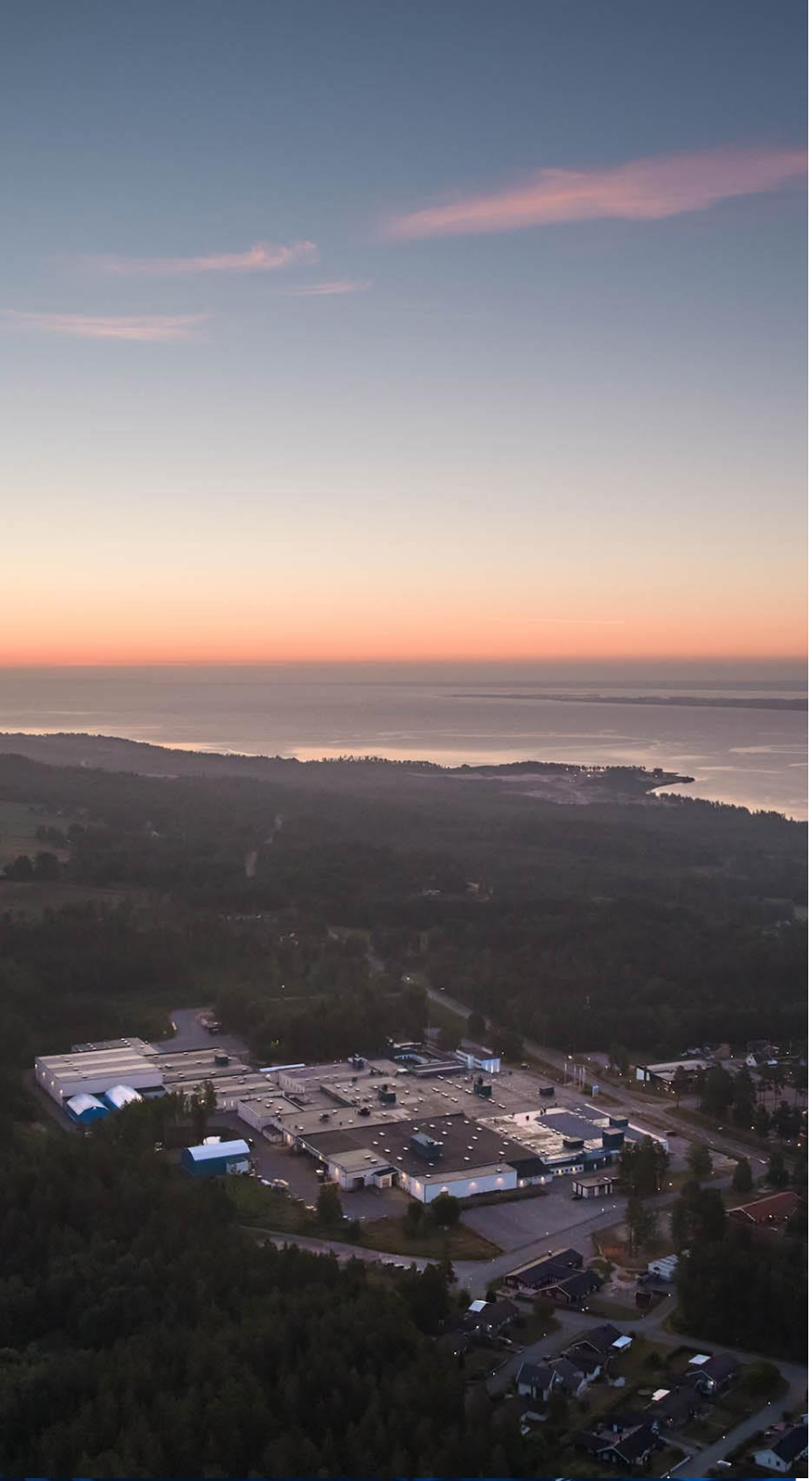

ENVIRONMENTAL PRODUCT DECLARATION

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

Discovery

Fagerhults Belysning AB

EPD HUB, HUB-0242

Publishing date 13 January 2023, last updated date 13 January 2023, valid until 13 January 2028

Created with One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Fagerhults Belysning AB
Address	Åvägen 1, 566 80 Habo, Sweden
Contact details	info@fagerhult.se
Website	www.fagerhult.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	Construction product
Category of EPD	Third party verified EPD
Scope of the EPD	Cradle to grave, A1-C4 and D
EPD author VP-004	Josefin Carlsson, Fagerhults Belysning AB
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
EPD verifier	S.V, as an authorized verifier acting for EPD Hub Limited

