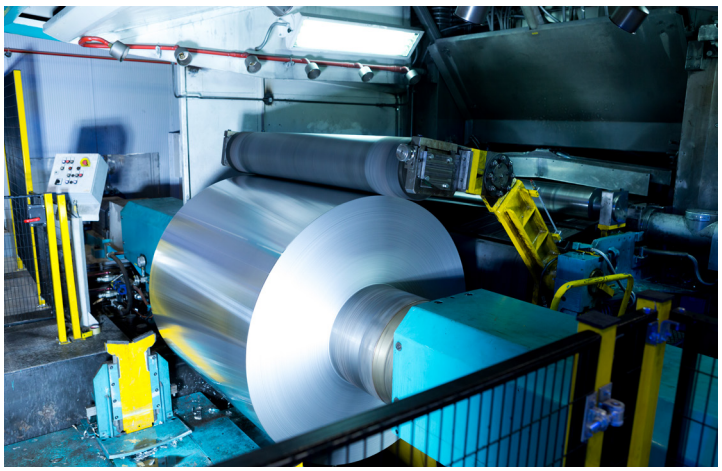
ENVIRONMENTAL
PRODUCT DECLARATION

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

High Recycled Content Aluminium Sheet (3423)

from

Assan Alüminyum



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

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 1.3.4

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 14025:2006:

☐ EPD process verification ☑ EPD verification

Third party verifier
SimaPro partners for India & Sri Lanka, SIPL Pvt Ltdy

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 8/27
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.

Disclaimer: Additional deviations within the EPDs may exist that have not been identified by the Secretariat of the EPD International AB. The responsibility for verifying EPDs lies with independent third-party verifiers, EPD International AB is not accountable for detecting each potential deviation that passes through the EPD verification process.

Company Information

Owner of the EPD

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Assan Alüminyum, one of the world's leading manufacturers in the flat-rolled aluminium (FRP) industry, producing coil & sheet, foil and pre-painted aluminium products since 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 360 thousand tons in its production facilities, with the highest continuous casting capacity in all of Europe and Americas. The company is currently one of the 2 largest aluminium foil manufacturers in Europe, with an aluminium foil production capacity of 130 thousand tons.

Assan Alüminyum Creates the Future Together with its business partners. With its core values of reliability, flexibility, innovation and sustainability, the company provides customized solutions for its customers. Assan Alüminyum's vision is based on creating long-lasting value by being more sustainable, in environmental, governance and social terms. Assan Alüminyum received the Aluminium Stewardship Initiative (ASI) Performance Standard Certificate for all of facilities. ASI framework is essential for the company to manage all of its business processes according to global sustainability standards. With the clean energy that the company produces at its Manavgat Renewable Energy Power Plant, it generates and procures I-RECs (International Renewable Energy Certificate) that allow it to fully offset its market-based Scope 2 emissions. The 100% and infinitely recyclable aluminium is recycled at its integrated recycling facility, which helps reduce the carbon footprint of the company.

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 Center.

With its global culture, 1700 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 North American subsidiary of Assan Alüminyum in Chicago, aims to perform the ambitious plans for growth in North America.

NAME AND LOCATION OF PRODUCTION SITES

Tuzla Plant
Yayla Mahallesi 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:
High Recycled Content Aluminium Sheet (3423)

Flat rolled aluminium is produced by casting aluminium through the melting of aluminium ingots / t-bars. The cast coils are then rolled down to the desired thickness in cold rolling mills. Aside from cold rolling, semi-finished cold rolled aluminium sheet production processes may also include annealing, tension levelling, cut-to-length, slitting processes and packaging processes.

The flat rolled coil & sheet production process begins with the re-melting of unwrought aluminum, aluminum scrap, and alloying elements in the melting furnaces to produce a given alloy chemical composition and casting of coils on twin roll continuous casting lines.

Cast coils are reduced in thickness in successive stages on cold rolling mills to the desired thickness, the coils are slit to the final desired width, and heat-treated in annealing furnaces as required by the metallurgical process to produce final desired mechanical properties.

