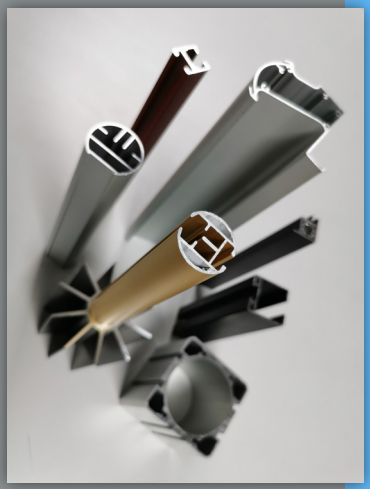
ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 for:

Anodised Aluminium Profile from Tuna Aluminium



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Programme operator: EPD International AB & EPD Turkey

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

Programme	EPD Turkey, a fully aligned regional programme. www.epdturkey.org	The International EPD® System www.environdec.com
Programme Operator	EPD Turkey: SÜRATAM – Turkish Centre for Sustainable Production Research & Design Nef 09 B Blok No:7/15 34415 Kagıthane/Istanbul Turkey	The International EPD® System EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Geographical Scope	Global	
UN CPC Code	42532 (Bars, rods and profiles, of aluminium)	

EPD OWNER

Tuna Alüminyum Met. Kim. İnş. San. Ve Dış Tic. A.Ş.

Veliköy O.S.B.Sanayi Bulvarı No:98/A / 59500

Çerkezköy / Tekirdağ / TURKEY

Programme Information

Programme	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden www.environdec.com info@environdec.com
Product Category Rules (PCR)	2019:14 Version 1.1, 2019-09-14 Construction Products EN 15804:2012 + A2:2019 Sustainability of Construction Works
Independent third-party verification of the declaration and data, according to ISO 14025:2006	EPD process certification ( ) EPD verification (**X**)
Third party verifier	Professor Vladimír Kocí
Approved by	The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier	Yes ( ) No (**X**)

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs for construction products are primarily intended for use in B2B communication, but their use in B2C communication under certain conditions is not precluded. For EPDs intended for B2C communication, refer to ISO 14025.

About Company

Tuna Aluminium Reliable Aluminium Profile Supplier

Founded in 1989, Tuna Aluminium has become one of the leading regional players in aluminium extrusion industry, by staying one step ahead of change throughout its journey of 33 years.

Tuna Aluminium has been producing the profiles to various sectors including automotive, machinery, building materials, lighting, energy, electronic, marine, furniture and decoration.

Tuna Aluminium offers full service under one roof and product excellence with the Extrusion, Anodizing, Powder Coating and Machining Lines.

Quality

Product quality and customer satisfaction is at the heart of the Tuna Aluminium and we use the most advanced technological equipment in the industry.

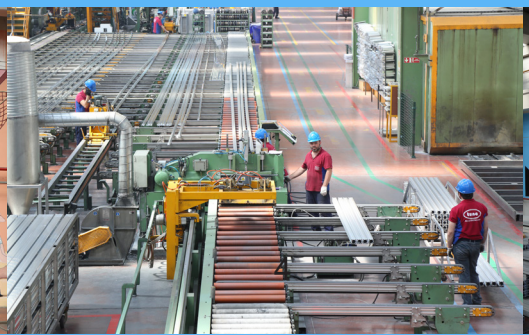
While all processes, the profiles are carefully inspected for irregularities and the surface conditions is to the highest standard. Quality is the upmost importance for us.

Research and Development

Research and further development have been the highest priority of Tuna Aluminium. Our work is continually being carried out to find new solutions and innovations using the latest cad/cam workstations.

Logistic

The Tuna Aluminium Quality requires high-performance logistics perfectly organize time management ensures deliveries arrive at their destinations on time.



Product Information

Anodised Aluminium Profiles

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.

Tuna Aluminium has fully automated Anodising Lineand 14400 tonnes of profiles anodized annually.

Anodised products are in accordance with Qualanod norms.

Tuna Aluminium has waste water treatment plant for wastes of anodizing process.

