ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

EPD HUB, HUB-4523
Published on 24.11.2025, last updated on 24.11.2025, valid until 23.11.2030

Optimus MP 1500 IP44 47W 6600lm ACMP

Airam Electric Oy Ab

This EPD is intended for business-to-business and/or business-to-consumer communication. 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. 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.

MANUFACTURER AND SITE

Manufacturer	Airam Electric Oy Ab
Address	Sementtitehtaankatu 6, 04260 Kerava, FI
Contact details	asiakaspalvelu@airam.fi
Website	https://www.airam.fi
Place of production	China, Dongguan
Place(s) of raw material origin	Asia
Place(s) of installation and use	EU
Period for data	Calendar year 2024

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 cPCR: EN 50693
Sector	Electrical product
Category of EPD	Third party verified EPD
Parent EPD number	-
Scope of the EPD	Cradle to gate with options, A4-A5, B6, and modules C1-C4, D
EPD author	Emma Malinen, Airam Electric Oy Ab
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☑ External verification
EPD verifier	Vera Durão, as an authorised verifier acting for EPD Hub Limited

PRODUCT SPECIFICATION

Product name	Optimus MP 1500 IP44 47W 6600lm ACMP
Product number / reference	4338598
GTIN (Global Trade Item Number)	6435200308603
NOBB (Norwegian Building Product Database)	-
A1-A3 Specific data (%)	2,92

PRODUCT CLASSIFICATION

Declared operating voltage, Volt	240
Light source color temperature, Kelvin	4000
Protection index for water and dust (IP)	44
Impact resistance index (IK)	7
Luminous flux, Lumen	6600
Electrical power, Watt	47
Luminous efficiency, Lm/W	140

PRODUCT DESCRIPTION

Energy-efficient industrial luminaire that has a low profile and a microprism diffuser that provides even light. It is suitable for industrial spaces, commercial buildings, warehouses, parking garages, carports, hallways and damp areas. Power is adjustable from the luminaire. Surface mounting or suspension mounting with accessories.

ABOUT THE MANUFACTURER

Airam Electric is a Finnish family-owned company established in Helsinki in 1921. We deliver locally designed lighting solutions for demanding professional markets. Our products combine innovative technology, robust durability, and energy efficiency while offering flexible, customizable options for offices, industrial facilities, and public environments. Locally tailored solutions, diverse installation methods and use of intelligent control systems, ensure that our solutions meet unique project requirements.

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 unit
Declared unit mass, kg	3,149
Mass of packaging, kg	0,547
Functional unit	6600 lumens over 100 000h (L70B50).
Reference service life (years)	20
Assigned lifetime (hours)	100000
GWP-total, A1-A3 (kg CO_2e)	51,4
GWP-fossil, A1-A3 (kg CO_2e)	52,4
Secondary material, inputs (%)	15,9
Secondary material, outputs (%)	49,6
Total energy use, A1-A3 (kWh)	201
Net freshwater use, A1-A3 (m^3)	4,29E-01

LIFE CYCLE ASSESSMENT

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	X	ND	X	X	X	X	X
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demo.	Transport	Waste processing	Disposal	Reuse, Recovery, Recycling

Modules not declared = ND.

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. 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

All allocations are done as per the reference standards and the applied PCR. In this study, ancillary materials, energy & water consumption, material loss and waste generation at the manufacturing site are attributed to the bill of materials of the products, therefore, they are allocated by partitioning the quantities on the base of the total production in kg throughout the year. Allocation has been done in the following ways:

Data type	Allocation
Raw materials	No allocation
Packaging materials	No allocation
Ancillary materials	Allocated by mass
Manufacturing energy and waste	Allocated by mass

A3 - Manufacturing
Manufacturing includes the extraction and production of raw materials, transportation to the production site and the production process itself including assembly of the luminaire. A location-based (China) approach is used in modelling the electricity mix utilised in the factory.
The factory has estimated that the production loss is 0,1% of all the materials used and the production losses go back to the suppliers.
The product is packed in a cardboard box and shipped to the warehouses on a wooden pallet.

