



ENVIRONMENTAL PRODUCT DECLARATION

Cold Rolled
Aluminium Sheet



PROGRAMME

The International EPD® System, www.environdec.com
EPD® Turkey, www.epdturkey.org

PROGRAMME OPERATOR

EPD® International AB & EPD Turkey

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Programme Information

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Product category rules (PCR)

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The Technical Committee of the International EPD® System. See 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.

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Yes

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No

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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

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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 m² area, of which 300.000 m² 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 72.793m² 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:

Cold Rolled Aluminium Sheet

Cold rolled aluminium sheet products production facilities were established in Sakarya-Karapürçek in 2014 within the body of ASAŞ in order to meet the growing demand for high quality products in the Turkish and world markets.

The facility provides services in a total area of 310,000 m², of which 135,000 m² is closed, with a total flat product capacity of 120,000 tons, of which 45,000 tons are painted annually. In the facility, plates are produced in different alloys (1000-3000-5000-8000 series) and tempers, in requested sizes and surface properties (embossed, painted).

Aluminium coil and sheet products, consist of embossing, step plate and roll coating are all stretched in different alloys and sizes. The product surfaces can be produced completely oil-free or low-oil, upon request, film coating on the surface or paper between the plates is applied.

Aluminium painted sheets are all stretched aluminium sheet products of different sizes and colours. Painted aluminium is the product that comes out by colouring aluminium sheets and plates. Painted plates are covered with a protective film.

Intended Use of Product

Aluminium sheets have a wide range of applications due to superior corrosion properties, welding capabilities, electrical and thermal conductivity characteristics. They are highly resistant to external environment due to corrosion resistance. This and many other features make it available in many industries, especially construction, automotive, and transport. In addition, they benefit from energy efficiency with light-weight features in many areas.

Production

In the flat rolled production plant, the process starts with induction and casting. Cast rolled aluminium is produced by mixing primary aluminium, secondary aluminium, and pre-consumer recycled materials with other additives in the casting process. After the casting process, aluminium alloys are treated in cold rolling, plate annealing, plate stretching and cutting processes.

The cast rolled aluminium is after sent to cold rolling and annealing processes. Cast rolled aluminium is treated flattened into different thicknesses in cold rolling mill. Electricity, water, and some lubricants are consumed in this stage. After passing through the cold rolling mill, aluminium sheet is subjected to the annealing for softening the aluminium sheet.

As the last process before cutting, the coils are stretched to make the coil product smoother. As a result of all these processes, aluminium sheet is produced. After the cutting process is completed, the flat rolled aluminium sheet is ready and packaged to be delivered to the customer.

In addition to the processes mentioned for cold rolled aluminium sheet, dyeing process is applied for the production of painted aluminium sheet. For the production of painted aluminium sheet, the stretched flat rolled aluminium product is processed in the dyeing process. After the cutting process is completed, the painted aluminium sheet is ready and packaged to be delivered to the customer.



Technical Specifications

Product	Standarts	Description
Cold Rolled Aluminium Sheet	TS EN 485-1:2016	Aluminium and Aluminium Alloys - Sheet, strip and plate - Part 1: Technical conditions for inspection and delivery
	DS/EN 485-2	Aluminium and Aluminium Alloys - Sheet, strip and plate - Part 2: Mechanical Properties
	DS/EN 485-3	Aluminium and Aluminium Alloys - Sheet, strip and plate - Part 3: Tolerances on dimensions and form for hot-rolled products
	DIN EN 485-4	Aluminium and Aluminium Alloys - Sheet, strip and plate - Part 4: Tolerances on shape and dimensions for cold-rolled products
	ASTM B209M-10	Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric)
	BS EN 1715-2:2008	Aluminium and aluminium alloys - Drawing stock- Part 2: Specific requirements for electrical applications
	DS/EN 1386	Aluminium and aluminium alloys - Trade plate - Specifications
	DIN_EN_ISO_7438	Metallic materials - Bend test
	TS 205-3 EN ISO 7799	Metallic materials - Sheet and strip 3 mm thick or less - Reverse bend test
	DS/EN ISO 20482	Metallic Materials - Sheet and Strip - Erichsen Cupping Test
	TS 10525 EN 1669	Aluminium and aluminium alloys-Test methods-Earing test for sheet and strip
	TS EN ISO 6507-1	Metallic materials - Vickers hardness test - Part 1: Test method
	TS EN ISO 6506-1	Metallic materials - Brinell hardness test - Part 1: Test method
	TS EN ISO 6892-1	Metallic Materials - Tensile Testing - Part1: Method of test at room temperature

UN CPC Code : 41534 – Plates, sheets and strip, of aluminium, of a thickness exceeding 0.2 mm

LCA Information

Declared Unit

1 kg of Cold Rolled Aluminium Sheet manufactured in Sakarya facilitate (TR).

