ENVIRONMENTAL PRODUCT DECLARATION

B1 Composite Panel *from* Sistem Alüminyum

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

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 4299, Other metal goods

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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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

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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.

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:
B1 Composite Panel

Production

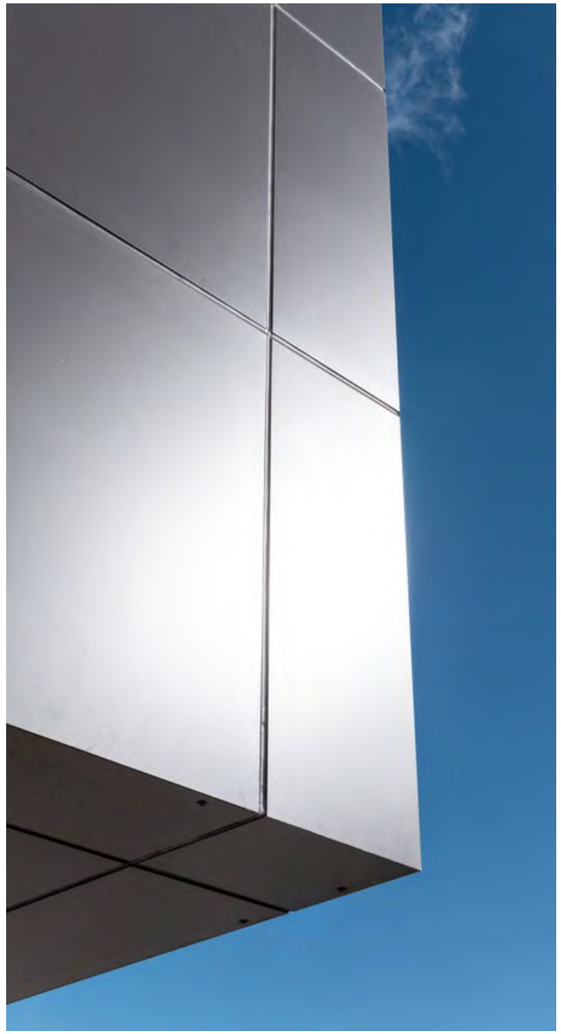
Aluminium composite panel is a building material consisting of two aluminium sheets and a combination of low-density polyethylene filling between them. Adhesive granule and polyethylene adhesion to aluminium plate is provided. Because the top aluminium plate is painted, it has superior surface strength. In our composite panels; lightness, aesthetic appearance, fast and easy installation, high sound and heat insulation, a wide variety of colours and flexible project applicability are the most obvious features.

Our products are produced in three types: B2 standard type, non-combustible A2 and B1-FR (Flame Retardant) aluminium composite panels. Our flame-retardant and flame-resistant products have Exova and WarringtonFire test approval reports. Our Alutechbond aluminium composite panels also have ERA, TSE, G conformity certificate, TSE National Technical approval, ISO 9001, ISO 14001, ISO 27001 Information Security Management, Gost-R, ITP Poland certificates.

ALUTECHBOND® aluminium composite panels can be used at temperatures from -50°C to +80°C and the warranty period is 20 years. Building interior and exterior facades, decoration applications, billboards are the main areas of panel use. All materials used in the production of composite panels are recyclable. The annual total capacity of our two composite panel lines, which we produce from 0.21, 0.30, 0.35, 0.40- and 0.50 mm thickness range and 1,250- and 1,500 mm wide x 3,200 mm length plates, has reached 6.000.000 m^2.

Intended Use of Product

With our ALUTECHBOND® 100/200/300/400 series composite panel products that add colour to the building world, we offer our customers unlimited colour and texture options that provide creative architectural solutions.



Technical Specifications

Product-related Certifications:

B1 Composite Panel Technical Specifications

Product	Standard	Description
Composite Panel	TS 13777	Composite panels-Polyethylene and mineral filled-Both face covered aluminium sheet

UN CPC Code : 4299, Other metal goods

LCA Information

Declared Unit

The declared unit is a 1 m^2 of B1 Composite Panel.

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 and amount of waste.

