

Sistem AI
ALÜMİNYUM

ENVIRONMENTAL PRODUCT DECLARATION

Mechanic Aluminium *from*
Sistem Alüminyum

PROGRAMME

The International EPD® System

PROGRAMME OPERATOR

EPD Turkey

GEOGRAPHICAL SCOPE

Global

EPD REGISTRATION NUMBER

S-P-08724

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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

General Information

Programme Information

Programme: The International EPD® System

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Programme Operator: EPD Turkey, managed and run by: SÜRATAM A.S. www.suratam.org

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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 41532, Bars, rods and profiles, of aluminium

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



Sistem Alüminyum Sanayi ve Ticaret A.Ş. 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.

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

Owner of the EPD

Sistem Alüminyum Sanayi ve Ticaret A.Ş.

Ergene-1 OSB, Vakıflar OSB Mh. D100 Cd.

No:13/1 59930 Ergene/Tekirdag/Türkiye

www.sistemal.com

Sistem Alüminyum Sanayi ve Ticaret A.Ş. is one of Turkey's leading manufacturer of aluminium extrusion profiles and aluminium composite panels companies in Turkey. Founded in 1994, it is a fully integrated designer and producer of architectural facade systems and extruded aluminium profiles for industrial applications.

Sistem Alüminyum's Ergene-Tekirdağ factory is established on an area of 330.000 m², 95.000 m² of which is enclosed. In this fully integrated factory, there are dyehouse facility, foundry – billet production, aluminium extrusion lines, electrostatic powder coating and anodizing facilities, transfer wood coating department, mechanical processing facility and composite panel production lines.

Our company, which aims to continuously develop and be a pioneer in the aluminium profile sector, is moving forward with fast steps to achieve this goal with its quality system studies.

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CE, TSE, EN, GOST-R, QUALICOAT for static powder coating applications, QUALANOD for anodizing applications, our company has system certificates such as ISO 9001, ISO 14001, ISO 45001, ISO 50001, IATF 16949 Automotive Quality Management System and ISO/IEC 27001 Information Security Management System. In addition, SİSTEM ALÜMİNYUM SAN. VE TİC. A.Ş. confirms that chemicals (heavy metals) that you order, are restricted by REACH and ROHS for the materials are within legal limits and are sensitive to environmental health.

Sistem Alüminyum is the export leader of Turkey in the sector with over fifty countries. It has the first prizes of 2018, 2019 and 2020 in the "Metallic Stars of Export Awards, Aluminium Rods and Profiles Category" given by the Istanbul Ferrous and Non-Ferrous Metals Exporters Association (IDDMIB).



Product Information

Product Name: Mechanic Aluminium Profile

Production

In the aluminium profile production plant, the process starts with homogenization, casting and pressing. In the casting process, primary aluminium, secondary aluminium and some auxiliary materials are used as inputs. There are electricity, natural gas, and water consumption.

In the process stage, the processes are carried out automatically by the state-of-the-art homogenization furnace and cooling cabinet feed and discharge charging trolley. In the Foundry, the process continues as smelting, alloying, degassing, filtration, casting, cutting to length, homogenization, cooling and packaging respectively.

Billets produced in our foundry have 5", 6", 7", 8" and 10" maximum length of 7000 mm in diameter and standard alloys (1050, 1350, 5083, 5754, 6005, 6005A, 6060, 6061, 6063, 6082 and 6463), as well as the production of the desired alloy can be made.

In order to achieve the desired quality in our billets, spectral analyses and controls are performed on the spectrometer device by sampling the molten metal during alloying before casting and the billet after casting.

After homogenization, shell thickness measurement, microstructure control, segregation and grain boundary analysis are performed.

In extrusion process, there is electricity, natural gas, and diesel (from forklifts) consumption. In our extrusion lines, aluminium profiles are manufactured for various sectors and purposes. Extrusion process can be summarized as forcing a heated aluminium billet to pass through a die so that the aluminium that exits the die takes a particular shape as it stretches out as a profile. Aluminium profile extrusion is a sensitive process measured in microns. Sistem is a specialist in tailor made aluminium profiles.

