# ENVIRONMENTAL PRODUCT DECLARATION

## IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

OTL Connector
Ouneva Oy


**EPD HUB, HUB-3154**
Published on 07.03.2026, last updated on 07.03.2026, valid until 07.03.2031

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

# GENERAL INFORMATION

## MANUFACTURER

| | |
|---|---|
| Manufacturer | Ouneva Oy |
| Address | 21 Teollisuustie, 82730, Tuupovaara, FI |
| Contact details | firstname.lastname@ouneva.fi |
| Website | www.ounevaproducts.fi/en |

## 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 | Manufactured 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 | Annika Tuovinen, Ouneva Group |
| EPD verification | Independent verification of this EPD and data, according to ISO 14025:<br>☐ Internal verification ☑ External verification |
| EPD verifier | Magaly Gonzalez Vazquez 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 | OTL Connector |
| Additional labels | OTL Universal and Branching Connectors, PEN, Multipole, FBB (see annex 1) |
| Product reference | - |
| Place(s) of raw material origin | EU |
| Place of production | Tuupovaara, Finland |
| Place(s) of installation and use | Global |
| Period for data | Calendar year 2023 |
| Averaging in EPD | Multiple products |
| Variation in GWP-fossil for A1-A3 (%) | +30 / -24 |
| GTIN (Global Trade Item Number) | 6410019141030 |
| NOBB (Norwegian Building Product Database) | - |
| A1-A3 Specific data (%) | 42,7 |

## ENVIRONMENTAL DATA SUMMARY

| | |
|---|---|
| **Declared unit** | 0,1 kg of product |
| **Declared unit mass** | 0,1 kg |
| **Mass of packaging** | 0,03 kg |
| **GWP-fossil, A1-A3 ($kgCO_2e$)** | 0,83 |
| **GWP-total, A1-A3 ($kgCO_2e$)** | 0,83 |
| **Secondary material, inputs (%)** | 53,9 |
| **Secondary material, outputs (%)** | 66,7 |
| **Total energy use, A1-A3 (kWh)** | 3,29 |
| **Net freshwater use, A1-A3 ($m^3$)** | 0,02 |

# PRODUCT AND MANUFACTURER

## ABOUT THE MANUFACTURER

We are a strong, family-owned Finnish company with over 50 years of experience in manufacturing connectors and meeting the requirements of the electrical industry. We design and manufacture our high-quality products in North Karelia, Finland. We also provide customer-specific connector and power supply solutions. We meet the strict requirements of the industry with our solid design and testing expertise, continuously developing our operations.

In addition to our own connector products, we are a contract manufacturer of sheet metal products for the electronics, machinery and electrical industries, to mention a few. Our deliveries scale from single components to complex, demanding system deliveries.

## PRODUCT DESCRIPTION

Ouneva's OTL connectors are suitable for a wide range of applications and needs. They can be used to connect and branch both aluminum and copper conductors, cables and busbars. The universal connectors are tested and certified for operating voltages up to 1,500 volts. They are easy to install without special tools to ensure the best user experience.

The body is made of tin-plated aluminium. Housing is made of halogen-free UL94 V0-class polyamide. Pregreased contact spaces and the connection done with hex screws guarantee easy and quick installation. Tightening torques on the lid of the connectors make the installation easy, and component markers can be pressed onto the connectors. The compact size of the connectors enables efficient use of space even in constricted installation spaces.

OTL Universal connector 1x50 chosen as a representative product for the EPD is designed for 1xAl/Cu 1,5-50 mm2 conductors with DIN-rail mounting.

Standards: EN 60947-7-1:2009, EN 60947-7-2:2009, EN 61238-1:2003, UL1059 and CSA C22.2 No 158-10

Further information can be found at: www.ounevaproducts.fi/en

## PRODUCT RAW MATERIAL MAIN COMPOSITION

| Raw material category | Amount, mass % | Material origin |
|---|---|---|
| Metals | 45 | EU |
| Minerals | 0 | - |
| Fossil materials | 55 | EU |
| 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 | 0,00227 |

## FUNCTIONAL UNIT AND SERVICE LIFE

| | |
|---|---|
| Declared unit | 0,1 kg of 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 | 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/ ... | 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 connector is made of metal and plastic parts. The product packaging and transport materials consist of cardboard, label, installation instruction, a flat pallet and packaging film. The distances and transport routes were estimated based on supplier locations.

