ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

AL 59 Conductor - APAR Industries Limited.

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EPD Hub

EPD EPD HUB, HUB-0183

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GENERAL INFORMATION

MANUFACTURER

Manufacturer	APAR Industries Limited
Address	Factory -Unit –III , Survey no. 127/1/2 Village: Athola, Umarkoi Road, Silvassa – 396230, India Registered Office - 301,Panorama Complex,R.C. Dutt Road, Vadodara - 390007, India
ContactDetails	epd.info@apar.com
Website	www.apar.com

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804+A2:2019 and ISO 14025
PCR	EPD Hub Core PCR version 1.0, 1 Feb 2022
Sector	Electrical product
Category of EPD	Third party verified EPD
Scope of the EPD	Cradle to gate with options, A4-A5, and modules C1-C4, D
EPD author	Mr. Rahul Galghate & Mr. Madanmohan Padhi
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
EPD verifier	Elma Avdyli, EPD Hub

The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

PRODUCT

Product name	AL 59 Conductor
Additional labels	-
Product reference	WG210176
Place of production	Silvassa, DNH-396230 India
Period for data	Calendar year 2021
Averaging in EPD	No averaging
Variation in GWP-fossil for A1-A3	Not Relevant

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 kg of Aluminium manufactured conductors.
Declared unit mass	1 kg
GWP-fossil, A1-A3 (kgCO2e)	8.15
GWP-total, A1-A3 (kgCO2e)	8.28
Secondary material, inputs (%)	2.83
Secondary material, outputs (%)	99.0
Total energy use, A1-A3 (kWh)	34.3
Total water use, A1-A3 (m3e)	0.0388

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

APAR Industries was started in 1958, in India. Over 60 years later, we have grown into a diversified billion dollar company, and expanded to over 140 countries as a highly trusted manufacturer and supplier of conductors, a wide variety of cables, specialty oils, polymers and lubricants. At APAR, we have been able to excel at what we do because of who we are: relentless innovators who are constantly pushing ourselves to discover, perfect and deliver tomorrow's solutions today

PRODUCT DESCRIPTION

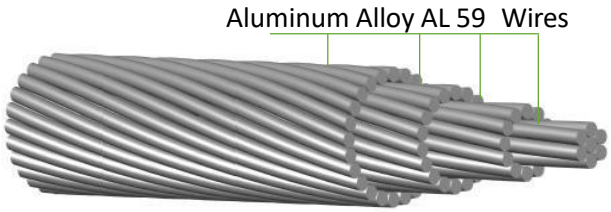

Fig. 1 AL 59 Conductor

AL-59 are widely-used conductors for renewable energy projects. It is highly energy-efficient and corrosion-resistant conductors

DATA SHEET AL 59 Conductor

#	PARTICULARS	UNIT	DATA	
1	Specification according to which the conductor will be manufactured and tested.	-	SS 424 08 13 & SS 424 08 14	
2	Code Name	-	AL59 Conductor	
3	Nominal area (Aluminium Alloy)	mm^2	684.5	
4	Stranding (Al.Alloy wires - Number/Diameter)	mm	Al.Alloy (AL-59) 61/3.78 mm	
5	Nominal O.D. of Conductor	mm	34.02	
6	Nominal Mass of Conductor without grease	Kg/km	1891.9	
7	Nominal Mass of Conductor without grease	Kg/km	2011.2	
8	Minimum Rated Strength of Conductor	KN	156.1	
9	Maximum DC resistance of Conductor at 20 deg.C.	Ω/Km	0.0434	
10	Lay ratio of Conductor	-	Max	Min
11	(a) 1+6 wire layer	-	14	12
12	(b) 12 wire layer	-	13	11
13	(c) 18 wire layer	-	13	11
14	(d) 24 wire layer	-	13	11
15	Direction of lay for outside layer	-	Right Hand (Z)	
16	Greasing	-	Case-4 of EN 50182	
17	a) Type & Grade	-	Type A of EN 50326	
18	b) minimum drop point	°C	150	
19	d) Weight of the grease	Kg/km	119.3 ±20%	
20	Maximum length of conductor	M	2359	

This type of conductor is manufacturing as per SS 424 08 13 & SS 424 08 14 & generally used in Overhead power line for 11 KV to 400 KV. It is characterized by having low resistance High Conductivity with excellent electrical characteristics, excellent sag tension characteristics and superior corrosion resistance to that of ACSR TYPE CONDUCTOR. Compared to ACSR they have lighter in weight, has a comparable strength and current carrying capacity, lower electrical losses and superior corrosion resistance. Given these properties, this conductor has a wide acceptance as a transmission conductor within the market.

