ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

OPK Pole Branching Connector
Ouneva Oy

EPD HUB, HUB-2875
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	Teollisuustie 21, 82730, Tuupovaara, FI
Contact details	firstname.lastname@ouneva.fi
Website	www.ounevagroup.fi

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: ☐ 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	OPK Pole Branching Connector
Additional labels	OPK 2x50, 3x50, 4x50, 6x50 (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 (%)	+10 / -14 %
GTIN (Global Trade Item Number)	6410019143317
NOBB (Norwegian Building Product Database)	-
A1-A3 Specific data (%)	56,7

ENVIRONMENTAL DATA SUMMARY

Declared unit	0,1 kg of product
Declared unit mass	0,1 kg
Mass of packaging	0,1295 kg
GWP-fossil, A1-A3 ($kgCO_2e$)	0,82
GWP-total, A1-A3 ($kgCO_2e$)	0,79
Secondary material, inputs (%)	2,32
Secondary material, outputs (%)	72,1
Total energy use, A1-A3 (kWh)	3,99
Net freshwater use, A1-A3 (m^3)	0,01

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

The pole branching connector is suitable for both aluminium and copper cables, for connections up to 1 000 V. The 1-pole branch connector is intended for branch connections of electrical devices and switchgear. The body of the branch connector is tinned aluminum, the contact protection is polyamide.

IP23 can be achieved with adequate sized conductor in each slot. Sealing kit is available as accessory for IP33 class sealing.

Representative product OPK 3×50 LED has five branching conductor inputs. All product variants are intended for the same purpose and consist of the same materials. OPK products are available in varying sizes and colors. The connectors have three to nine branching conductor inputs.

Standards: EN 60947-7-1:2009, EN 61238-1:2003; EN 60529:1991 + A1:2000 + A2:2013

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

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	74	EU, Asia
Minerals	0	-
Fossil materials	26	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	0.0093

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. Packaging materials consist of cardboard, label, installation instruction, a flat pallet and plastic. A 16-32-metric ton EURO5 lorry datapoint for road transport and a container ship datapoint for sea transport was used in A2. Transport distances for raw materials were calculated based on supplier locations.

The manufacturing of OPK connectors involve injection moulding, metal working processes, 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 calculations are 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 A5 does not involve material loss or energy consumption, as the connector can be assumed to be installed manually. The installation phase considers waste treatment of 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 have been considered for module C1.

C2-C4 accounts for the processing, disposal and transport of waste. The waste treatment scenarios were modeled based on waste processing statistics in the EU area. Recycling rates are considered based on World Steel Organization for steel (85 %), International Aluminium Institute for aluminium (81%). 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.