The manufacturing processes include injection moulding, metal working and surface treatment, assembly and packing. A residual mix electricity datapoint was used for manufacturing energy use in A3. Production losses are sent to local waste treatment facilities. Recycling rates for manufacturing losses were considered based on International Aluminium Institute for aluminium (81 %) and International Resource Panel statistics for electroplating materials (50 %). A 50 km transport distance was estimated from the factory to local waste treatment operators.

## 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.

A4 transport is based on sales data from the year 2023. The module uses sales weighted proportions of the product being shipped to multiple locations.

The installation phase does not involve material loss or energy consumption, as the connector is assumed to be installed manually. The installation phase (A5) considers waste treatment of the packaging materials. Based on Eurostat statistics, the recycling rate is 83 % for paper and cardboard, 32 % for wood and 40 % for plastic. The incineration rate is 8 % for paper and cardboard, 30 % for wood and 37 % for plastic.

## PRODUCT USE AND MAINTENANCE (B1-B7)

Product use and maintenance are not declared in the EPD, as the connector does not require repairs and has no operational use of water or energy during its lifetime.

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

## PRODUCT END OF LIFE (C1-C4, D)

End of Life scenarios are based on European statistics, where the product is mainly in use.

The connector is assumed to be deinstalled manually. Therefore no energy or material consumption has been considered for module C1.

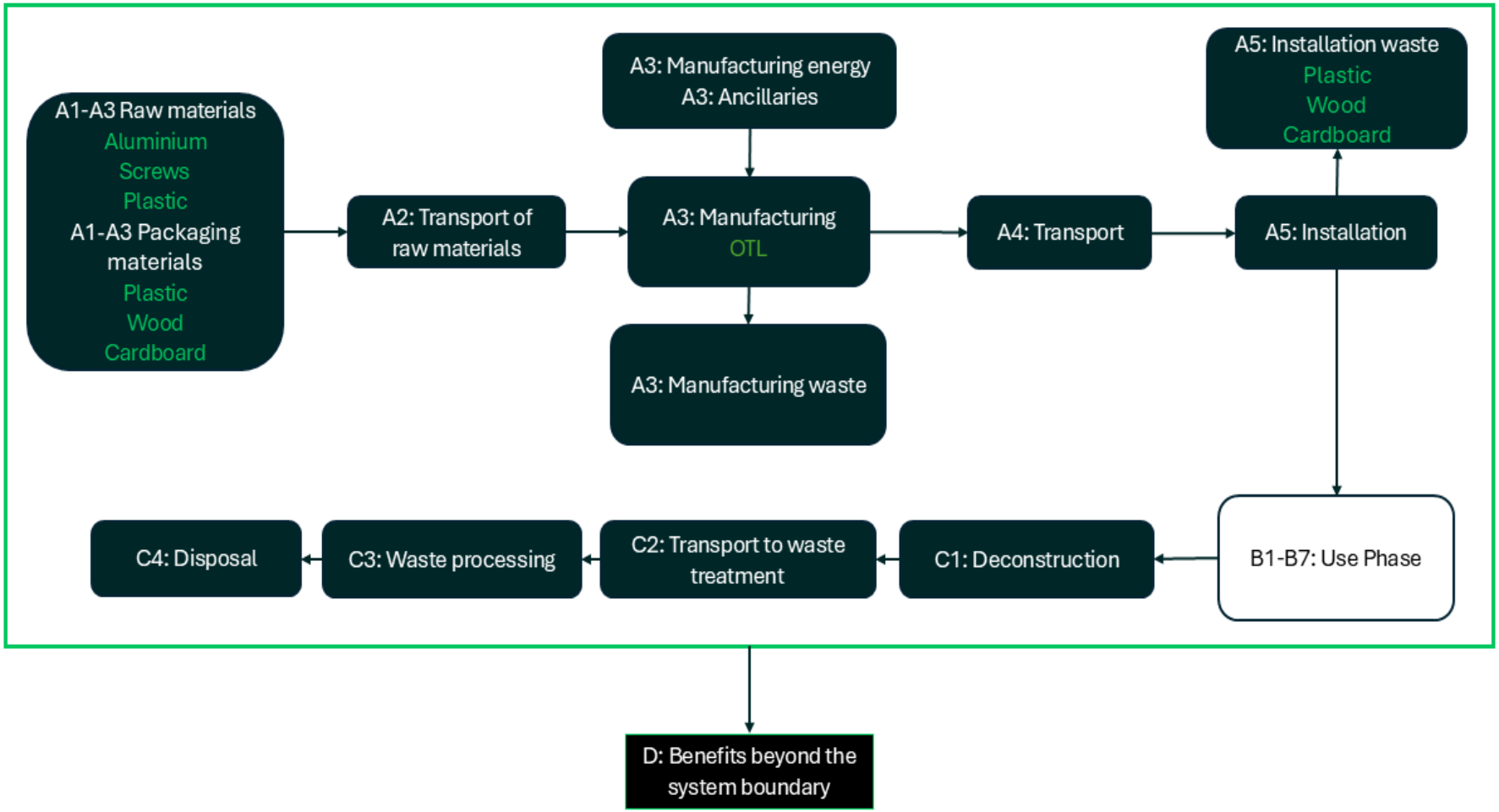
C2-C4 accounts for the processing, disposal and transport of waste. Recycling rates are considered based on World Steel Organization for steel (85 %), International Aluminium Institute for aluminium (81%) in Europe. For plastic parts, a OneClick waste treatment scenario was selected. Distances included in the datasets were used for transport of materials to waste treatment facilities.