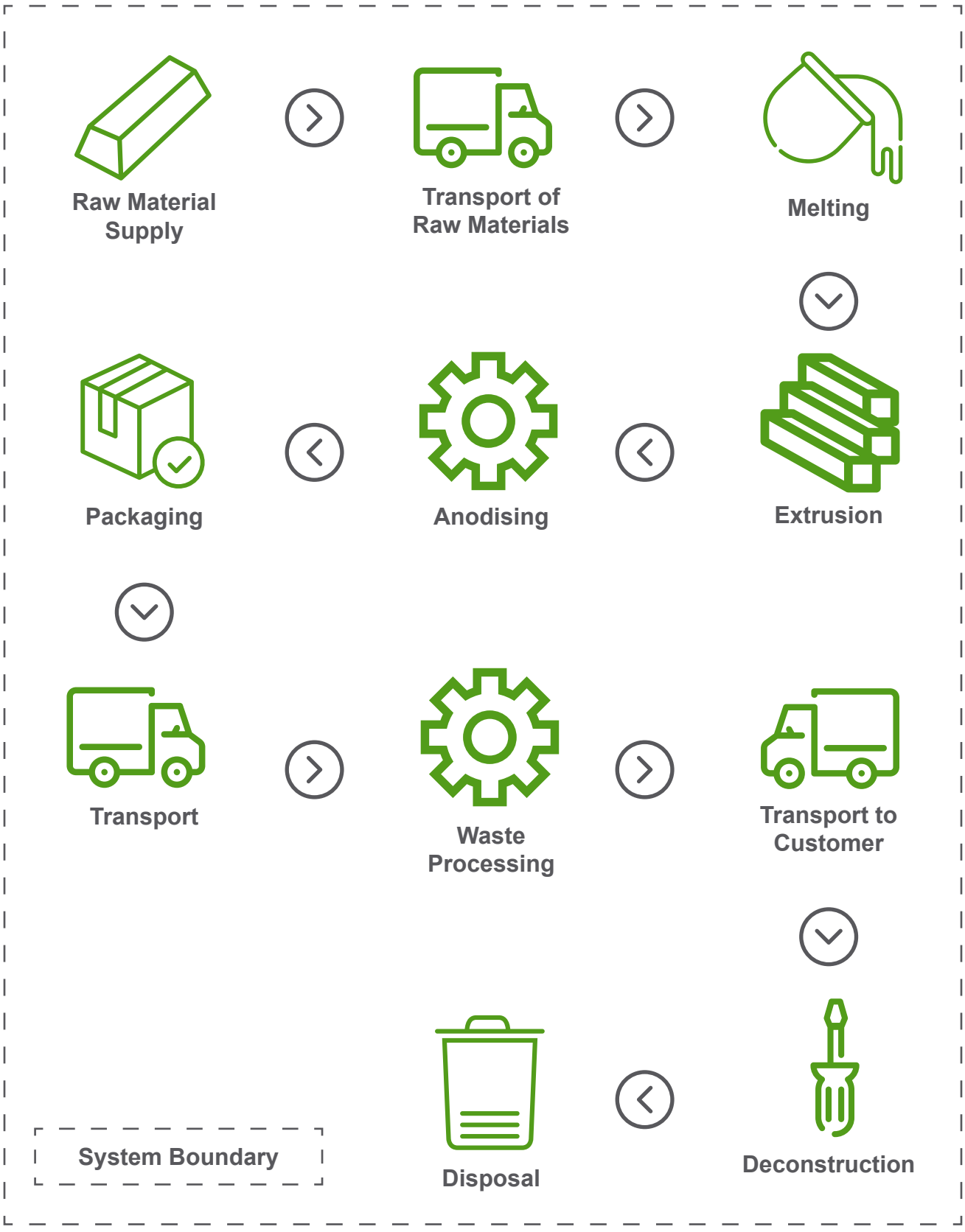
LCA Information

Functional Unit	1 kg of Uncoated Aluminium Profile
Time Representativeness	2021
Database(s) and LCA Software Used	Ecoinvent 3.6, TLCID (Turkish Lifecycle Inventory Database) and SimaPro 9.1
System Boundaries	A1-A4, C1-C4 and D.
Allocation	No allocation performed
Cut-Off Rules	No cut-off rule was applied within the LCA study underlying this EPD.

