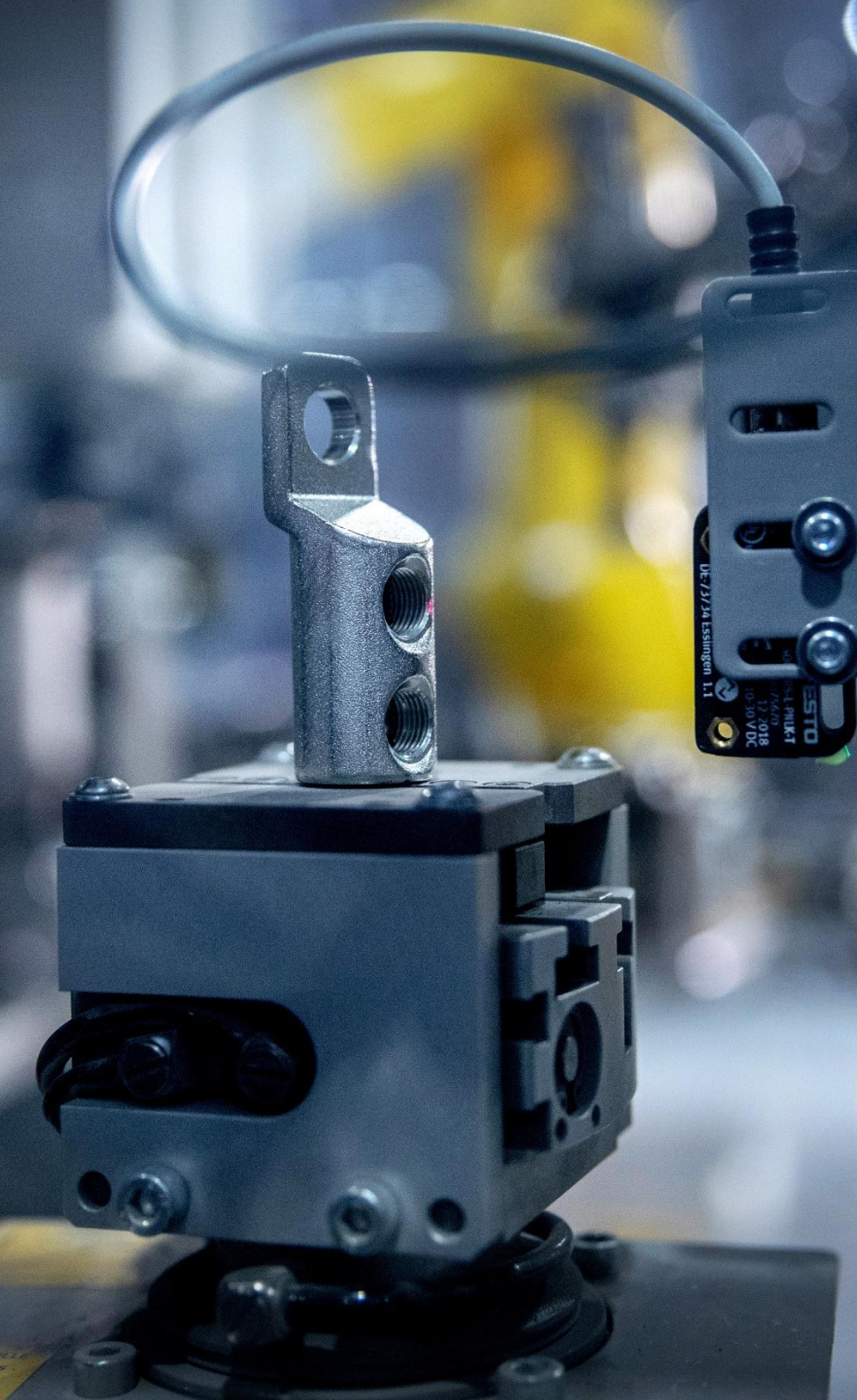
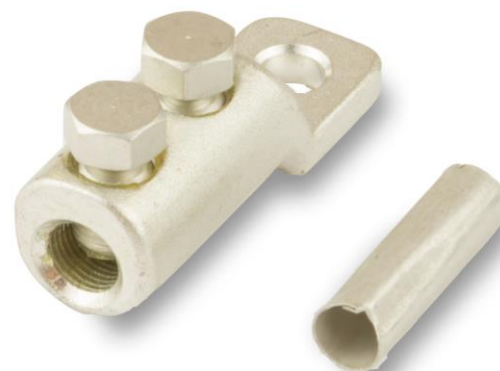




ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

Low voltage mechanical cable lug
Ensto Finland Oy



EPD HUB, HUB-7481

Published on 10.09.2026, last updated on 10.09.2026, valid until 09.09.2031

Life Cycle Assessment study has been performed in accordance with the requirements of EN 15804, EPD Hub PCR version 1.2 (24 Mar 2025) and JRC characterization factors EF 3.1.