Specific component design, based on in-depth knowhow and supported by advanced IT infrastructure, enables us to build bespoke products that are individual to customer specifications. Our experience and resources ensure delivery in the most cost and time efficient way.

In our extrusion department, there are 9 press lines that we can produce profiles up to 14 meters long. The aluminium billets used in our extrusion lines are first class. In our production, besides 1xxx, 5xxx and 6xxx series alloys, special alloyed profiles can also be manufactured.

After extrusion process, mechanic process can be made to produce mechanic aluminium profile. There is electricity and diesel (from forklifts) consumption in mechanic process. Technology and technical issues our experienced team of precision cutting angle single head and double head saws, CNC-machining centres, eccentric presses, drilling, drills, thermal insulation barrier mounting track service is provided to our customers with a superior quality. Mechanic aluminium profiles are ready to be sent to customers after packaging

Intended Use of Product

SİSTEM is our company name and also the brand of our special or standard aluminium extrusion profiles that we produce for industrial manufacturers. Our aluminium profiles are used extensively across numerous sectors, including in: Electrical and electronic applications, lighting, heat sinks, special machining applications, furniture, greenhouses, solar energy systems infrastructures, automotive, marine, aviation, household appliances and building facade carrier and complementary products etc. At SİSTEM we combine expert alloy selection and optimised design to produce extruded aluminium profiles of exceptional quality that meet all required specifications.

Technical Specifications

Product-related Certifications:

Mechanic Aluminium Profile Technical Specifications

Product	Standard	Description
Mechanic Aluminium Profile	EN-12020	Aluminium and aluminium alloys - Extruded precision profiles in alloys EN AW-6060 and EN AW-6063 - Part 1: Technical conditions for inspection and delivery

UN CPC Code : 41532, Bars, rods and profiles, of aluminium



LCA Information

Declared Unit

The declared unit is a 1 kg of Mechanic Aluminium Profile

Reference Service Life

Not applicable

Time Representativeness

The production data in this LCA study represents the period of 1st January 2022 and 31st December 2022.

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.

