ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

EPD HUB, HUB-7504
Published on 11.09.2026, last updated on 11.09.2026, valid until 10.09.2031

ESC 80 ESCAP Emergency Exit Light with up to 30 viewing distance

Teknoware Emergency Lighting Oy

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	Teknoware Emergency Lighting Oy
Address	Ilmarisentie 8, 15200 Lahti, Finland
Contact details	info@teknoware.com
Website	https://www.teknoware.com/
Place of production	Ilmarisentie 8, 15200 Lahti, Finland
Place(s) of raw material origin	Global
Place(s) of installation and use	Europe
Period for data	calendar year 2023

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, B6, and modules C1-C4, D
EPD author	Katariina Koikkalainen, Teknoware Oy
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	ESC 80 ESCAP Emergency Exit Light AaltoCtrl with up to 30 viewing distance
Product number / reference	TWS8092WA/WM, TWS8092WAR/WMR,TWS8092WART/WMRT and TWS8092WAT/WMT. Individually packed Y8092WA/WM131-139 and Y8092WA/WM141-149.
GTIN (Global Trade Item Number)	6438045015071, 6438045012940, 6438045013015, 6438045015156, 6438045014753, 6438045014678, 6438045014838, 6438045015392, 6438045015231, 6438045015316, 6438045015712, 6438045015552, 6438045015477, 6438045015637, 6438045015088, 6438045015163, 6438045012957, 6438045013022, 6438045014760, 6438045014685, 6438045014845, 6438045015408, 6438045015729, 6438045015248, 6438045015323, 6438045015569, 6438045015484, 6438045015644
NOBB (Norwegian Building Product Database)	-
A1-A3 Specific data (%)	4,99

PRODUCT CLASSIFICATION

Declared operating voltage, Volt	220-240
Light source color temperature, Kelvin	-
Protection index for water and dust (IP)	IP43
Impact resistance index (IK)	-
Luminous flux, Lumen	-
Electrical power, Watt	2,6
Luminous efficiency, Lm/W	-
Additional characteristics	All Teknoware emergency exit lights meet the requirements of the European standards EN 1838 and EN 60598-2-22, including their photometric requirements. The purpose of emergency lights is to generate illuminance levels of minimum 1 lux for escape routes and minimum 0.5 lux for open areas, which are typical in Europe. The minimum luminance in the green area is 2 cd/m2. In an emergency, 50 % of the illuminance must be available within 5 seconds and the full value within 60 seconds of supply failure in escape routes and open area.

PRODUCT DESCRIPTION

Teknoware ESC 80 ESCAP and ESC 90 ESCAP are self-contained LED emergency exit luminaires intended for the indication of emergency escape routes in commercial, industrial and public buildings. The luminaires consist of a plastic base housing the electronic components and the ESCAP energy storage unit, and an illuminated pictogram panel providing emergency exit signage. The products are equipped with Teknoware ESCAP supercapacitor technology, enabling emergency operation without a conventional battery and providing a design lifetime of up to 15 years. The luminaires incorporate LumiTest self-testing functionality and are available both with and without Teknoware AaltoCtrl wireless remote monitoring.

The luminaires operate from a 220–240 V, 50/60 Hz AC power supply, provide a 1-hour emergency backup duration and comply with EN 1838 and EN 60598-2-22 requirements for emergency lighting. Both product ranges have an IP43 enclosure rating, Protection Class II and are suitable for operation in ambient temperatures from -25 °C to +35 °C.

The products are designed for flexible installation. The power supply is connected through a separate mounting piece supplied with the luminaire, enabling simple installation and maintenance. The luminaires can be configured as single-sided or double-sided and are suitable for ceiling and wall mounting as standard. Additional accessories enable flag-mounted, pendant-mounted and recessed installations. Standard colours are white (RAL 9003) and black (RAL 9005), while other RAL colours are available on request.

The ESC 80 ESCAP product range is available with viewing distances of 20 m, 26 m and 30 m. The luminaires have dimensions of 268 × 40 × 185 mm and a typical product weight of 0.42 kg. The pictogram panel is manufactured from acrylic material.

The ESC 90 ESCAP product range is available with a viewing distance of 25 m. The luminaires have dimensions of 268 × 40 × 202 mm and a typical product weight of 0.73 kg. The pictogram panel is manufactured from polycarbonate.

This Environmental Product Declaration (EPD) is based on the Teknoware ESC 80 ESCAP emergency exit luminaire with AaltoCtrl wireless monitoring and a viewing distance of up to 30 m as the declared product.

The ESC 80 ESCAP variants with viewing distances of 20 m and 26 m and the ESC 90 ESCAP emergency exit luminaire with a viewing distance of 25 m were modelled separately. The environmental performance of these variants is presented in Annex 1 (Scaling Table).

ABOUT THE MANUFACTURER

Teknoware Emergency Lighting Oy is a Finnish manufacturer of emergency lighting solutions for buildings, infrastructure and marine applications. The company designs, manufactures and supplies emergency lighting luminaires, central battery systems and monitoring solutions for customers worldwide. Teknoware's emergency lighting products are used in commercial, industrial, public and transportation applications and are manufactured in Finland. Teknoware Emergency Lighting Oy is committed to continuously improving the environmental performance of its products and operations through product development, responsible sourcing and environmental management practices.

