



# ENVIRONMENTAL PRODUCT DECLARATION

Anodised  
Aluminium  
Profile



## PROGRAMME

The International EPD® System, [www.environdec.com](http://www.environdec.com)  
EPD® Turkey, [www.epdturkey.org](http://www.epdturkey.org)

## PROGRAMME OPERATOR

EPD® International AB & EPD Turkey

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# Programme Information

## Programme Information

**Programme:** The International EPD® System

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### Information about verification and reference PCR:

*CEN standard EN 15804 serves as the Core Product Category Rules (PCR)*

#### Product category rules (PCR)

*PCR 2019:14 Construction products (EN 15804:A2) Version 1.1*

#### PCR review was conducted by

*The Technical Committee of the International EPD® System. See [www.environdec.com/TC](http://www.environdec.com/TC) for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat [www.environdec.com/contact](http://www.environdec.com/contact).*

Independent verification of the declaration and data, according to ISO 14025:2006:

EPD process verification



EPD verification

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#### Approved by

The International EPD® System Technical Committee, supported by the Secretariat

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

Yes



No

#### LCA Study & EPD Design Conducted by

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EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

# Company Information

## Owner of the EPD

### ASAŞ Alüminyum Sanayi ve Ticaret A.Ş.

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Based on its stable financial growth trend since its establishment in 1990, ASAŞ is one of the leading manufacturers in Europe and exports to more than 90 countries across 6 continents. With over 3000 employees, ASAŞ provides services for its clients at its Aluminium Extrusion Profile, Aluminium Composite Panel, Aluminium Flat Rolled Products, PVC Profile and Roller Shutter production facilities which are located in a total of 923.000 m<sup>2</sup> area, of which 300.000 m<sup>2</sup> is enclosed, in Turkey. Company offers the advantage of keeping all processes under control both in terms of quality & cost and getting service from a single point with its fully integrated manufacturing facilities which combines all the production functions that customers needed in the supply chain. ASAS GmbH, sub company of ASAŞ, serves as a logistics and service center with 72.793m<sup>2</sup> closed area in neighboring Koblenz city of Neuwied, Germany.

Passion of “Adding Value” to every job it does, the sector and the society in which it operates and sustainability is at the heart of ASAŞ’s business philosophy. Corporate social responsibility projects are carried out with this philosophy to strengthen the society. ASAŞART, which is positioned as an “Art Production Center, operates as a learning+ sharing+ designing+ production platform that brings art and design students together with academics and professionals. Within ASAŞART, special projects are developed to support young talents in their art carrier; aluminium sculpture contest, training programs with universities, international workshops and art exhibitions are organized. Children are at the center of ASAS’ corporate social responsibility projects. Company established ASAS Basketball Club so as to support children to be successful individuals in the future with sports as well as social and educational activities.

ASAŞ positions itself as a solution partner with a passion of trying to foresee the future trends by following the innovations and always offering the best for its customers by investing in technology. Therefore, while making investments company adopts the principles of “continuous investment in sustainability, technology, integration and innovation” to always serve its customers better. With this perspective, company established the first R & D Center in aluminium sector in Turkey. Alloy development, process development and product development studies are carried out under the umbrella of R&D Center. Company develops projects to use its resources more efficiently and grows with environment friendly investments. Besides these, ASAŞ takes part in international projects to contribute the development of new processes that helps to minimize the environmental impact of the production processes and increase the energy efficiency.



ASAŞ produces wide range of value-added products for various sectors like automotive, railway, commercial vehicles, energy, packaging, construction, consumer products, maritime etc. worldwide. Finished and semi-finished products are produced to meet its customers’ needs in their own projects. Besides this, the company enrich its knowledge in the field of production with design & product development studies and offers its high-quality products to the market under its own brands. Aluminium architectural systems (door, window, and curtain wall systems), aluminum composite panels, u-PVC door and window systems, aluminum design products (aluminum flag and lighting poles, aluminum furniture etc.), roller shutter systems, garage doors and motor control systems are product groups that the company sells with its own brand.