Benefits and loads from recycling and recovery are included in module D. The recycling and recovery of aluminium and steel in C1-C4 and packaging materials in A5 lead to avoided virgin raw material production and energy from primary sources. Benefits and loads in module D correspond to recycling and recovery rates modeled in packaging and product end of life modules A5 and C1-C4.

Recycled material content in raw and packaging materials has been subtracted from the EoL recycled material mass on Benefits and loads to avoid double counting. Module D was modeled by selecting predefined datasets with generic EU scenarios for each material type.

The scenarios included are currently in use and are representative for one of the most likely scenarios.

# 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.

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.

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

## PRODUCT & MANUFACTURING SITES GROUPING

| | |
|---|---|
| Type of grouping | Multiple products |
| Grouping method | Based on a representative product |
| Variation in GWP-fossil for A1-A3, % | +30 / -24 |

A representative product OTL 1x50 (VC05-0013) weighs 31 grams and is intended for connections from 1,5 to 50 mm2. The product acts as a representative for the OTL products declared in this EPD. Declared products weigh from 17 to 680 grams and are intender for connections from 1,5 to 300 mm2. Variance of GWP-fossil for A1-A3 is declared in this EPD. Product specific results for GWP fossil and total are declared in annex 1.

The products serve a similar purpose and performance rating and are

manufactured using the same processes in the same factory.

Modules A4-A5 and the end-of-life is based on statistical data in Europe and is applicable for all products. The range of products complies with the allowed averaging and aggregations requirements defined on EPD Hub GPI 2.9 & Annex 1.

## LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator for EPD Hub V3 and EPD Process Certification v3.2.3. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.10.1/3.11 and One Click LCA databases as sources of environmental data. Allocation used in Ecoinvent 3.10.1/3.11 environmental data sources follow the methodology 'allocation, Cut-off, EN 15804+A2'.

International Aluminium Institute: https://international-aluminium.org/international-aluminium-institute-publishes-global-recycling-data/

International resource panel, Recycling rates of metals: A status report (https://www.unep.org/resources/report/recycling-rates-metals-status-report)

World Steel Organization: https://worldsteel.org/about-steel/facts/steelfacts/wider-sustainability/steel-recovery-rates-by-market/