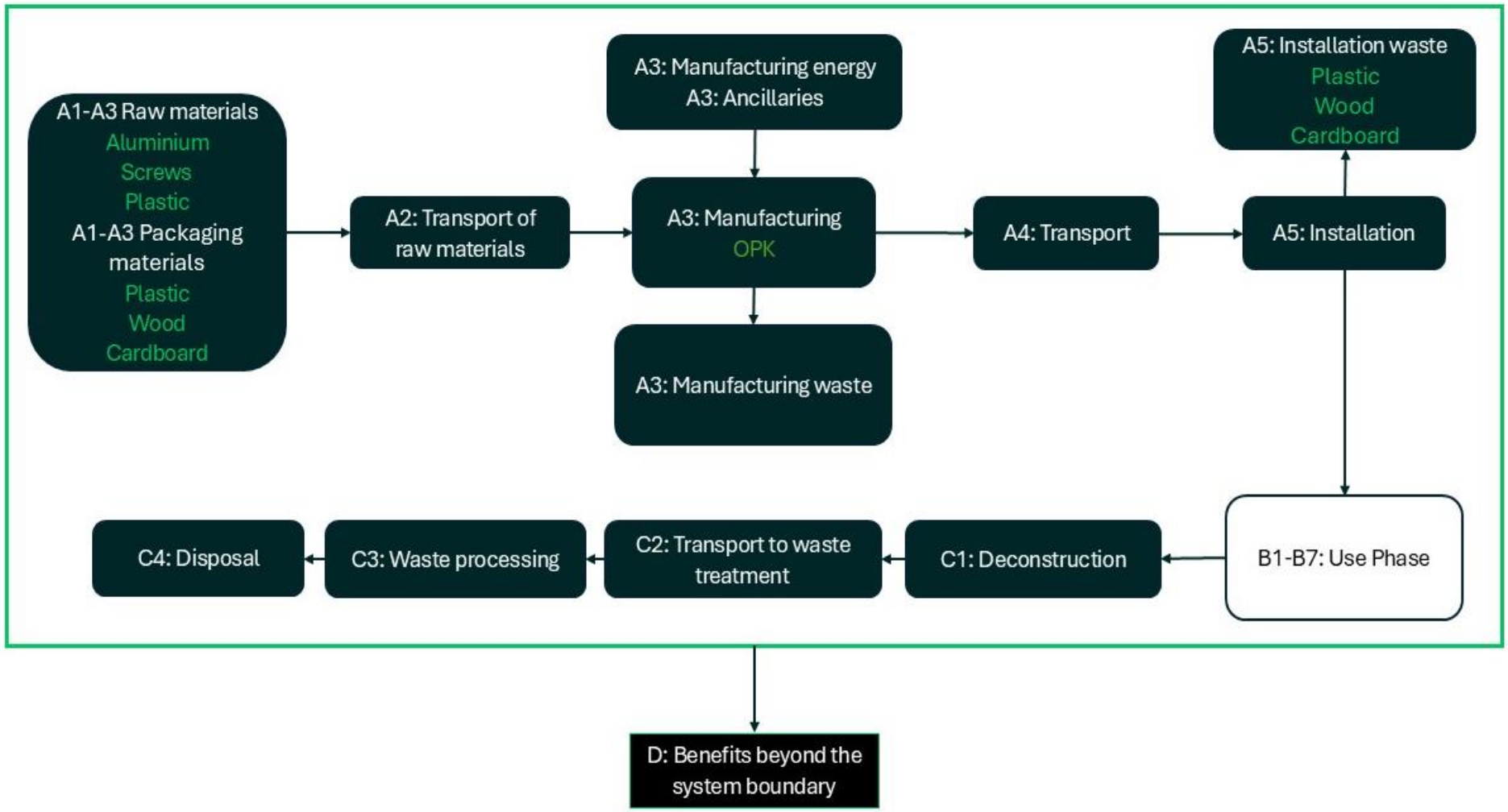
Benefits and loads from recycling and recovery are included in module D. The recycling and recovery of aluminium, steel and plastic in C1-C4 and packaging materials in A5 lead to avoided virgin raw material production and energy from primary sources. Benefits and loads in module D correspond to recycling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

selecting predefined datasets with generic EU scenarios for each material type.

Recycled raw material content has been substracted from benefits and loads to avoid double counting. Benefits and loads do not include manufacturing losses or co-products from A3.

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, %	+10 / -14 %

A representative product OPK 3x50 LED was selected for the EPD study. The product acts as a representative product for OPK variants declared in this EPD (Annex 1). The products are designed for varying sizes of conductors for connections up to 1000 V. The products serve a similar purpose and performance rating, contain similar materials and are manufactured using the same processes in Ouneva's Tuupovaara factory.