# Product Information

Product Name:

## Anodised Aluminium Profile

Anodising is one of the most common used coating types. Electrochemical process is used for anodising. Anodising thickens and strengthens the existing thin natural oxide coating. Firstly, pre-treatment has done in acid/alkali solutions to remove dirt, grease and impurities. Secondly, etching process has done on the surface to make it rough. Then, it is brightened to a smooth surface to receive coating. Lastly, section to be coated is dipped in electrolyte and current is passed through electrolyte. Hence, oxygen formed in the electrolyte deposits on aluminium section and oxygen reacts with aluminium to form a thick oxide coating. Anodising is used to surface treat the aluminium profiles. The anodising layer improves the corrosion resistance and makes the profiles more resistant to external influences. Anodising can have done only over aluminium products. In addition, anodised aluminium profiles are highly resistant to abrasion and easy to clean and maintain.

### Intended Use of Product

Aluminium is silvery white and light weight material. Aluminium is used for a wide range of applications from small cans to aeroplane parts. Most common applications of aluminium are automobile components, food processing industry, building and construction sector. It is used for structural glazing, glass houses, green buildings, structural buildings, partitions, doors and windows. Aluminium is most reliable and commonly used structural material. Aluminium is preferred due to light weight property. It reduces weight, dead loads and costs. Also, aluminium is corrosion resistant.

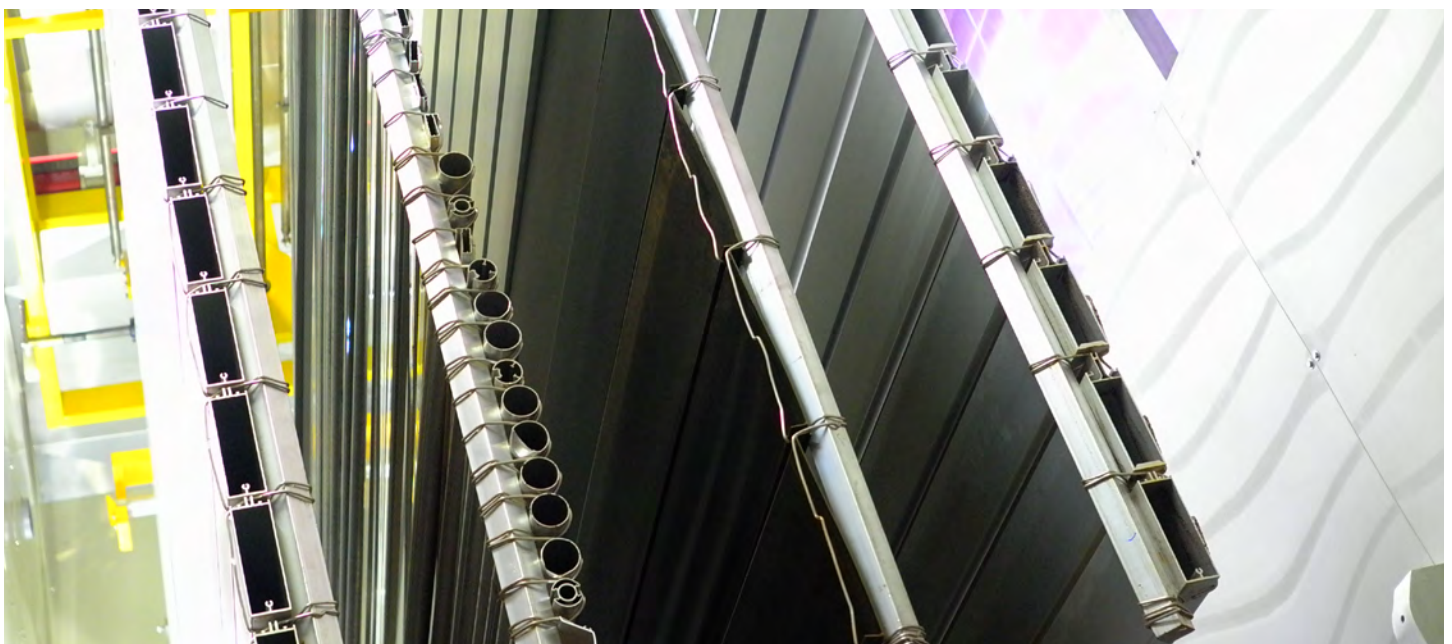
It generates a thin oxide film that prevent corrosion and protect surface. Aluminium's electrical and thermal conductivity leads to good conducting of heat and electricity. Aluminium is non-toxic, odourless, non-magnetic. It also has good reflectivity and not structural changes in low temperature. Besides, aluminium can be 100% recyclable and a recycled product.