Finishing operations are performed on slitting, tension levelling, cut-to-length, and packaging lines as needed. Tension levelling lines are used to flatten the material and surface cleaning. Slitting lines are used to reduce the coil width or to slit it into strips. Cut-to-length lines are used to convert coil into sheets in specific lengths.

High recycled content aluminium sheet consists of a special alloy designed by Assan Alüminyum, containing more than 95% non-primary aluminium raw materials.

High recycled content aluminium sheet products are produced through standard flat rolled aluminium production processes, with an input of higher than 95% non-primary aluminium raw materials.

Intended Use of Product

High recycled content aluminium sheet has superior qualities, such as lightness, impermeability, high-conductivity, high corrosion resistance, easy formability and infinite recyclability, which make it the product of choice for various different applications and industries. High recycled content aluminium sheet is primarily used in construction. As aluminium is 100% and infinitely recyclable, the High recycled content aluminium sheet has a lower carbon footprint than equivalent products, as a result of lower energy input, with its higher non-primary aluminium content.

Technical Specifications

Technical specification	Test Method	Unit	1 kg of High recycled content aluminium sheet (3423)
Density	*	(kg/m3) x 103	2,72
Melting point (Typical)	*	^{0}C	630-650
Electrical conductivity (Typical) at 24^{0}C/ at 68 ^{0}F	EN 14121:2009	MS/m (0,58*%IACS)	22-30
Thermal conductivity (Typical) at 24^{0}C/ at 77 ^{0}F	*	W/(m.K)	160-220
Average Coefficient of thermal expansion (Typical) 20^{0}C to 100^{0}C /68^{0}F to 212 ^{0}F	*	µm/m.°C	22-25
Modulues of elasticity (Typical)	*	GPa	69-70
Hardness (min)	EN 485-2	HB	-
Yield strength (min)	EN 485-2	MPa	105
Ultimate tensile strength (min)	EN 485-2	MPa	130
Breaking elongation (min) (50 mm&4D)	EN 485-2	%	3
Chemical Composition (min)	EN 573-3	% by mass	97

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

LCA Information

Declared Unit

1 kg of High Recycled Content Aluminium Sheet (3423) 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 1 January - 31 December 2023.

Database(s) and LCA software used

SimaPro LCA v9.6.0.1 software with Ecoinvent v3.9.1

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 v3.9.1

Allocation

Mass allocation of actual data for pre-consumer and post-consumer recycled materials has been applied according to the EN15804:2012+A2:2019 standard.