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	Discovery
Place of production	Habo, Sweden
Period for data	2021
Averaging in EPD	Multiple products
Variation in GWP-fossil for A1-A3	15,4 %

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 unit of Discovery
Declared unit mass	1.7 kg
GWP-fossil, A1-A3 (kgCO2e)	24.3
GWP-total, A1-A3 (kgCO2e)	23.3
Secondary material, inputs (%)	1.44
Secondary material, outputs (%)	29.4
Total energy use, A1-A3 (kWh)	116.0
Total water use, A1-A3 (m3e)	122.0

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Fagerhult creates premium lighting solutions that enhance human well-being in professional and public environments. With sustainability and connectivity at heart, we focus on office, education, healthcare, retail and outdoor applications. We work closely with customers and partners in the European market and provide lighting solutions globally – with tailor-made solutions for our customers. The Fagerhult brand includes both the product company Fagerhults Belysning AB (based in Fagerhult, Sweden) and 13 sales companies located around Europe.

Fagerhult is part of the Fagerhult Group, one of Europe's leading lighting companies, with 12 different brands and 4,100 employees in 28 countries around the world.

PRODUCT DESCRIPTION

The EPD covers the complete Discovery family and all data is represented by the worst case article within the family as a representation for all variants.

Discovery is an effective all-round luminaire with IP 44 that satisfies needs in more demanding environments. With its elegant design, it can be mounted on both walls and ceilings and is perfect for stairwells, corridors, kitchens, bathrooms, cellars and more.

The product consists of 73% polycarbonate that is ISCC certified and based on renewable materials instead of fossil oil, which reduces the products climate impact. In addition, lighting control with Organic Response can be added, which reduce the climate impact further with decreased energy consumption. More information can be found at www.fagerhult.com.

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	8,3	Global, mainly EU
Minerals	0	
Fossil materials	70,2	Global, mainly EU
Bio-based materials	21,5	EU

BIOGENIC CARBON CONTENT

Product’s biogenic carbon content at the factory gate.

Biogenic carbon content in product, kg C	
Biogenic carbon content in packaging, kg C	1.02

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 unit of Discovery
Mass per declared unit	1.7 kg
Reference service life	20 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	MNR	MNR	MNR	MNR	MNR	x	MNR	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	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR.

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 product contains components made of plastics, metals and electronics. All materials and components are transported to the production facility of Fagerhult in Habo, Sweden, where the product is being assembled together. Production losses of raw materials of components that are designed inhouse are considered in the study. Electricity and district heating is needed for the manufacturing processes and different equipment. The energy supply at Fagerhults facility in Habo is 100 % renewable. Ancillary materials needed within the assembly and manufacturing process are considered neglected. The product is packaged in a cardboard box before being sent to the installation site on a wooden pallet wrapped in plastic film.

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.

The transportation distance from production facility in Habo to the installation site is assumed as an average distance to existing markets based on market share. The average transportation distance is 441 km for road transportation, 450 km for sea transportation, and 542 km for air transportation. Vehicle capacity utilization factor may vary in reality, but as the emissions caused by transportations are relatively small in relation to the total results, the variety in load is assumed to be neglected and full load is assumed. Return trip is assumed to be used by the transportation company to serve the needs of other clients, therefore are empty returns not taken into account. Transportation impacts that occur from delivery of the product cover direct exhaust emissions of fuel, environmental impacts of fuel production, as well as related infrastructure emissions. Environmental impacts from installation include waste packaging materials from wood pallet, cardboard box and plastic film. The impacts of energy consumption during installation are included, however used ancillary materials during installation are considered negligible.

PRODUCT USE AND MAINTENANCE (B1-B7)

During the use phase, the product consumes electricity. The calculations are based on the Swedish electricity grid mix (B6). Impacts due to electricity production include direct emissions to air, transformation and transmission losses.

The service life is assumed to be 20 years and the annual operational hours are based on the European standard EN 15193-1. According to the same standard, the Organic Response sensor may reduce the electricity consumption during usage by 60% in the application areas where Discovery is used. However, even if the sensor is included in the model of the product (A1-A3), we have not considered the reduction of electricity consumption in B6, to present the worst case.