### Production

Aluminium profile production process starts with casting and continuous homogenizing. Aluminium billet which is cylindrical block of aluminium alloy is produced in casting process.

The Asaş Billet Casting line uses a fully automated computer-aided, hot top air slip casting system to control the casting process and produce exceptionally superior quality aluminium billets that adhere to the highest European EN AW quality standards. Before going to the extrusion process, billets are subjected to continuous billet homogenizing. Thus, the billets become malleable and ready to be formed in the extrusion process.

Extrusion is the process used in the production of aluminium profiles that makes possible to create many kinds of shades and design of profiles. In this process, the billets are pushed through the extrusion line at which the profile is brought to the desired shape. After bare aluminium profile is produced, the profile is subjected to the anodization process. Anodising thickens and strengthens the existing thin natural oxide coating. The anodised aluminium profiles are packaged to be delivered to the customer.



# Technical Specifications

Product	Standards	Description
<b>Anodised Aluminium Profile</b>	DIN EN 15085-2	Welding Certification of Railway Vehicles and Components
	ISO 3834-2	Quality Requirements for Melting Source of Metallic Materials Certificate
	IATF 16949	Automotive Quality Management System Certificate
	ISO/TS 22163 (IRIS)	Railway Applications Quality System Certificate
	EN 1090-3	Steel and Aluminium Construction Applications Certificate
	EN 40-6	Aluminium Lighting Poles Certificate
	TS EN 755-1	Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 1: Technical conditions for inspection and delivery
	TS EN 12020-1	Aluminium and aluminium alloys - Extruded precision profiles in alloys EN AW-6060 and EN AW-6063 - Part 1: Technical conditions for inspection and delivery
	TS 4922	Coating of aluminium or aluminium alloys by anodic oxidation process – Technical specifications

**UN CPC Code:** 42532 Bars, rods and profiles, of aluminum



# LCA Information

## Declared Unit

1 kg of Anodised Aluminium Profile manufactured in ASAŞ Manufacturing plant in Akyazi (TR).

## Reference Service Life

Not applicable.

## Time Representativeness

The inventory for the LCA study is based on the period of 1<sup>st</sup> January 2021 and 30<sup>st</sup> June 2021

## Database(s) and LCA software used

SimaPro LCA v9.2.0.2 software with Ecoinvent v3.7.1

## Description of System Boundaries

Cradle to gate with options, modules, C1-C4, D (A1–A3 + C + D)

## Data Quality and Data Collection

According to EN 15804:2012+A2:2019 specific data was used for module A3 (Processes the manufacturer has influence over) and was gathered from the manufacturing plant. Specific data includes actual product weights, amounts of raw materials used, product content, energy consumption, transport figures, water consumption and amounts of wastes.

There is two manufacturing plant in Sakarya and Akyazi, Turkey. However, extruded aluminium profile products are manufactured in Akyazi.

The manufacturing data (specific) are monitored and recorded by Asaş aluminium profile manufacturing responsible people. Specific energy and chemical consumption values and raw materials/chemicals are collected from Asaş.

