AssanAlüminyum

ENVIRONMENTAL
PRODUCT DECLARATION

In accordance with ISO 14025 and EN 15804:2012+A2:2019 for:

Cold Rolled Aluminium Sheet
from
Assan Alüminyum

Programme
The International EPD® System,
www.environdec.com

Programme operator
EPD International
AB & EPD Turkey

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EPD® THE INTERNATIONAL EPD® SYSTEM

EPD® TURKEY ENVIRONMENTAL PRODUCT DECLARATIONS

ECO PLATFORM EPD EN 15804 VERIFIED

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 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.

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

◇ EPD process certification ◈ EPD verification

Third party verifier:

Ing. Luca Giacomello, PMP®
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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:

Semtrio Sustainability Consulting
BUDOTEK Teknopark, No 4/21, Umraniye / Istanbul Turkey
www.semtrio.com

Assan Alüminyum has the sole ownership, liability, and responsibility for the EPD.

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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Assan Alüminyum, one of the world's leading manufacturer in the flat-rolled aluminium (FRP) industry, has been producing coil & sheet, foil and pre-painted aluminium products since its establishment in 1988, offering its products to a variety of sectors such as packaging, distribution, construction, consumer durables, automotive and HVAC. Assan Alüminyum, a subsidiary of Kibar Holding, has an installed annual capacity of 300 thousand tons in its production facilities located in Istanbul and Kocaeli – Turkey.

The company is currently one of the 2 largest aluminium foil manufacturers in Europe, with an aluminium foil production capacity of 100 thousand tons.

Assan Alüminyum aims to Create the Future Together with its business partners. With its core values of ***reliability, flexibility, innovation and sustainability, the company's vision is based on creating long-term value by being more sustainable***, in environmental, governance and social terms.

COMPANY INFORMATION

With its motto of “Creating the future without wasting it”, Assan Alüminyum constantly strives to reduce its carbon footprint, by producing clean energy at its renewable energy power plant, recycling inner and outer scrap at its in-house recycling facility and developing new energy efficiency projects every year to reduce its energy consumption per ton of production.

Assan Alüminyum, a global pioneer in the continuous casting technology, creates value by developing innovative, tailor-made solutions for its business partners at its officially registered R&D Centre.

With its global culture and 1500 dedicated employees, Assan Alüminyum exports to more than 70 countries around the world, particularly to West Europe and North America. Kibar Americas, the wholly owned subsidiary of Assan Alüminyum, established in Chicago, aims to perform the ambitious plans for growth in North America.

NAME AND LOCATION OF PRODUCTION SITES

Tuzla Plant
Yayla Mahallesi D-100 Karayolu Rüya Sokak No:2 34940 Tuzla – İstanbul/Turkey

Dilovası Plant
Dilovası Organize Sanayi Bölgesi 1. Kısım Dicle sok. No 40 41455 / Kocaeli/Turkey

PRODUCT INFORMATION

Product name: **Cold Rolled Aluminium Sheet**

This EPD evaluates the potential environmental impacts for 1 kg Cold Rolled Aluminium Sheet with Cradle to gate with options, modules C1–C4, module D and with optional modules A4-5 approach.

- All stretched, aluminium roll and plate products of different alloys and sizes.
- Product surfaces that can be embossed depending on the final mode of utilization and manufactured entirely oil-free or lightly oiled.
- Upon order, surface film coating or inter-plate paper applications.
- Compliance with the EN, AA or ASTM norms in all processes.

Alloys: 1050/3003/3105/5005/5754

Intended use of the product:

In building and construction, it is formed into products including siding, building façade, gutters, roofing, awnings, and carports. Sheet aluminium can be colour-anodized to black, gold, red, blue and hundreds of other colours. It can be etched to a matte finish, polished to a sparkling brightness, or textured to resemble wood and painted.