Created with One Click LCA

ENSTO

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Ensto Finland Oy
Address	Ensio Miettisen katu 2 P.O.Box 77 06150 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 15804:2012+A2:2019/AC:2021 and ISO 14025
PCR	EPD Hub Core PCR Version 1.2, 24 Mar 2025
Sector	Electrical product
Category of EPD	Third party verified EPD
Parent EPD number	-
Scope of the EPD	Cradle to gate with options, A4-A5, and modules C1-C4, D
EPD author	Xiang Hu
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☒ External verification
EPD verifier	Haiha Nguyen as an authorized verifier for EPD Hub

This EPD is intended for business-to-business and/or business-to-consumer communication. 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	Low voltage mechanical cable lug
Additional labels	-
Product reference	-
Place(s) of raw material origin	EU and Asia
Place of production	Finland, Porvoo
Place(s) of installation and use	Europe and Globe
Period for data	Calendar year 2025
Averaging in EPD	Multiple products
Variation in GWP-fossil for A1-A3 (%)	-5.2/+7.2
GTIN (Global Trade Item Number)	-
NOBB (Norwegian Building Product Database)	-
A1-A3 Specific data (%)	2,66

ENVIRONMENTAL DATA SUMMARY

Declared unit	Mechanical cable lug
Declared unit mass	1 kg
Mass of packaging	0,05 kg
GWP-fossil, A1-A3 (kgCO ₂ e)	21,4
GWP-total, A1-A3 (kgCO ₂ e)	21,6
Secondary material, inputs (%)	2,41
Total energy use, A1-A3 (kWh)	62,9
Net freshwater use, A1-A3 (m ³)	0,12

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Ensto is an international, growth-oriented family business and technology company, which creates sustainable solutions for electricity distribution. For 67 years, we have been dedicated to electricity with a long-term and human-centric approach. Our aim is to become a trusted partner for our customers and help them succeed and create a more sustainable tomorrow.

We offer innovative and reliable, long-lifecycle line and cable accessories, distribution and protection automation and control solutions as well as substations for electricity systems. Our own R&D, manufacturing, and laboratories give us the expertise to continually innovate and serve our customers on an individual level.

We are bound by our common purpose: making life better with electricity.

PRODUCT DESCRIPTION

Low voltage mechanical cable lugs are components used for terminating electrical conductors in power distribution systems with a rated voltage up to 1 kV. They provide a mechanical and electrical connection between cables and equipment such as switchgear, transformers, and distribution boards. The connection is based on a shear-head bolt design, where integrated bolts are tightened until the heads break off at a predefined torque, ensuring a consistent and reliable contact without the need for crimping tools. This installation principle supports repeatable connection quality and reduces installation variability. The products are compatible with a wide range of conductor types, including solid and stranded, as well as circular and sector-shaped conductors, making them applicable across different low voltage cable configurations.

The cable lugs are typically manufactured from conductive metallic materials, such as aluminium or copper alloys, and may include surface

treatments to enhance corrosion resistance and electrical performance over time. Mechanical cable lugs are intended for permanent installation in fixed electrical systems and do not require maintenance during the use phase under normal operating conditions. As passive components, they do not consume energy during use, and their environmental impacts are primarily associated with raw material extraction, manufacturing, transport, and end-of-life processing.

The product group comprises fifteen low voltage mechanical cable lug variants, including both standard and tin-plated versions. All products perform the same function, utilize the same shear-head bolt connection technology, and are intended for the same low-voltage cable termination applications. The principal differences between the products are the conductor size range they accommodate, the dimensions of the lug body and palm, and the presence or absence of a tin-plated surface finish. These characteristics influence the quantity of raw materials used and, consequently, the environmental performance of the individual products. Variations in environmental impacts within the product group are primarily driven by differences in product mass and material consumption, with larger cable lugs generally exhibiting higher life cycle impacts due to increased metal content. Tin-plated variants additionally include a thin surface coating that contributes marginally to the overall environmental profile compared with the corresponding non-plated variants.

PRODUCT

LUG6-50/8LV
LUG6-50/8LVTIN
LUG6-50/10LVTIN
LUG6-50/12LVTIN
LUG50-95/10LV
LUG50-95/10LVTIN
LUG50-95/12LVTIN
LUG50-95/14LVTIN
LUG95-185/12LV

LUG95-185/12LVTIN
LUG95-185/14LVTIN
LUG95-185/16LVTIN
LUG150-300/12LV
LUG150-300/12LVTIN
LUG150-300/16LVTIN

More information from product web:

<https://www.ensto.com/products/low-voltage-distribution-and-automation/lv-underground-cable-accessories/lv-mechanical-cable-lugs/>

Further information can be found at:
ensto.com

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	98	EU and Asia
Minerals	2	EU
Fossil materials	0	-
Bio-based materials	0	-

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	0,014

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 kg of Mechanical cable lug
Mass per declared unit	1 kg
Functional unit	-
Reference service life	30 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	ND	ND	ND	ND	ND	ND	ND	x	x	x	x	x		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/ demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Not declared = ND.

