Teknik ALÜMİNYUM

ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 and EN 15804:2012+A2:2019/AC:2021 for

Cold Rolled Aluminium Sheet

PROGRAMME
The International EPD® System

PROGRAMME OPERATOR
EPD Turkey

GEOGRAPHICAL SCOPE
Global

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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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ECO PLATFORM EPD VERIFIED

General 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)
Product Category Rules (PCR): <PCR 2019:14 Construction products (EN 15804:2012+A2.2019/AC:2021) Version 1.2.5 and UN CPC code(s) and 4153, Semi-finished products of aluminium or aluminium alloys

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 verification of the declaration and data, according to ISO 14025:2021:

☐ EPD process verification ☑ EPD verification

Third party verifier
SIPL Pvt Ltd, New Delhi, India - sunil@sipl-sustainability.com

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
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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.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company Information

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Teknik Alüminyum was established in 1960 as Turkey's first aluminium flat product producer. Our company, which moved to its new factory in Çorlu/Tekirdağ with an annual capacity of 100.000 tons in 2009, was acquired by the American AA Metals company in January 2019.

Teknik Alüminyum is able to deliver the high-quality aluminium materials to its customers in the fastest way with its long years of experience in both domestic and international markets. Teknik Alüminyum aims to continue its growth by increasing customer satisfaction in the years ahead with the principle of being a solution partner sought in the global aluminium industry.

In order to understand the expectations of our customers in the world of production and to fulfil them on time, advanced process setups and process parameters must be defined on the product. With a view to create all these definitions, statistical control-oriented engineering studies are carried out and the "Engineering Change Management" approach is applied in our development studies of an existing process. However, to make a difference in competitive production conditions, it has now become a necessity to produce fast and innovative solutions for the customer's different product expectations. At this stage, "New Product Commissioning" systematic method is applied in our new product development research.

Product Information

Product Name:
Cold Rolled Aluminium Sheet

Product

Aluminum is an eco friendly metal with its easy productibility, high recycling rate and wide usage area. For a cleaner future, Teknik Aluminyum produces and offers to the world markets Aluminum products, which are light, easy to process and therefore used in almost every field of industry, within the framework of sustainability understanding.

Process

Teknik Alüminyum A.Ş can produce aluminium coils and sheets in 1XXX, 3XXX, 5XXX and 8XXX series alloys with a thickness between 0.17 and 3.14 mm and a maximum width of 2200 mm by cold rolling process.

In flat aluminium production, first line is casting line. In the casting line first, aluminum mixture is prepared with primary aluminium, recycled aluminium, process scrap aluminium, alloying elements and other additives. Cast rolled aluminum coils are then processed in the cold rolling line where the coils are rolled to its final thickness. After cold rolling process coils are softened in the annealing process by heating.

Next process is the tension and levelling line where the coils are stretched to ensure flatness and degreased in order to prevent surface oil and smudge.

At the final stage coils are process in the cut to length line or slitting line depending on the type of the final product.

In cut to length line coil are cut and sheet products are produced. In slitting line coil and strip product are processed.

After the finishing lines flat products are packed and shipped to the customers.

Intended Use of Product

Aluminum sheets are widely used in automotive, construction,consumer durables and electrical&electronic industries. Their electric and thermal conductivity make them ideal for heat transfer applications, such as heat sinks in electronic devices or heat exchangers in the automotive industry. Aluminum, which has a huge usage area in the construction and home appliances industry have excellent weldability, they can be weld without the need for any filler materials.

Technical Specifications

Cold Rolled Aluminium Sheet

Product	Standard	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)
	ASTM B117	Specification for Salt Spray Test
	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 : 4153, Semi-finished products of aluminium or aluminium alloys

LCA Information

Declared Unit

The declared unit is a 1 kg of Cold Rolled Aluminium Sheet

Reference Service Life

Not applicable

Time Representativeness

The production data in this LCA study represents the period of 1st January 2020 and 31st December 2020.