Aluminium Sheet Technical Specifications

Technical specification	Method	Unit	Value
Density	NA	$(kg/m^3) \times 10^3$	2.70-2.73
Melting point (Typical)	NA	°C	630-657
Electrical conductivity (Typical) at 20°C/at 68 °F	EN 14121:2009	MS/m (0.58%IACS)	20-36
Thermal conductivity (Typical) at 25°C/at 77 °F	NA	W/(m.K)	160-230
Average Coefficient of thermal expansion (Typical) 20°C to 100°C /68°F to 212 °F	NA	per °C	23.2-23.9mm/m
Modulus of elasticity (Typical)	NA	MPa $\times 10^3$	69-70 GPA
Hardness (typical)	NA	HB	18-100
Yield strength (min)	EN 546-2	MPa	15
Ultimate tensile strength (min)	EN 546-2	MPa	60
Breaking elongation (min) (50 mm&4D)	EN 546-2	%	1
Chemical composition	EN 573-3	% by mass	Varying alloy by alloy, Al 95.0 – 99.6

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

LCA Information:

- **Declared unit:** 1 kg packaged cold rolled aluminium sheet ready to delivery at the factory gate.
- **Reference service life:** Not Applicable.
- **Time representativeness:** The production data in this LCA study represents the period of July-August-September 2020.
- **Database(s) and LCA software used:** SimaPro v9.1.1.1 and Ecoinvent v3.6
- **Description of system boundaries:** Cradle to gate with options, modules C1–C4, module D and with optional modules A4–A5 (A1–A3 + C + D and A4-5).
- **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 Assan Alüminyum Tuzla and Dilovası 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. For A1 and A2 modules, according to EN 15804:2012+A2:2019, generic data was applied and was obtained from Ecoinvent v3.6.
- **Allocation:** Mass allocation has been applied for pre-consumer recycled materials according to EN 15804:2012+A2:2019.
- **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. Wastewater generated from core prosses have been excluded due to the cut-off rule. Impacts caused by treatment operations have been calculated lower than 1% environmental relevance.

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
Modules declared	X	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	GLO	GLO	TR	GLO	GLO	-	-	-	-	-	-	-	GLO	GLO	GLO	GLO	GLO
Specific data used	>99.5%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	Not relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	<10%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

X: Declared; ND: Not Declared

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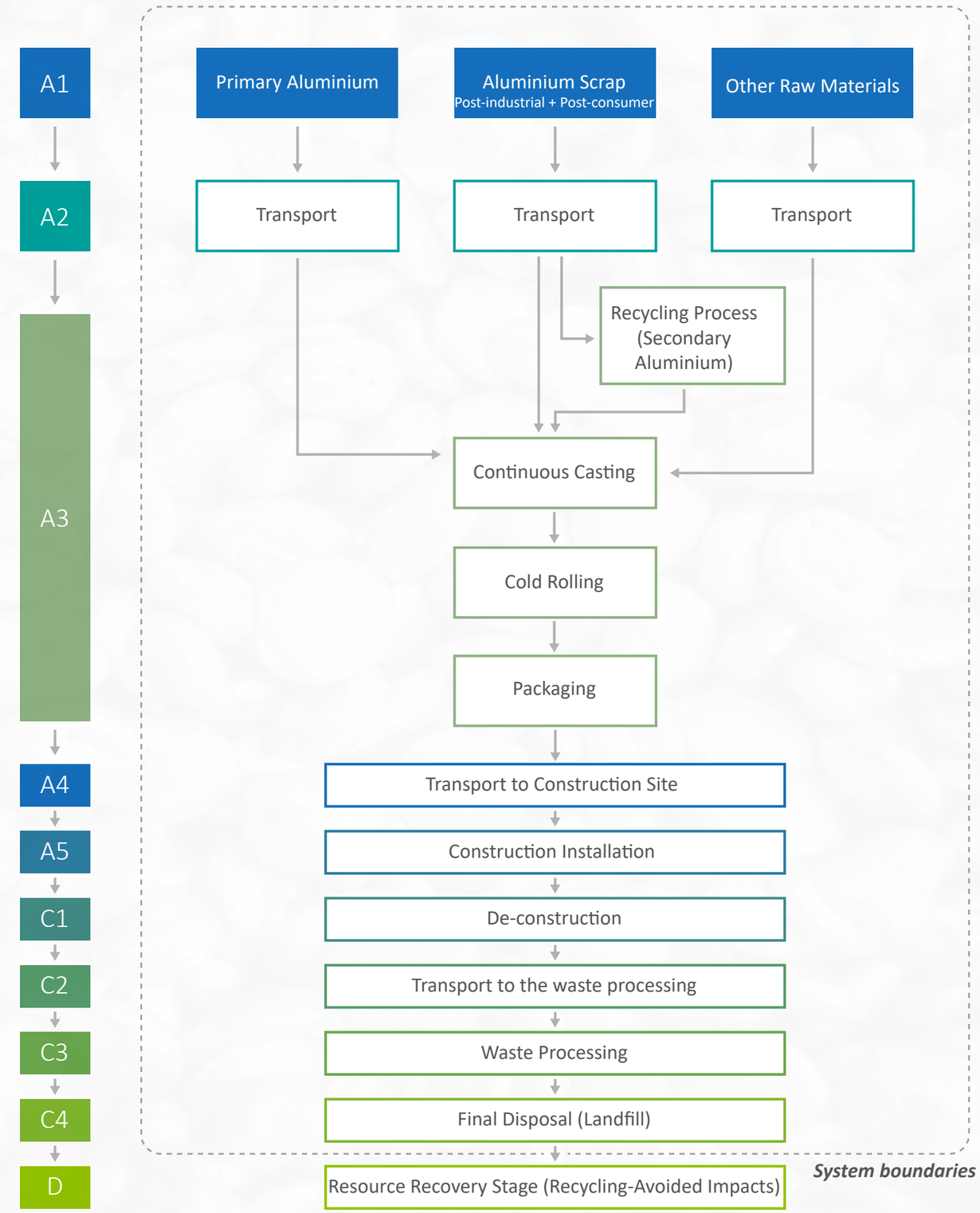
System Diagram:



Description of declared modules:

A1 - Raw Materials Supply

This stage takes into account raw material extraction, processing and energy used in the production process. Primary aluminium, secondary aluminium and other raw materials are considered in this stage.

A2 – Transport to The Manufacturer

This stages includes transportation of the raw materials from supplier to factory gate. Transportation types are considered as seaway, road, railroad or etc.

A3 – Manufacturing

This stages includes energy and water consumption during the manufacturing processes. Additionally, packaging materials are covered by this stage. Followed production processes are as;

- Aluminium Scrap Recycling
- Casting Process
- Cold Rolling Process
- Packaging

A4 – Transport to Construction Site

An average distance of 500 km has been assumed for the transport to construction site. Transport is calculated on the basis of a scenario with the parameters described in the table below.

Parameters A4 Module

Parameters A4 Module	
Transport by road*	Lorry >32 metric ton
Distance (km)	500
Database	Ecoinvent v3.6

**Technology is Euro 6*

A5 – Construction Installation

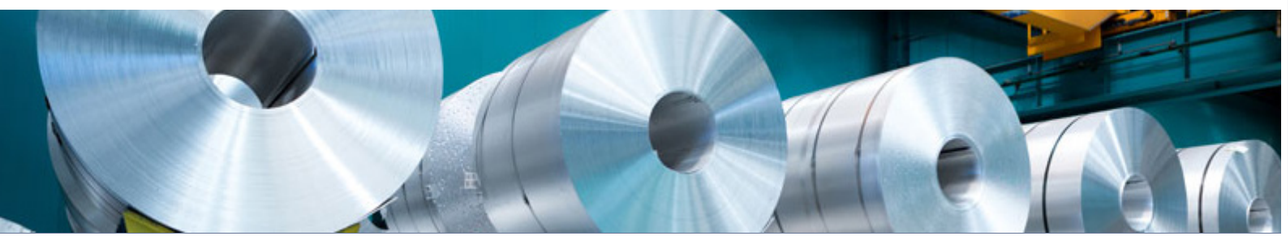
An average building installation machine diesel and electricity consumption assumed. It is calculated on the basis of a scenario with the parameters described in the table below.

