ENVIRONMENTAL PRODUCT DECLARATION

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

SLIW insulation piercing connector
Ensto Finland Ltd

EPD HUB, HUB-0846

Publishing date 16 November 2023, last updated on 16 November 2023, valid until 16 November 2028.

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Ensto Finland Ltd
Address	Ensio Miettisen katu 2 P.O.Box 77 06101 Porvoo Finland
Contact details	ensto@ensto.com, sales@ensto.com
Website	ensto.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	Manufactured 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	Marjo Ketonen
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☒ External verification
EPD verifier	Magaly González Vázquez, 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	SLIW insulation piercing connector
Additional labels	
Product reference	SLIW50 -series size range: SLIW50-SLIW59
Place of production	Finland: Porvoo manufacturing site
Period for data	Calendar year 2022
Averaging in EPD	Multiple products
Variation in GWP-fossil for A1-A3	-3,7 / +1,2 %

ENVIRONMENTAL DATA SUMMARY

Declared unit	0,1 kg SLIW Product
Declared unit mass	0,1 kg
GWP-fossil, A1-A3 (kgCO2e)	7,49E-01
GWP-total, A1-A3 (kgCO2e)	7,28E-01
Secondary material, inputs (%)	5,48
Secondary material, outputs (%)	73,3
Total energy use, A1-A3 (kWh)	3,99
Total water use, A1-A3 (m3e)	5,12E-02

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Ensto offers innovative and reliable, long-lifecycle line accessories, distribution and protection automation and control solutions as well as substations for electricity distribution networks.

PRODUCT DESCRIPTION

Insulation piercing connectors for low voltage application area,
highest system voltage 1 kV.
SLIWs are designed to use with insulated aluminium or copper conductors. Fully insulated bolt and connectors design enables hot line installation without peeling insulation from conductor. Both main and branch conductor insulations are pierced by single bolt action.
Waterproof: Test voltage 6 kV/50 Hz/1 min in water.
Further information can be found on
ensto.com/electricity-distribution-networks/products/

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	44	EU / Asia
Minerals	20	EU
Fossil materials	36	EU
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	0,0257

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	0,1 kg SLIW Product
Mass per declared unit	0,1 kg
Functional unit	-
Reference service life	-

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	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 environmental impacts considered during the product stage encompass the manufacturing of raw materials used in production, as well as packaging materials and other ancillary materials, including chemicals for metal treatment, water and oil processing, and machinery. The energy used by machines and the handling of waste generated in the production processes at manufacturing facilities are also included in this stage. The study also takes into account material losses that occur during the manufacturing processes, assuming a 5% loss for polymers. Metal machining residue is recycled outside of Enstos facilities, and the benefits from recycling are considered beyond the system boundaries (D), along with energy recovery from plastics and incineration of packaging materials.

The materials included in the SLIW product construction consist of metals, plastics, polymer composites, and packaging, labeling, and instructional print materials. Along with packaging and ancillary additives, they are transported by truck and shipping to the production facility. Metal preforms are machined and subjected to surface treatments, such as aluminum surface treatment involving pickling, tinning, and washing. Finished metal parts are pre-assembled, while plastics are dried and automatically transferred and dosed for injection molding. The final product is automatically assembled and packaged.

The distance for materials from the supplier to the factory is estimated based on the country of origin. The electricity consumption required during the manufacturing process is allocated from the annual production representative year, which is 2022. Allocation is necessary because multiple parallel production lines for machining have different outputs and technology levels, and a single product component can be output from multiple lines. After final assembly, components are packaged in plastic bags and cardboard boxes, which are then placed on wooden pallets. The wooden pallets are purchased recycled, assuming an 80% share of virgin wood and 20% recycled wood to account for packaging manufacturing burden in the system. The environmental impacts considered during the product stage cover the manufacturing of raw materials used in production, as well as packaging materials and other ancillary materials. All raw materials for the products are produced outside of Enstos facilities.

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.

SLIW Products are sold globally, and the average shipping and truck distances were calculated based on sales data from the year 2022, using average distances of representative products included in the averaged product system. An SLIW average product and its packaging are transported 1,400 km by truck and 260 km via sea freight. The vehicle capacity utilization volume factor is assumed to be 100%, indicating a full load.