Cut-off Rules

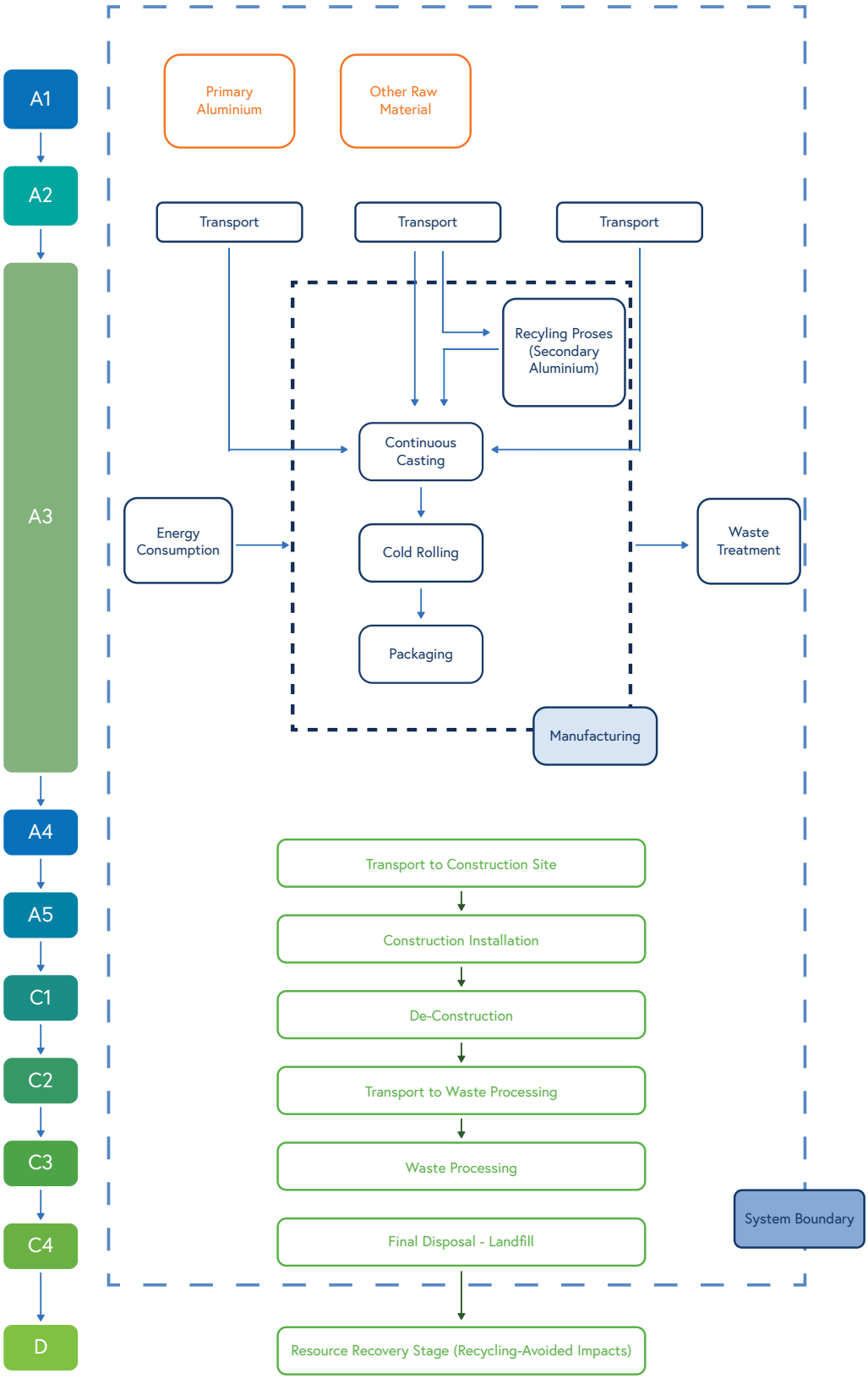
Life Cycle Inventory data for a minimum of 99 % of total inflows to the three life cycle stages have been included and a cut-off rule of 1% regarding energy, mass, and environmental relevance was applied.

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	Maintanence	Repair	Replacement	Refurbishment	Operaitional energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Recycling Potential
Module	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.

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 roadway and seaway.

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.

Assan Alüminyum holds an International Renewable Energy Certificate (IREC), verifying that 100% of the electricity consumed at its Dilovası and Tuzla production facilities is sourced from renewable energy, specifically hydropower plants. The carbon footprint associated with 1 kWh of hydropower electricity is calculated as 0.0047428836 tCO_2e.

A1-3 - Cradle to gate – Mandatory Module

The aggregation of the modules A1, A2 and A3 is allowed by EN 15804:2012+A2:2019. This rule is applied in this EPD and denoted by A1-3. This module represents the extraction and processing of raw materials, the transport to production sites and the manufacture and packaging.

A4 - Transport to construction site – Voluntary Optional Module

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	
Transport by road*	Lorry >32 metric ton
Distance (km)	500
Database	Ecoinvent v3.9.1

A5 - Construction installation - Voluntary Optional Module

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	
Water use, m3	0
Electricity, kWh	0.013
Diesel, MJ	0.5977

Description of Declared Modules

C1 - De-construction

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.

Data	Amount	Unit
Energy Consumption	0.5977	MJ/kg
Energy Consumption	597.7	MJ/ton

*It is assumed that diesel is consumed as energy.

C2 - Transport to Waste Processing – Mandatory Module

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 attached table.

Parameters C2 Module	
Data	**Amount**
Transport by road*	Lorry >32 metric ton
Distance	200
Database	Ecoinvent 3.9.1

*Technology is Euro 6

The parameters C2 module remains consistent for and High Recycled Content Aluminium Sheet (3423).