# 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 | 6,00E-01 | 3,04E-02 | 1,97E-01 | 8,28E-01 | 3,24E-02 | 1,01E-02 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 2,78E-03 | 5,59E-02 | 2,74E-02 | -2,73E-02 |
| GWP – fossil | kg $CO_2$e | 5,94E-01 | 3,04E-02 | 2,06E-01 | 8,31E-01 | 3,24E-02 | 1,74E-03 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 2,77E-03 | 5,59E-02 | 2,74E-02 | -2,75E-02 |
| GWP – biogenic | kg $CO_2$e | 3,91E-03 | 5,70E-06 | -9,23E-03 | -5,32E-03 | 6,42E-06 | 8,35E-03 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 6,11E-07 | -6,78E-06 | -2,69E-06 | 2,49E-04 |
| GWP – LULUC | kg $CO_2$e | 1,99E-03 | 1,18E-05 | 2,97E-04 | 2,30E-03 | 1,15E-05 | 2,39E-07 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 1,23E-06 | 1,82E-06 | 5,17E-07 | -8,22E-05 |
| Ozone depletion pot. | kg CFC-$_{11}$e | 1,99E-08 | 5,74E-10 | 2,89E-09 | 2,34E-08 | 6,44E-10 | 3,12E-12 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 3,93E-11 | 3,30E-11 | 1,65E-11 | -2,52E-10 |
| Acidification potential | mol $H^+$e | 4,62E-03 | 2,42E-04 | 7,16E-04 | 5,58E-03 | 1,08E-04 | 1,23E-06 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 9,30E-06 | 2,52E-05 | 7,98E-06 | -1,07E-04 |
| EP-freshwater[2)] | kg Pe | 5,22E-04 | 1,82E-06 | 9,51E-05 | 6,19E-04 | 2,14E-06 | 5,56E-08 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 2,16E-07 | 8,14E-07 | 1,22E-07 | -1,29E-05 |
| EP-marine | kg Ne | 9,83E-04 | 6,71E-05 | 4,37E-04 | 1,49E-03 | 3,59E-05 | 1,40E-06 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 3,02E-06 | 9,92E-06 | 2,70E-05 | -1,81E-05 |
| EP-terrestrial | mol Ne | 6,57E-03 | 7,39E-04 | 1,59E-03 | 8,90E-03 | 3,90E-04 | 4,73E-06 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 3,29E-05 | 9,23E-05 | 3,68E-05 | -2,67E-04 |
| POCP ("smog")[3)] | kg NMVOCe | 1,98E-03 | 2,45E-04 | 4,90E-04 | 2,71E-03 | 1,63E-04 | 1,56E-06 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 1,31E-05 | 2,46E-05 | 1,01E-05 | -8,71E-05 |
| ADP-minerals & metals[4)] | kg Sbe | 1,52E-04 | 8,66E-08 | 3,12E-07 | 1,53E-04 | 1,05E-07 | 1,23E-09 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 8,77E-09 | 7,39E-08 | 2,61E-09 | -3,87E-07 |
| ADP-fossil resources | MJ | 8,02E+00 | 4,17E-01 | 3,15E+00 | 1,16E+01 | 4,55E-01 | 2,73E-03 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 3,93E-02 | 2,47E-02 | 1,12E-02 | -4,44E-01 |
| Water use[5)] | $m^3$e depr. | 3,52E-01 | 1,90E-03 | 3,26E-02 | 3,86E-01 | 2,23E-03 | 1,02E-04 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 1,85E-04 | 3,83E-03 | 1,80E-03 | -2,50E-03 |

*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 | 3,05E-08 | 2,11E-09 | 4,17E-09 | 3,68E-08 | 2,54E-09 | 1,80E-11 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 2,35E-10 | 2,42E-10 | 7,18E-11 | -1,08E-09 |
| Ionizing radiation[6)] | kBq U235e | 8,47E-03 | 4,76E-04 | 4,85E-02 | 5,74E-02 | 5,77E-04 | 1,15E-05 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 3,24E-05 | 6,96E-05 | 1,82E-05 | -1,13E-02 |
| Ecotoxicity (freshwater) | CTUe | 3,09E+00 | 5,08E-02 | 1,32E+00 | 4,46E+00 | 5,95E-02 | 4,19E-03 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 6,04E-03 | 1,16E-01 | 1,15E+00 | 1,29E-01 |
| Human toxicity, cancer | CTUh | 4,23E-10 | 5,41E-12 | 4,69E-11 | 4,76E-10 | 5,54E-12 | 1,94E-13 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 4,68E-13 | 5,62E-12 | 2,47E-12 | 1,10E-12 |
| Human tox. non-cancer | CTUh | 2,23E-08 | 2,35E-10 | 2,91E-09 | 2,55E-08 | 2,84E-10 | 9,09E-12 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 2,48E-11 | 2,24E-10 | 1,27E-10 | 1,49E-09 |
| SQP[7)] | - | 9,46E-01 | 2,12E-01 | 1,45E+00 | 2,61E+00 | 2,69E-01 | 2,57E-03 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 2,76E-02 | 2,95E-02 | 1,32E-02 | -1,61E-01 |