A4 - Transport to site
Delivery from factory to port in China (approx.65km), shipping from Shenzhen (CN) to Helsinki (FIN) approx. 28139km.
From the port of Helsinki to the Airam Kerava warehouse approx.25km and deliveries from the Airam Kerava warehouse via wholesaler central warehouses and local stores to customers are modelled with an average distance of 239 km.

A5 – Installation
Luminaires are installed manually without energy or water use. Only packaging waste (cardboard and plastics) is generated and included in A5.

B1–B5 – Use stage (except energy)
No consumables, emissions, or replacements occur during service life. Declared as ND.

B6 – Operational energy use
The operational energy use of the declared luminaire is calculated according to the methodology of EN 15193-1:2017 + A1:2021 for lighting systems in buildings, in compliance with EN 15804+A2 and the EPD Hub Core Product Category Rules. The declared unit is a surface-mounted Optimus MP luminaire (1500 mm) with a rated power of 47W

Worst-case scenario (full power, no controls):
Assumes continuous operation without any energy-saving controls.
Annual operating hours: 3600 h/year (300 working days × 12 h/day).
Reference Service Life (RSL): 20 years.
Total energy consumption:
47 W × 3600h/year × 20 years ÷ 1000 = 3384 kWh

Represents a conservative estimate for office or commercial use without dimming or sensing.

B7 – Water use
Not applicable.

PRODUCT & MANUFACTURING SITES GROUPING

Type of grouping	No grouping
Grouping method	Not applicable
Variation in GWP-fossil for A1-A3, %	-

This EPD is product and factory specific.

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	62,86	China
Minerals	0	
Fossil materials	32,80	China
Bio-based materials	0	
Electronic parts	4,38	China

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	0,076

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA Luminaire EPD Generator v2.2.7. The LCA and EPD have been prepared according to the reference standards, EN 50693, and ISO 14040/14044. Ecoinvent v3.10.1/3.11 and One Click LCA databases were used 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'.

PRODUCT LIFE CYCLE

MANUFACTURING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production. The material losses occurring during the manufacturing processes are treated as per the waste handling practices in the factory, while scenario assumptions are made in the absence of exact data. The study also considers the fuels used by machines as well as losses during electricity transmission.

The product is made of metals, plastics, and electronic components. All components are transported to the production facility, where the main manufacturing processes are associated with assembly of different parts and components. The finished product is packaged with polyethylene, cardboard, and/or paper as packaging material before being sent to customers.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation distances from manufacturing sites to customer locations are based on sales volume-based weighted averages. In the absence of exact data, conservative assumptions are made (A4). Environmental impacts from installation include waste packaging materials (A5). The impacts of energy consumption and the used ancillary materials during installation are considered negligible.