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.

A market-based approach is used in modelling the electricity mix utilized in the factory.

The declared unit is 1 kg of mechanical cable lug. The modeling and calculations are based on primary and secondary data collected from manufacturing operations and suppliers.

The materials included in the product family of mechanical cable lug primarily consist of metals (mainly copper and aluminum), and various packaging materials. Along with packaging and ancillary materials, raw materials are transported by truck to the production facilities. Metal preforms are machined, and some components undergo surface treatments, such as tin coating. All primary raw materials are sourced externally. Material transport distances from suppliers to the factory were estimated based on each supplier's country of origin.

Energy consumption by machines and the management of waste generated during production at the manufacturing facilities are also part of this stage. Manufacturing waste is from metal. All material loss represents less than 4% of the total material-related impacts in stages A1–A3. Electricity consumption for manufacturing was allocated based on annual production data from January to December 2025. This allocation accounts for multiple parallel machining lines with different outputs and technologies, as each product component may be produced across various lines in the same facility.

Final products are assembled at the same facility. After final assembly, products packed in cardboard boxes are placed on wooden pallets and secured with packaging film for transport. The environmental impacts associated with the wooden pallets are included in the assessment based on the pallet mass allocated to the declared unit. End-of-life treatment of the wood packaging is modelled using the default regional scenarios available in One Click LCA, where 32% of the wood packaging waste is recycled, 30% is

incinerated with energy recovery, and 38% is landfilled, according to Eurostat-based waste treatment statistics applied in the model.

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.

Transportation impacts occurring from the delivery of final products to the construction site (A4) include direct vehicle emissions from fuel combustion, upstream impacts from fuel production, and impacts associated with transport infrastructure. The products covered by this EPD are sold mainly in Europe, although some deliveries also take place in other global markets. Transport distances were determined based on representative delivery scenarios for the assessed product group. On average, products and their associated packaging are transported 1,500 km by road freight transport. The modelling also accounts for typical vehicle utilization rates, including partial loads and empty return trips.

Module A5 includes the treatment of packaging waste generated during installation. Packaging materials, including cardboard, plastic film, and wooden pallets, are assumed to be collected and transported to waste treatment facilities after installation. The transportation of packaging waste to the treatment facilities is modelled using a road freight transport distance of 50 km. Waste treatment routes are based on European average statistics and include material recycling, energy recovery through incineration, and landfill disposal, depending on the packaging material type. European waste treatment data were selected because the products are primarily marketed within Europe and provide a consistent and representative basis for modelling packaging end-of-life in the absence of market-specific waste management data.

The installation phase (A5) does not result in losses of the product itself. Waste generated during installation is limited to packaging materials and minor installation accessories. These include cardboard and paper packaging, plastic packaging materials (e.g. films), and wooden pallets used for transportation.

Packaging waste is modelled based on the declared unit and is treated according to typical European waste management practices. For paper and cardboard packaging, the applied treatment assumptions are 83% recycling and 17% energy recovery. Plastic packaging waste is treated through a combination of recycling (37%), energy recovery via incineration (63%), and no landfill disposal. Wooden packaging waste is assumed to be treated through a mix of recycling, energy recovery, and disposal, with 32% recycled wood waste, 30% untreated wood, and 38% energy recovery.

Waste collection, sorting, transportation, and treatment processes are included in Module A5. For the treatment of packaging waste, an average transport distance of 50 km is assumed between the site where the waste is collected and the waste treatment or recycling facility. This distance represents a commonly applied background assumption for local waste management and recycling operations where specific transport data are not available.

PRODUCT END OF LIFE (C1-C4, D)

It is assumed that if the product is de-installed, this will occur manually during an update of the electricity distribution system, or the product will enter the waste stream as part of the deconstruction of the entire underground electricity distribution network.

The recovered product is assumed to undergo a shredding process, during which metals are separated for recycling. Waste is assumed to be collected separately and transported by lorry to a waste treatment facility.

