ENVIRONMENTAL PRODUCT DECLARATION

Aluminium Rollform

TURKEY EPD®
ENVIRONMENTAL PRODUCT DECLARATIONS

EPD®
THE INTERNATIONAL EPD® SYSTEM

ECO PLATFORM EPD VERIFIED

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

PROGRAMME OPERATOR
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Programme Information

Programme Information

Programme: The International EPD System
Address: EPD® International AB Box 21060 SE-100 31 Stockholm, Sweden
Website: www.environdec.com
E-mail: info@environdec.com

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Product category rules (PCR)
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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:

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Third party verifier
Vladimír Kočí, PhD
Šárecká 5, 16000 Prague 6, Czech Republic

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☐ Yes ☑ No

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Semtrio Sustainability Consulting
BUDOTEK Teknopark, No 8/27
Umraniye / Istanbul Turkey
www.semtrio.com

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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

ASAŞ Alüminyum Sanayi ve Ticaret A.Ş.

Rüzgarlı Bahçe Mah., Kumlu Sok. No.2
Asaş İş Merkezi, 34810
Kavacık, Beykoz – İstanbul, Türkiye
www.asastr.com

Contact: Mr. Hasan Basri Taşkın
hasan.taskin@asastr.com

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), aluminium composite panels, u-PVC door and window systems, aluminium design products (aluminium flag and lighting poles, aluminium 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:
Aluminium Rollform

Shutter systems produced in the Shutter and Shutter Production Facilities of ASAŞ, which attaches importance to R&D studies and won an award in this regard; helps to minimize the air conditioner consumption by blocking the sun rays in the summer months, and helps to reduce the heating costs by trapping the hot air inside for a long time in the winter months. Polyurethane-filled lamellas designed using aluminium sheets produced in the Aluminium Flat Products Production Facility, which continues its activities within ASAŞ, provide high thermal insulation and provide savings to users in the long term.

ASAŞ has produced 37-39-43-55N-55S and 77 mm roller shutter and garage door slats with polyurethane filing by Aluminium Rollform technology which has high quality standards and advanced level. Aluminium Rollform can enhance functionality service, using in production of roof panels, window, and door. One of the most used rollform material is aluminium which can be used because of its lightweightness. Aluminium is corrosion resistant which means that it does not rust or corrode. Aluminium is greatly versatile so that it can effortlessly be bent, cut, and shaped into form. Also, aluminium rollforms have multiple colours according to clients. Roll forming technology has many advantages which are high production capability, higher strength of roll formed sections.

Intended Use of Product

Shutter systems are preferred more and more by users every year due to its benefits especially in summer and winter months in the interest of thermal insulation and safety. Along with classical designs, systems produced with new technologies in the recent period also give buildings an aesthetic appearance

Production

In the cold 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 streching and dyeing and lastly cutting processes.

After the cutting process is completed, the cold rolled painted aluminium sheet is ready and internally transported to ASAŞ Akyazı plant, to be utilized in aluminium rollform production or in other production lines for different purposes.

The aluminium rollform production process can be grouped into two main stages: PUR foam production and PUR foam press into aluminium rollform lamellas.

In terms of production of aluminium rollform product, PUR foam is firstly produced by introducing polyol and isocyanate in a mixer. Following this, the produced PUR foam is directly transferred from the mixer to the lamella line to be pressed between two painted aluminium sheets, casted with Rollform technology into desired shape and form . Lastly, PUR filled lamellas is sent to the cutting and packaging line to be ready for customer delivery, cut and packaged regarding customer needs and specifications.