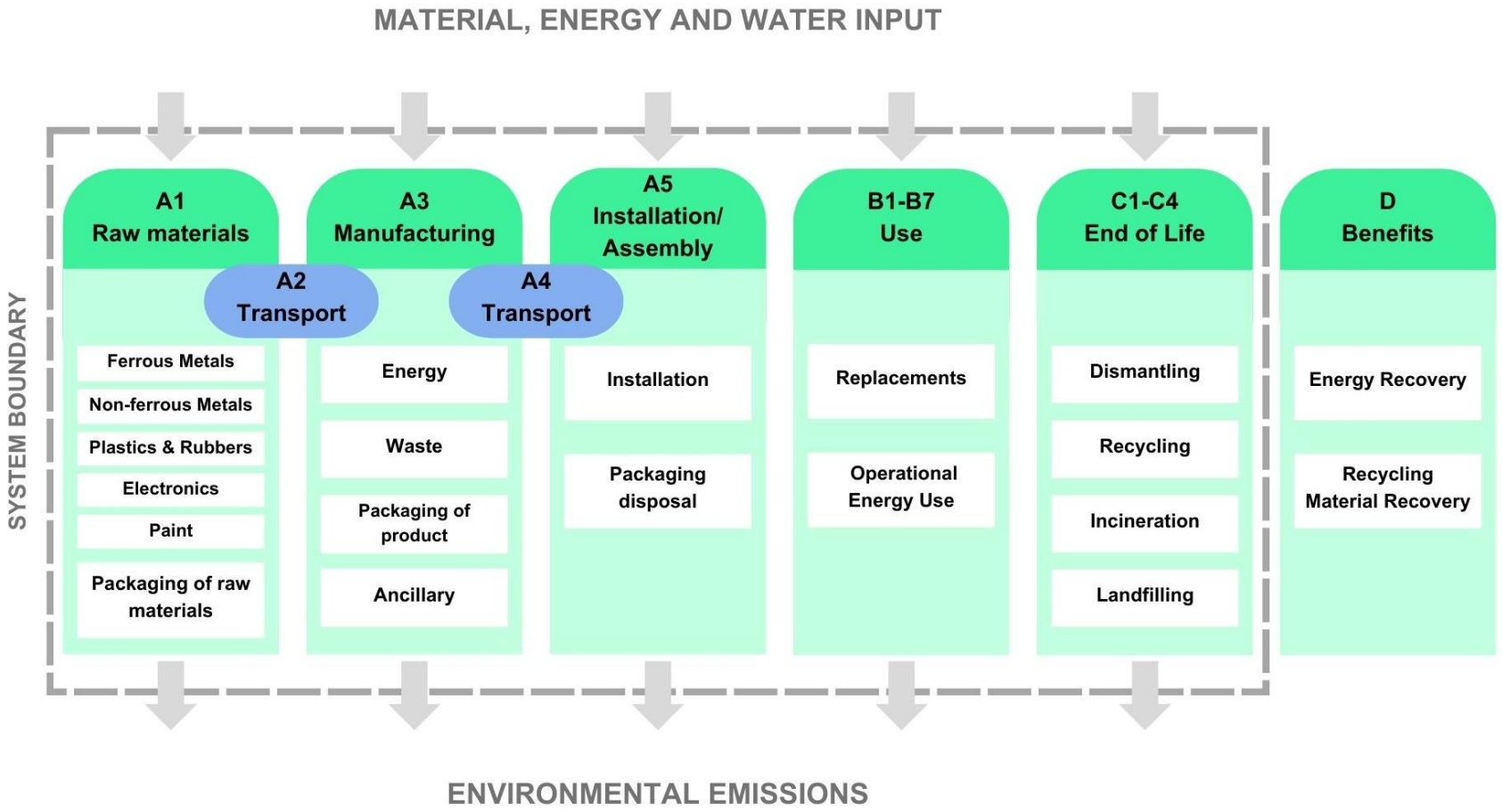
PRODUCT USE AND MAINTENANCE (B1-B7)

During the use phase, the product consumes electricity (B6). Impacts due to electricity production include direct emissions to air, transformation, and transmission losses.

PRODUCT END OF LIFE (C1-C4, D)

Consumption of energy and natural resources in demolition process is assumed to be negligible. It is assumed that the waste is collected separately and transported to the waste treatment centre. The transport distance is 150 km while the transportation method is assumed to be lorry (C2). According to EN 50693:2019, the sequence of treatment operations occurring to the product shall include de-pollution, fractions separation and preparation (dismantling, crushing, shredding, sorting), recycling, other material recovery, energy recovery and disposal. In this study, the default values from table G.4 of EN 50693 is used for treating materials in different waste treatment methods. Due to the material and energy recovery potential of parts in the lighting system, the end-of-life product is converted into recycled raw materials, while the energy recovered from incineration displaces electricity and heat production (D). The benefits and loads of incineration and recycling are included in Module D.