*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 | 7,70E-01 | 6,56E-03 | 1,66E-01 | 9,42E-01 | 7,83E-03 | -7,88E-02 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 5,38E-04 | 2,62E-03 | 3,43E-04 | -9,31E-02 |
| Renew. PER as material | MJ | 0,00E+00 | 0,00E+00 | 7,61E-02 | 7,61E-02 | 0,00E+00 | -7,61E-02 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 3,36E-03 |
| Total use of renew. PER | MJ | 7,70E-01 | 6,56E-03 | 2,42E-01 | 1,02E+00 | 7,83E-03 | -1,55E-01 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 5,38E-04 | 2,62E-03 | 3,43E-04 | -8,98E-02 |
| Non-re. PER as energy | MJ | 7,43E+00 | 4,17E-01 | 3,06E+00 | 1,09E+01 | 4,55E-01 | -4,79E-02 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 3,93E-02 | -8,11E-01 | -7,89E-01 | -4,44E-01 |
| Non-re. PER as material | MJ | 1,42E+00 | 0,00E+00 | 5,51E-02 | 1,47E+00 | 0,00E+00 | -5,51E-02 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 0,00E+00 | -7,09E-01 | -7,09E-01 | 2,18E-02 |
| Total use of non-re. PER | MJ | 8,85E+00 | 4,17E-01 | 3,11E+00 | 1,24E+01 | 4,55E-01 | -1,03E-01 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 3,93E-02 | -1,52E+00 | -1,50E+00 | -4,22E-01 |
| Secondary materials | kg | 5,39E-02 | 1,92E-04 | 6,13E-03 | 6,02E-02 | 2,08E-04 | 4,22E-06 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 1,74E-05 | 2,59E-05 | 6,84E-06 | 1,44E-02 |
| Renew. secondary fuels | MJ | 1,66E-04 | 2,08E-06 | 2,24E-03 | 2,41E-03 | 2,61E-06 | 3,23E-08 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 2,21E-07 | 1,06E-06 | 1,89E-07 | -2,64E-06 |
| 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 | $m^3$ | 1,34E-02 | 5,15E-05 | 3,53E-03 | 1,70E-02 | 6,10E-05 | -4,35E-06 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 5,36E-06 | 6,79E-05 | -3,33E-05 | -8,77E-04 |