Parameters A5 Module

Parameters A5 Module	
Water use, m^3	0
Electricity, kWh	0.013
Diesel, MJ	0.5977

C1 - De-construction

This stage takes into account dismantling or demolition of the product from the site. It has been assumed that during the de-construction operations the same electricity and diesel is consumed as during the Construction installation of aluminium sheet.



C2 - Transport to Waste Processing

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

Parameters C2 Module

Parameters C2 Module	
Transport by road*	Lorry >32 metric ton
Distance (km)	200
Database	Ecoinvent v3.6

**Technology is Euro 6*

C3 - Waste processing for reuse, recovery and/or recycling

It has been assumed that during the de-construction operations the same electricity and diesel is consumed as during the Construction installation of aluminium foil.

C4 - Final disposal

Recovery rates for aluminium during building dismantling are modelled based on figures reported by the European Aluminium Association. It was assumed a 95% for recovery rate while the remaining 5% goes to landfill.

D - Reuse, Recovery or Recycling Potential

Scrap inputs to the production stage are subtracted from scrap to be recycled at end of life in order to obtain the net scrap output from the product system. This remaining net scrap is then delivered to recycling process. 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 A1-3, A4-5 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 INCLUDING PACKAGING

Content declaration of aluminium sheet	
Material	**Percentage**
Aluminium, primer ingot	50%-70%
Post-consumer material	2%-11%
Pre-consumer material	23%-36%
Iron	<1%
Manganese	<1%
Others	<1%
Renewable material	0%
Biogenic carbon	0%

Content declaration of packaging	
Material	**Percentage**
Wooden Pellet	50%-70%
Paper	10%-20%
Hardboard	10%-20%
Cardboard	10%-20%
PE Film	1%-5%
Plastic Parts	1%-5%
	Amount
Biogenic Carbon, kg C	0.01-0.05

Biogenic carbon is arising from wooden pellet packaging material. No substances included into “Candidate List of Substances of Very High Concern (SVHC) for authorisation”. No recycling content included in packaging materials.

ENVIRONMENTAL INFORMATION

Potential Environmental Impact – **Mandatory Indicators According to EN 15804**

Results for 1 kg Cold Rolled Aluminium Sheet									
Indicator	**Unit**	**TOT. A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO2 eq.	10.01	0.045	0.062	0.055	0.018	0.007	0.003	-8.59
GWP-Biogenic	kg CO2 eq.	-0.063	1.07E-05	8.95E-05	1.05E-05	4.27E-06	7.90E-05	0.037	-0.014
GWP-Luluc	kg CO2 eq.	0.194	1.54E-05	7.69E-05	4.85E-06	6.17E-06	7.21E-05	2.07E-06	-0.175
GWP-Total	kg CO2 eq.	10.142	0.045	0.063	0.055	0.018	0.008	0.040	-8.78
ODP	kg CFC 11 eq.	7.98E-07	1.06E-08	1.20E-08	1.18E-08	4.26E-09	2.13E-10	2.70E-10	-6.72E-07
AP	mol H+ eq.	0.076	1.49E-04	0.001	0.001	5.94E-05	4.88E-05	1.52E-05	-0.068
EP-Freshwater	kg PO43- eq.	0.004	1.62E-05	9.42E-05	8.94E-05	6.47E-06	4.84E-06	2.10E-05	-0.004
	kg P eq	3.04E-04	4.15E-07	1.03E-06	1.91E-07	1.66E-07	8.42E-07	1.72E-07	-2.61E-04
EP-Marine	kg N eq.	0.009	3.24E-05	2.59E-04	2.53E-04	1.30E-05	6.44E-06	4.55E-05	-0.008
EP-Terrestrial	mol N eq.	0.104	3.61E-04	0.003	0.003	1.44E-04	7.15E-05	3.97E-05	-0.090
POCP	kg NMVOC eq.	0.034	1.38E-04	0.001	0.001	5.54E-05	1.98E-05	2.01E-05	-0.030
ADP-Minerals& Metals*	kg Sb eq.	1.23E-04	7.32E-07	1.09E-07	9.23E-08	2.93E-07	1.63E-08	1.75E-08	-4.33E-05
ADP-fossil*	MJ	99.2	0.716	0.833	0.751	0.286	0.082	0.030	-81.7
WDP	m3	3.38	0.003	0.005	0.001	0.001	0.004	0.001	-2.20