LIFE CYCLE FLOW DIAGRAM



ENVIRONMENTAL IMPACT DATA, RESULTS PER DECLARED UNIT

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	5,05E+01	3,32E-02	8,87E-01	5,14E+01	1,30E+00	1,41E+00	ND	ND	ND	ND	ND	1,10E+03	ND	0,00E+00	9,23E-02	1,16E+00	6,74E-01	-6,67E+00
GWP – fossil	kg CO_2e	5,02E+01	3,32E-02	2,23E+00	5,24E+01	1,30E+00	4,87E-02	ND	ND	ND	ND	ND	1,09E+03	ND	0,00E+00	9,22E-02	1,16E+00	6,74E-01	-6,65E+00
GWP – biogenic	kg CO_2e	2,82E-01	7,52E-06	-1,37E+00	-1,08E+00	2,18E-04	1,36E+00	ND	ND	ND	ND	ND	2,48E+00	ND	0,00E+00	2,01E-05	-2,34E-04	-5,35E-05	-8,04E-03
GWP – LULUC	kg CO_2e	7,17E-02	1,49E-05	1,88E-02	9,06E-02	6,81E-04	1,82E-05	ND	ND	ND	ND	ND	3,40E+00	ND	0,00E+00	4,08E-05	9,85E-05	1,73E-05	-6,67E-03
Ozone depletion pot.	kg CFC_{-11}e	1,76E-06	4,90E-10	1,99E-08	1,78E-06	1,86E-08	6,59E-10	ND	ND	ND	ND	ND	1,90E-05	ND	0,00E+00	1,29E-09	1,00E-09	4,33E-10	-3,55E-08
Acidification potential	mol H^+e	3,87E-01	1,13E-04	1,16E-02	3,99E-01	3,21E-02	2,87E-04	ND	ND	ND	ND	ND	5,58E+00	ND	0,00E+00	3,07E-04	8,19E-04	1,98E-04	-3,84E-02
EP-freshwater[2)]	kg Pe	5,49E-02	2,58E-06	6,70E-04	5,56E-02	5,18E-05	6,33E-06	ND	ND	ND	ND	ND	9,77E-01	ND	0,00E+00	7,17E-06	3,59E-05	5,13E-06	-3,12E-03
EP-marine	kg Ne	6,46E-02	3,72E-05	3,71E-03	6,83E-02	8,05E-03	1,33E-04	ND	ND	ND	ND	ND	9,68E-01	ND	0,00E+00	9,96E-05	2,64E-04	5,79E-04	-6,91E-03
EP-terrestrial	mol Ne	6,92E-01	4,05E-04	3,01E-02	7,23E-01	8,93E-02	1,24E-03	ND	ND	ND	ND	ND	8,41E+00	ND	0,00E+00	1,08E-03	2,58E-03	9,13E-04	-6,76E-02
POCP ("smog")[3)]	kg NMVOCe	2,16E-01	1,67E-04	8,43E-03	2,25E-01	2,45E-02	3,57E-04	ND	ND	ND	ND	ND	2,79E+00	ND	0,00E+00	4,28E-04	7,04E-04	2,58E-04	-2,22E-02
ADP-minerals & metals[4)]	kg Sbe	1,39E-02	9,26E-08	3,81E-06	1,39E-02	1,81E-06	1,43E-07	ND	ND	ND	ND	ND	2,44E-03	ND	0,00E+00	3,03E-07	2,77E-06	6,73E-08	-1,54E-04
ADP-fossil resources	MJ	6,53E+02	4,82E-01	2,30E+01	6,77E+02	1,64E+01	5,30E-01	ND	ND	ND	ND	ND	2,59E+04	ND	0,00E+00	1,29E+00	9,80E-01	3,09E-01	-7,26E+01
Water use[5)]	m^3e depr.	1,64E+01	2,38E-03	4,67E-01	1,69E+01	5,17E-02	5,21E-02	ND	ND	ND	ND	ND	6,71E+02	ND	0,00E+00	6,00E-03	8,54E-02	3,86E-02	-2,46E+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	3,13E-06	3,32E-09	1,94E-07	3,33E-06	5,03E-08	3,86E-09	ND	ND	ND	ND	ND	1,95E-05	ND	0,00E+00	7,32E-09	8,68E-09	2,39E-09	-5,90E-07
Ionizing radiation[6)]	kBq U235e	4,16E+00	4,20E-04	4,62E-02	4,21E+00	8,55E-03	5,87E-04	ND	ND	ND	ND	ND	7,24E+02	ND	0,00E+00	1,05E-03	4,87E-03	3,87E-04	-3,88E-01