*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 | 2,22E-02 | 5,89E-04 | 2,01E-02 | 4,29E-02 | 6,52E-04 | 3,96E-05 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 6,79E-05 | 1,05E-03 | 4,76E-04 | -1,35E-02 |
| Non-hazardous waste | kg | 1,82E+00 | 1,18E-02 | 1,64E+01 | 1,83E+01 | 1,37E-02 | 9,43E-03 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 1,27E-03 | 2,85E-02 | 9,97E-02 | 2,68E-01 |
| Radioactive waste | kg | 1,36E-05 | 1,18E-07 | 1,13E-05 | 2,51E-05 | 1,43E-07 | 2,91E-09 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 7,93E-09 | 1,73E-08 | 4,54E-09 | -2,47E-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 | 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 | 1,85E-02 | 0,00E+00 | 1,58E+01 | 1,58E+01 | 0,00E+00 | 3,48E-03 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 0,00E+00 | 4,37E-02 | 0,00E+00 | 0,00E+00 |
| Materials for energy rec | kg | 2,34E-04 | 0,00E+00 | 6,20E-04 | 8,54E-04 | 0,00E+00 | 1,43E-03 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 0,00E+00 | 2,30E-02 | 0,00E+00 | 0,00E+00 |
| Exported energy | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 1,24E-02 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 0,00E+00 | 2,70E-01 | 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 | 5,82E-03 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 0,00E+00 | 1,10E-01 | 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 | 6,60E-03 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 0,00E+00 | 1,60E-01 | 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 | 6,19E-01 | 3,02E-02 | 2,07E-01 | 8,56E-01 | 3,22E-02 | 2,06E-03 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 2,76E-03 | 5,59E-02 | 2,73E-02 | -2,74E-02 |
| Ozone depletion Pot. | kg $CFC_{-11}$e | 1,34E-08 | 4,56E-10 | 2,38E-09 | 1,63E-08 | 5,12E-10 | 2,54E-12 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 3,14E-11 | 2,85E-11 | 1,41E-11 | -2,44E-10 |
| Acidification | kg $SO_2$e | 3,87E-03 | 1,90E-04 | 5,81E-04 | 4,64E-03 | 8,27E-05 | 9,22E-07 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 7,12E-06 | 1,91E-05 | 5,73E-06 | -8,52E-05 |
| Eutrophication | kg $PO_4^3$e | 5,50E-04 | 2,94E-05 | 3,96E-04 | 9,76E-04 | 2,01E-05 | 6,55E-07 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 1,73E-06 | 4,62E-06 | 3,17E-06 | 6,33E-06 |
| POCP (“smog”) | kg $C_2H_4$e | 2,24E-04 | 1,21E-05 | 3,92E-05 | 2,75E-04 | 7,59E-06 | 1,55E-07 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 6,37E-07 | 1,19E-06 | 5,41E-07 | -1,56E-05 |
| ADP-elements | kg Sbe | 1,53E-04 | 8,47E-08 | 3,08E-07 | 1,53E-04 | 1,03E-07 | 1,19E-09 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 8,56E-09 | 7,25E-08 | 2,02E-09 | -3,87E-07 |
| ADP-fossil | MJ | 7,90E+00 | 4,09E-01 | 2,40E+00 | 1,07E+01 | 4,45E-01 | 2,53E-03 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 3,87E-02 | 2,36E-02 | 1,09E-02 | -2,80E-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 $CO_2e$ | 5,96E-01 | 3,04E-02 | 2,07E-01 | 8,33E-01 | 3,24E-02 | 1,74E-03 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 2,78E-03 | 5,59E-02 | 2,74E-02 | -2,76E-02 |

*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

1. Market for heat, district or industrial, other than natural gas, Albania, Ecoinvent, 0.0707 kgCO2e/MJ
2. Electricity, medium voltage, residual mix, Finland, Ecoinvent, 0.66 kgCO2e/kWh
3. Electricity, medium voltage, residual mix, Finland, Ecoinvent, 0.66 kgCO2e/kWh

#### Transport scenario documentation - A4 (Transport resources)

1. Transport, freight, lorry 16-32 metric ton, EURO5, 457 km
2. Transport, freight, lorry 16-32 metric ton, EURO5, 881 km
3. Transport, freight, sea, container ship, 680 km
4. Transport, freight, lorry 16-32 metric ton, EURO5, 3170 km
5. Transport, freight, sea, container ship, 89 km
6. Transport, freight, lorry 16-32 metric ton, EURO5, 1287 km
7. Transport, freight, sea, container ship, 89 km
8. Transport, freight, lorry 16-32 metric ton, EURO5, 900 km
9. Transport, freight, sea, container ship, 7000 km

#### Transport scenario documentation A4

| Scenario parameter | Value |
|---|---|
| Capacity utilization (including empty return) % | 100 |
| Bulk density of transported products | - |
| Volume capacity utilization factor | 1 |

Installation scenario documentation - A5 (Installation waste)