Database(s) and LCA software used

SimaPro v9.4.0.2 LCA software and Ecoinvent 3.7.1

Description of System Boundaries

Cradle to gate with modules
C1–C4 and module D (A1–A3 + C + D)

Cut-off Rules

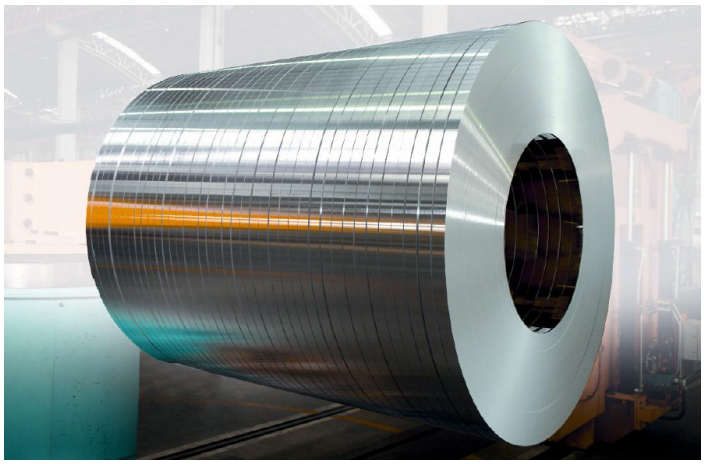
Life Cycle Inventory data for a minimum of 99 % of total inflows to the three life cycle stages have been included and a cut-off rule of 1% regarding energy, mass, and environmental relevance was applied.

Data Quality

According to EN 15804:2012+A2.2019/AC:2021 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.

Allocation

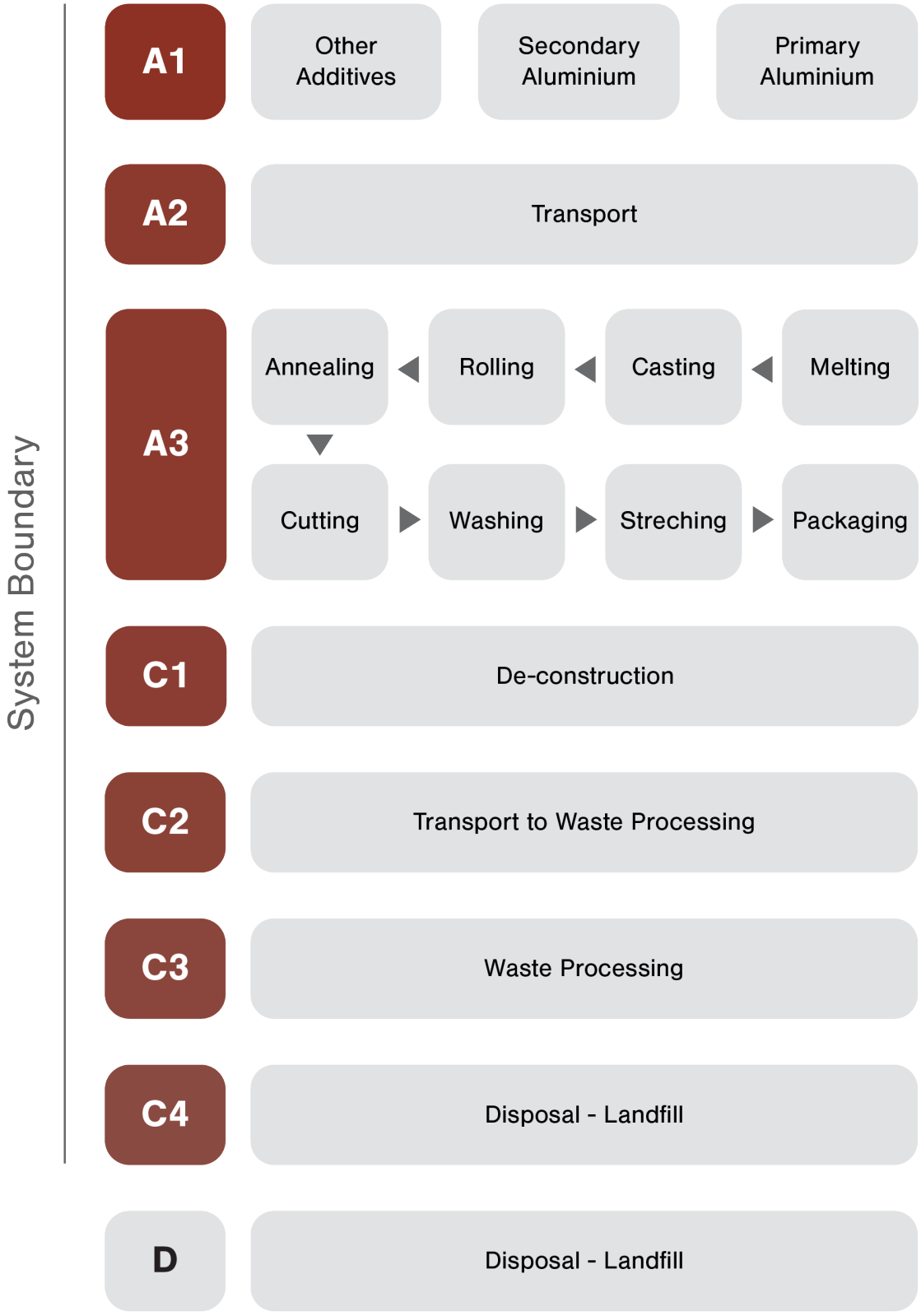
Consumption for electricity, natural gas, diesel, and water is allocated based on the series that are being produced.