Upstream			Core					Downstream								Otther Environmental Information
Raw Material Supply	Transport	Manufacturing	Transport	Construction Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	Deconstruction, demolition	Transport	Waste Processing	Disposal	Future reuse, recycling or energy recovery potentials
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

*ND: Not declared.

System Boundary



System Description

A1: Raw Material Supply

Raw material supply includes raw material extraction and pre-treatment processes before its use. Raw material consists of 22% recycled content.

A2: Transport

Raw material transport distances are calculated according to 2020 supply figures of Tuna Aluminium.

A3: Manufacturing

Manufacturing processes consist of melting, extruding, anodising and packaging steps for aluminium profile at Tuna Aluminium.

A4: Transport

Transport of aluminium profiles to consumers are modelled according to 2020 transport figures of Tuna Aluminium for uncoated aluminium.

C1: Deconstruction, demolition

For deconstruction stage, 0.239 MJ electricity use per kg of material was assumed (Gervasio et al., 2018).

C2: Transport

This step covers transport of materials after deconstruction. Average distance was assumed as 100 km from demolition site to waste processing site for disposal.

C3: Waste Processing

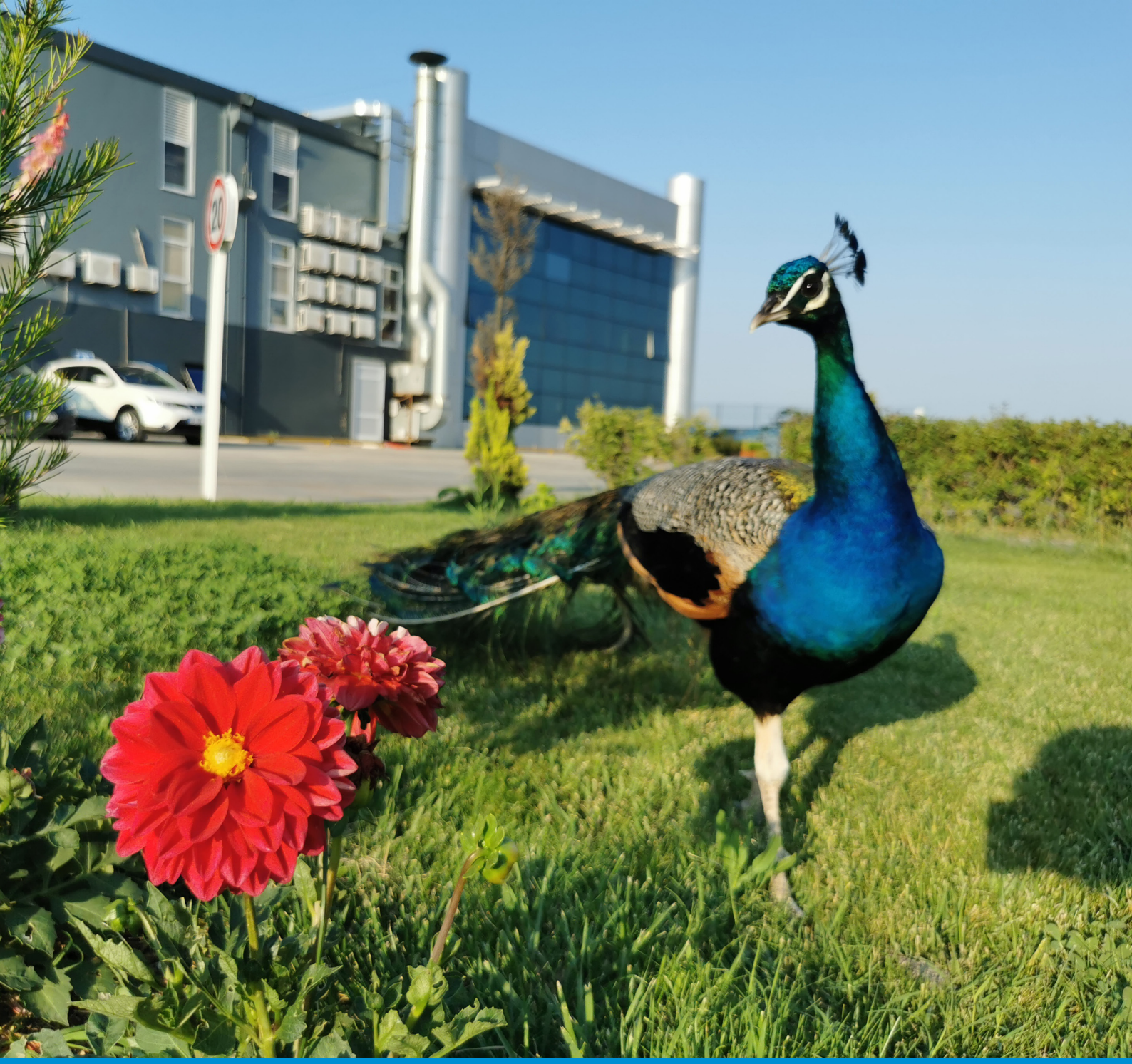
Wastes can be recycled directly or disposed of according to different scenarios. No process is needed.