1. Treatment of waste paperboard, unsorted, sorting, Ecoinvent, Materials for recycling, 0.0021 kg
2. Treatment of waste packaging paper, municipal incineration, Ecoinvent, Materials for energy recovery, 2.0E-4 kg
3. Treatment of waste packaging paper, municipal incineration, Ecoinvent, Materials for energy recovery, 7.2E-6 kg
4. Exported Energy: Thermal, Ecoinvent, 5.8E-4 MJ
5. Exported Energy: Thermal, Ecoinvent, 2.3E-5 MJ
6. Exported Energy: Thermal, Ecoinvent, 0.0017 MJ
7. Exported Energy: Thermal, Ecoinvent, 0.0043 MJ
8. Exported Energy: Electricity, Ecoinvent, 4.0E-4 MJ
9. Exported Energy: Electricity, Ecoinvent, 1.6E-5 MJ
10. Exported Energy: Electricity, Ecoinvent, 0.0023 MJ
11. Exported Energy: Electricity, Ecoinvent, 0.0031 MJ
12. Treatment of waste packaging paper, sanitary landfill, Ecoinvent, 2.3E-4 kg
13. Treatment of waste packaging paper, sanitary landfill, Ecoinvent, 8.1E-6 kg
14. Treatment of waste paper, unsorted, sorting, Ecoinvent, Materials for recycling, 7.5E-5 kg
15. Treatment of waste wood, post-consumer, sorting and shredding, Ecoinvent, Materials for recycling, 8.1E-4 kg
16. Treatment of waste wood, untreated, municipal incineration, Ecoinvent, Materials for energy recovery, 7.6E-4 kg
17. Treatment of waste wood, untreated, sanitary landfill, Ecoinvent, 9.7E-4 kg
18. Treatment of waste polyethylene, for recycling, unsorted, sorting, Ecoinvent, Materials for recycling, 5.0E-4 kg
19. Treatment of waste polyethylene, municipal incineration, Ecoinvent, Materials for energy recovery, 4.6E-4 kg
20. Treatment of waste polyethylene, sanitary landfill, Ecoinvent, 2.9E-4 kg

End-of-life scenario documentation - C1-C4 (Data source)

1. Treatment of waste aluminium, sanitary landfill, Ecoinvent, 0.006 kg
2. Sorting and pressing of iron scrap, Ecoinvent, Materials for recycling, 0.0247 kg
3. Sorting and pressing of iron scrap, Ecoinvent, Materials for recycling, 0.019 kg
4. Treatment of scrap steel, inert material landfill, Ecoinvent, 0.0047 kg
5. Exported Energy: Electricity, Ecoinvent, 0.11 MJ
6. Exported Energy: Thermal, Ecoinvent, 0.16 MJ
7. Treatment of waste plastic, mixture, municipal incineration, Ecoinvent, Materials for

energy recovery, 0.023 kg
8. Treatment of waste plastic, mixture, municipal incineration, Ecoinvent, 0.011 kg
9. Treatment of waste plastic, mixture, sanitary landfill, Ecoinvent, 0.011 kg

| Scenario information | Value |
|---|---|
| Scenario assumptions e.g. transportation | Transport, freight, lorry >32 metric ton, EURO5, 50 km for landfill, 250 km for recycling, 150 km for incineration |