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	Maintanence	Repair	Replacement	Refurbishment	Operaitional 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-A3 - Cradle to gate

The aggregation of the modules A1, A2 and A3 is allowed by EN 15804:2012+A2.2019/AC:2021. This rule is applied in this EPD and denoted by A1-3. This module includes the extraction and processing of raw materials before production stage, transport to production sites, processing of raw materials at the facility and packaging of the final product.

Module A1 represents the extraction and processing of raw materials.

Module A2 includes transportation of the raw materials from supplier to factory gate. The transportation methods taken into account are sea transport and road transport.

Module A3 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.

C1 - De-construction

Demolition of the Cold Rolled Aluminium Sheet from base construction was assumed to be done manually. Given the scenario that is assumed, environmental impact of de-construction process is not considered under the scope of this study.

C2 - Transport to waste processing

It has been assumed that the transportation to the sorting facility covers an average distance of 100 km.

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

This module includes the energy consumption required for the sorting of Cold Rolled Aluminium Sheet in the recycling process.

C4 - Final disposal

For the end-of-life scenario, 96% of the product will be collected and sorted during de-construction. It is anticipated that 4% of the product will be lost during de-construction, while the remaining 96% will make its way to the sorting/recycling facility.
The recycling rate of the Cold Rolled Aluminium Sheet are assumed to be 96% at the sorting/recycling facility; making up a total of 96% of end-of-life products recycled to be used again in construction projects or construction material manufacturing, and the remaining 4% of waste being sent to landfill.

D - Reuse, recovery or recycling

Module D includes the environmental aspects of recycled scrap generated at the end-of-life minus that used Module A1, which stands for the extraction and processing during the production stage.
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 Cold Rolled Aluminium Sheet from the product system. This remaining net Cold Rolled Aluminium Sheet is then sent to recycling.