The end-of-life scenario (C1-C4) has been modelled in accordance with EN

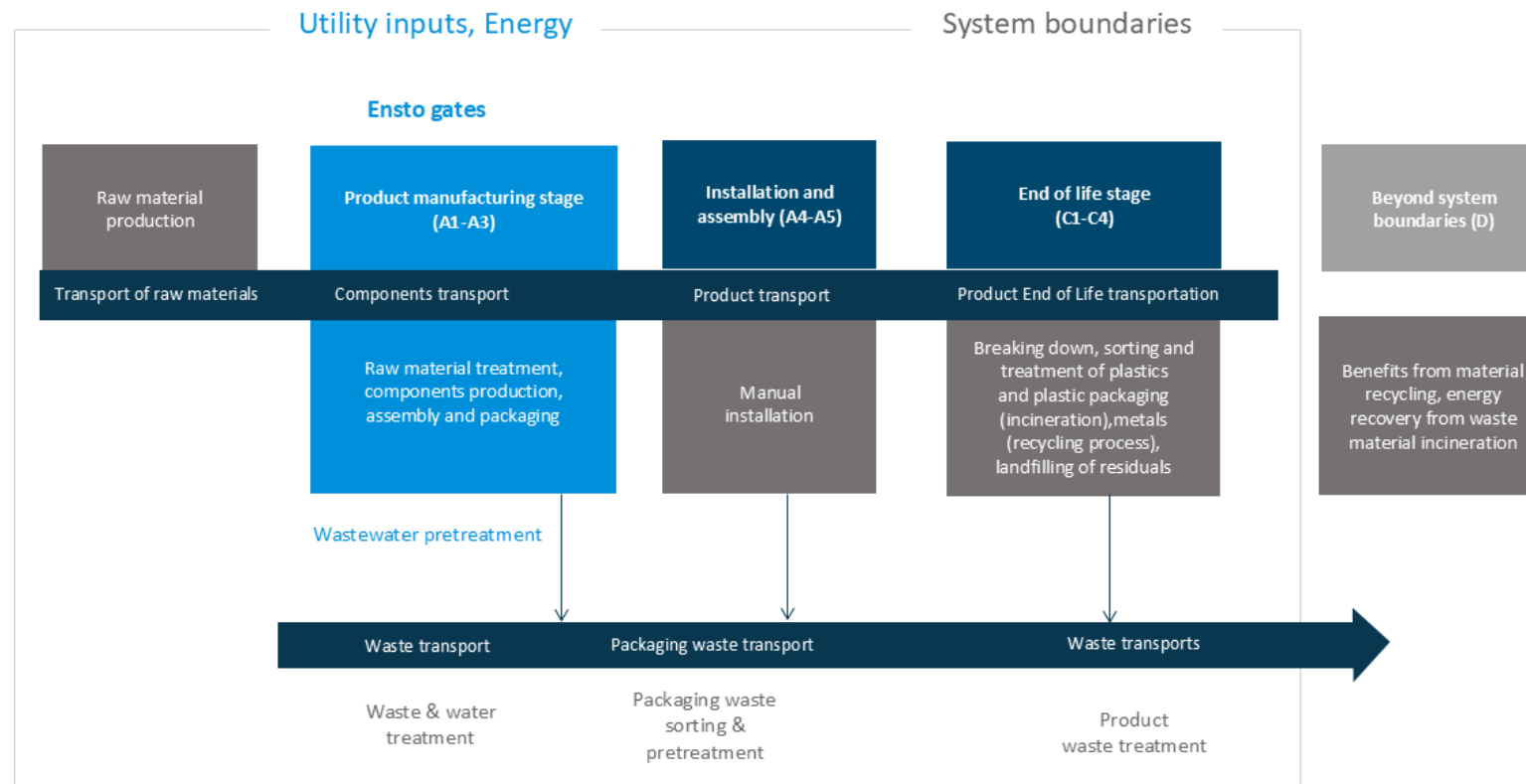
50693. Due to the broad geographical market in which the product may be sold, it is not possible to determine exact transport distances to waste treatment facilities. Therefore, conservative transport distances have been assumed based on expert judgement and common European practice. Transport of waste materials to treatment facilities is assumed to be carried out by road freight transport. The following average distances are applied: 250 km to recycling facilities, 150 km to incineration plants, and 50 km to landfill sites. These assumptions are applied consistently to different material fractions, including metals, and are considered representative for a conservative end-of-life scenario.

Benefits and loads beyond the system boundary (Module D) are calculated based on the material flows defined in modules A5 and C1–C4, in accordance with the applicable PCR, EN 50693, and EN 15804. The potential environmental benefits and burdens from recycling and incineration processes are modelled using representative proxy datasets from the ecoinvent database.

No recycled content in raw materials or packaging materials is considered in the calculation of Module D benefits and loads, to avoid any potential double counting.

The representativeness of the applied EoL scenarios is supported by publicly available Eurostat data, including statistics on packaging waste generation and treatment in the European Union (EUROSTAT references provided). These sources are used as a reference to ensure that the end-of-life modelling is consistent with prevailing European waste treatment practices.

LIFE CYCLE FLOW DIAGRAM



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.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded.

All materials and processes have been included.