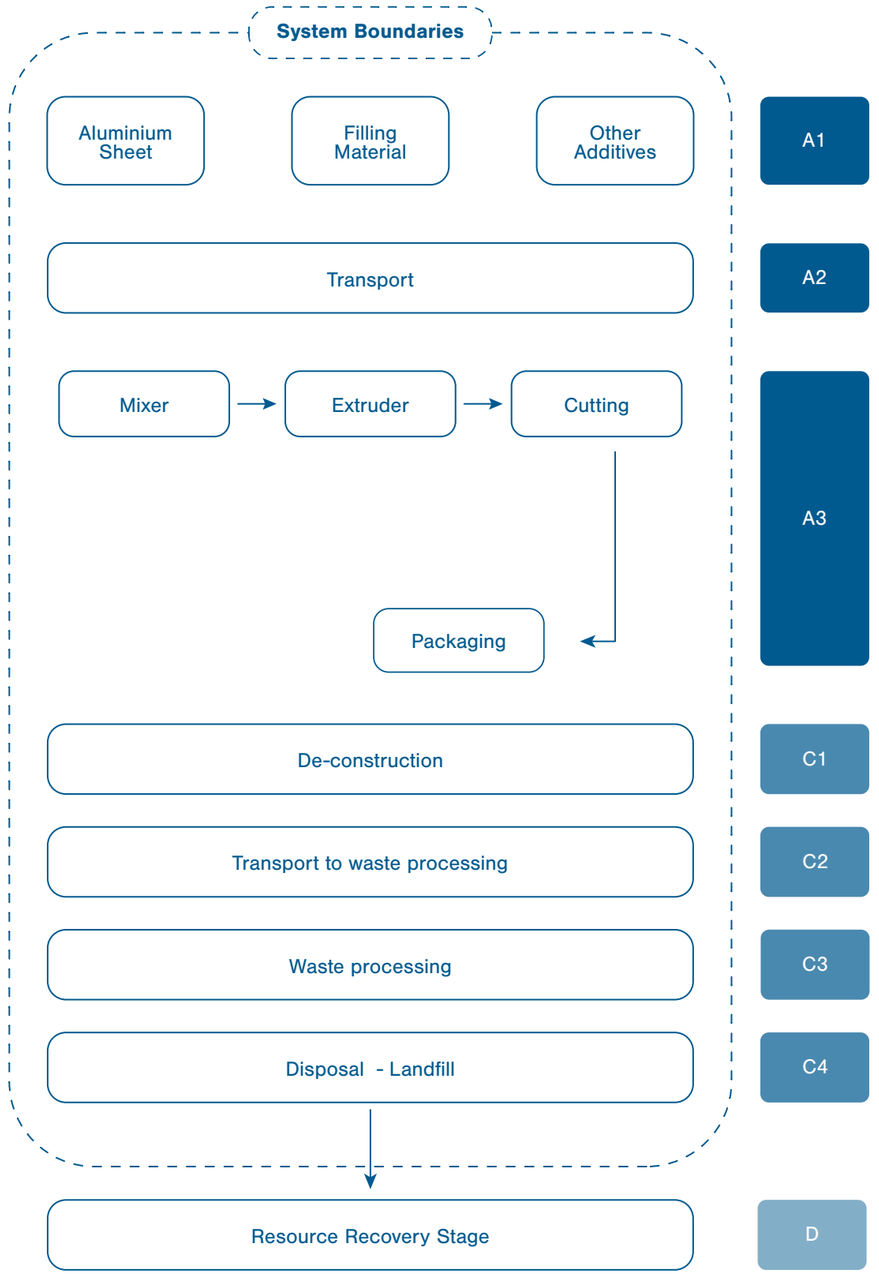
Allocation

The methodology for the allocation of mentioned data below was weight allocation on the produced amount of products. Electricity and diesel consumption, waste generation, packaging materials and air emissions is allocated according to produced amount of B1 composite panel. The total values for the plant's raw material, energy consumption, water consumption, and waste output over a one-year period have been divided by the annual output of each product to provide a value per m2 of composite panel 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 – Mandatory Module

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 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 composite panel 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

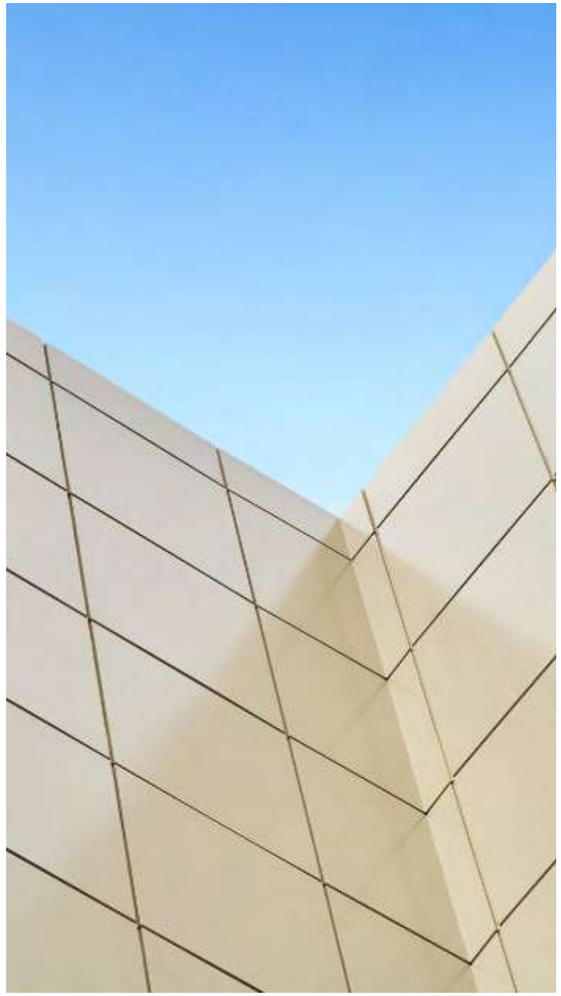
This module includes the energy consumption required for the sorting of composite panel in the recycling process.