Technical Specifications

Product	Standarts	Description
Painted Aluminium Sheet	TS EN 9260 ISO 4628-2	Paints and varnishes - Evaluation of degradation of coatings; Designation of quantity and size of defects, and of intensity of uniform changes in appearance - Part 2: Assessment of degree of blistering
	DS EN ISO 4628-3	Paints and varnishes - Evaluation of degradation of coatings - Designation of quantity and size of defects, and of intensity of uniform changes in appearance - Part 3: Assessment of degree of rusting
	DS EN ISO 4628-4	Paints and varnishes - Evaluation of degradation of coatings; Designation of quantity and size of defects, and of intensity of uniform changes in appearance - Part 4: Assessment of degree of cracking
	DS EN ISO 4628-5	Paints and varnishes - Evaluation of degradation of coatings; Designation of quantity and size of defects, and of intensity of uniform changes in appearance - Part 5: Assessment of degree of flaking
	DS EN ISO 4628-10	Paints and varnishes. Evaluation of degradation of coatings. Designation of quantity and size of defects, and of intensity of uniform changes in appearance Assessment of degree of filiform corrosion.
	TS EN ISO 1520	Paints and varnishes - Cupping test
	TS EN ISO 6270-1	Paints and varnishes - Determination of resistance to humidity - Part 1: Condensation (single-sided exposure)
	DIN EN ISO 2808	Paint and Varnishes -Determintion of film thickness
	DS/EN ISO 2409	Paint and Varnishes -Cross cut test
	ISO 3251	Paints, varnishes and plastics - Determination of non-volatile-matter content
	ISO 1519	Paints and varnishes - Bend test (cylindirical mandrel)
	ASTM D 4214-07	Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films

Product	Standarts	Description
Aluminium Rollform	EN 13659	Shutters and external venetian blinds - Performance requirements including safety
	TS EN 1932	External blinds and shutters - Resistance to wind loads – Method of testing

UN CPC Code : 4299 – fabricated metal products-Other fabricated metal.

LCA Information

Declared Unit

1 kg of Aluminium Rollform Sheet manufactured in Akyazı 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.

ASAŞ handles its industrial production operations in two facilities. The facilites are established in Akyazı and Karapürçek; both in Turkey, Sakarya province.

The raw material, painted aluminium sheets, is manufactured in ASAŞ Sakarya premises. The product is internally transported to ASAŞ Akyazı premises to be utilized in aluminium rollform/shutter systems manufacture and in other domains compatible with Akyazı facility manufacture capabilities.

The manufacturing data (specific), specific energy and chemical consumption values and raw materials/chemicals are collected are monitored and recorded by ASAŞ responsible from people

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. Energy data was subjected to allocation, according to total electric production through trigeneration facility within ASAŞ Akyazı, and total electric consumption from Turkey grid, hydropower mix.