VALIDATION OF DATA

Data collection for production, transport, and packaging was conducted using time and site-specific information, as defined in the general information section on page 1 and 2. Upstream process calculations rely on generic data as defined in the Bibliography section. Manufacturer-provided specific and generic data were used for the product's manufacturing stage. The analysis was performed in One Click LCA EPD Generator, with the 'Cut-Off, EN 15804+A2' allocation method, and characterization factors according to EN 15804:2012+A2:2019/AC:2021 and JRC EF 3.1.

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 material	Physical Properties
Ancillary materials	No allocation
Manufacturing energy and waste	Physical Properties

Energy consumption (used energy and heat) for whole manufacturing site is divided by the total amounts of all components treated at the sites during reference calendar year 2025. Materials for product undergo one manufacturing site as they are specialized in different manufacturing: metals and machining.

PRODUCT & MANUFACTURING SITES GROUPING

Type of grouping	Multiple products
Grouping method	Based on average results of product group - by total revenue
Variation in GWP-fossil for A1-A3, %	-5.2/+7.2

This EPD represents an average of a group of mechanical cable lug with similar design, materials, and functions. The averaging is based on

production data from multiple products within the product family and manufactured at Ensto sites in Porvoo (Finland), which use comparable manufacturing processes, raw materials, and components. The environmental results are calculated using a production-weighted average approach based on total revenue, ensuring that higher-volume products contribute proportionally more to the average results.

The included products have similar technical performance and serve the same functional purpose, although geometrical dimensions and material quantities vary between product variants. This variation is not linearly scalable due to differences in product size and configuration.

The reported variation in GWP-fossil represents the deviation of individual products within the group from the declared average result. The variation is expressed as the percentage difference between the lowest and highest GWP-fossil results relative to the declared average value, in accordance with EPD requirements.

The lowest variation within the product group was observed for LUG150-300-12LV and LUG150-300-16LVTIN, with a deviation of approximately +0.9% from the declared average GWP-fossil result, while the highest positive variation was observed for LUG6-50-8LV (+7.2%) and the highest negative variation for LUG95-185-12LVTIN, LUG95-185-14LVTIN, and LUG95-185-16LVTIN (-5.2%). The observed variability is primarily driven by differences in the relative material composition of the product variants after normalization to the declared unit of 1 kg. Although aluminium is the dominant material in all product variants, the proportion of aluminium relative to other materials varies slightly between configurations. In addition, differences in the relative share of packaging materials, fastening components, tin-plated surface coatings, and other auxiliary materials contribute to variations in the environmental profile when results are expressed per declared unit. Smaller product variants generally contain a higher proportion of these secondary materials relative to their total mass, resulting in slightly higher GWP-fossil values, whereas larger variants contain a higher proportion of the main aluminium body and a lower relative contribution from packaging and auxiliary materials. Despite these

differences, all products are manufactured using the same technology, perform the same function, and are composed of the same principal materials, resulting in a limited variation range of -5.2% to +7.2% relative to the declared average.

This approach ensures transparent representation of the variability within the product group and confirms that the declared results reflect the average environmental performance rather than a specific product variant or manufacturing site, in line with EPD Hub requirements.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator for EPD Hub V3. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent 3.11 and One Click LCA databases as sources of environmental data. Allocation used in Ecoinvent 3.11 environmental data sources follow the methodology 'allocation, Cut-off, EN 15804+A2'.

This EPD follows requirements for construction products considered as electric equipment. Assessment EPD is Based on

- EPD Hub Core Product Category Rules version 1.2, March 2025
- EPD Hub General Program Instructions version 1.3, March 2025
- EN 15804:2012+A2:2019/AC:2021 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
- EN 15941:2024 Sustainability of construction works - Data quality for environmental assessment of products and construction work - Selection and use of data
- EN 15942:2011 Sustainability of construction works - Environmental product declarations - Communication format business-to-business
- ISO 14025:2006 Environmental statements and programmes for products - Principles and general requirements
- ISO 14040:2006 Environmental management - Life cycle assessment - Principles and framework
- ISO 14044:2006 Environmental management - Life cycle assessment -

Requirements and guidelines

- EUROSTAT,

https://ec.europa.eu/eurostat/databrowser/view/env_waspac__custom_8519259/default/table?lang=en

- EUROSTAT,

https://ec.europa.eu/eurostat/databrowser/view/env_waspac__custom_8519242/default/table?lang=en

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- EUROSTAT,

https://ec.europa.eu/eurostat/databrowser/view/env_waspac__custom_8519242/default/table?lang=en