The installation phase does not involve material loss. Waste collection of packaging materials for further processing is conducted in the installation waste step (A5), and this step encompasses impacts from wooden pallet pre-treatment, wood chipping, plastic film, and paper and cardboard sorting.

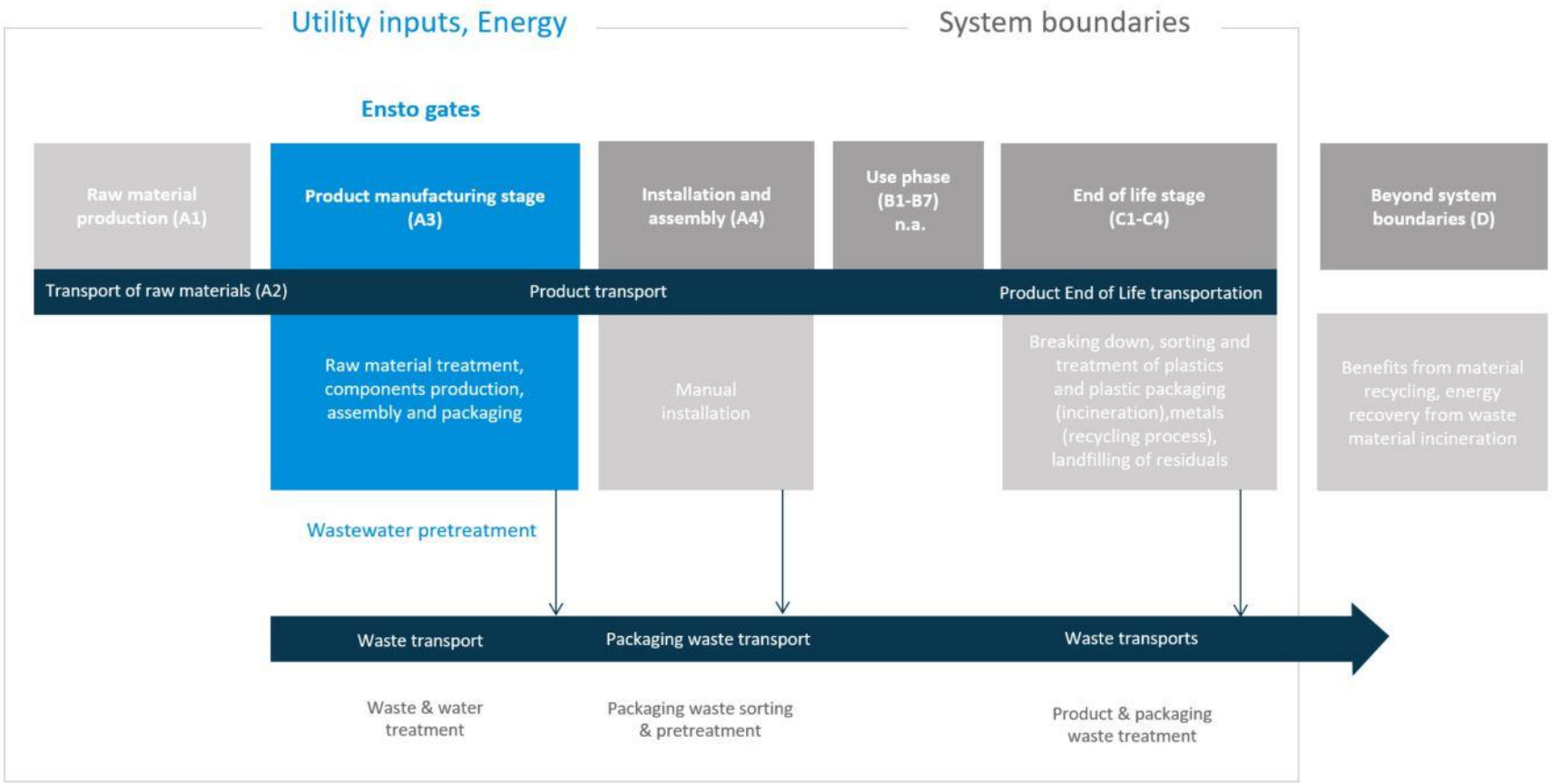
PRODUCT USE AND MAINTENANCE (B1-B7)

Use-phase and maintenance are not investigated as actions are not needed during connector's lifespan.
Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