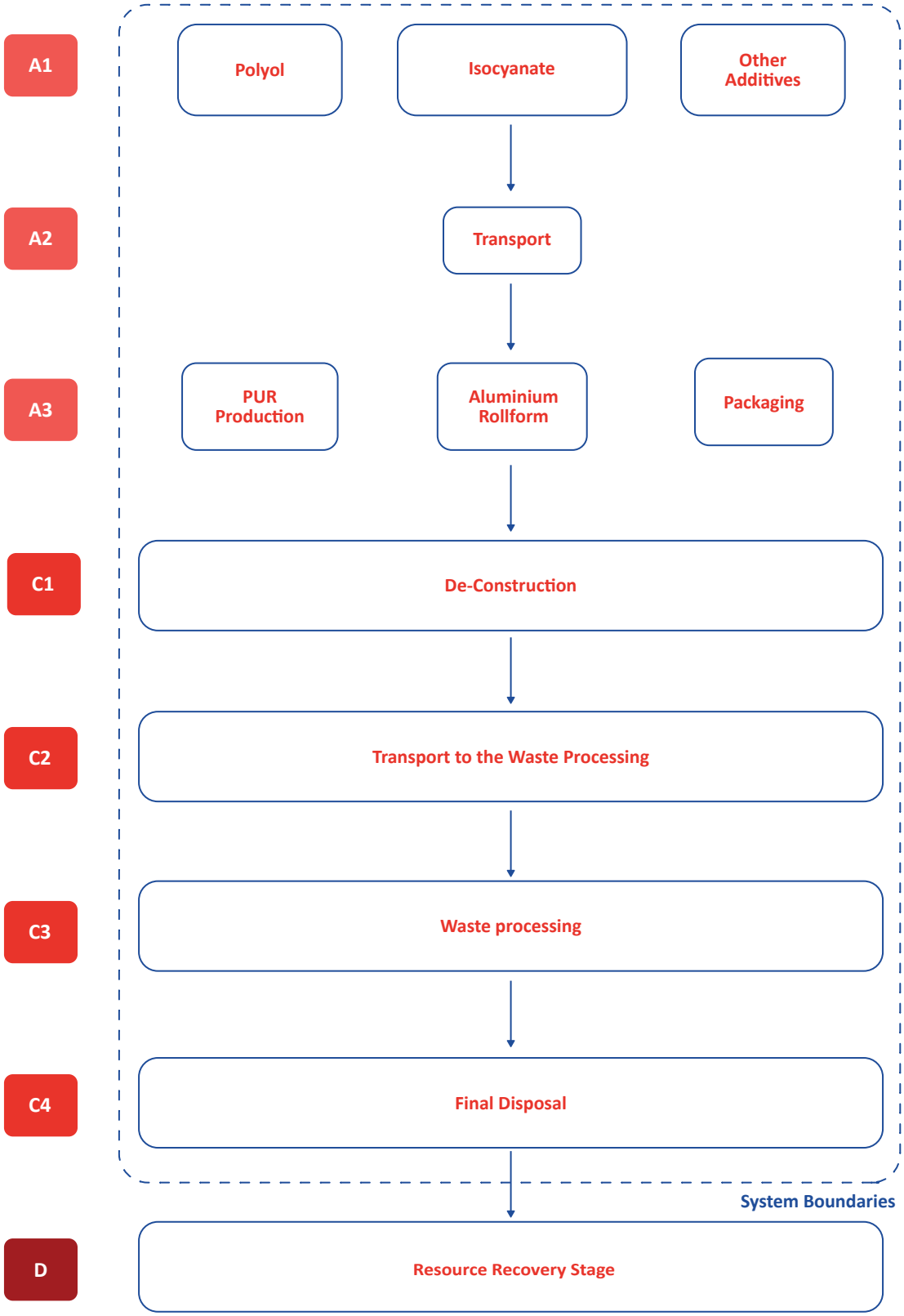
Cut-off Rules

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
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. Product manufacture process can be categorized into 3 steps. First, painted aluminium sheet is produced within ASAŞ. Followed manufacture sub-processes for the painted aluminium sheet, which will qualify as a raw material in the aluminium rollform production line, are as following:

- Induction
- Casting
- Cold Rolling
- Annealing
- Cutting

The proceeding step is production of polyurethane (PUR) foam; and lastly, pressing the foam within the aluminium lamellas which have been meticulously formed in aluminium rollform technology.

C1 - De-construction

In module C1, it is assumed that demolition of the aluminium rollform product 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 100 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)	100
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 recycling aluminium material that could be stripped away from the PUR core. The stripping process was assumed to be 75% efficient.

C4 - Final Disposal

Only the inseperable portion of the final product is considered to be sent to landfill. If seperated completely from each other, aluminium sheets are subjected to recyling and PUR foam is sent to incineration.

D - Reuse, Recovery or Recycling Potential

Aluminium Rollform inputs to the production stage are subtracted from the construction to be recycled at end-of-life in order to obtain the aluminium rollform from the product system. This remaining net aluminium rollform 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 Aluminium Rollform*

	Painted Aluminium Sheet					PUR Foam				
Product	Primer Aluminium, weight-%	Post consumer recycled material, weight-%	Internal Scrap, weight-%	Additives, weight-%,	Colourant, weight-%	Polyol, weight-%	Isocynate, weight-%	Post-consumer material, weight-%	Renew-able material, weight-%	Biogenic carbon, kg
Aluminium Rollform	50 - 55	5 – 10	15 – 20	< 1	5 – 10	< 5	< 8	7 – 10	0	0

Packaging Declaration by mass% *(versus the product)*

Aluminium Rollform	Weight, %	Biogenic carbon, kg C
LDPE	5.2	-
Board	4.0	-
Wood	2.5	0.0312