C4: Disposal

It was assumed that 95% of aluminium profile is recycled, other 5% was landfilled.

D: Future reuse, recycling or energy recovery potentials

22% of raw materials, 95% of materials after demolition and 80% of packaging materials were included as benefit because of their recycling.



ENVIRONMENTAL PERFORMANCE OF TUNA ALUMINIUM

Potential Environmental Impact

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP - Fossil	kg CO_2 eq	20.2	0.26	28.8 x10^{-6}	16.3 x10^{-3}	0	2.03 x10^{-3}	-4.45
GWP - Biogenic	kg CO_2 eq	-62.1 x10^{-3}	54.4 x10^{-6}	0.87 x10^{-6}	4.85 x10^{-6}	0	21.4 x10^{-6}	14.1 x10^{-3}
GWP - Luluc	kg CO_2 eq	28.8 x10^{-3}	75.7 x10^{-6}	62.1 x10^{-9}	4.84 x10^{-6}	0	1.65 x10^{-6}	-5.73 x10^{-3}
GWP - Total	kg CO_2 eq	20.1	0.26	29.7 x10^{-6}	16.3 x10^{-3}	0	2.05 x10^{-3}	-4.44
ODP	kg CFC11 eq	0.87 x10^{-6}	58.7 x10^{-9}	2.22 x10^{-12}	3.74 x10^{-9}	0	0.25 x10^{-9}	-0.16 x10^{-6}
AP	mol H^+ eq	0.11	1.07 x10^{-3}	0.22 x10^{-6}	46.9 x10^{-6}	0	13.8 x10^{-6}	-23.9 x10^{-3}
EP - Freshwater	kg P eq	8.41 x10^{-3}	20.4 x10^{-6}	29.8 x10^{-9}	1.33 x10^{-6}	0	0.7 x10^{-6}	-1.82 x10^{-3}
*EP - Freshwater	kg PO_4 eq	25.7 x10^{-3}	62.4 x10^{-6}	91.1 x10^{-9}	4.06 x10^{-6}	0	2.14 x10^{-6}	-5.58 x10^{-3}
EP - Marine	kg N eq	18.2 x10^{-3}	0.31 x10^{-3}	29.9 x10^{-9}	8.98 x10^{-6}	0	3.24 x10^{-6}	-3.91 x10^{-3}
EP - Terrestrial	mol N eq	0.18	3.42 x10^{-3}	0.49 x10^{-6}	99.8 x10^{-6}	0	35.7 x10^{-6}	-40.3 x10^{-3}
POCP	kg NMVOC eq	53.2 x10^{-3}	1.04 x10^{-3}	67.2 x10^{-9}	37.9 x10^{-6}	0	10.3 x10^{-6}	-11.9 x10^{-3}
ADPE	kg Sb eq	45.8 x10^{-6}	0.76 x10^{-6}	12.4 x10^{-12}	49.3 x10^{-9}	0	1.23 x10^{-9}	-10.8 x10^{-6}
ADPF	MJ	240	3.91	0.6 x10^{-3}	0.25	0	29.9 x10^{-3}	-52.3
WDP	m^3 depriv.	112	26.6 x10^{-3}	8.31 x10^{-6}	1.70 x10^{-3}	0	0.83 x10^{-3}	-0.54
PM	disease inc.	0.77 x10^{-6}	18 x10^{-9}	0.8 x10^{-12}	1.04 x10^{-9}	0	0.18 x10^{-9}	-0.18 x10^{-6}
IR	kBq U-235 eq	0.21	18.5 x10^{-3}	16.4 x10^{-6}	1.21 x10^{-3}	0	0.19 x10^{-3}	-41.6 x10^{-3}
ETP - FW	CTUe	386	2.79	0.35 x10^{-3}	0.18	0	31	-89.7
HTTP - C	CTUh	15.7 x10^{-9}	81.4 x10^{-12}	7.65 x10^{-15}	5.17 x10^{-12}	0	1.73 x10^{-12}	-3.72 x10^{-9}
HTTP - NC	CTUh	0.37 x10^{-6}	3.19 x10^{-9}	0.28 x10^{-12}	0.2 x10^{-9}	0	48.9 x10^{-12}	-87.6 x10^{-6}
SQP	Pt	31.6	2.61	0.12 x10^{-3}	0.17	0	34.7 x10^{-3}	-6.95