Some variation in A1-A3 GWP-fossil exists between the products, and the variance is declared in this EPD. GWP total and fossil results are declared in Annex 1. Modules A4-A5 and the end-of-life scenarios are applicable to all products in use in Europe. The range of products complies with allowed averaging and aggregation requirements defined in 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_2e	5,54E-01	2,31E-02	2,11E-01	7,88E-01	2,31E-02	4,18E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,65E-03	3,25E-02	1,64E-02	-1,88E-01
GWP – fossil	kg CO_2e	5,50E-01	2,31E-02	2,46E-01	8,19E-01	2,31E-02	7,83E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,65E-03	3,25E-02	1,64E-02	-1,88E-01
GWP – biogenic	kg CO_2e	1,34E-03	4,20E-06	-3,52E-02	-3,38E-02	4,57E-06	3,40E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,88E-07	-6,63E-06	-2,09E-06	9,81E-04
GWP – LULUC	kg CO_2e	2,42E-03	9,02E-06	5,75E-04	3,00E-03	8,20E-06	1,03E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,18E-06	2,13E-06	5,49E-07	-5,08E-04
Ozone depletion pot.	kg CFC_{-11}e	3,58E-08	4,35E-10	6,48E-09	4,27E-08	4,58E-10	1,32E-11	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,80E-11	2,87E-11	1,31E-11	-1,72E-09
Acidification potential	mol H^+e	4,45E-03	1,93E-04	8,48E-04	5,49E-03	7,77E-05	5,22E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,92E-06	2,42E-05	5,76E-06	-1,20E-03
EP-freshwater[2)]	kg Pe	4,67E-04	1,37E-06	1,16E-04	5,84E-04	1,52E-06	2,31E-07	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,06E-07	9,66E-07	9,93E-08	-6,63E-05
EP-marine	kg Ne	7,48E-04	5,32E-05	5,79E-04	1,38E-03	2,57E-05	5,72E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,91E-06	7,83E-06	1,64E-05	-1,89E-04
EP-terrestrial	mol Ne	5,73E-03	5,86E-04	1,98E-03	8,29E-03	2,79E-04	2,03E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,17E-05	7,72E-05	2,57E-05	-2,10E-03
POCP ("smog")[3)]	kg NMVOCe	2,05E-03	1,92E-04	6,47E-04	2,89E-03	1,17E-04	6,60E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,28E-05	2,13E-05	7,22E-06	-6,67E-04
ADP-minerals & metals[4)]	kg Sbe	1,70E-04	6,51E-08	4,75E-07	1,71E-04	7,50E-08	5,00E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,08E-09	9,69E-08	2,01E-09	-2,55E-06
ADP-fossil resources	MJ	7,22E+00	3,16E-01	3,94E+00	1,15E+01	3,24E-01	1,15E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,77E-02	2,50E-02	9,67E-03	-2,25E+00
Water use[5)]	m^3e depr.	7,32E+04	1,44E-03	4,97E-02	7,32E+04	1,58E-03	4,43E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,80E-04	2,34E-03	1,14E-03	-3,66E-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, 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	2,67E-08	1,59E-09	5,27E-09	3,36E-08	1,80E-09	7,66E-11	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,36E-10	2,76E-10	6,18E-11	-2,72E-08
Ionizing radiation[6]	kBq U235e	1,46E-02	3,59E-04	5,61E-02	7,11E-02	4,11E-04	4,67E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,17E-05	7,90E-05	1,71E-05	-2,11E-02
Ecotoxicity (freshwater)	CTUe	3,61E+00	3,84E-02	1,64E+00	5,29E+00	4,24E-02	1,61E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,67E-03	7,18E-02	1,87E+00	-6,65E-01
Human toxicity, cancer	CTUh	5,55E-10	4,13E-12	7,22E-11	6,32E-10	3,94E-12	8,20E-13	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,44E-13	3,93E-12	1,59E-12	-5,07E-11
Human tox. non-cancer	CTUh	5,18E-08	1,77E-10	3,66E-09	5,56E-08	2,02E-10	3,78E-11	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,40E-11	1,75E-10	1,03E-10	1,36E-09
SQP[7]	-	2,42E+00	1,59E-01	3,03E+00	5,61E+00	1,91E-01	1,10E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,99E-02	3,76E-02	1,26E-02	-5,55E-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	2,13E+00	4,94E-03	3,09E-01	2,45E+00	5,57E-03	-3,16E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,17E-04	3,19E-03	2,95E-04	-2,97E-01