Ecotoxicity (freshwater)	CTUe	1,13E+03	6,81E-02	8,73E+00	1,14E+03	1,49E+00	1,04E+00	ND	ND	ND	ND	ND	2,73E+03	ND	0,00E+00	2,05E-01	2,52E+00	1,99E+00	-4,44E+01
Human toxicity, cancer	CTUh	3,91E-08	5,48E-12	1,30E-09	4,04E-08	2,66E-10	5,82E-11	ND	ND	ND	ND	ND	2,27E-07	ND	0,00E+00	1,57E-11	1,35E-10	2,01E-10	-9,93E-09
Human tox. non-cancer	CTUh	1,97E-06	3,12E-10	1,96E-08	1,99E-06	5,25E-09	2,64E-09	ND	ND	ND	ND	ND	9,79E-06	ND	0,00E+00	8,10E-10	6,10E-09	3,71E-09	-3,33E-07
SQP[7)]	-	2,22E+02	4,85E-01	1,20E+02	3,42E+02	2,99E+00	2,65E-01	ND	ND	ND	ND	ND	4,41E+03	ND	0,00E+00	7,73E-01	1,09E+00	3,99E-01	-2,18E+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 the 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	6,46E+01	6,60E-03	8,17E+00	7,27E+01	1,45E-01	-1,51E+01	ND	ND	ND	ND	ND	6,06E+03	ND	0,00E+00	1,77E-02	1,25E-01	7,76E-03	-7,20E+00
Renew. PER as material	MJ	0,00E+00	0,00E+00	1,20E+01	1,20E+01	0,00E+00	-1,20E+01	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renew. PER	MJ	6,46E+01	6,60E-03	2,02E+01	8,48E+01	1,45E-01	-2,72E+01	ND	ND	ND	ND	ND	6,06E+03	ND	0,00E+00	1,77E-02	1,25E-01	7,76E-03	-7,20E+00
Non-re. PER as energy	MJ	6,26E+02	4,82E-01	2,27E+01	6,49E+02	1,64E+01	5,30E-01	ND	ND	ND	ND	ND	2,59E+04	ND	0,00E+00	1,29E+00	-1,58E+01	-1,69E+01	-7,26E+01
Non-re. PER as material	MJ	2,75E+01	0,00E+00	3,60E-01	2,79E+01	0,00E+00	-3,88E-01	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	-1,33E+01	-1,41E+01	0,00E+00
Total use of non-re. PER	MJ	6,53E+02	4,82E-01	2,31E+01	6,77E+02	1,64E+01	1,42E-01	ND	ND	ND	ND	ND	2,59E+04	ND	0,00E+00	1,29E+00	-2,91E+01	-3,10E+01	-7,26E+01
Secondary materials	kg	5,00E-01	0,00E+00	0,00E+00	5,00E-01	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Renew. secondary fuels	MJ	1,64E-02	2,60E-06	1,90E-01	2,07E-01	3,25E-05	5,41E-06	ND	ND	ND	ND	ND	1,14E-02	ND	0,00E+00	7,40E-06	4,46E-05	5,83E-06	-7,51E-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	0,00E+00	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	4,19E-01	7,12E-05	1,04E-02	4,29E-01	1,33E-03	7,47E-04	ND	ND	ND	ND	ND	2,15E+01	ND	0,00E+00	1,71E-04	1,60E-03	-9,91E-05	9,60E-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	5,83E+00	8,16E-04	2,40E-01	6,07E+00	2,30E-02	1,31E-02	ND	ND	ND	ND	ND	5,90E+01	ND	0,00E+00	2,26E-03	2,47E-02	8,42E-02	-1,75E+00
Non-hazardous waste	kg	1,50E+02	1,51E-02	1,05E+01	1,61E+02	3,41E-01	9,18E-01	ND	ND	ND	ND	ND	4,80E+03	ND	0,00E+00	4,23E-02	6,67E-01	1,89E+00	-4,91E+01
Radioactive waste	kg	1,04E-03	1,03E-07	1,08E-05	1,05E-03	2,09E-06	1,46E-07	ND	ND	ND	ND	ND	1,86E-01	ND	0,00E+00	2,57E-07	1,20E-06	9,66E-08	-9,52E-05