Content Declaration

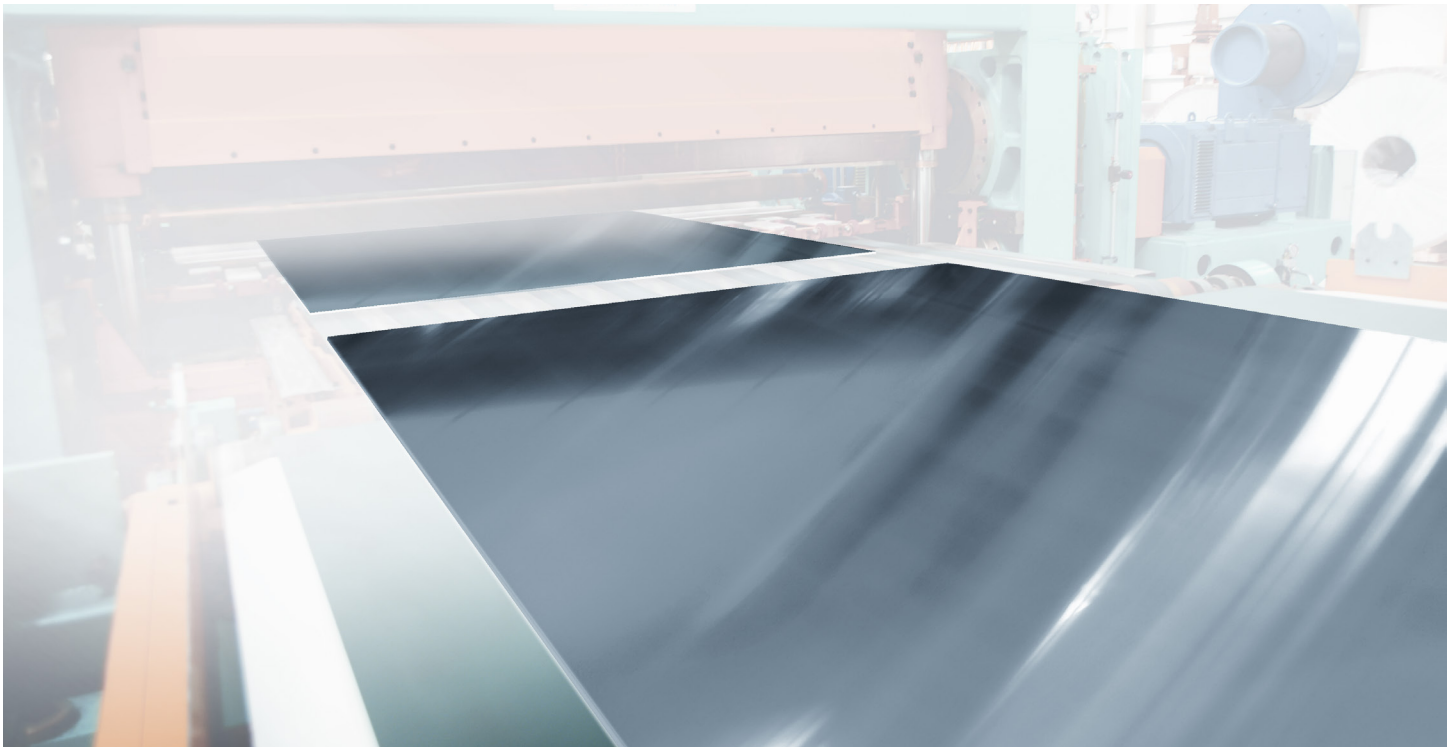
Content declaration of 1 kg **Cold Rolled Aluminium Sheet**

Product	Primary Aluminium, %	Pre-consumer recycled materials, %	Additives, %	Renewable material weight, %	Biogenic carbon weight, %
Cold Rolled Aluminium Sheet	65-70	30-35	0-5	0	0-5

Packaging Materials

Content declaration of Packaging Material, for 1 kg of **Cold Rolled Aluminium Sheet**

Cold Rolled Aluminium Sheet	Weight, %	Biogenic carbon, %
Steel	0-5	-
Wood	0-5	0-5
Packaging film	0-5	-
Kraft paper	0-5	0-5