Acronyms: GWP-total: Climate change, GWP-fossil: Climate change- fossil, GWP-biogenic: Climate change - biogenic, GWP-luluc: Climate change - land use and transformation, ODP: Ozone layer depletion, AP: Acidification terrestrial and freshwater, EP-freshwater: Eutrophication freshwater, EP-marine: Eutrophication marine, EP-terrestrial: Eutrophication terrestrial, POCP: Photochemical oxidation, ADPE: Abiotic depletion - elements, ADPF: Abiotic depletion - fossil resources, WDP: Water scarcity, PM: Respiratory inorganics - particulate matter, IR: Ionising radiation, ETP-FW: Ecotoxicity freshwater, HTP-c: Cancer human health effects, HTP-nc: Non-cancer human health effects, SQP: Land use related impacts, soil quality.

Legend: A1: Raw Material Supply, A2: Transport, A3: Manufacturing, A1-A3: Sum of A1, A2, and A3, A4: Transport to Site, A5: Installation, C1: De-Construction, C2: Waste Transport, C3: Waste Processing, C4: Disposal, D: Benefits and Loads Beyond the System Boundary.

Disclaimer 1: 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 2: 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.

*EP-Freshwater: This indicator has been calculated as “kg P eq” as required in the characterization model. (EUTREND model, Struijs et al, 2009b, as implemented in ReCiPe; http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml)

Use of Resources

Impact Category	Unit	A1-A3	A4	C1	C2	C3	C4	D
PERE	MJ	7.76	38.7×10^{-3}	95.3×10^{-6}	2.65×10^{-3}	0	1.64×10^{-3}	-1.44
PERM	MJ	0	0	0	0	0	0	0
PERT	MJ	7.76	38.7×10^{-3}	95.3×10^{-6}	2.65×10^{-3}	0	1.64×10^{-3}	-1.44
PENRE	MJ	240	3.91	0.6×10^{-3}	0.25	0	0.3×10^{-3}	-52.3
PENRM	MJ	0	0	0	0	0	0	0
PENRT	MJ	240	3.91	0.6×10^{-3}	0.25	0	0.3×10^{-3}	-52.3
SM	kg	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0
FW	m^3	2.04	0.66×10^{-3}	0.17×10^{-6}	42.6×10^{-6}	0	22.1×10^{-6}	-16.3×10^{-3}

Acronyms : PERE: Use of renewable primary energy excluding resources used as raw materials, PERM: Use of renewable primary energy resources used as raw materials, PERT: Total use of renewable primary energy, PENRE: Use of non-renewable primary energy excluding 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, SM: Secondary material, RSF: Renewable secondary fuels, NRSF: Non-renewable secondary fuels, FW: Net use of fresh water.