All Aluminum Conductors Steel reinforced (ACSR): These are concentrically stranded conductor with one or more layers of hard drawn Aluminum wire on galvanized steel wire core which are coated with zinc with Class A / Class B Coating. The core can be single wire or stranded depending on the size of the conductors. Compared to ACSR they have lighter in weight, has a comparable strength and current carrying capacity, lower electrical losses and superior corrosion resistance. Given these properties, this conductor has a wide acceptance as a transmission conductor within the market."

Features:

1. Better Conductivity, so better power transmission.
2. Lower operating cost due to lower ohmic losses.
3. Can be recycled easily

Further information can be found at www.apar.com.

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	94.70	Asia
Minerals	-	-
Fossil materials	5.30	Asia
Bio-based materials	-	-

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0
Biogenic carbon content in packaging, kg C	0

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 kg of Aluminium manufactured conductor.
Mass per declared unit	1 kg
Functional unit	-
Reference service life	50 Years

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0.1 % (1000 ppm).

PRODUCT LIFE-CYCLE

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
x	x	x	x	x	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse

Modules not declared = MND.

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

The conductor is made of aluminum (Al59) wires. The raw materials in the form of aluminum ingots are transported to company as production facility, where aluminum is drawn into wires to the required dimension, heat treated to attain the required properties and finally, the wires are combined on the wire stranding machine to conduct electricity better. To get the improved mechnical and electrical properties raw material is added with master alloy and all layer of conductor is filled with grease except the outer surface to give excellent resistance to corrosion. There is no insulation materials present in the product. The manufacturing processes require electricity and fuels for the different equipment as well as heating. Certain ancillary materials are also included. The study considers the losses of main raw materials occurring during the manufacturing process. The finished product is packed in a steel drum and the exposed outer surface of conductor is covered with a polypropylene sheet before being sent to the installation site. The impacts associated with the packaging are excluded in this life-cycle assessment model, following the EN 15804+A2:2019 Chapter 6.3.6 & 6.4.4

PRODUCT LIFE-CYCLE

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

Environmental impacts from installation in the construction site include waste packaging materials (A5) and release of biogenic carbon dioxide from waste processing of wood ubet .These were not considered in the present life-cycle assessment model, as mentioned in the previous section (EN 15804+A2:2019 Chapter 6.3.6, & 6.4.4) Electricity consumption for installation is considered to be 0.0283 MJ of product for stringing the conductors using a crane. Transportation distance is defined according to the PCR. Average distance of transportation from production plant to building site is 13180 km and the transportation method is lorry and container ship. Vehicle capacity utilization volume factor is assumed to be 100 % which means full load. In reality, it may vary but as role of transportation emissions in total results is small, the variety in load is assumed to be negligible. Empty returns are not taken into account as it is assumed that return trip is used by the transportation company to serve the needs of other clients. Transportation does not cause losses as product are packaged properly. Also, volume capacity utilization factor is assumed to be 100 % for the nested packaged products.

PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD does not cover the use phase.

Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

Energy consumption is assumed to be 0.0283 MJ of diesel to be deconstructed. It is assumed that the waste is collected separately and transported to the waste treatment center. Transportation distance to treatment is assumed as 100 km and the transportation method is assumed to be lorry (C2). Module C3 accounts for energy and resource inputs for sorting and treating these waste streams - 99% of aluminum is assumed to be recycled. Due to the material and energy recovery potential of aluminum, a part of the end-of-life product is converted into recycled raw materials.

MANUFACTURING PROCESS

Description of system boundaries: Cradle to gate with options, Modules C1–C4, Module D and with optional module A4-A5

A1 to A4

Raw Material supplier

Transportation to APAR

APAR Industries Limited

Melting & Casting

Rolling

Coiling

Aluminium Wire Rod

Wire Drawing

Spool Loading

A5

Conductor Winding

Length Measurement

Conductor Forming

C1 C4 D

Warehouse

Transportation

Installation

Recycling

Waste Process Disposal

Demolition

LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The packaging was excluded from the model according to EPD Hub PCR Rule. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

Data type	Allocation
Raw materials	No allocation
Packaging materials	No allocation
Ancillary materials	No allocation
Manufacturing energy and waste	Mass allocation

AVERAGES AND VARIABILITY

Type of average	No averaging
Averaging method	Not applicable
Variation in GWP-fossil for A1-A3	Not Relevant
Type of average	No averaging
Averaging method	Not applicable

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. Ecoinvent and One Click LCA databases were used as sources of environmental data.