C3 - Waste Processing for Reuse, Recovery and/or Recycling – Mandatory Module

During the pre-recycling process, materials are separated to ensure effective recycling, resulting in negligible environmental impacts. Materials intended for reuse, however, do not undergo any processing before being used at another construction site, thus having zero environmental impact. It is assumed that the same amount of electricity and diesel is consumed during the deconstruction phase as during the installation of aluminium sheet in the construction phase.

C4 - Final Disposal – Mandatory Module

All end-of-life products will be collected and recycled back into the production system, including the High Recycled Content Aluminium Sheet (3423). A total of 95% of these products are recycled and reused in construction projects or material production, while the remaining 5% are sent to landfill. The recovery rates for aluminium during building dismantling are based on data from the European Aluminium Association, assuming a 95% recovery rate and 5% going to landfill.

Description of Declared Modules

D - Reuse, recovery or recycling – Mandatory Module

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 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.

This LCA and the 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

Material	Percentage, %
Aluminium, primer ingot	0-10
Post-consumer material	0-10
Pre-consumer material	80-90
Iron	<1
Manganese	<1
Others	<1
Renewable material	0
Biogenic carbon	0

Material	Percentage, %	Biogenic carbon, %
Cardboard	0-5	0-5
Hardboard	0-5	0-5
PE film	0-5	-
Paper	0-5	0-5
Metal parts	0-5	-

GWP-GHG intensity of input scrap

Material	Weight (%)	GWP-GHG (kgCO2e/kg)
Pre-consumer scrap	56.41	0.96
Post-consumer scrap	0.24	0.004

Environmental Information

Potential Environmental Impact –

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

Results for 1 kg of High Recycled Content Aluminium Sheet (3423)									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	1.69	0.05	0.07	0.06	0.02	0.01	1.28E-03	-0.37
GWP -biogenic	kg CO_2 eq.	0.03	2.56E-04	3.29E-04	9.95E-05	1.02E-04	2.30E-04	2.21E-05	-3.17E-03
GWP-luluc	kg CO_2 eq.	4.56E-03	2.20E-05	8.30E-05	5.26E-06	8.80E-06	7.77E-05	1.62E-06	-2.76E-03
GWP-total	kg CO_2 eq.	1.73	0.05	0.07	0.06	0.02	0.01	1.30E-03	-0.38
ODP	kg CFC 11eq.	5.15E-05	8.27E-10	9.51E-10	9.14E-10	3.31E-10	3.74E-11	2.29E-11	-2.72E-09
AP	mol H^+ eq.	0.01	1.32E-04	5.87E-04	5.40E-04	5.30E-05	4.70E-05	7.37E-06	-2.52E-03
EP-freshwater	kg P eq.	5.86E-04	4.21E-06	9.03E-06	1.74E-06	1.68E-06	7.28E-06	2.02E-07	-1.45E-04
EP-marine	kg N eq.	1.72E-03	3.36E-05	2.59E-04	2.51E-04	1.34E-05	8.34E-06	3.14E-06	-3.56E-04
EP-terrestrial	mol N eq.	0.02	3.64E-04	2.82E-03	2.74E-03	1.45E-04	7.63E-05	2.78E-05	-3.62E-03
POCP	kg NMVOC eq.	0.01	2.00E-04	8.41E-04	8.18E-04	8.01E-05	2.26E-05	8.72E-06	-1.25E-03
ADP minerals &metals*	kg Sb eq.	3.27E-05	1.46E-07	2.38E-08	2.09E-08	5.85E-08	2.94E-09	3.29E-09	-3.45E-07
ADP-fossil*	MJ	17.5	0.78	0.86	0.78	0.31	0.08	0.02	-3.83
WDP*	m^3	0.32	4.87E-03	4.86E-03	2.30E-03	1.95E-03	2.56E-03	-0.01	-0.15

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

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[2] Disclamer: It is essential to interpret the lifecycle impacts of the product by considering the outcomes of all relevant modules, including A1-A3 (or A1-A5 for services) and module C, as a whole. Using the results of modules A1-A3/A1-A5 independently may lead to incomplete conclusions regarding the product's environmental performance.