Reference Service Life

Not applicable.

Time Representativeness

The inventory for the LCA study is based on the period of 1st January 2021 and 30st 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 Akyazı, Turkey. However, cold rolled products are manufactured in Sakarya. The manufacturing data (specific) are monitored and recorded by Asaş Flat Rolled 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.

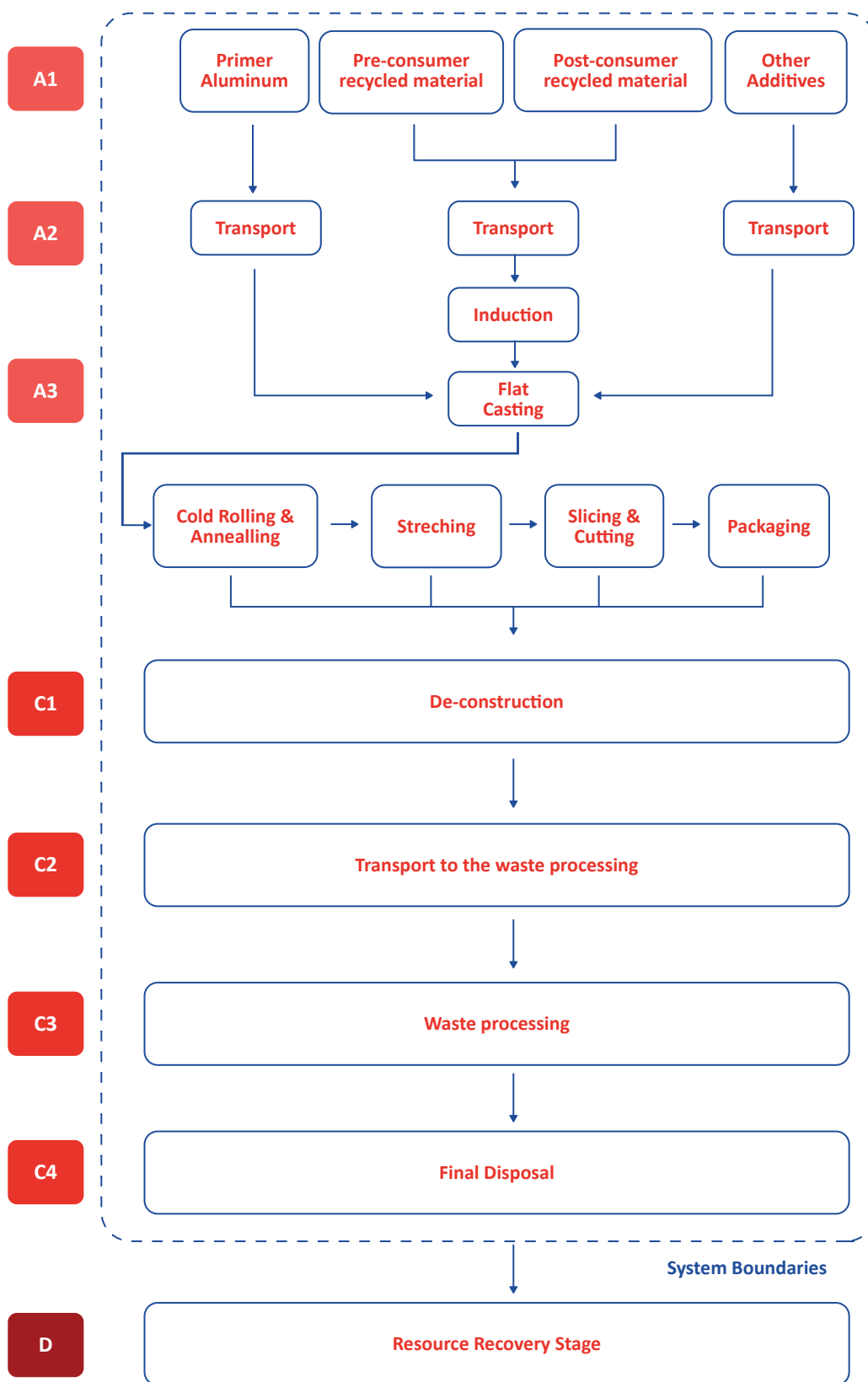
Cut-off Rules

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%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
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;

- Induction
- Casting
- Cold Rolling
- Annealing
- Cutting
- Packaging

C1 - De-construction

In module C1, it is assumed that demolition of the cold rolled aluminium sheet 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 cold rolled products in the recycling process.