ENVIRONMENTAL IMPACT DATA

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3
GWP – total[1)]	kg CO_2e	7.53E0	8.61E-2	6.61E-1	8.28E0	1.53E-1	8.69E-2	MND	MND	MND
GWP – fossil	kg CO_2e	7.4E0	8.6E-2	6.63E-1	8.15E0	1.54E-1	8.56E-2	MND	MND	MND
GWP – biogenic	kg CO_2e	2.46E-2	-5.87E-6	-1.86E-3	2.27E-2	-2.5E-5	2.28E-4	MND	MND	MND
GWP – LULUC	kg CO_2e	1.11E-1	4.96E-5	4.76E-5	1.11E-1	9.53E-5	1.11E-3	MND	MND	MND
Ozone depletion pot.	kg $CFC_{-11}e$	9.98E-7	1.77E-8	7.09E-8	1.09E-6	3.14E-8	1.17E-8	MND	MND	MND
Acidification potential	mol H^+e	3.3E-2	1.97E-3	2.22E-3	3.72E-2	4.19E-3	4.41E-4	MND	MND	MND
EP-freshwater[2)]	kg Pe	8.16E-4	5.41E-7	1.59E-5	8.32E-4	8.56E-7	8.34E-6	MND	MND	MND
EP-marine	kg Ne	6.49E-3	4.89E-4	4.1E-4	7.39E-3	1.06E-3	9.64E-5	MND	MND	MND
EP-terrestrial	mol Ne	6.74E-2	5.43E-3	4.66E-3	7.75E-2	1.18E-2	1.02E-3	MND	MND	MND
POCP ("smog")[3)]	kg NMVOCe	2.15E-2	1.43E-3	1.36E-3	2.43E-2	3.06E-3	3.09E-4	MND	MND	MND
ADP-minerals & metals[4)]	kg Sbe	3.5E-5	1.19E-6	6.07E-7	3.68E-5	1.73E-6	3.89E-7	MND	MND	MND
ADP-fossil resources	MJ	1.04E2	1.16E0	9.21E0	1.15E2	2.03E0	1.2E0	MND	MND	MND
Water use[5)]	m^3e depr.	4.16E3	3.18E-3	2.96E-1	4.16E3	5.06E-3	4.16E1	MND	MND	MND

Impact category	Unit	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	MND	MND	MND	MND	2.59E-3	9.1E-3	8.05E-1	4.05E-4	-6.73E0
GWP – fossil	kg CO_2e	MND	MND	MND	MND	2.59E-3	9.09E-3	7.93E-1	4E-4	-6.52E0
GWP – biogenic	kg CO_2e	MND	MND	MND	MND	7.21E-7	6.6E-6	1.12E-2	4.98E-6	-4.26E-2
GWP – LULUC	kg CO_2e	MND	MND	MND	MND	2.19E-7	2.74E-6	6.81E-4	4.17E-7	-1.64E-1
Ozone depletion pot.	kg $CFC_{-11}e$	MND	MND	MND	MND	5.6E-10	2.14E-9	4.87E-8	4.5E-11	-8.26E-7
Acidification potential	mol H^+e	MND	MND	MND	MND	2.71E-5	3.82E-5	1.09E-2	2.67E-6	-4.34E-2
EP-freshwater[2)]	kg Pe	MND	MND	MND	MND	1.05E-8	7.39E-8	8.32E-5	1.41E-8	-3.53E-4
EP-marine	kg Ne	MND	MND	MND	MND	1.2E-5	1.15E-5	9.16E-4	6.24E-7	-4.63E-3
EP-terrestrial	mol Ne	MND	MND	MND	MND	1.31E-4	1.27E-4	1.17E-2	6.97E-6	-5.11E-2
POCP ("smog")[3)]	kg NMVOCe	MND	MND	MND	MND	3.61E-5	4.08E-5	3.36E-3	2.07E-6	-1.94E-2
ADP-minerals & metals[4)]	kg Sbe	MND	MND	MND	MND	3.96E-9	1.55E-7	5.06E-5	3.11E-9	-2.85E-5
ADP-fossil resources	MJ	MND	MND	MND	MND	3.57E-2	1.41E-1	7.98E0	5.62E-3	-9.91E1
Water use[5)]	m^3e depr.	MND	MND	MND	MND	6.65E-5	5.26E-4	6.32E-1	1.6E-4	-4.51E-1