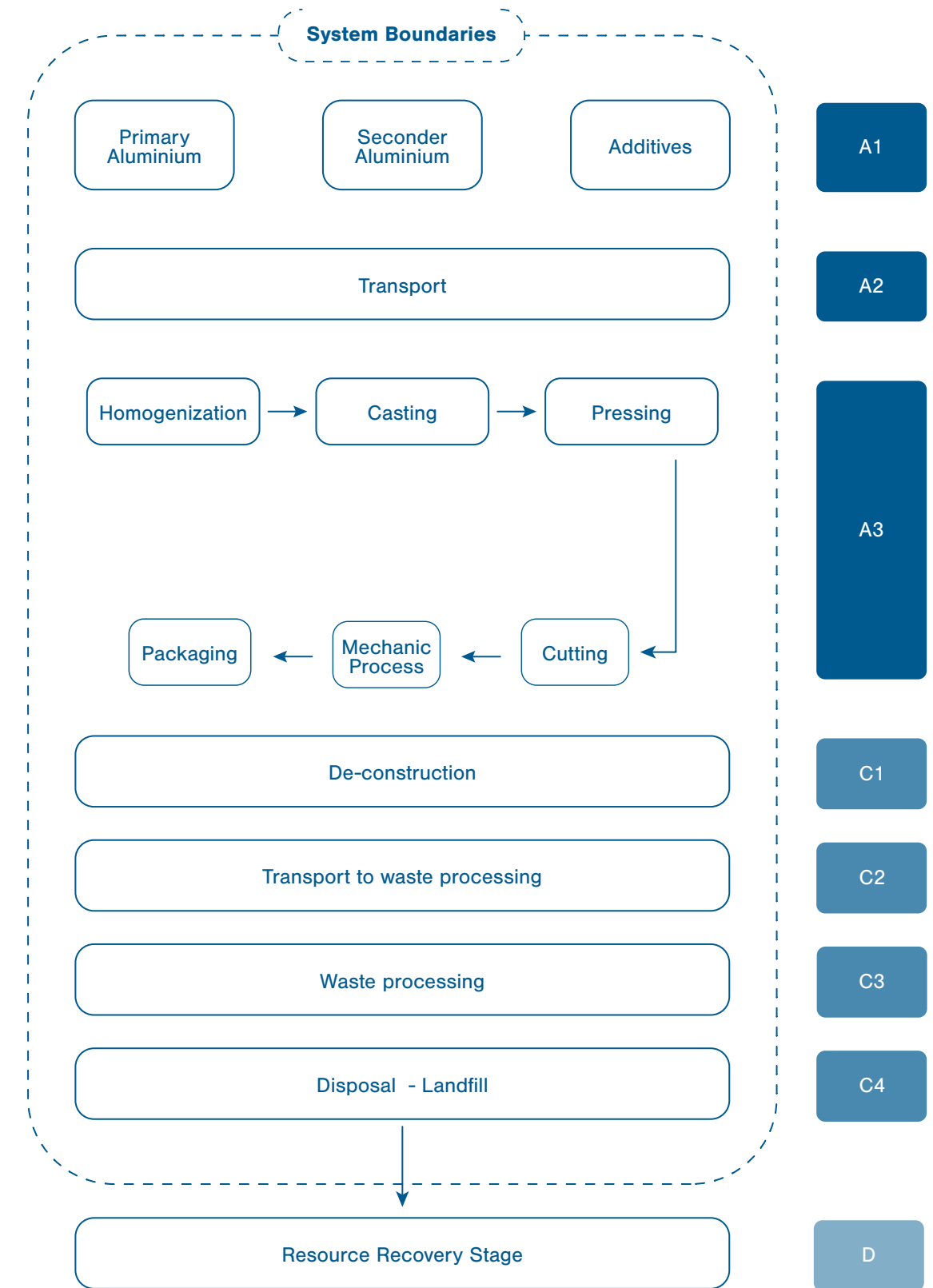
Allocation

The methodology for the allocation of mentioned data below was weight allocation on the produced amount of products. Water consumption is allocated according to amount of production in aluminium profile.

Modules declared, geographical scope, share of specific data (in GWP-GHG indicator) and data variation

MODULES	PRODUCT STAGE			CONSTRUCTION PROCESS STAGE			USE STAGE					END OF LIFE STAGE				RESOURCE RECOVERY STAGE	
	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 represents the extraction and processing of raw materials, transport to production sites and the manufacture and packaging.

Module A1 represents the extraction and processing of raw materials.

Module A2 includes transportation of the raw materials from supplier to factory gate. Transportation types are considered as seaway and roadway.

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

In module C1, it is assumed that demolition of the aluminium profiles 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 500 km has been assumed for the transport to sorting facility.

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

This module includes the energy consumption required for the sorting of aluminium profile in the recycling process.

C4 - Final disposal

In accordance with the data, the recycling rate is assumed as 95% based on the European Aluminum Commission. 95% of the product after its lifetime will be collected and recycled into the manufacturing system. It is assumed that 5% of the product is lost during de-construction and 95% reached the sorting/recycling facility. The recycling rate of the aluminium profile are assumed to be 95%; making up a total of 90% of end-of-life products recycled to be used again in construction projects or construction material manufacture process, and the remaining 10% of end-of-life products being sent to landfill.