C4 - Final Disposal

95% of the products after their 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 flat rolled and painted aluminium sheet products 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

Cold Rolled Aluminium Sheet inputs to the production stage are subtracted from the construction to be recycled at end-of-life in order to obtain the flat rolled aluminium sheet from the product system. This remaining net cold rolled aluminium sheet are 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 Cold Rolled Aluminium Sheet

Product	Primer Aluminium, weight-%	Post-consumer recycled materials, weight-%	Pre-consumer recycled materials, weight-%	Additives, weight-%	Renewable material, weight-%	Biogenic carbon, weight-%
Cold Rolled Aluminium Sheet	60-70	10-15	20-25	0-5	0	0

Packaging Declaration by mass% (versus the product)

Cold Rolled Aluminium Sheet	Weight, %	Biogenic carbon, kg C
LDPE	<1	-
Paper	<1	-
Wood	1-5	0.009
Metal	<1	-

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 Cold Rolled Aluminium Sheet							
Indicator	Unit	A1-3 Total	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq	13.4	0	0.031	0.006	0.004	-9.44
GWP -biogenic	kg CO ₂ eq	-0.058	0	7.50E-05	2.35E-04	1.06E-04	0.022
GWP-luluc	kg CO ₂ eq	0.124	0	1.06E-05	8.45E-06	3.62E-06	-0.094
GWP-total	kg CO ₂ eq	13.4	0	0.031	0.006	0.004	-9.51
ODP	kg CFC 11eq	6.88E-07	0	7.03E-09	5.32E-10	4.22E-10	-4.14E-07
AP	mol H ⁺ eq	0.090	0	8.59E-05	3.75E-05	2.53E-05	-0.067
EP-Freshwater	kg PO ₄ ³⁻ eq	0.006	0	9.19E-06	4.89E-06	2.62E-06	-0.005
EP-aquatic freshwater	kg P eq	0.001	0	2.32E-07	4.31E-07	1.29E-07	-4.71E-04
EP-marine	kg N eq	0.012	0	1.75E-05	9.94E-06	6.05E-06	-0.009
EP-Terrestrial	kg N eq	0.140	0	1.95E-04	1.10E-04	6.76E-05	-0.101
POCP	kg NMVOC eq	0.043	0	7.45E-05	3.03E-05	2.00E-05	-0.031
ADP-minerals & metals*	kg Sb eq	3.43E-05	0	1.13E-07	9.81E-09	8.53E-09	-1.22E-05
ADP-fossil*	MJ	139	0	0.469	0.105	0.054	-94.6
WDP	m ³	2.40	0	0.001	0.001	0.001	-1.68

* 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 Cold Rolled Aluminium Sheet							
Indicator	Unit	A1-3 Total	C1	C2	C3	C4	D
GWP-GHG ¹	kg CO ₂ eq	13.2	0	0.031	0.005	0.004	-9.38
Results according to EN 15804+A2 for 1 kg of Cold Rolled Aluminium Sheet							
PM	[disease inc.]	8.80E-07	0	1.95E-09	4.75E-10	3.58E-10	-6.34E-07
IRP	[kBq U235 eq]	0.364	0	0.002	0.001	1.84E-04	-0.250
ET-freshwater	[CTUe]	365	0	0.360	0.056	60.4	-259
HT-cancer	[CTUh]	2.41E-08	0	1.28E-11	1.73E-12	3.62E-12	-1.64E-08
HT-non-cancer	[CTUh]	3.85E-07	0	3.52E-10	4.33E-11	9.15E-11	-2.81E-07
SQP	[pt]	32.6	0	3.27E-01	0.014	6.97E-02	-16.5

Acronyms

GWP-GHG = Global Warming Potential total excl. biogenic carbon following IPCC AR5 methodology; **PM**= Particulate Matter **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)

¹ 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 Cold Rolled Aluminium Sheet							
Indicator	Unit	A1-3 Total	C1	C2	C3	C4	D
PERE	MJ	44.7	0	0.006	0	0.003	-31.7
PERM	MJ	0	0	0	0	0	0
PERT	MJ	44.7	0	0.006	0	0.003	-31.7
PENRE	MJ	147	0	0.498	0	0.058	-100
PENRM	MJ	0	0	0	0	0	0
PENRT	MJ	147	0	0.498	0	0.058	-100
SM	kg	0.373	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m ³	0.534	0	4.27E-04	0.001	1.82E-04	-0.390

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 Cold Rolled Aluminium Sheet							
Indicator	Unit	A1-3 Total	C1	C2	C3	C4	D
Hazardous waste disposed	kg	0.014	-	0	0	0	0
Non-hazardous waste disposed	kg	0.001	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 Cold Rolled Aluminium Sheet							
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	0.003	0	0	0	0	0.903
Materials for energy recovery	kg	0	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
- **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
- **SimaPro LCA Software** www.simapro.com
- **Asas Alüminyum Sanayi ve Ticaret A.Ş.** www.asastr.com

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