ENVIRONMENTAL IMPACT DATA

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

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 ₂ e	2,10E+01	1,35E-01	5,07E-01	2,16E+01	1,70E-01	3,29E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,57E-02	1,53E-02	4,19E-02	-4,55E+00
GWP – fossil	kg CO ₂ e	2,07E+01	1,35E-01	5,18E-01	2,14E+01	1,70E-01	2,02E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,56E-02	1,53E-02	4,19E-02	-4,44E+00
GWP – biogenic	kg CO ₂ e	1,41E-01	-9,24E-06	-1,28E-02	1,28E-01	3,84E-05	1,28E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,38E-07	-6,80E-06	2,45E-06	-1,44E-03
GWP – LULUC	kg CO ₂ e	1,05E-01	6,91E-05	1,41E-03	1,06E-01	7,58E-05	1,58E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,22E-05	1,89E-05	5,47E-06	-1,09E-01
Ozone depletion pot.	kg CFC-11e	1,21E-06	1,93E-09	9,59E-09	1,22E-06	2,50E-09	1,90E-11	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,48E-10	2,03E-10	1,11E-10	-7,90E-08
Acidification potential	mol H ⁺ e	1,39E-01	2,99E-03	1,53E-03	1,44E-01	5,78E-04	1,05E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,15E-04	1,83E-04	3,81E-05	-3,19E-02
EP-freshwater ²⁾	kg Pe	2,95E-02	6,37E-06	2,20E-04	2,97E-02	1,32E-05	4,60E-07	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,57E-06	1,02E-05	7,96E-07	-4,99E-03
EP-marine	kg Ne	2,36E-02	7,53E-04	4,09E-04	2,48E-02	1,90E-04	9,35E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,86E-05	4,06E-05	1,70E-05	-4,88E-03
EP-terrestrial	mol Ne	1,96E-01	8,36E-03	3,86E-03	2,09E-01	2,07E-03	3,90E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,19E-04	4,58E-04	1,59E-04	-4,99E-02
POCP (“smog”) ³⁾	kg NMVOCe	6,10E-02	2,33E-03	1,27E-03	6,46E-02	8,52E-04	1,30E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,73E-04	1,36E-04	4,95E-05	-1,83E-02
ADP-minerals & metals ⁴⁾	kg Sbe	2,75E-04	2,04E-07	7,77E-07	2,76E-04	4,73E-07	1,23E-08	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,22E-07	1,08E-06	1,33E-08	-5,49E-05
ADP-fossil resources	MJ	1,98E+02	1,73E+00	7,96E+00	2,08E+02	2,46E+00	1,87E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,05E-01	2,07E-01	9,82E-02	-6,95E+01
Water use ⁵⁾	m ³ e depr.	5,34E+00	6,12E-03	9,28E-02	5,43E+00	1,22E-02	9,05E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,65E-03	4,03E-03	6,63E-03	-8,98E+00

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, EF 3.1

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	9,89E-07	6,62E-09	7,93E-09	1,00E-06	1,70E-08	4,63E-10	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,85E-09	2,50E-09	6,56E-10	-3,50E-07
Ionizing radiation ⁶⁾	kBq	1,84E-01	9,89E-04	7,92E-02	2,64E-01	2,14E-03	5,23E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,85E-04	1,78E-03	1,45E-04	-1,17E+00
	11235e																		
Ecotoxicity (freshwater)	CTUe	5,60E+02	8,36E-01	2,35E+01	5,85E+02	3,48E-01	5,05E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,33E-01	1,01E+00	2,51E+03	-3,43E+02
Human toxicity, cancer	CTUh	1,00E-08	2,68E-11	6,38E-11	1,01E-08	2,80E-11	3,71E-12	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,08E-12	1,36E-11	5,76E-12	-7,90E-09
Human tox. non-cancer	CTUh	2,13E-07	6,40E-10	2,36E-09	2,16E-07	1,59E-09	1,14E-10	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,16E-10	9,30E-10	6,03E-10	-5,83E-08
SQP ⁷⁾	-	2,45E+01	6,34E-01	2,94E+00	2,81E+01	2,48E+00	1,89E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,01E-01	3,96E-01	1,77E-01	-6,30E+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	1,94E+01	1,66E-02	1,78E-01	1,96E+01	3,37E-02	-5,41E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,10E-03	3,79E-02	2,30E-03	-2,89E+01
Renew. PER as material	MJ	0,00E+00	0,00E+00	4,38E-01	4,38E-01	0,00E+00	-4,38E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,12E-02
Total use of renew. PER	MJ	1,94E+01	1,66E-02	6,16E-01	2,01E+01	3,37E-02	-9,80E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,10E-03	3,79E-02	2,30E-03	-2,88E+01
Non-re. PER as energy	MJ	1,98E+02	1,73E+00	7,30E+00	2,07E+02	2,46E+00	-6,17E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,05E-01	2,07E-01	-4,69E-01	-6,95E+01
Non-re. PER as material	MJ	1,53E-01	0,00E+00	6,74E-01	8,28E-01	0,00E+00	-6,74E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	-1,53E-01	1,10E-01
Total use of non-re. PER	MJ	1,98E+02	1,73E+00	7,97E+00	2,08E+02	2,46E+00	-1,29E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,05E-01	2,07E-01	-6,23E-01	-6,94E+01
Secondary materials	kg	2,41E-02	7,97E-04	3,18E-02	5,67E-02	1,05E-03	4,11E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,25E-04	2,51E-04	3,98E-05	7,58E-01
Renew. secondary fuels	MJ	1,64E-03	4,18E-06	4,52E-03	6,16E-03	1,33E-05	3,03E-07	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,95E-06	1,18E-05	7,80E-07	-2,07E-04
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m ³	1,20E-01	1,59E-04	2,21E-03	1,22E-01	3,64E-04	-1,75E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,16E-05	9,25E-05	-1,01E-03	-1,94E-01