ENVIRONMENTAL IMPACT DATA

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3
Particulate matter	Incidence	3.13E-7	3.76E-9	7.01E-9	3.23E-7	6.88E-9	4.02E-9	MND	MND	MND
Ionizing radiation[6)]	kBq U235e	3.09E-1	4.91E-3	1.54E-2	3.29E-1	8.64E-3	3.53E-3	MND	MND	MND
Ecotoxicity (freshwater)	CTUe	5.52E1	8.21E-1	9.99E0	6.6E1	1.37E0	6.94E-1	MND	MND	MND
Human toxicity, cancer	CTUh	9.41E-9	4.17E-11	1.73E-10	9.62E-9	8.66E-11	9.79E-11	MND	MND	MND
Human tox. non-cancer	CTUh	1.15E-6	7.54E-10	1.25E-8	1.16E-6	1.3E-9	1.17E-8	MND	MND	MND
SQP[7)]	-	7.01E0	3.75E-1	3.29E-1	7.71E0	4.2E-1	8.23E-2	MND	MND	MND

Impact category	Unit	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	MND	MND	MND	MND	7.18E-10	8.22E-10	5.13E-8	3.63E-11	-4.12E-7
Ionizing radiation6)	kBq U235e	MND	MND	MND	MND	1.53E-4	6.18E-4	2.13E-2	1.91E-5	-6.85E-1
Ecotoxicity (freshwater)	CTUe	MND	MND	MND	MND	2.09E-2	1.08E-1	8.75E1	6.2E0	-1.18E2
Human toxicity, cancer	CTUh	MND	MND	MND	MND	7.5E-13	2.76E-12	1.55E-9	3.47E-13	-1.3E-8
Human tox. non-cancer	CTUh	MND	MND	MND	MND	1.85E-11	1.28E-10	9.82E-8	9.81E-12	2.98E-9
SQP7)	-	MND	MND	MND	MND	9.15E-4	2.13E-1	2.17E0	9.56E-3	-4.84E0

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3
Renew. PER as energy[8)]	MJ	3.87E1	9.71E-3	6.84E-1	3.94E1	1.57E-2	3.94E-1	MND	MND	MND
Renew. PER as material	MJ	4.76E-1	0E0	0E0	4.76E-1	0E0	4.76E-3	MND	MND	MND
Total use of renew. PER	MJ	3.91E1	9.71E-3	6.84E-1	3.98E1	1.57E-2	3.99E-1	MND	MND	MND
Non-re. PER as energy	MJ	7.37E1	1.16E0	9.21E0	8.41E1	2.03E0	8.97E-1	MND	MND	MND
Non-re. PER as material	MJ	3.24E1	0E0	0E0	3.24E1	0E0	3.24E-1	MND	MND	MND
Total use of non-re. PER	MJ	1.06E2	1.16E0	9.21E0	1.17E2	2.03E0	1.22E0	MND	MND	MND
Secondary materials	kg	2.83E-2	0E0	0E0	2.83E-2	0E0	2.83E-4	MND	MND	MND
Renew. secondary fuels	MJ	2.88E-2	0E0	0E0	2.88E-2	0E0	2.88E-4	MND	MND	MND
Non-ren. secondary fuels	MJ	6.74E-2	0E0	0E0	6.74E-2	0E0	6.74E-4	MND	MND	MND
Use of net fresh water	m^3	3.66E-2	1.43E-4	2.04E-3	3.88E-2	2.27E-4	3.93E-4	MND	MND	MND

Impact category	Unit	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8)]	MJ	MND	MND	MND	MND	1.93E-4	1.78E-3	1.19E0	3.32E-4	-4.23E1
Renew. PER as material	MJ	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Total use of renew. PER	MJ	MND	MND	MND	MND	1.93E-4	1.78E-3	1.19E0	3.32E-4	-4.23E1
Non-re. PER as energy	MJ	MND	MND	MND	MND	3.57E-2	1.41E-1	7.98E0	5.62E-3	-9.91E1
Non-re. PER as material	MJ	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Total use of non-re. PER	MJ	MND	MND	MND	MND	3.57E-2	1.41E-1	7.98E0	5.62E-3	-9.91E1
Secondary materials	kg	MND	MND	MND	MND	0E0	0E0	0E0	0E0	8.62E-1
Renew. secondary fuels	MJ	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Non-ren. secondary fuels	MJ	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m^3	MND	MND	MND	MND	3.15E-6	2.94E-5	5.18E-3	4.48E-6	-4.05E-2