C4 - Final disposal

100% of the product after its lifetime will be collected and recycled into the manufacturing system. It is assumed that no product has been lost during de-construction and 89% reached the sorting/recycling facility according to Eurostat data. The recycling rate of the composite panel is assumed to be 89%; making up a total of 89% of end-of-life products recycled to be used again in construction projects or construction material manufacture process, and the remaining 11% of end-of-life products being sent to landfill.

D - Reuse, recovery or recycling

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



Functional Unit

PRODUCT	NAME	VALUE	UNIT
B1 Composite Panel	Functional Unit	1	m^2
	Grammage	7	kg/m^2
	Conversion factor to 1 kg	0,143	-

Content Declaration

Content declaration of 1 m^2 **B1 Composite Panel**

PRODUCT	PRIMARY ALUMINIUM, %	PRE CONSUMER RECYCLED MATERIALS, %	POST CONSUMER RECYCLED MATERIALS, %	ADDITIVES, %	RENEWABLE MATERIAL, WEIGHT-%	BIOGENIC CARBON, WEIGHT- %
B1 Composite Panel	20 - 30	30 - 40	10 - 20	0-5	-	-

Packaging Materials

Content declaration of Packaging Material, for 1 m^2 of **B1 Composite Panel**

COMPOSITE PANEL	WEIGHT, %	BIOGENIC CARBON, KG C
Packaging Tape	0 - 5	-
LDPE	0 - 5	-
Kraft Paper	0 - 5	0 - 5
Surface Tape	0-10	-

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	37.8	0	0.569	0.396	0.030	-4.55
GWP -biogenic	kg CO_2 eq	0.437	0	1.38E-03	0.010	8.37E-04	0.025
GWP-luluc	kg CO_2 eq	0.484	0	1.95E-04	3.42E-04	2.86E-05	-0.009
GWP-total	kg CO_2 eq	38.7	0	0.571	0.406	0.031	-4.54
ODP	kg CFC 11eq	2.27E-06	0	1.29E-07	4.55E-08	3.34E-09	-1.02E-07
AP	mol H+ eq	0.254	0	1.58E-03	1.40E-03	2.00E-04	-0.029
EP-Freshwater	kg P eq	0.013	0	3.89E-05	1.62E-04	9.17E-06	-0.003
EP-marine	kg N eq	0.038	0	3.30E-04	2.29E-04	4.97E-05	-0.005
EP-Terrestrial	kg N eq	0.386	0	3.58E-03	2.17E-03	5.34E-04	-0.050
POCP	kg NMVOC eq	0.121	0	1.37E-03	6.49E-04	1.58E-04	-0.014
ADP-minerals & metals*	kg Sb eq	1.08E-04	0	2.09E-06	4.47E-07	6.73E-08	-3.36E-06
ADP-fossil*	MJ	357	0	8.63	6.98	0.428	-47.3
WDP	m^3	8.12	0	0.025	0.038	0.011	-0.539

** 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-GHG[1]	kg CO_2 eq	38.3	0	0.567	0.389	0.029	-4.53
RESULTS ACCORDING TO EN 15804:2012+A2.2019/AC:2021 FOR 1M² OF B1 COMPOSITE PANEL							
PM	[disease inc.]	3.22E-06	0	3.60E-08	5.85E-09	2.85E-09	-2.05E-07
IRP	[kBq U235 eq]	2.96	0	0.045	0.094	2.50E-03	-0.038
ETP-fw	[CTUe]	1.28E+03	0	6.63	2.25	477	-119
HT-C	[CTUh]	8.94E-08	0	2.35E-10	7.73E-11	2.86E-11	-3.82E-09
HT-nc	[CTUh]	1.35E-06	0	6.49E-09	1.79E-09	7.23E-10	-9.49E-08
SQP	[pt]	89.4	0	6.03	0.590	0.551	-8.02

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	175	0	0.118	0.540	0.028	-2.15
PERM	MJ	0	0	0	0	0	0
PERT	MJ	175	0	0.118	0.540	0.028	-2.15
PENRE	MJ	379	0	9.17	7.52	0.455	-50.1
PENRM	MJ	0	0	0	0	0	0
PENRT	MJ	379	0	9.17	7.52	0.455	-50.1
SM	kg	1.37	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m^3	1.63	0	0.008	0.036	1.44E-03	-0.176

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	0.040	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	0.280	0	0	0	0	0
Materials for energy recovery	kg	0.001	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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