Outout Flows

Impact Category	Unit	A1-A3	A4	C1	C2	C3	C4	D
HWD	kg	3.44×10^{-3}	0	0	0	0	0	0
NHWD	kg	31.7×10^{-3}	0	0	0	0	1	0
RWD	kg	0	0	0	0	0	0	0
CRU	kg	0	0	0	0	0	0	0
MFR	kg	31.7×10^{-3}	0	0	0	0	0.95	0
MER	kg	0	0	0	0	0	0	0
EE (Electrical)	MJ	0	0	0	0	0	0	0
EE (Thermal)	MJ	0	0	0	0	0	0	0

HWD: Hazardous waste disposed, NHWD: Non-hazardous waste disposed, RWD: Radioactive waste disposed, CRU: Components for reuse, MFR: Material for recycling, MER: Materials for energy recovery, EE (Electrical): Exported energy electrical, EE (Thermal): Exported energy, Thermal.

References

Ecoinvent

Ecoinvent Centre, www.ecoinvent.org

ELCD Database

European Platform on Life Cycle Assessment, https://eplca.jrc.ec.europa.eu/ELCD3/

EN ISO 9001

Quality Management Systems - Requirements

EN ISO 14001

Environmental Management Systems - Requirements

GPI

General Programme Instructions of the International EPD® System. Version 3.0.

ISO 45001

Occupational Health & Safety Management System - Requirements

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

ISO 14025 DIN EN ISO 14025:2009-11

Environmental labels and declarations - Type III environmental declarations — Principles and procedures

ISO 14040/44/ DIN EN ISO 14040:2006-10

Environmental management - Life cycle assessment - Principles and framework (ISO14040:2006) and Requirements and guidelines (ISO 14044:2006)

SimaPro

SimaPro LCA Software, Pré Consultants, the Netherlands, www.pre-sustainability.com

The International EPD® System

The International EPD® System is a programme for type III environmental declarations, maintaining a system to verify and register EPD®s as well as keeping a library of EPD®s and PCRs in accordance with ISO 14025. www.environdec.com

Contact Information

Programme	EPD TURKEY ENVIRONMENTAL PRODUCT DECLARATIONS EPD registered through fully aligned regional programme. EPD Turkey www.epdturkey.org	EPD THE INTERNATIONAL EPD® SYSTEM The International EPD® System www.environdec.com
Programme Operator	EPD Turkey SÜRATAM – Turkish Centre for Sustainable Production Research & Design Nef 09 B Blok No:7/15, 34415 Kagıthane / Istanbul, Turkey www.epdturkey.org info@epdturkey.org	EPD International AB Box 210 60 SE-100 31 Stockholm, Sweden www.environdec.com info@environdec.com
Owner of the Declaration	tuna ALUMINIUM	Veliköy O.S.B.Sanayi Bulvarı No:98/A / 59500 Çerkezköy / Tekirdağ / TURKEY + 90 282 746 13 00 www.tunaaluminium.com
LCA Practitioner & EPD Designer	metsims Sustainability Consulting	**United Kingdom Office** 4 Clear Water Place Oxford OX2 7NL, UK 0 800 722 0185 **Turkey Office** Lalegül Sok. No:7/18 34415 4. Levent-Istanbul, Turkey +90 212 281 13 33 www.metsims.com info@metsims.com
3rd Party Verifier	LCA studio	Professor Vladimír Kocí LCA Studio Šárecká 5,16000 Prague 6 - Czech Republic www.lcastudio.cz

www.tunaaluminium.com