It is assumed that if a product is de-installed, it will be done manually during an electricity distribution equipment system update, or the product will end up in a waste stream as part of the deconstruction process for the total overhead lines electricity distribution system. The shredding process is assumed for the SLIW, with metals being separated for recovery. It is also assumed that the waste is collected separately and transported to the waste treatment center. The transportation distance to the treatment center is assumed to be 100 km for both landfilling and recycling methods, with the transportation method being a lorry. The recycling recovery rate for steel and aluminum is stipulated at 85%, with the selection of this recycling rate informed by authoritative sources, namely the World Steel Association and the European Aluminum Association. It is noteworthy that the recycling rate for aluminum is notably higher at 90%, yet a consolidated rate of 85% has been adopted for both materials. Module C3 accounts for energy and resource inputs for treating these waste streams.
The metals in the product are assumed to be recycled along with cardboard and paper from packaging, while a 15% share of metals and the total glass fiber residue from plastic composite parts are assumed to end up in landfills. The wood pallet and plastic film are assumed to be incinerated, with the energy recovered from incineration displacing electricity and heat production. The benefits and environmental impacts of incineration and recycling are included in Module D for packaging materials as well.

MANUFACTURING PROCESS



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

AVERAGES AND VARIABILITY

Type of average	Multiple products
Averaging method	Averaged partially by shares of total mass and by revenue
Variation in GWP-fossil for A1-A3	-3,7 / +1,2 %

SLIW product series is produced in the same manufacturing location with similar or identical raw material and components. SLIW products under the SLIW50 series have similar but non-linearly scalable geometrical form and share of raw materials and they serve similar function for insulation piercing connection in low voltage rage with variation in product size.

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. Supplier EPD's, Ecoinvent v3.8 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	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	5,79E-01	2,13E-02	1,27E-01	7,28E-01	1,61E-02	2,64E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	8,73E-04	1,78E-01	2,18E-04	-1,00E-01
GWP – fossil	kg CO_2e	5,76E-01	2,12E-02	1,52E-01	7,49E-01	1,61E-02	7,08E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	8,73E-04	1,78E-01	2,18E-04	-1,00E-01
GWP – biogenic	kg CO_2e	1,11E-05	0,00E+00	-2,57E-02	-2,57E-02	0,00E+00	2,57E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWP – LULUC	kg CO_2e	3,03E-03	1,03E-05	1,07E-03	4,11E-03	6,03E-06	6,76E-07	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,22E-07	2,09E-05	2,03E-07	7,60E-05
Ozone depletion pot.	kg CFC_{-11}e	3,48E-08	4,67E-09	1,07E-08	5,02E-08	3,69E-09	6,22E-11	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,01E-10	1,19E-09	7,62E-11	-4,34E-09
Acidification potential	mol H^+e	2,75E-03	1,89E-04	7,50E-04	3,69E-03	7,31E-05	3,02E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,69E-06	9,75E-05	1,97E-06	-5,39E-04
EP-freshwater[2)]	kg Pe	2,16E-04	1,60E-07	6,86E-06	2,23E-04	1,31E-07	2,00E-08	MND	MND	MND	MND	MND	MND	MND	0,00E+00	7,15E-09	3,88E-07	2,44E-09	-4,48E-06
EP-marine	kg Ne	5,28E-04	4,76E-05	1,21E-04	6,96E-04	2,13E-05	8,24E-07	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,10E-06	3,14E-05	6,92E-07	-9,04E-05
EP-terrestrial	mol Ne	5,21E-03	5,29E-04	1,33E-03	7,07E-03	2,35E-04	8,29E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,21E-05	3,32E-04	7,61E-06	-1,07E-03
POCP ("smog")[3)]	kg NMVOCe	1,50E-03	1,51E-04	3,65E-04	2,01E-03	7,44E-05	2,65E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,88E-06	8,57E-05	2,19E-06	-4,54E-04
ADP-minerals & metals[4)]	kg Sbe	1,24E-05	5,66E-08	9,84E-07	1,34E-05	3,75E-08	6,86E-09	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,05E-09	2,03E-07	6,93E-10	-1,46E-06
ADP-fossil resources	MJ	5,81E+00	3,04E-01	3,97E+00	1,01E+01	2,41E-01	7,09E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,31E-02	1,53E-01	5,43E-03	-8,30E-01
Water use[5)]	m^3e depr.	3,58E+04	1,30E-03	1,07E-01	3,58E+04	1,07E-03	1,32E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	5,86E-05	6,88E-03	2,35E-05	-7,89E-02