# 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

Magaly Gonzalez Vazquez as an authorized verifier for EPD Hub Limited
07.03.2026

VERIFIED ISO 14025

## ANNEX 1

Scaling table: A1-A3, GWP-total & GWP-fossil

| Product name(s) | Product codes | Mass (g) | kg CO2e per 0,1 kg of product | | kg CO2e per product | |
|---|---|---|---|---|---|---|
| | | | GWP-total | GWP-fossil | GWP-total | GWP-fossil |
| OTL universal connector 1x16 | VC05-0010, VC05-0001, VC05-0045, VC05-0140, VC05-0141 | 17 | 1,08E+00 | 1,08E+00 | 2,14E-01 | 2,14E-01 |
| OTL universal connector 1x35 | VC05-0191, VC05-0192, VC05-0193, VC05-0245, VC05-0244 | 27 | 8,82E-01 | 8,82E-01 | 3,73E-01 | 3,73E-01 |
| OTL universal connector 1x50 | VC05-0013, VC05-0046, VC05-0047, VC05-0142, VC05-0143 | 31 | 8,28E-01 | 8,31E-01 | 3,95E-01 | 3,97E-01 |
| OTL universal connector 1x95 | VC05-0019, VC05-0050, VC05-0051, VC05-0144, VC05-0145 | 68 | 8,21E-01 | 8,19E-01 | 6,69E-01 | 6,67E-01 |
| OTL universal connector 1x150 | VC05-0028, VC05-0029, VC05-0030, VC05-0475, VC05-0476 | 103 | 8,35E-01 | 8,28E-01 | 9,50E-01 | 9,42E-01 |
| OTL universal connector 1x240 | VC05-0034, VC05-0035, VC05-0036, VC05-0477, VC05-0478 | 194 | 8,06E-01 | 7,97E-01 | 1,75E+00 | 1,73E+00 |
| OTL universal connector 1x300 | VC05-0213, VC05-0214, VC05-0215, VC05-0493, VC05-0494 | 195 | 6,93E-01 | 6,87E-01 | 2,52E+00 | 2,49E+00 |
| OTL universal connector 2x35 | VC05-0153, VC05-0154, VC05-0155, VC05-0479, VC05-0480 | 44 | 8,41E-01 | 8,40E-01 | 4,90E-01 | 4,90E-01 |
| OTL universal connector / OTL PEN Universal connector 2x50 | VC05-0016, VC05-0048, VC05-0049, VC05-0146, VC05-0147, VC05-0243 | 51 | 7,47E-01 | 7,45E-01 | 5,52E-01 | 5,51E-01 |
| OTL universal connector / OTL PEN Universal connector 2x95 | VC05-0042,VC05-0043, VC05-0044, VC05-0148, VC05-0149, VC05-0360 | 121 | 8,29E-01 | 8,24E-01 | 1,05E+00 | 1,05E+00 |
| OTL universal connector / OTL PEN Universal connector 2x150 | VC05-0031,VC05-0032, VC05-0033, VC05-0481, VC05-0482, VC05-0361 | 165 | 7,17E-01 | 7,10E-01 | 1,33E+00 | 1,32E+00 |
| OTL universal connector / OTL PEN Universal connector 2x240 | VC05-0037,VC05-0038, VC05-0039, VC05-0483, VC05-0484, VC05-0362 | 335 | 6,46E-01 | 6,42E-01 | 2,08E+00 | 2,07E+00 |
| OTL branching connector 3x50 | VC05-0233,VC05-0236, VC05-0237, VC05-0485, VC05-0486 | 109 | 7,80E-01 | 7,74E-01 | 1,03E+00 | 1,02E+00 |
| OTL branching connector 3x95 | VC05-0234, VC05-0238, VC05-0239, VC05-0487, VC05-0488 | 178 | 7,39E-01 | 7,32E-01 | 1,73E+00 | 1,72E+00 |
| OTL branching connector 3x150 | VC05-0235,VC05-0240, VC05-0241, VC05-0489, VC05-0490 | 246 | 7,88E-01 | 7,75E-01 | 1,90E+00 | 1,87E+00 |
| OTL branching connector 3x300 | VC05-0381, VC05-0392, VC05-0393, VC05-0491,VC05-0492 | 680 | 7,46E-01 | 7,48E-01 | 7,14E+00 | 7,16E+00 |
| Multipole OTL-connector 3x1x35 | VC05-0011 | 70 | 8,53E-01 | 8,56E-01 | 5,58E-01 | 5,59E-01 |
| Multipole OTL-connector 5x1x35 | VC05-0012 | 120 | 8,09E-01 | 8,09E-01 | 1,09E+00 | 1,09E+00 |
| Multipole OTL-connector 3x1x50 | VC05-0054 | 100 | 7,72E-01 | 7,70E-01 | 9,90E-01 | 9,87E-01 |
| OTL FBB branching connector 2x95 | VC05-0387, VC05-0390, VC05-0391 | 125 | 7,49E-01 | 7,37E-01 | 1,47E+00 | 1,45E+00 |
| OTL FBB branching connector 2x240 | VC05-0515, VC05-0516, VC05-0517 | 340 | 6,98E-01 | 6,96E-01 | 2,59E+00 | 2,58E+00 |
| OTL FBB branching connector 3x300 | VC05-0386, VC05-0394, VC05-0395 | 680 | 6,28E-01 | 6,33E-01 | 4,83E+00 | 4,87E+00 |