Environmental Performance

Results of the environmental performance indicators

Mandatory impact category indicators according to EN 15804

RESULTS PER FUNCTIONAL OR DECLARED UNIT							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq	13.7	0	0.016	0.059	0.003	-9.18
GWP -biogenic	kg CO_2 eq	-0.018	0	3.79E-05	0.001	8.52E-05	0.011
GWP-luluc	kg CO_2 eq	0.158	0	5.35E-06	5.06E-05	2.91E-06	-0.116
GWP-total	kg CO_2 eq	13.9	0	0.016	0.060	0.003	-9.28
ODP	kg CFC 11eq	8.09E-07	0	3.55E-09	6.72E-09	3.40E-10	-4.66E-07
AP	mol H^+ eq	0.095	0	4.34E-05	2.07E-04	2.03E-05	-0.067
EP-Freshwater	kg P eq	0.001	0	1.17E-07	2.56E-06	1.03E-07	-4.14E-04
EP-marine	kg N eq	0.013	0	8.84E-06	2.85E-05	4.87E-06	-0.009
EP-Terrestrial	mol N ep	0.143	0	9.83E-05	3.21E-04	5.44E-05	-0.099
POCP	kg NMVOC eq	0.045	0	3.77E-05	9.60E-05	1.61E-05	-0.031
ADP-minerals & metals*	kg Sb eq	2.40E-05	0	5.73E-08	6.61E-08	6.86E-09	-1.35E-05
ADP-fossil*	MJ	143	0	0.237	1.03	0.044	-91.0
WDP	m^3	2.73	0	0.001	0.006	0.001	-1.88

** 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-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

Environmental Performance

Additional mandatory and voluntary impact category indicators

RESULTS PER FUNCTIONAL OR DECLARED UNIT							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq	13.8	0	0.016	0.058	0.003	-9.24
RESULTS ACCORDING TO EN 15804:2012+A2.2019/AC:2021 FOR 1 KG OF COLD ROLLED ALUMINIUM SHEET							
PM	[disease inc.]	9.73E-07	0	9.83E-10	8.24E-10	2.88E-10	-6.82E-07
IRP	[kBq U235 eq]	0.446	0	0.001	0.005	1.48E-04	-0.302
ETP-fw	[CTUe]	360	0	0.182	0.333	48.6	-256
HT-C	[CTUh]	2.70E-08	0	6.45E-12	1.14E-11	2.91E-12	-1.86E-08
HT-nc	[CTUh]	4.16E-07	0	1.78E-10	2.65E-10	7.36E-11	-3.00E-07
SQP	[pt]	33.1	0	0.165	0.087	0.056	-15.9

Disclaimers shall be added, if required by EN 15804.

Acronyms

GWP-GHG = Global Warming Potential total excl. biogenic carbon following IPCC AR5 methodology; **PM** = Potential incidence of disease due to PM emissions; **IRP** = Potential Human exposure efficiency relative to U235; **ETP-fw** = Potential Comparative Toxic Unit for ecosystems; **HT-C** = Potential Comparative Toxic Unit for humans; **HT-nc** = Potential Comparative Toxic Unit for humans; **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+A2:2019/AC:2021.

Disclaimer 2: This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Disclaimer 3: The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

Resource Use Indicators

RESULTS PER FUNCTIONAL OR DECLARED UNIT							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	53.8	0	0.003	0.080	0.003	-39.2
PERM	MJ	0	0	0	0	0	0
PERT	MJ	53.8	0	0.003	0.080	0.003	-39.2
PENRE	MJ	151	0	0.251	1.11	0.046	-96.1
PENRM	MJ	0	0	0	0	0	0
PENRT	MJ	151	0	0.251	1.11	0.046	–96.1
SM	kg	0.340	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m^3	0.555	0	2.16E-04	0.005	1.46E-04	-0.383

** This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO2 is set to zero.*

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 Indicators

RESULTS PER FUNCTIONAL OR DECLARED UNIT							
Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous Waste Disposed	kg	0	0	0	0	0	0
Non-Hazardous Waste Disposed	kg	0.013	0	0	0	0	0
Radioactive Waste Disposed	kg	0	0	0	0	0	0

Output Flow Indicators

RESULTS PER FUNCTIONAL OR DECLARED UNIT							
Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Components for Re-use	kg	0	0	0	0	0	0
Material for Recycling	kg	0	0	0	0	0	0
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 2021 Environmental management - Life cycle assessment - Principles and framework

ISO 14044 2021 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/AC:2021 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 v4

The International EPD® System PCR 2019:14 Construction products v1.2.5 (EN 15804:2012+A2.2019/AC:2021)

Ecoinvent 3.7 www.ecoinvent.org

SimaPro LCA Software www.simapro.com

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