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

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	1,85E-08	1,86E-09	4,48E-09	2,48E-08	1,83E-09	2,02E-10	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,01E-10	7,67E-10	4,12E-11	-7,20E-09
Ionizing radiation[6)]	kBq U235e	1,75E-02	1,43E-03	1,69E-01	1,88E-01	1,15E-03	6,52E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,24E-05	1,21E-03	2,41E-05	-9,78E-04
Ecotoxicity (freshwater)	CTUe	6,48E+00	2,65E-01	3,24E+00	9,98E+00	2,16E-01	5,93E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,18E-02	8,08E-01	3,94E-03	-3,33E+00
Human toxicity, cancer	CTUh	5,14E-10	8,89E-12	1,02E-10	6,25E-10	5,41E-12	2,01E-12	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,90E-13	2,28E-10	1,48E-13	6,27E-10
Human tox. non-cancer	CTUh	1,61E-08	2,44E-10	1,82E-09	1,82E-08	2,13E-10	1,70E-11	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,17E-11	1,54E-08	2,24E-12	-2,10E-09
SQP[7)]	-	1,71E+00	2,44E-01	3,96E+00	5,92E+00	2,75E-01	6,99E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,51E-02	8,25E-02	1,36E-02	-1,48E+00

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. 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; 7) SQP = Land use related impacts/soil quality.

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	1,72E+00	3,32E-03	1,11E+00	2,83E+00	2,70E-03	5,48E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,48E-04	1,40E-02	6,08E-05	-3,72E-01
Renew. PER as material	MJ	0,00E+00	0,00E+00	2,47E-01	2,47E-01	0,00E+00	-2,47E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renew. PER	MJ	1,72E+00	3,32E-03	1,35E+00	3,07E+00	2,70E-03	-2,47E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,48E-04	1,40E-02	6,08E-05	-3,72E-01
Non-re. PER as energy	MJ	7,36E+00	3,04E-01	3,87E+00	1,15E+01	2,41E-01	7,09E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,31E-02	1,53E-01	5,43E-03	-9,22E-01
Non-re. PER as material	MJ	1,27E+00	0,00E+00	6,52E-02	1,34E+00	0,00E+00	-9,75E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	-1,24E+00	0,00E+00	0,00E+00
Total use of non-re. PER	MJ	8,64E+00	3,04E-01	3,94E+00	1,29E+01	2,41E-01	-9,04E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,31E-02	-1,09E+00	5,43E-03	-9,22E-01
Secondary materials	kg	5,48E-03	1,05E-04	3,59E-03	9,17E-03	6,75E-05	1,40E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,64E-06	6,90E-05	1,75E-06	4,66E-02
Renew. secondary fuels	MJ	3,08E-04	9,60E-07	2,38E-03	2,69E-03	6,71E-07	9,05E-08	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,67E-08	3,97E-06	3,33E-08	-7,33E-05
Non-ren. secondary fuels	MJ	5,79E-04	0,00E+00	0,00E+00	5,79E-04	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	4,73E-02	3,52E-05	3,84E-03	5,12E-02	3,10E-05	3,38E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,70E-06	1,13E-04	6,02E-06	-1,85E-03

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	4,11E-02	4,31E-04	1,45E-02	5,61E-02	3,20E-04	5,87E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,74E-05	9,98E-03	0,00E+00	-2,65E-02
Non-hazardous waste	kg	4,00E-01	6,33E-03	9,77E-01	1,38E+00	5,22E-03	9,42E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,86E-04	9,70E-02	2,63E-02	-2,36E-01
Radioactive waste	kg	2,67E-05	2,04E-06	3,76E-05	6,64E-05	1,61E-06	3,64E-08	MND	MND	MND	MND	MND	MND	MND	0,00E+00	8,77E-08	6,25E-07	0,00E+00	-1,20E-06