D - Reuse, recovery or recycling

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



Content Declaration

Content declaration of 1 kg **Mechanic Aluminium Profile**

PRODUCT	PRIMARY ALUMINIUM, %	PRE CONSUMER RECYCLED MATERIALS, %	POST CONSUMER RECYCLED MATERIALS, %	ADDITIVES, %	RENEWABLE MATERIAL, WEIGHT-%	BIOGENIC CARBON, WEIGHT-%
Mechanic Aluminium Profile	50 - 55	30 - 40	10 - 15	0 - 5	0	0 - 5

Packaging Materials

Content declaration of Packaging Material, for 1 kg of **Mechanic Aluminium Profile**

ALUMINIUM PROFILE	WEIGHT, %	BIOGENIC CARBON, KG C
Packaging Tape	0 - 5	-
LDPE	0 - 5	-
Kraft Paper	0 - 5	0 - 5



Environmental Performance

Potential Environmental Impact Mandatory 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	16.4	0	0.077	0.057	0.004	-7.59
GWP -biogenic	kg CO ₂ eq	-0.049	0	0	0.049	1.06E-04	0.017
GWP-luluc	kg CO ₂ eq	0.136	0	2.65E-05	4.95E-05	3.62E-06	-0.076
GWP-total	kg CO ₂ eq	16.5	0	0.077	0.059	0.004	-7.65
ODP	kg CFC 11eq	7.64E-07	0	1.76E-08	6.59E-09	4.22E-10	-3.33E-07
AP	mol H ⁺ eq	0.111	0	2.15E-04	2.03E-04	2.53E-05	-0.053
EP-Freshwater	kg P eq	0.007	0	5.28E-06	2.34E-05	1.16E-06	-0.004
EP-marine	kg N eq	0.017	0	4.48E-05	3.32E-05	6.29E-06	-0.008
EP-Terrestrial	kg N eq	0.176	0	4.87E-04	3.15E-04	6.76E-05	-0.081
POCP	kg NMVOC eq	0.061	0	1.86E-04	9.40E-05	2.00E-05	-0.025
ADP-minerals & metals*	kg Sb eq	4.74E-05	0	2.84E-07	6.47E-08	8.53E-09	-9.79E-06
ADP-fossil*	MJ	167	0	1.17	1.01	0.054	-76.1
WDP	m ³	2.99	0	0.003	0.005	0.001	-1.35

* 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 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

Environmental Performance

Potential Environmental Impact Additional Mandatory and Voluntary Indicators

RESULTS PER FUNCTIONAL OR DECLARED UNIT

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
GWP-GHG¹	kg CO ₂ eq	16.3	0	0.077	0.056	0.004	-7.62

RESULTS ACCORDING TO EN 15804:2012+A2.2019/AC:2021 FOR 1 KG OF ALUMINIUM PROFILE

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
PM	[disease inc.]	1.05E-06	0	4.88E-09	8.47E-10	3.61E-10	-5.11E-07
IRP	[kBq U235 eq]	0.766	0	0.006	0.014	3.16E-04	-0.387
ETP-fw	[CTUe]	433	0	0.900	0.326	60.4	-209
HT-C	[CTUh]	2.58E-08	0	3.19E-11	1.12E-11	3.62E-12	-1.32E-08
HT-nc	[CTUh]	4.46E-07	0	8.81E-10	2.59E-10	9.15E-11	-2.26E-07
SQP	[pt]	35.7	0	0.818	0.085	0.070	-13.2

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.

Use of Resources

RESULTS PER FUNCTIONAL OR DECLARED UNIT

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
PERE	MJ	47.4	0	0.016	0.078	0.003	-25.5
PERM	MJ	0	0	0	0	0	0
PERT	MJ	47.4	0	0.016	0.078	0.003	-25.5
PENRE	MJ	177	0	1.24	1.09	0.058	-80.4
PENRM	MJ	0	0	0	0	0	0
PENRT	MJ	177	0	1.24	1.09	0.058	-80.4
SM	kg	2.38E-01	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m ³	0.67	0	0.001	0.005	1.82E-04	-0.313

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 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 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	0.015	0	0	0	0	0
Radioactive waste disposed	kg	0	0	0	0	0	0

Output Flows

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	0.098
Materials for energy recovery	kg	8.21E-05	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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