: info@environdec.com

ISO 14025: 2006 declaration and data verification process: EPD® verification
Third party verifier:
Ing. Vito D'Incognito – Individual EPD® Verifier

Accredited or approved by: Technical Committee of International EPD® System
It is not possible to compare EPDs which, although within the same product category, are operated by different programs.

This LCA study was conducted by Massimo Lombardi on behalf of Greener Italia Srl, a company specialized in life cycle analysis.

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ENVIRONMENTAL PRODUCT DECLARATION ALUMINIUM PACKAGING

» MONOBLOC AEROSOL CANS
» BOTTLES

Registration number:
S-P-02313

Product Category Rules:
Packaging Products
PCR 2019:13 - Version 1.0
Valid until:
2023/11/08

CPC Code:
42931

Registration date:
2021/02/03
Valid until:
2026/02/02

Geographical scope:
Global

Programme Operator:
The International EPD® System
www.environdec.com

This EPD has been developed in conformity to ISO 14025. 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

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