For A1 and A2 modules, According to EN 15804:2012+A2:2019, generic data was applied and was obtained from Ecoinvent v3.7.1.

Data collection for this LCA study has been carried out in accordance with data requirement stated in ISO 14040-44, ISO 14025, ISO 14020, and the requirements given in the General Program Instructions v3.01; PCR Construction products 2019:14, version 1.11 by The International EPD® System and EN 15804:2012+A2:2019.

Specific data used in this LCA study is less than 1 year old. Generic data used in the study was obtained from Ecoinvent v3.7.1 which is less than 10 years old.

Cut-off criteria for the upstream generic data is at least 99%, according to the General Programme Requirement in terms of the energy, the mass, and the overall environmental relevance of the flows. Inventory data covers all elementary flows and are obtained from Ecoinvent v3.7.1.

## Allocation

Waste and packaging data are allocated to cold rolled aluminium sheet, painted aluminium sheet and aluminium foil, taking into account the total amount in the relevant time period.

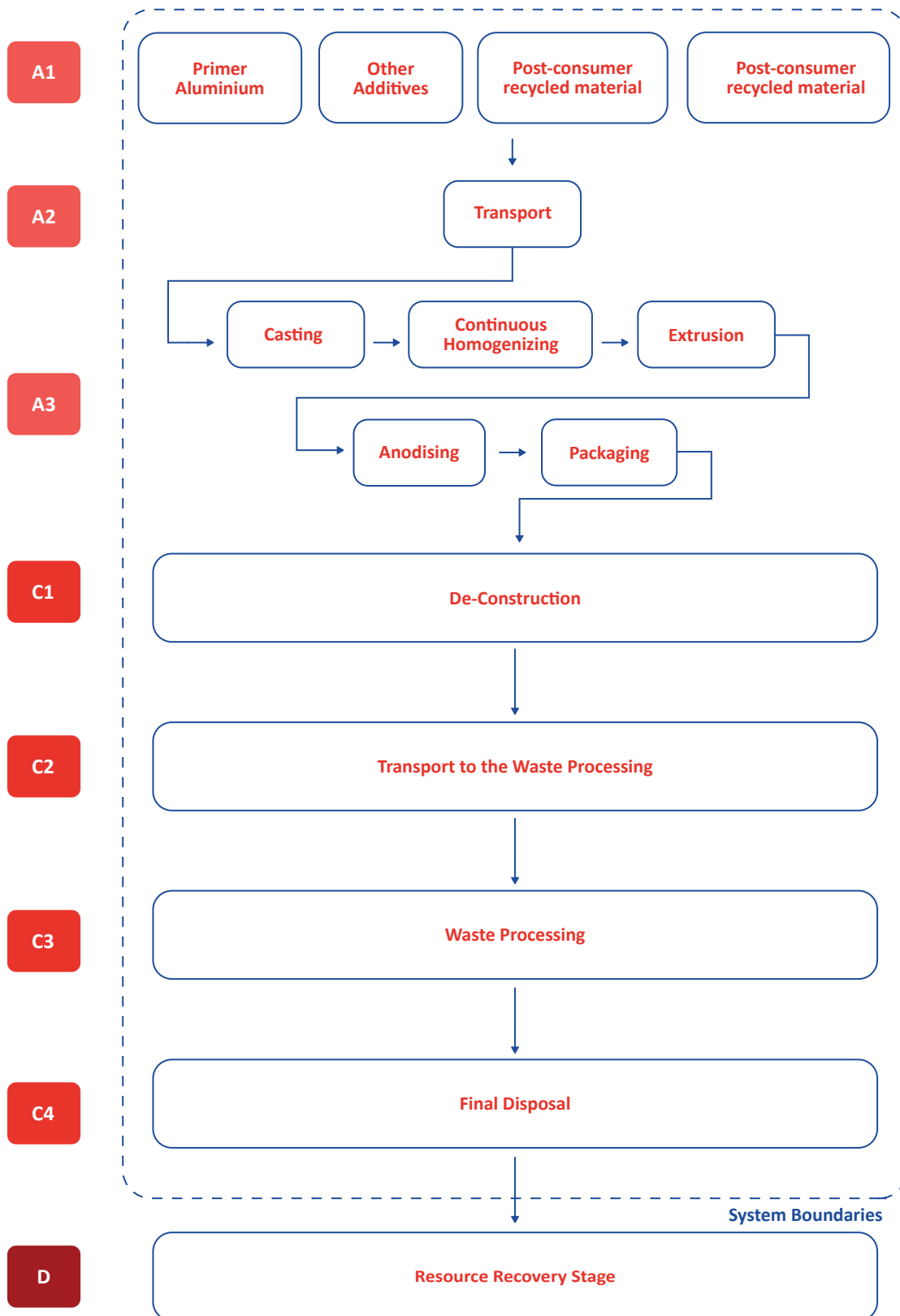
## Cut-off Rules

Life Cycle Inventory data for a minimum of 99 % of total inflows to the three life cycle stages have been included and a cut-off rule of 1% regarding energy, mass, and environmental relevance was applied.

## Modules declared, geographical scope, share of specific data (in GWP-GHG indicator) and data variation

	PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				RESOURCE RECOVERY STAGE
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Recycling Potential
MODULES	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Module declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	GLO	GLO	TR	-	-	-	-	-	-	-	-	-	GLO	GLO	GLO	GLO	GLO
Specific data used	>99.5%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation-products	Not Relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation-sites	Not relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-

# System Diagram



# Description of Declared Modules

## A1 - Raw Materials Supply

This module takes into account raw material extraction, processing and energy used in the production process.

## A2 - Transport to the Manufacturer

This module includes transportation of the raw materials from supplier to factory gate. Transportation types are considered as seaway and roadway.