ENVIRONMENTAL IMPACT DATA

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3
Hazardous waste	kg	7.15E-1	1.41E-3	2.32E-2	7.39E-1	2.43E-3	7.45E-3	MND	MND	MND
Non-hazardous waste	kg	5.83E0	4.21E-2	6.24E-1	6.5E0	5.66E-2	6.59E-2	MND	MND	MND
Radioactive waste	kg	3.21E-4	7.94E-6	2.45E-5	3.53E-4	1.4E-5	3.92E-6	MND	MND	MND

Impact category	Unit	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	MND	MND	MND	MND	3.84E-5	1.37E-4	0E0	1.29E-4	-1.67E0
Non-hazardous waste	kg	MND	MND	MND	MND	4.1E-4	1.52E-2	0E0	9.87E-3	-1.62E1
Radioactive waste	kg	MND	MND	MND	MND	2.5E-7	9.7E-7	0E0	2.19E-8	-5.83E-4

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3
Components for re-use	kg	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND
Materials for recycling	kg	1.89E-2	0E0	0E0	1.89E-2	0E0	1.89E-4	MND	MND	MND
Materials for energy rec	kg	3.24E-4	0E0	0E0	3.24E-4	0E0	3.24E-6	MND	MND	MND
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND

Impact category	Unit	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	MND	MND	MND	MND	0E0	0E0	9.9E-1	0E0	0E0
Materials for energy rec	kg	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Exported energy	MJ	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3
Global Warming Pot.	kg CO2e	7.34E0	8.54E-2	6.54E-1	8.08E0	1.53E-1	8.49E-2	MND	MND	MND
Ozone depletion Pot.	kg CFC-11e	8.7E-7	1.41E-8	5.63E-8	9.41E-7	2.49E-8	1.01E-8	MND	MND	MND
Acidification	kg SO2e	2.72E-2	1.57E-3	1.81E-3	3.06E-2	3.34E-3	3.43E-4	MND	MND	MND
Eutrophication	kg PO43e	7.25E-3	1.85E-4	5.59E-4	7.99E-3	3.91E-4	8.45E-5	MND	MND	MND
POCP (“smog”)	kg C2H4e	1.71E-3	4.23E-5	7.42E-5	1.82E-3	8.76E-5	1.95E-5	MND	MND	MND
ADP-elements	kg Sbe	3.5E-5	1.19E-6	6.07E-7	3.68E-5	1.73E-6	3.89E-7	MND	MND	MND
ADP-fossil	MJ	1.04E2	1.16E0	9.21E0	1.15E2	2.03E0	1.2E0	MND	MND	MND

Impact category	Unit	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO2e	MND	MND	MND	MND	2.57E-3	9.01E-3	7.75E-1	3.88E-4	-6.56E0
Ozone depletion Pot.	kg CFC-11e	MND	MND	MND	MND	4.43E-10	1.7E-9	4.07E-8	3.68E-11	-8.29E-7
Acidification	kg SO2e	MND	MND	MND	MND	3.83E-6	1.85E-5	9.83E-3	2.47E-6	-3.75E-2
Eutrophication	kg PO43e	MND	MND	MND	MND	6.74E-7	3.74E-6	3.75E-3	5.54E-7	-1.4E-2
POCP (“smog”)	kg C2H4e	MND	MND	MND	MND	3.94E-7	1.17E-6	4E-4	1.44E-7	-3.83E-3
ADP-elements	kg Sbe	MND	MND	MND	MND	3.96E-9	1.55E-7	5.06E-5	3.11E-9	-2.85E-5
ADP-fossil	MJ	MND	MND	MND	MND	3.57E-2	1.41E-1	7.98E0	5.62E-3	-9.91E1

VERIFICATION STATEMENT

VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with reference standard, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The digital background data for this EPD

This EPD has been generated by One Click LCA EPD generator, which has been verified and approved by the EPD Hub.

THIRD-PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of the data collected and used in the LCA calculations, the way the LCA-based calculations have been carried out, the presentation of environmental data in the EPD, and other additional environmental information, as present with respect to the procedural and methodological requirements in ISO 14025:2010 and reference standard.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.

Elma Avdyli as an authorized verifier acting for EPD Hub Limited

19.01.2024