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 Aluminium Rollform							
Indicator	**Unit**	**A1-3 Total**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq	14.0	0	0.017	0.004	0.337	-6.22
GWP - biogenic	kg CO_2 eq	-0.051	0	3.30E-05	1.64E-04	3.11E-04	0.014
GWP-luluc	kg CO_2 eq	0.119	0	6.16E-06	5.87E-06	1.07E-05	-0.062
GWP-total	kg CO_2 eq	14.1	0	0.017	0.004	0.337	-6.27
ODP	kg CFC 11eq	7.01E-07	0	3.68E-09	3.70E-10	2.44E-09	-2.73E-07
AP	mol H+ eq	0.092	0	4.94E-05	2.61E-05	3.40E-04	-0.044
EP-Freshwater	kg PO_4^{3-} eq	0.007	0	5.21E-06	3.40E-06	9.34E-05	-0.003
EP-aquatic freshwater	kg P eq	0.001	0	1.49E-07	2.99E-07	4.57E-07	-3.10E-04
EP-Marine	kg N eq	0.013	0	1.00E-05	6.91E-06	1.71E-04	-0.006
EP-Terrestrial	kg N eq	0.144	0	1.11E-04	7.67E-05	0.002	-0.067
POCP	kg NMVOC eq	0.045	0	4.16E-05	2.10E-05	4.03E-04	-0.020
ADP-minerals &metals*	kg Sb eq	3.52E-05	0	6.04E-08	6.82E-09	5.69E-08	-8.03E-06
ADP-fossil*	MJ	156	0	0.251	0.073	0.299	-62.4
WDP	m^3	3.19	0	0.001	0.001	0.024	-1.10

** 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 Aluminium Rollform							
Indicator	**Unit**	**A1-3 Total**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq	13.8	0	0.017	0.004	0.333	-6.18
Results according to EN 15804+A2 for 1 kg of Aluminium Rollform							
PM	[disease inc.]	9.13E-07	0	1.07E-09	3.30E-10	1.70E-09	-4.18E-07
IRP	[kBq U235 eq]	0.357	0	0.001	0.001	0.001	-0.165
ET-freshwater	[CTUe]	1876	0	0.215	0.039	137.022	-171
HT-cancer	[CTUh]	1.85E-07	0	6.88E-12	1.20E-12	4.02E-11	-1.08E-08
HT-non-cancer	[CTUh]	6.30E-07	0	1.93E-10	3.01E-11	1.33E-09	-1.85E-07
SQP	[pt]	33.4	0	0.174	0.010	0.187	-10.8

Acronyms

GWP-GHG = Global Warming Potential total excl. biogenic carbon following IPCC AR5 methodology; **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 Aluminium Rollform							
Indicator	**Unit**	**A1-3 Total**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	45.7	0	0.003	0.009	0.011	-20.9
PERM	MJ	0	0	0	0	0	0
PERT	MJ	45.7	0	0.003	0.009	0.011	-20.9
PENRE	MJ	166	0	0.266	0.077	0.324	-65.9
PENRM	MJ	0	0	0	0	0	0
PENRT	MJ	166	0	0.266	0.077	0.324	-65.9
SM	kg	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m^3	0.578	0	2.08E-04	0.001	0.002	-0.257

Acronmys

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 Aluminium Rollform							
Indicator	**Unit**	**A1-3 Total**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	0.013	0	0	0	0.030	0
Non-hazardous waste disposed	kg	0.006	0	0	0	0.220	0
Radioactive waste disposed	kg	0	0	0	0	0	0

Output Flows

Results according to EN 15804+A2 for 1 kg of Aluminium Rollform							
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	0.043	0	0	0	0	0.660
Materials for energy recovery	kg	0.002	0	0	0	0	0.090
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 Aluminyum Sanayi ve Ticaret A.Ş.** www.asastr.com

Contact

Third party verifier
Vladimír Kočí, PhD
Šárecká 5, 16000
Prague 6/Czech Republic
www.lcastudio.cz

Owner of Declaration
ASAŞ Alüminyum Sanayi ve Ticaret A.Ş.
Rüzgarlı Bahçe Mah., Kumlu Sok. No.2
Asaş İş Merkezi, 34810
Kavacık, Beykoz – İstanbul, Türkiye
www.asastr.com

LCA Study & EPD Design Conducted By
Semtrio Sustainability Consulting
BUDOTEK Teknopark, No 8/27
Umraniye / Istanbul Turkey
www.semtrio.com