Environmental Information

Potential Environmental Impact –

Additional Mandatory and Voluntary Indicators

Results according to PCR2019:14 for 1 kg of High Recycled Content Aluminium Sheet (3423)									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq.	1.70	0.05	0.07	0.06	0.02	0.01	1.29E-03	-0.38
Results according to EN 15804+A2 for 1 kg of High Recycled Content Aluminium Sheet (3423)									
PM	[disease inc.]	1.22E-07	5.10E-09	1.56E-08	1.54E-08	2.04E-09	2.09E-10	1.35E-10	-2.74E-08
IRP	[kBq U235 eq]	0.08	6.89E-04	4.09E-04	3.50E-04	2.76E-04	5.85E-05	4.74E-05	-0.01
ETP-fw	[CTUe]	104	0.84	0.68	0.51	0.33	0.18	669	-11.0
HT-C	[CTUh]	2.22E-08	2.67E-10	2.42E-10	2.34E-10	1.07E-10	7.95E-12	6.58E-12	-1.02E-09
HT-nc	[CTUh]	4.70E-08	6.46E-10	4.01E-10	3.47E-10	2.59E-10	5.41E-11	1.38E-08	-5.72E-09
SQP	[pt]	5.00	0.79	0.06	0.05	0.31	0.01	0.03	-0.59
Net use of fresh water	m^3	0.08	7.35E-04	8.50E-04	4.08E-04	2.94E-04	4.42E-04	5.19E-05	-0.02
Eutrophication	kg PO4--- eq	2.42E-03	2.51E-05	1.15E-04	8.99E-05	1.00E-05	2.51E-05	1.85E-06	-5.67E-04
Human toxicity	kg 1,4-DB eq	15.3	0.19	0.15	0.15	0.08	0.01	4.42E-03	-0.70
Fresh water aquatic ecotox.	kg 1,4-DB eq	5.84	0.02	0.02	0.02	0.01	0.01	1.54E-03	-0.44
Marine aquatic ecotoxicity	kg 1,4-DB eq	8.42E03	74.6	69.9	54.6	29.8	15.4	2.17	-1.53E03
Terrestrial ecotoxicity	kg 1,4-DB eq	0.08	1.23E-03	1.01E-03	9.67E-04	4.93E-04	4.29E-05	3.19E-05	-3.48E-03

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)

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Environmental Information

Use of Resources

Results for 1 kg of High Recycled Content Aluminium Sheet (3423)									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	7.83	0.01	0.04	4.79E-03	4.10E-03	0.03	6.39E-04	-0.99
PERM	MJ	0	0	0	0	0	0	0	0
PERT	MJ	7.83	1.01	0.04	4.79E-03	4.10E-03	0.03	6.39E-04	-0.99
PENRE	MJ	18.7	0.83	0.92	0.83	0.33	0.09	0.02	-4.10
PENRM	MJ	0	0	0	0	0	0	0	0
PENRT	MJ	18.7	0.83	0.92	0.83	0.33	0.09	0.02	-4.10
SM	kg	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m^3	0.08	7.35E-04	8.50E-04	4.08E-04	2.94E-04	4.42E-04	5.19E-05	-0.02

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

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Environmental Information

Waste Production

Results for 1 kg of High Recycled Content Aluminium Sheet (3423)									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	0	0	0	0	0	0	0	0
Non-hazardous waste disposed	kg	0	0	0	0	0	0	0.05	0
Radioactive waste disposed	kg	0	0	0	0	0	0	0	0

Output Flows

Results for 1 kg of High Recycled Content Aluminium Sheet (3423)									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0	0	0	0	0	0	0	0
Material for recycling	kg	0	0	0	0	0	0	0	0.95
Materials for energy recovery	kg	0	0	0	0	0	0	0	0
Exported energy, electricity	MJ	0	0	0	0	0	0	0	0
Exported energy, thermal	MJ	0	0	0	0	0	0	0	0

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References

- **ISO 14040** 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 14021** 2016 Environmental labels and declarations
- **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 v5.0.0 https://www.environdec.com/resources/documentation#generalprogrammeinstructions
- **The International EPD® System** PCR 2029:14 Construction products v1.3.4 (EN 15804:A2)
- **Ecoinvent 3.9.1** www.ecoinvent.org
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