## A3 - Manufacturing

This stage includes energy and water consumption during the manufacturing process. Additionally, packaging materials are covered in this module. The processing of any waste arising from this stage is also included. Followed production processes are as;

- Casting
- Continuous homogenizing
- Extrusion
- Anodising
- Packaging

## C1 - De-construction

In module C1, it is assumed that demolition of the anodised aluminium profiles from base construction material is done manually. Given the scenario that is assumed, environmental impact of de-construction process is not considered in this study.

## C2 - Transport to Waste Processing

An average distance of 200 km has been assumed for the transport to sorting facility. Transport is calculated on the basis of a scenario with the parameters described in the attached table.

Parameters C2 Module	
Transport by road*	Lorry, 16-32 metric ton
Distance (km)	200
Database	Ecoinvent v3.7.1

\*Technology is Euro 6

## C3 - Waste Processing for Reuse, Recovery and/or Recycling

This module includes the energy consumption required for the sorting of anodised aluminium profile in the recycling process.

## C4 - Final Disposal

95% of the product after its lifetime will be collected and recycled into the manufacturing system. It is assumed that 5% of the product is lost during de-construction and 95% reached the sorting/recycling facility. The recycling rate of the anodised aluminium profile are assumed to be 95%; making up a total of 90% of end-of-life products recycled to be used again in construction projects or construction material manufacture process, and the remaining 10% of end-of-life products being sent to landfill.

## D - Reuse, Recovery or Recycling Potential

Anodised aluminium profile inputs to the production stage are subtracted from the construction to be recycled at end-of-life in order to obtain the aluminium profile from the product system. This remaining net aluminium profile is then sent to recycling. Module D reports the environmental aspects of recycled scrap generated at the end of life minus that used at the production stage.

## Information on which life cycle stages are not considered

This EPD only cover the Cradle to Gate with options A1-3 and C1-4 and D stages because other stages are very dependent on particular scenarios and are better developed for specific building or construction works.