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	3,41E+00	2,51E-03	4,10E-02	3,46E+00	4,17E-03	3,97E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,87E-04	1,36E-03	1,02E-03	-9,65E-01
Non-hazardous waste	kg	1,46E+02	4,02E-02	1,35E+00	1,48E+02	7,71E-02	3,29E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,66E-02	5,37E-02	8,16E-01	-1,19E+01
Radioactive waste	kg	4,51E-05	2,42E-07	1,88E-05	6,41E-05	5,24E-07	1,29E-08	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,44E-07	4,54E-07	3,56E-08	-3,10E-04

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	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	0,00E+00	0,00E+00	3,22E-02	3,22E-02	0,00E+00	3,35E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	6,81E-01	0,00E+00	0,00E+00
Materials for energy rec	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,11E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,68E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Heat	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,45E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML

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 ₂ e	2,09E+01	1,34E-01	5,18E-01	2,16E+01	1,69E-01	2,40E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,54E-02	1,53E-02	4,18E-02	-4,55E+00
Ozone depletion Pot.	kg CFC ₁₁ e	1,28E-06	1,54E-09	7,84E-09	1,29E-06	2,00E-09	1,57E-11	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,97E-10	1,76E-10	9,04E-11	-6,52E-08
Acidification	kg SO ₂ e	1,19E-01	2,38E-03	1,22E-03	1,23E-01	4,41E-04	7,91E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,76E-05	1,47E-04	2,79E-05	-2,68E-02
Eutrophication	kg PO ₄ ³ e	1,92E-02	2,75E-04	9,71E-04	2,04E-02	1,08E-04	5,77E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,28E-05	2,16E-05	1,64E-05	-2,99E-03
POCP (“smog”)	kg C ₂ H ₄ e	8,26E-03	1,22E-04	9,95E-05	8,48E-03	3,93E-05	1,82E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,14E-06	8,68E-06	2,14E-06	-2,98E-03
ADP-elements	kg Sbe	2,73E-04	2,00E-07	7,53E-07	2,74E-04	4,61E-07	1,20E-08	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,20E-07	1,08E-06	1,21E-08	-5,33E-05

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
ADP-fossil	MJ	1,95E+02	1,72E+00	6,72E+00	2,03E+02	2,43E+00	1,79E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,95E-01	1,76E-01	9,59E-02	-4,94E+01

ADDITIONAL INDICATOR – GWP-GHG

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG ⁹⁾	kg CO ₂ e	2,08E+01	1,35E-01	5,20E-01	2,15E+01	1,70E-01	2,02E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,57E-02	1,53E-02	4,19E-02	-4,55E+00

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. In addition, the characterisation factors for the flows – CH₄ fossil, CH₄ biogenic and Dinitrogen monoxide – were updated. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterisation factor for biogenic CO₂ is set to zero

SCENARIO DOCUMENTATION

DATA SOURCES

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source and quality	1. Electricity in Finland
Electricity kg CO ₂ e / kWh	0.71
District heating data source and quality	2. Heating in Finland
District heating kg CO ₂ e / MJ	0.0551

Transport scenario documentation - A4 (Transport resources) and Scenario documentation

Scenario parameter	Value
Fuel type, consumption, and vehicle type. Eg, electric truck, diesel powered truck	Market for transport, freight, lorry >32 metric ton, EURO5
Average transport distance, km	Truck 1500 km
Capacity utilization (including empty return) %	50%

Bulk density of transported products	2820
Volume capacity utilization factor	1

Installation at the building site (A5) - Scenario documentation

Scenario information	Value
Ancillary materials for installation (specified by material) / kg or other units as appropriate	No ancillary materials are required for installation.
Water use / m ³	No water is required for installation.
Other resource use / kg	No other resource is required for installation.
Quantitative description of energy type (regional mix) and consumption during the installation process / kWh or MJ	No energy is required for installation.
Waste materials on the building site before waste processing, generated by the product's installation (specified by type) / kg	Cardboard packaging, 0.031 kg/ DU Paper packaging, 0.00054 kg/ DU Wood packaging, 0.0025 kg/ DU Plastic packaging, 0.0158 kg/ DU