Renew. PER as material	MJ	0,00E+00	0,00E+00	2,94E-01	2,94E-01	0,00E+00	-2,94E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renew. PER	MJ	2,13E+00	4,94E-03	6,03E-01	2,74E+00	5,57E-03	-6,11E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,17E-04	3,19E-03	2,95E-04	-2,97E-01
Non-re. PER as energy	MJ	7,90E+00	3,16E-01	3,67E+00	1,19E+01	3,24E-01	-2,19E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,77E-02	-4,48E-01	-4,63E-01	-2,25E+00
Non-re. PER as material	MJ	7,97E-01	0,00E+00	2,54E-01	1,05E+00	0,00E+00	-2,54E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	-3,99E-01	-3,99E-01	0,00E+00
Total use of non-re. PER	MJ	8,70E+00	3,16E-01	3,93E+00	1,29E+01	3,24E-01	-4,73E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,77E-02	-8,46E-01	-8,61E-01	-2,25E+00
Secondary materials	kg	2,32E-03	1,46E-04	1,21E-02	1,45E-02	1,48E-04	1,79E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,65E-05	2,74E-05	5,24E-06	2,66E-02
Renew. secondary fuels	MJ	7,83E-04	1,56E-06	7,20E-03	7,98E-03	1,86E-06	1,39E-07	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,10E-07	1,18E-06	1,29E-07	-4,18E-06
Non-ren. secondary fuels	MJ	1,39E-03	0,00E+00	0,00E+00	1,39E-03	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	7,15E-03	3,89E-05	4,19E-03	1,14E-02	4,34E-05	-1,88E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,28E-06	4,32E-05	-4,52E-05	-2,77E-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	4,27E-02	4,47E-04	2,32E-02	6,63E-02	4,64E-04	1,67E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,49E-05	6,81E-04	3,03E-04	-3,38E-02
Non-hazardous waste	kg	2,14E+00	8,89E-03	2,23E+01	2,45E+01	9,77E-03	4,06E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,21E-03	1,86E-02	9,58E-02	2,96E-01
Radioactive waste	kg	2,46E-05	8,90E-08	1,32E-05	3,79E-05	1,02E-07	1,18E-08	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,75E-09	1,95E-08	4,24E-09	-5,13E-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	7,12E-05	0,00E+00	2,15E+01	2,15E+01	0,00E+00	1,38E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	5,91E-02	0,00E+00	0,00E+00
Materials for energy rec	kg	9,54E-05	0,00E+00	2,88E-04	3,83E-04	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	1,30E-02	0,00E+00	0,00E+00
Exported energy	MJ	3,90E-04	0,00E+00	0,00E+00	3,90E-04	0,00E+00	5,63E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	1,52E-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	2,65E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	6,40E-02	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	2,98E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	8,80E-02	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_2e	5,84E-01	2,30E-02	2,46E-01	8,53E-01	2,29E-02	9,03E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,63E-03	3,25E-02	1,63E-02	-1,87E-01
Ozone depletion Pot.	kg CFC_{-11}e	3,01E-08	3,46E-10	4,90E-09	3,53E-08	3,65E-10	1,07E-11	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,03E-11	2,45E-11	1,10E-11	-1,53E-09
Acidification	kg SO_2e	4,97E-03	1,52E-04	6,83E-04	5,81E-03	5,93E-05	3,89E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,82E-06	1,88E-05	4,16E-06	-1,01E-03
Eutrophication	kg PO_4^3e	7,35E-04	2,30E-05	7,68E-04	1,53E-03	1,44E-05	2,55E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,66E-06	3,76E-06	2,38E-06	-7,34E-05
POCP (“smog”)	kg C_2H_4e	3,08E-04	9,54E-06	5,27E-05	3,70E-04	5,43E-06	6,19E-07	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,10E-07	1,15E-06	3,79E-07	-8,00E-05
ADP-elements	kg Sbe	1,71E-04	6,37E-08	4,69E-07	1,71E-04	7,33E-08	4,86E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,88E-09	9,60E-08	1,65E-09	-2,53E-06
ADP-fossil	MJ	6,55E+00	3,11E-01	3,06E+00	9,92E+00	3,17E-01	1,07E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,72E-02	2,37E-02	9,39E-03	-1,91E+00