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-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

** 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.*

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

Results according to PCR2019:14 for 1 kg Cold Rolled Aluminium Sheet									
Indicator	**Unit**	**TOT. A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO2 eq.	9.841	0.045	0.062	0.054	0.018	0.007	0.026	-8.43
Results according to EN 15804+A2 for 1 kg Cold Rolled Aluminium Sheet									
PM	[disease inc.]	9.06E-07	3.88E-09	1.54E-08	1.52E-08	1.55E-09	2.07E-10	1.91E-10	-8.32E-07
IRP	[kBq U235 eq]	0.504	0.003	0.003	0.003	0.001	4.58E-05	1.10E-04	-0.462
ET-freshwater	[CTUe]	284	0.614	0.525	0.451	0.245	0.075	21.1	-252
HT-cancer	[CTUh]	2.67E-08	1.24E-11	1.49E-11	1.37E-11	4.94E-12	1.18E-12	1.98E-12	-2.47E-08
HT-non-cancer	[CTUh]	3.90E-07	6.28E-10	4.49E-10	3.88E-10	2.51E-10	6.08E-11	9.49E-11	-3.63E-07
SQP	[pt]	90	0.993	0.209	0.162	0.397	0.047	0.055	-71.732

Acronyms	GWP-GHG = Global Warming Potential total excl. biogenic carbon following IPCC AR5 methodology; PM = Particulate matter emissions; 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.

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ENVIRONMENTAL INFORMATION

Use of resources

Results per 1 kg Cold Rolled Aluminium Sheet									
Indicator	**Unit**	**TOT. A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	66.9	0.008	0.024	0.004	0.003	0.020	0.002	-61.6
PERM	MJ	0.00	0	0	0	0	0	0	0
PERT	MJ	66.9	0.008	0.024	0.004	0.003	0.020	0.002	-61.6
PENRE	MJ	99.2	0.716	0.833	0.751	0.286	0.082	0.030	-81.7
PENRM	MJ.	0.00	0	0	0	0	0	0	0
PENRT	MJ	99.2	0.716	0.833	0.751	0.286	0.082	0.030	-81.7
SM	kg	0.399	0	0	0	0	0	0	0
RSF	MJ	0.00	0	0	0	0	0	0	0
NRSF	MJ	0.00	0	0	0	0	0	0	0
FW	m3	0.181	9.21E-05	1.16E-04	4.27E-05	3.69E-05	7.33E-05	2.50E-05	-0.152

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 re-sources; 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 per 1 kg Cold Rolled Aluminium Sheet									
Indicator	**Unit**	**TOT. A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	0	0	-	0	0	0	0	0
Non-hazardous waste disposed	kg	0	0	-	0	0	0	0	0
Radioactive waste disposed	kg	0	0	-	0	0	0	0	0

Output Flows

Results per 1 kg Cold Rolled Aluminium Sheet									
Indicator	**Unit**	**TOT. A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0	0	-	0	0	0	0	0
Material for recycling	kg	0.696	0	-	0	0	0	0	0
Materials for energy recovery	kg	0	0	-	0	0	0	0	0
Exported energy, electricity	MJ	0	0	-	0	0	0	0	0
Exported energy, thermal	MJ	0	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

- 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
  https://www.environdec.com/contentassets/95ee9211a9614f1faa7461ff32cecc91/general-programme-instructions-v3.01.pdf
- The International EPD® System / PCR 2019:14 Construction products v1.1 (EN 15804:A2)
  https://www.environdec.com/PCR/Detail/?Pcr=%2014759

- Ecoinvent 3.6
  http://www.ecoinvent.org/
- SimaPro LCA Software
  https://simapro.com/
- Assan Alüminyum
  https://www.assanaluminyum.com/en/
- Aluminium Recycling in LCA / European Aluminium Association, 2013

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