PRODUCT END OF LIFE (C1-C4, D)

Consumption of energy are considered in the deconstruction process, but consumption of natural resources are assumed to be negligible. It is assumed that the waste is collected separately and transported to a waste treatment centre. Transportation distance and method to waste treatment is assumed as 50 km with lorry (C2). According to EN 50693:2019, the sequence of treatment operations occurring to the product shall include de-pollution, fractions separation and preparation (dismantling, crushing, shredding, sorting), recycling, other material recovery, energy recovery and disposal. In this study, the default values from table G.4 of EN 50693 is used for treating materials in different waste treatment methods. Module C3 accounts for energy and resource inputs for sorting and treating these waste streams for recycling and incineration with energy recovery.

Recycling rates are based on historical data as worst case. When the product reaches end of life it is likely that the infrastructure and processes for recycling materials are much more efficient than today. Waste assumed to be landfilled are 5 % of metal waste (World Steel Association), 10 % of electrical and electronic waste (Elkretsen) and 0 % of plastic waste (Ikem). Due to the material and energy recovery potential of parts in the lighting system, the end-of-life product is converted into recycled raw materials, while the energy recovered from incineration displaces electricity and heat production (D).

The wooden pallet and the majority of the plastic wrapping used during transportation is also incinerated for energy recovery. The benefits and loads of incineration and recycling are included in Module D.

MANUFACTURING PROCESS

DESIGN & PREPERATION

RAW MATERIAL & COMPONENTS

PRODUCTION

ASSEMBLY

PACKAGING & DELIVERY

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 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	Allocated by mass or volume
Packaging materials	Allocated by mass or volume
Ancillary materials	No allocation
Manufacturing energy and waste	Allocated by mass or volume

AVERAGES AND VARIABILITY

Type of average	Multiple products
Averaging method	Averaged by shares of total mass
Variation in GWP-fossil for A1-A3	15,4 %

This EPD is product and factory specific and does not contain average calculations.

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 VP-029-C

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	2,28E1	7,49E-2	3,81E-1	2,33E1	6,3E-1	2,14E0	MND	MND	MND	MND	MND	6,25E1	MND	2,57E-3	7,57E-3	3,48E0	5,54E-3	-1,86E0
GWP – fossil	kg CO_2e	2,33E1	7,49E-2	8,44E-1	2,43E1	6,33E-1	5,74E-2	MND	MND	MND	MND	MND	5,66E1	MND	2,32E-3	7,56E-3	3,49E0	5,53E-3	-2,02E0
GWP – biogenic	kg CO_2e	-5,79E-1	2,89E-5	-9,18E-1	-1,5E0	2,33E-4	2,08E0	MND	MND	MND	MND	MND	2,24E0	MND	9,37E-5	5,49E-6	-3,5E-4	5,07E-6	1,72E-1
GWP – LULUC	kg CO_2e	5,16E-2	9,22E-6	4,55E-1	5,07E-1	6,86E-5	1,67E-4	MND	MND	MND	MND	MND	3,68E0	MND	1,57E-4	2,27E-6	7,73E-5	2,47E-7	-4,99E-3
Ozone depletion pot.	kg CFC_{-11}e	1,81E-6	1,71E-8	1,35E-7	1,96E-6	1,44E-7	5,53E-9	MND	MND	MND	MND	MND	2,77E-5	MND	1,17E-9	1,78E-9	8,93E-9	1,35E-10	-1,11E-7
Acidification potential	mol H^+e	1,89E-1	4,32E-4	5,43E-3	1,95E-1	3,65E-3	2,43E-4	MND	MND	MND	MND	MND	3,68E-1	MND	1,11E-5	3,17E-5	7,56E-4	3,93E-6	-1,37E-2
EP-freshwater[2)]	kg Pe	2,61E-3	2,53E-7	6,32E-5	2,67E-3	1,94E-6	5,14E-7	MND	MND	MND	MND	MND	4,93E-3	MND	1,73E-7	6,15E-8	2,42E-6	1,3E-8	-8,39E-5
EP-marine	kg Ne	2,64E-2	1,46E-4	1,49E-3	2,81E-2	1,25E-3	1,09E-4	MND	MND	MND	MND	MND	6,31E-2	MND	2,44E-6	9,57E-6	2,93E-4	1,18E-5	-1,79E-3
EP-terrestrial	mol Ne	3,13E-1	1,61E-3	1,88E-2	3,33E-1	1,37E-2	1,04E-3	MND	MND	MND	MND	MND	8,27E-1	MND	3,17E-5	1,06E-4	3,17E-3	1,46E-5	-2,06E-2
POCP ("smog")[3)]	kg NMVOCe	8,71E-2	4,28E-4	4,57E-3	9,21E-2	3,63E-3	2,93E-4	MND	MND	MND	MND	MND	1,88E-1	MND	7E-6	3,4E-5	8,14E-4	5,28E-6	-7,05E-3
ADP-minerals & metals[4)]	kg Sbe	1,9E-3	4,06E-7	1,05E-5	1,91E-3	2,16E-6	4,79E-7	MND	MND	MND	MND	MND	2,28E-3	MND	3,89E-8	1,29E-7	1,88E-6	4,75E-9	-1,53E-6
ADP-fossil resources	MJ	3,14E2	1,15E0	1,25E1	3,28E2	9,03E0	6,21E-1	MND	MND	MND	MND	MND	6,63E3	MND	2,82E-1	1,18E-1	1,2E0	1,03E-2	-5,17E1
Water use[5)]	m^3e depr.	7,27E0	1,57E-3	1,71E0	8,97E0	1,17E-2	-1,77E-3	MND	MND	MND	MND	MND	8,69E1	MND	3,61E-3	4,37E-4	2,8E-2	4,58E-4	-1,02E0