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	5,53E-01	2,31E-02	2,46E-01	8,22E-01	2,31E-02	7,83E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,65E-03	3,25E-02	1,64E-02	-1,89E-01

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, 518 km
2. Transport, freight, sea, container ship, 89 km
3. Transport, freight, lorry 16-32 metric ton, EURO5, 250 km
4. Transport, freight, lorry 16-32 metric ton, EURO5, 836 km
5. Transport, freight, sea, container ship, 350 km

Transport scenario documentation A4

Scenario parameter	Value
Capacity utilization (including empty return) %	100
Bulk density of transported products	2,30E+03
Volume capacity utilization factor	1

Installation scenario documentation - A5 (Installation waste)

1. Treatment of waste paperboard, unsorted, sorting, Ecoinvent, Materials for recycling, 0.0077 kg
2. Treatment of waste packaging paper, municipal incineration, Ecoinvent, 7.4E-4 kg
3. Treatment of waste packaging paper, municipal incineration, Ecoinvent, 1.6E-5 kg
4. Exported Energy: Thermal, Ecoinvent, 0.0021 MJ
5. Exported Energy: Thermal, Ecoinvent, 5.0E-5 MJ
6. Exported Energy: Thermal, Ecoinvent, 0.0076 MJ
7. Exported Energy: Thermal, Ecoinvent, 0.02 MJ
8. Exported Energy: Electricity, Ecoinvent, 0.0015 MJ
9. Exported Energy: Electricity, Ecoinvent, 3.6E-5 MJ
10. Exported Energy: Electricity, Ecoinvent, 0.01 MJ
11. Exported Energy: Electricity, Ecoinvent, 0.015 MJ
12. Treatment of waste packaging paper, sanitary landfill, Ecoinvent, 8.4E-4 kg
13. Treatment of waste packaging paper, sanitary landfill, Ecoinvent, 1.8E-5 kg
14. Treatment of waste paper, unsorted, sorting, Ecoinvent, Materials for recycling, 1.7E-4 kg
15. Treatment of waste wood, post-consumer, sorting and shredding, Ecoinvent, Materials for recycling, 0.0036 kg
16. Treatment of waste wood, untreated, municipal incineration, Ecoinvent, 0.0034 kg
17. Treatment of waste wood, untreated, sanitary landfill, Ecoinvent, 0.0043 kg
18. Treatment of waste polyethylene, for recycling, unsorted, sorting, Ecoinvent, Materials for recycling, 0.0023 kg
19. Treatment of waste polyethylene, municipal incineration, Ecoinvent, 0.0021 kg
20. Treatment of waste polyethylene, sanitary landfill, Ecoinvent, 0.0013 kg

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

1. Treatment of waste aluminium, sanitary landfill, Ecoinvent, 0.0103 kg
2. Sorting and pressing of iron scrap, Ecoinvent, Materials for recycling, 0.0441 kg
3. Sorting and pressing of iron scrap, Ecoinvent, Materials for recycling, 0.015 kg
4. Treatment of scrap steel, inert material landfill, Ecoinvent, 0.0039 kg
5. Exported Energy: Electricity, Ecoinvent, 0.064 MJ
6. Exported Energy: Thermal, Ecoinvent, 0.088 MJ
7. Treatment of waste plastic, mixture, municipal incineration, Ecoinvent, Materials for energy recovery, 0.013 kg
8. Treatment of waste plastic, mixture, municipal incineration, Ecoinvent, 0.0065 kg
9. Treatment of waste plastic, mixture, sanitary landfill, Ecoinvent, 0.0065 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

ANNEX 1

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

			kg CO2e per 0,1 kg of product		kg CO2e per product	
Product code(s)	Product name	Mass (g)	GWP-total	GWP-fossil	GWP-total	GWP-fossil
VC02-0072, VC02-0075, VC02-0076	OPK 2×50 LED	33	8,68E-01	8,79E-01	3,07E-01	3,11E-01
VC02-0026, VC02-0040, VC02-0057	OPK 4×50	42	8,09E-01	8,16E-01	4,05E-01	4,08E-01
VC02-0039, VC02-0041, VC02-0055	OPK 4×50 LED	46	7,88E-01	7,96E-01	4,53E-01	4,57E-01
VC02-0111, VC02-0112, VC02-0113	OPK 3×50 LED	49	7,88E-01	8,19E-01	4,69E-01	4,87E-01
VC02-0038, VC02-0043, VC02-0059	OPK 6×50 LED	70	7,50E-01	6,83E-01	6,02E-01	5,48E-01
VC02-0027, VC02-0042, VC02-0058	OPK 6×50	61	6,74E-01	6,83E-01	5,39E-01	5,46E-01