# Content Declaration

## Content Declaration by mass%, 1 kg of Anodised Aluminium Profile

Product	Primer Aluminium, weight-%	Post-consumer recycled materials, weight-%	Pre-consumer recycled materials, weight-%	Additives, weight-%	Renewable material, weight-%	Biogenic carbon, weight-%
Anodised Aluminium Profile	35-45	0-5	40-50	10-20	0	0

## Packaging Declaration by mass% (versus the product)

Anodised Aluminium Profile	Weight, %	Biogenic carbon, kg C
LDPE	<1	-
Paper	<1	-
Wood	<1	0.018

Disclaimer: There are no SVHC compounds in the products which is declared in the report.



# Environmental Performance

## Potential Environmental Impact *Mandatory Indicators According to EN 15804+A2*

Results for 1 kg of Anodised Aluminium Profile							
Indicator	Unit	A1-3 Total	C1	C2	C3	C4	D
GWP-fossil	kg CO <sub>2</sub> eq	15.2	0	0.031	0.006	0.004	-9.29
GWP -biogenic	kg CO <sub>2</sub> eq	-0.103	0	7.50E-05	2.35E-04	1.06E-04	0.038
GWP-luluc	kg CO <sub>2</sub> eq	0.075	0	1.06E-05	8.45E-06	3.62E-06	-0.053
GWP-total	kg CO <sub>2</sub> eq	15.2	0	0.031	0.006	0.004	-9.30
ODP	kg CFC 11eq	6.42E-07	0	7.03E-09	5.32E-10	4.22E-10	-2.99E-07
AP	mol H+ eq	0.094	0	8.59E-05	3.75E-05	2.53E-05	-0.062
EP-Freshwater	kg PO <sub>4</sub> <sup>3-</sup> eq	0.007	0	9.19E-06	4.89E-06	2.62E-06	-4.82E-03
EP-aquatic freshwater	kg P eq	0.001	0	2.32E-07	4.31E-07	1.29E-07	-5.38E-04
EP-Marine	kg N eq	0.014	0	1.75E-05	9.94E-06	6.05E-06	-8.81E-03
EP-Terrestrial	kg N eq	0.160	0	1.95E-04	1.10E-04	6.76E-05	-0.100
POCP	kg NMVOC eq	0.047	0	7.45E-05	3.03E-05	2.00E-05	-0.029
ADP-minerals & metals*	kg Sb eq	4.01E-05	0	1.13E-07	9.81E-09	8.53E-09	-9.20E-06
ADP-fossil*	MJ	170	0	0.469	0.105	0.054	-94.9
WDP	m <sup>3</sup>	3.43	0	0.001	0.001	0.001	-1.35

\* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

### Acronyms

**GWP-fossil** = Global Warming Potential fossil fuels; **GWP-biogenic** = Global Warming Potential biogenic; **GWP-luluc** = Global Warming Potential land use and land use change; **ODP** = Depletion potential of the stratospheric ozone layer; **AP** = Acidification potential, Accumulated Exceedance; **EP-freshwater** = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; **EP-aquatic freshwater** = Eutrophication potential, fraction of nutrients reaching aquatic freshwater end compartment; **EP-marine** = Eutrophication potential, fraction of nutrients reaching marine end compartment; **EP-terrestrial** = Eutrophication potential, Accumulated Exceedance; **POCP** = Formation potential of tropospheric ozone; **ADP-minerals&metals** = Abiotic depletion potential for non-fossil resources; **ADP-fossil** = Abiotic depletion for fossil resources potential; **WDP** = Water (user) deprivation potential, deprivation-weighted water consumption