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 reuse	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	0,00E+00	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	9,29E-03	9,29E-03	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	1,56E+00	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	0,00E+00	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	5,26E-03	5,26E-03	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	5,26E+00	0,00E+00	0,00E+00
Exported energy: Electricity	MJ	0,00E+00	0,00E+00	2,22E-03	2,22E-03	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	2,22E+00	0,00E+00	0,00E+00
Exported energy: Heat	MJ	0,00E+00	0,00E+00	3,05E-03	3,05E-03	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	3,05E+00	0,00E+00	0,00E+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	5,02E+01	3,32E-02	2,25E+00	5,25E+01	1,30E+00	4,87E-02	ND	ND	ND	ND	ND	1,10E+03	ND	0,00E+00	9,23E-02	1,16E+00	6,74E-01	-6,66E+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 characterization factor for biogenic CO2 is set to zero.

SCENARIO DOCUMENTATION
DATA SOURCES

Manufacturing energy scenario documentation – A3 (Energy data source)

1. Energy supply, electricity transformation and distribution, distribution of medium, Market for electricity, medium voltage, centralChinaGrid, ecoinvent 3.10.1, 0.92 kgCO2e/kWh

Transport scenario documentation - A4

1. Market for transport, freight, lorry 16-32 metric ton, EURO5, 329 km
2. Market for transport, freight, sea, container ship, 28139 km

Installation scenario documentation - A5 (Energy data source)

-

Installation scenario documentation - A5 (Waste materials data source)

1. Corrugated board box production, 0.526 kg
2. Kraft paper production, 0.0217 kg
3. Eur-flat pallet production, 0.016 unit

Use stages scenario documentation - B4 (Installation data source)

-

Use stages scenario documentation - B6-B7 (Energy data source)

1. Energy supply, electricity transformation and distribution, distribution of medium, Market group for electricity, medium voltage, Europe, 3384.0 kWh

TRANSPORT SCENARIO DOCUMENTATION - A4

Scenario parameter	Value
Capacity utilization (including empty return) %	50 %
Bulk density of transported products / kg/m³	1,97E+02
Volume capacity utilization factor (factor: =1 or <1 or ≥1 for compressed or nested packaged products)	1

INSTALLATION SCENARIO DOCUMENTATION - A5

Scenario parameter	Value
Ancillary materials for installation (specified by material) / kg or other units as appropriate	0
Water use / m³	0
Other resource use / kg	0
Direct emissions to ambient air, soil and water / kg	0

USE STAGES SCENARIO DOCUMENTATION - B4 REPLACEMENT

Scenario information	Value
Replacement cycle / Number per RSL or year	-

USE STAGES SCENARIO DOCUMENTATION - B6-B7 USE OF ENERGY AND WATER

Scenario information	Value
Ancillary materials specified by material / kg or units as appropriate	Not applicable
Net fresh water consumption / m³	0
Power output of equipment / kW	0,047
Characteristic performance, e.g., energy efficiency, emissions, variation of performance with capacity utilization, etc. / Units as appropriate	N/A
Further assumptions for scenario development, e.g., frequency and period of use, number of occupants / Units as appropriate	N/A

END OF LIFE SCENARIO DOCUMENTATION

Scenario information	Value
Collection process – kg collected separately	3,149
Collection process – kg collected with mixed construction waste	0
Recovery process – kg for re-use	0
Recovery process – kg for recycling	1,56E+00
Recovery process – kg for energy recovery	0
Disposal (total) – kg for final deposition	1,12E+00
Scenario assumptions e.g. transportation	Lorry, 16-32 metric ton, EURO5; 150 km

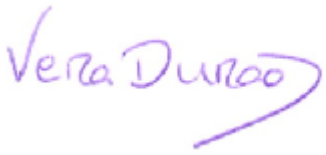
THIRD-PARTY VERIFICATION STATEMENT

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.



Vera Durão, as an authorised verifier acting for EPD Hub Limited
24.11.2025

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: Hai Ha Nguyen
Tool verification validity: 28 March 2025 - 27 March 2028