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

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	1,29E-6	2,02E-9	7,7E-8	1,37E-6	1,44E-8	5,37E-9	MND	MND	MND	MND	MND	2,66E-6	MND	8,87E-11	6,84E-10	6,05E-9	7,24E-11	-1,34E-7
Ionizing radiation[6)]	kBq U235e	1,06E0	4,69E-3	4,3E-2	1,11E0	3,95E-2	1,09E-2	MND	MND	MND	MND	MND	2,27E2	MND	9,68E-3	5,14E-4	3,41E-3	4,04E-5	-3,45E-1
Ecotoxicity (freshwater)	CTUe	1,93E3	6,21E-1	5,54E1	1,99E3	5,1E0	5,72E-1	MND	MND	MND	MND	MND	3,48E3	MND	1,04E-1	8,99E-2	3,08E0	4,68E-2	-4,66E1
Human toxicity, cancer	CTUh	2,43E-8	1,09E-11	1,06E-9	2,54E-8	8,42E-11	8,17E-11	MND	MND	MND	MND	MND	9,92E-8	MND	2,27E-12	2,3E-12	2,19E-10	4,53E-13	-6,4E-10
Human tox. non-cancer	CTUh	1,23E-6	9,28E-10	1,96E-8	1,25E-6	7,79E-9	2,25E-9	MND	MND	MND	MND	MND	2,45E-6	MND	5,18E-11	1,06E-10	1,14E-8	1,76E-11	-1,29E-8
SQP[7)]	-	6,5E1	3,84E-1	2,54E0	6,79E1	2,5E0	3,24E-1	MND	MND	MND	MND	MND	1,13E2	MND	4,18E-3	1,78E-1	5,25E-1	3,62E-2	-5,39E-1

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8)]	MJ	3,12E1	6,61E-3	6,5E1	9,63E1	4,26E-2	1,42E-1	MND	MND	MND	MND	MND	3,19E3	MND	1,35E-1	1,48E-3	6,52E-2	1,9E-4	-1,2E1
Renew. PER as material	MJ	6,89E0	0E0	9,78E0	1,67E1	0E0	-1,27E1	MND	MND	MND	MND	MND	0E0	MND	0E0	0E0	0E0	0E0	8,66E-1
Total use of renew. PER	MJ	3,81E1	6,61E-3	7,48E1	1,13E2	4,26E-2	-1,25E1	MND	MND	MND	MND	MND	3,19E3	MND	1,35E-1	1,48E-3	6,52E-2	1,9E-4	-1,11E1
Non-re. PER as energy	MJ	3,1E2	1,15E0	1,18E1	3,23E2	9,03E0	6,21E-1	MND	MND	MND	MND	MND	6,63E3	MND	2,82E-1	1,18E-1	1,2E0	1,03E-2	-2,83E1
Non-re. PER as material	MJ	1,43E1	0E0	-3,91E-1	1,39E1	0E0	-7,46E-1	MND	MND	MND	MND	MND	0E0	MND	0E0	0E0	-2,98E1	-1E0	-1,28E1
Total use of non-re. PER	MJ	3,24E2	1,15E0	1,14E1	3,37E2	9,03E0	-1,25E-1	MND	MND	MND	MND	MND	6,63E3	MND	2,82E-1	1,18E-1	-2,86E1	-9,9E-1	-4,11E1
Secondary materials	kg	2,42E-2	0E0	2,52E-4	2,44E-2	0E0	0E0	MND	MND	MND	MND	MND	0E0	MND	0E0	0E0	0E0	0E0	6,19E-1
Renew. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	0E0	MND	0E0	0E0	0E0	0E0	0E0
Non-ren. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	0E0	MND	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m^3	1,22E2	1,27E-4	8,86E-3	1,22E2	8,68E-4	3,29E-4	MND	MND	MND	MND	MND	1,76E0	MND	7,32E-5	2,45E-5	1,19E-3	1,15E-5	-7,76E-3

8) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	2,18E0	5,68E-4	3,51E-2	2,22E0	3,79E-3	5,63E-3	MND	MND	MND	MND	MND	5,38E0	MND	2,11E-4	1,14E-4	0E0	1,9E-5	-1,09E-1
Non-hazardous waste	kg	5,57E1	3,89E-2	1,09E0	5,69E1	2,07E-1	7,32E-1	MND	MND	MND	MND	MND	2,03E2	MND	6,11E-3	1,26E-2	0E0	4,14E-2	-2,05E0
Radioactive waste	kg	4,71E-3	8,18E-6	5,68E-5	4,78E-3	6,46E-5	5,75E-6	MND	MND	MND	MND	MND	9,29E-2	MND	3,96E-6	8,07E-7	0E0	6,15E-8	-1,62E-4

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	0E0	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	0E0	0E0	2,43E-2	2,43E-2	0E0	3,35E-1	MND	MND	MND	MND	MND	0E0	MND	0E0	0E0	5E-1	0E0	0E0
Materials for energy rec	kg	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	0E0	MND	0E0	0E0	0E0	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	8,06E0	MND	MND	MND	MND	MND	0E0	MND	0E0	0E0	1,41E1	0E0	0E0

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

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO_2e	2,23E1	7,93E-2	1,33E0	2,37E1	6,3E-1	9,36E-2	MND	MND	MND	MND	MND	5,93E1	MND	2,44E-3	7,49E-3	3,48E0	3,96E-3	-1,91E0
Ozone depletion Pot.	kg CFC_{-11}e	1,11E-6	1,44E-8	1,13E-7	1,24E-6	1,14E-7	5,43E-9	MND	MND	MND	MND	MND	4,48E-5	MND	1,9E-9	1,41E-9	7,74E-9	1,08E-10	-1,2E-7
Acidification	kg SO_2e	1,87E-1	3,17E-4	3,73E-3	1,91E-1	2,62E-3	1,74E-4	MND	MND	MND	MND	MND	2,98E-1	MND	8,38E-6	1,54E-5	5,24E-4	3,55E-6	-1,19E-2
Eutrophication	kg PO_4^3e	4,52E-2	5,77E-5	1,4E-3	4,67E-2	4,79E-4	2,5E-4	MND	MND	MND	MND	MND	1,6E-1	MND	5,07E-6	3,11E-6	4,54E-4	8,8E-4	-1,94E-3
POCP (“smog”)	kg C_2H_4e	1,02E-2	8,46E-6	2,35E-4	1,05E-2	6,36E-5	1,84E-5	MND	MND	MND	MND	MND	1,27E-2	MND	3,77E-7	9,75E-7	1,98E-5	7,83E-7	-6,62E-4
ADP-elements	kg Sbe	1,9E-3	4,06E-7	1,05E-5	1,91E-3	2,16E-6	4,79E-7	MND	MND	MND	MND	MND	2,28E-3	MND	3,89E-8	1,29E-7	1,88E-6	4,75E-9	-1,53E-6
ADP-fossil	MJ	3,14E2	1,15E0	1,25E1	3,28E2	9,03E0	6,21E-1	MND	MND	MND	MND	MND	6,63E3	MND	2,82E-1	1,18E-1	1,2E0	1,03E-2	-5,17E1

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

Why does verification transparency matter? Read more online
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.

Silvia Vilčeková, as an authorized verifier acting for EPD Hub Limited
13.01.2023

VERIFIED ISO 14025