## Potential Environmental Impact *Additional Mandatory and Voluntary Indicators*

Results according to PCR2019:14 for 1 kg of Anodised Aluminium Profile							
Indicator	Unit	A1-3 Total	C1	C2	C3	C4	D
GWP-GHG <sup>1</sup>	kg CO <sub>2</sub> eq	14.9	0	0.031	0.005	0.004	-9.19
Results according to EN 15804+A2 for 1 kg of Anodised Aluminium Profile							
PM	[disease inc.]	7.73E-07	0	1.95E-09	4.75E-10	3.58E-10	-5.12E-07
IRP	[kBq U235 eq]	0.235	0	0.002	0.001	1.84E-04	-0.142
ET-freshwater	[CTUe]	383	0	0.360	0.056	60.4	-249
HT-cancer	[CTUh]	2.10E-08	0	1.28E-11	1.73E-12	3.62E-12	-1.16E-08
HT-non-cancer	[CTUh]	3.59E-07	0	3.52E-10	4.33E-11	9.15E-11	-2.31E-07
SQP	[pt]	33.2	0	0.327	0.014	0.070	-16.3



### Acronyms

**GWP-GHG** = Global Warming Potential total excl. biogenic carbon following IPCC AR5 methodology; **IRP** = Ionizing radiation, human health; **ET-freshwater** = Eco-toxicity (freshwater); **HT-cancer** = Human toxicity, cancer effects; **HT-non-cancer** = Human toxicity, non-cancer effects; **SQP** = Potential soil quality index (SQP)

<sup>1</sup> The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

# Use of Resources

Results according to EN 15804+A2 for 1 kg of Anodised Aluminium Profile

Indicator	Unit	A1-3 Total	C1	C2	C3	C4	D
PERE	MJ	30.5	0	0.006	0.013	0.003	-16.6
PERM	MJ	0	0	0	0	0	0
PERT	MJ	30.5	0	0.006	0	0.003	-16.6
PENRE	MJ	181	0.498	0.110	0.058	-100	0
PENRM	MJ	0	0	0	0	0	0
PENRT	MJ	181	0	0.110	0	-100	0
SM	kg	0.637	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m <sup>3</sup>	0.588	0	4.27E-04	0.001	1.82E-04	-0.370

## Acronyms

**PERE** = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; **PERM** = Use of renewable primary energy resources used as raw materials; **PERT** = Total use of renewable primary energy resources; **PENRE** = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; **PENRM** = Use of non-renewable primary energy resources used 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



## Waste Production

Results according to EN 15804+A2 for 1 kg of Anodised Aluminium Profile							
Indicator	Unit	A1-3 Total	C1	C2	C3	C4	D
Hazardous waste disposed	kg	0.003	0	0	0	0	0
Non-hazardous waste disposed	kg	0.008	0	0	0	0.098	0
Radioactive waste disposed	kg	0	0	0	0	0	0

## Output Flows

Results according to EN 15804+A2 for 1 kg of Anodised Aluminium Profile							
Indicator	Unit	A1-3 Total	C1	C2	C3	C4	D
Components for re-use	kg	0	0	0	0	0	0
Material for recycling	kg	0.014	0	0	0	0	0.903
Materials for energy recovery	kg	0.001	0	0	0	0	0
Exported energy, electricity	MJ	0	0	0	0	0	0
Exported energy, thermal	MJ	0	0	0	0	0	0

# References

- **ISO 14040** 2006 Environmental management - Life cycle assessment - Principles and framework
- **ISO 14044** 2006 Environmental management - Life cycle assessment - Requirements and guidelines
- **ISO 14025** 2006 Environmental labels and declarations - Type III environmental declarations - Principles and procedures
- **ISO 14020** 2000 Environmental labels and declarations - General principles
- **EN 15804:2012+A2:2019** Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
- **The International EPD® System** [www.environdec.com](http://www.environdec.com)
- **The International EPD® System** The General Programme Instructions v3.01
- **The International EPD® System** PCR 2029:14 Construction products v1.1 (EN 15804:A2)
- **Ecoinvent 3.7** [www.ecoinvent.org](http://www.ecoinvent.org)
- **SimaPro LCA Software** [www.simapro.com](http://www.simapro.com)
- **Asas Alüminyum Sanayi ve Ticaret A.Ş.** [www.asastr.com](http://www.asastr.com)

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