Output materials (specified by type) as result of waste processing at the building site e.g. collection for recycling, for energy recovery, disposal (specified by route) / kg	Cardboard: to recycling - 0,026 kg to incineration - 0,0025 kg to landfill - 0,0028 kg Paper: to recycling - 0,00045 kg to incineration - 0,000043 kg to landfill - 0,000049 kg Plastic: to recycling - 0,0063 kg to incineration - 0,0058 kg to landfill - 0,0036 kg Wood: to recycling - 0,0008 kg to incineration - 0,00075 kg to landfill - 0,00095 kg
Direct emissions to ambient air, soil and water / kg	No direct emission during the installation of products.

End of life (C1-C4) - Scenario documentation

Scenario information	Value
Collection process – kg collected separately	1
Collection process – kg collected with mixed waste	0
Recovery process – kg for re-use	0
Recovery process – kg for recycling	0,68
Recovery process – kg for energy recovery	0
Disposal (total) – kg for final deposition	0,32
Scenario assumptions e.g. transportation	The following average distances are applied: 250 km to recycling facilities, 150 km to incineration plants, and 50 km to landfill sites.

THIRD-PARTY VERIFICATION STATEMENT

EPD Hub declares that this EPD is verified in accordance with ISO 14025 by an independent, third-party verifier. The project report on the Life Cycle Assessment and the report(s) on features of environmental relevance are filed at EPD Hub. EPD Hub PCR and ECO Platform verification checklist are used.

EPD Hub is not able to identify any unjustified deviations from the PCR and EN 15804+A2 in the Environmental Product Declaration and its project report.

EPD Hub maintains its independence as a third-party body; it was not involved in the execution of the LCA or in the development of the declaration and has no conflicts of interest regarding this verification.

The company-specific data and upstream and downstream data have been examined as regards plausibility and consistency. The publisher is responsible for ensuring the factual integrity and legal compliance of this declaration.

The software used in creation of this LCA and EPD is verified by EPD Hub to conform to the procedural and methodological requirements outlined in ISO 14025:2010, ISO 14040/14044, EN 15804+A2, and EPD Hub Core Product Category Rules and General Program Instructions.

Verified tools

Tool verifier: Magaly Gonzalez Vazquez

Tool verification validity: 27 March 2025 - 26 March 2028

Haiha Nguyen as an authorized verifier for EPD Hub Limited 10.09.2026



APPENDIX - SCALING TABLE

A1-A3 EN15804+A2						
Product	Total weight-scaling factor	GWP total	GWP fossil	GWP biogenic	GWP -LULUC	Variation
Unit	kg/kg	kg CO2e/0,1 kg	kg CO2e/0,1 kg	kg CO2e/0,1 kg	kg CO2e/0,1 kg	%
LUG6-50-8LV	0,46	2,32	2,29	0,01	0,01	7,2 %
LUG6-50-8LVTIN	0,49	2,21	2,17	0,01	0,01	1,5 %
LUG6-50-10LVTIN	0,39	2,20	2,18	0,01	0,01	1,9 %
LUG6-50-12LVTIN	0,39	2,20	2,18	0,01	0,01	1,9 %
LUG50-95-10LV	0,67	2,25	2,22	0,01	0,01	3,8 %
LUG50-95-10LVTIN	0,72	2,12	2,09	0,01	0,01	-2,3 %
LUG50-95-12LVTIN	0,72	2,12	2,09	0,01	0,01	-2,3 %
LUG50-95-14LVTIN	0,72	2,12	2,09	0,01	0,01	-2,3 %
LUG95-185-12LV	1,31	2,21	2,19	0,01	0,01	2,4 %
LUG95-185-12LVTIN	1,42	2,06	2,03	0,01	0,01	-5,2 %
LUG95-185-14LVTIN	1,42	2,06	2,03	0,01	0,01	-5,2 %
LUG95-185-16LVTIN	1,42	2,06	2,03	0,01	0,01	-5,2 %
LUG150-300-12LV	3,25	2,18	2,16	0,01	0,01	0,9 %
LUG150-300-12LVTIN	3,25	2,19	2,16	0,01	0,01	1,0 %
LUG150-300-16LVTIN	3,25	2,18	2,16	0,01	0,01	0,9 %
Average in 0,1 kg	1,00	2,16	2,14	0,01	0,01	0,0 %

These results are generated with OneClick LCA based on different designs. Result variations arise from differences in product dimensions, as all products in the series are manufactured at the same site using similar or identical materials and components.