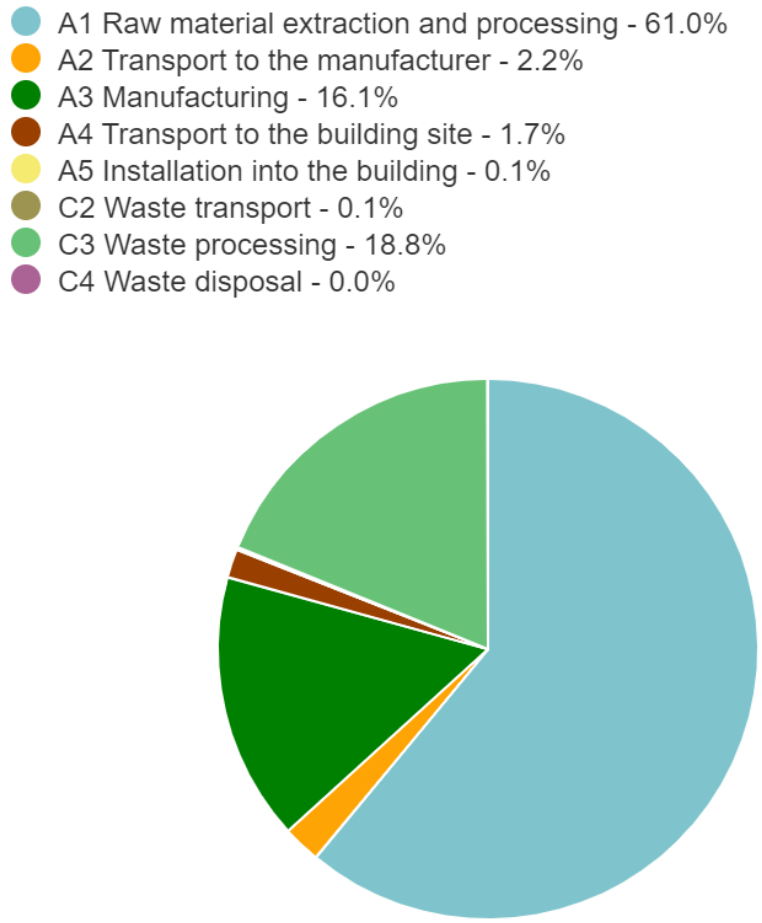
END OF LIFE – OUTPUT FLOWS

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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	4,60E-03	0,00E+00	9,30E-03	1,39E-02	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	3,74E-02	0,00E+00	0,00E+00
Materials for energy rec	kg	1,31E-04	0,00E+00	0,00E+00	1,31E-04	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	1,52E-04	0,00E+00	0,00E+00	1,52E-04	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	1,12E+00	0,00E+00	0,00E+00

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	3,17E-01	2,10E-02	1,50E-01	4,88E-01	1,59E-02	9,46E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	8,64E-04	1,77E-01	2,15E-04	-9,58E-02
Ozone depletion Pot.	kg CFC_{-11}e	8,63E-09	3,70E-09	9,56E-09	2,19E-08	2,92E-09	5,06E-11	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,59E-10	9,72E-10	6,04E-11	-4,41E-09
Acidification	kg SO_2e	1,13E-03	1,51E-04	6,24E-04	1,90E-03	5,70E-05	2,39E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,87E-06	7,49E-05	1,49E-06	-4,44E-04
Eutrophication	kg PO_4^3e	5,99E-04	2,26E-05	2,63E-04	8,84E-04	1,24E-05	5,48E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,54E-07	3,90E-05	3,47E-07	-1,79E-04
POCP (“smog”)	kg C_2H_4e	5,67E-05	4,84E-06	3,10E-05	9,25E-05	2,17E-06	3,00E-07	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,12E-07	2,98E-06	5,32E-08	-4,91E-05
ADP-elements	kg Sbe	5,78E-06	5,52E-08	9,41E-07	6,78E-06	3,63E-08	6,80E-09	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,98E-09	2,01E-07	6,71E-10	-1,45E-06
ADP-fossil	MJ	3,78E+00	3,04E-01	3,80E+00	7,88E+00	2,41E-01	7,09E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,31E-02	1,53E-01	5,43E-03	-8,29E-01

Global Warming Potential fossil kg CO2e - Life-cycle stages



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

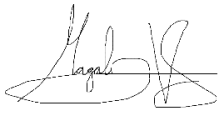
I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of the data collected and used in the LCA calculations, the way the LCA-based calculations have been carried 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.

Magaly González Vázquez, as an authorized verifier acting for EPD Hub Limited
16.11.2023



VERIFIED ISO 14025