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 unit
Declared unit mass, kg	1,204
Mass of packaging, kg	0,350
Functional unit	Operating the product for 8760 hours per year consuming 2,6 Watts for 15 years. Escap luminaires come with a supercapacitor as a backup power source, which has a lifetime of 15 years and does not require replacing during the lifetime of the product.
Reference service life (years)	15
Assigned lifetime (hours)	131400
GWP-total, A1-A3 (kg CO_2e)	13,6
GWP-fossil, A1-A3 (kg CO_2e)	14,1
Secondary material, inputs (%)	5,63
Secondary material, outputs (%)	6,76
Total energy use, A1-A3 (kWh)	62,5
Net freshwater use, A1-A3 (m^3)	1,20E-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

Not declared = ND.

CUT-OFF CRITERIA

All mandatory life cycle modules and processes required by the reference standard and the applicable PCR have been included in the assessment. No hazardous materials or substances have been excluded from the model.

All relevant materials, components, manufacturing processes, transportation activities and end-of-life processes have been declared and included. Six product labels (stickers) and the installation and maintenance instructions (14 A4 pages in total) were excluded from the assessment, as their combined weight represented approximately 1.1% of the total product weight and their contribution to the overall environmental impacts was considered insignificant.

No neglected unit process exceeds 1% of the total mass or energy flows. The sum of neglected input and output flows does not exceed 5% of total mass or energy flows for any life cycle module.

The production of capital goods and infrastructure, construction activities, maintenance and operation of production equipment, personnel-related activities, and energy and water consumption associated with company management, administration and sales activities have been excluded from the assessment.

VALIDATION OF DATA

Primary data for manufacturing, packaging, transportation and energy consumption were collected from the Teknoware Emergency Lighting Oy production facility in Lahti, Finland. The data are representative of the production processes and operating conditions during the reference year 2023.

Upstream processes, including raw material production, component manufacturing, transportation and end-of-life treatment, were modelled using generic datasets from the background LCA database. Manufacturer-specific data were used wherever available for product composition, manufacturing processes, packaging materials, transportation assumptions and energy consumption.

The environmental impacts associated with manufacturing energy use were calculated using a market-based electricity approach. Total electricity and district heating consumption recorded at the manufacturing facility during 2023 were allocated to products based on the total production volume during the same period. Manufacturing energy consumption was therefore allocated on a per-unit basis.

No allocation was required for raw materials or packaging materials. Co-product allocation was not applied, as no relevant co-products were generated during manufacturing. Manufacturing energy use was allocated according to production volume, based on the total number of products manufactured in 2023.

The life cycle assessment was performed using the One Click LCA EPD Generator. Calculations were carried out using the "Cut-off, EN 15804+A2" allocation methodology and characterization factors in accordance with EN 15804:2012+A2:2019/AC:2021 and the European Commission Environmental Footprint (EF) 3.1 method.

The electricity mix used for manufacturing is documented in the scenario information section of this EPD.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

All allocations have been performed in accordance with the requirements of EN 15804, EN 50693 and the applicable Product Category Rules (PCR). Allocation was avoided wherever possible through subdivision of processes and collection of product-specific data.

No allocation was required for raw materials or packaging materials, as these were directly assigned to the declared product based on product-specific bill of materials and packaging data.

Ancillary materials and manufacturing waste generated during production were allocated based on product mass where product-specific data were not available.

A market-based approach was used to model the electricity consumed at the manufacturing facility. Primary data on electricity and district heating consumption were collected from the Lahti production facility for the year 2023. Total facility energy consumption was allocated to individual products based on the total annual production volume. The environmental impacts associated with manufacturing energy use were therefore calculated on a per-unit basis using the total number of products manufactured during the reporting year.

Co-product allocation was not applied, as no relevant co-products are generated during the manufacturing of the declared product and revenues associated with production waste streams are negligible.

Where primary data were unavailable, conservative assumptions and representative background datasets were applied. Transportation assumptions were based on known supplier locations, logistics routes and transportation modes, while product distribution distances were calculated using sales-volume-weighted averages by destination country for 2023.

The allocation principles applied in this study are presented below:

Data type	Allocation
Raw materials	No allocation
Packaging materials	No allocation
Ancillary materials	Physical Properties
Manufacturing energy and waste	Physical Properties

PRODUCT & MANUFACTURING SITES GROUPING

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

This Environmental Product Declaration (EPD) is based on a representative product within the declared product family. The EPD also covers additional variants of the same product family, as identified in Annex 1 (Scaling Table).

All covered product variants are manufactured at the Teknoware Emergency Lighting Oy production facility in Lahti, Finland, using the same manufacturing technology, assembly processes, power source technology and quality control procedures. Each product variant was modelled separately using product-specific bills of materials and technical data.

The product variants covered by this EPD are identical in terms of functionality, power source technology, manufacturing processes and installation principles. The primary differences between the variants relate to product dimensions and the resulting quantities of materials and components. Consequently, the manufacturing processes, intended use and end-of-life treatment remain substantially the same across the product family.

The environmental performance of the covered product variants is presented in Annex 1 (Scaling Table).

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	0,6	Europe
Minerals	0	
Fossil materials	80,1	Europe
Bio-based materials	0	
Electronic parts	19,3	Asia

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	0,0717

SUBSTANCES, REACH - VERY HIGH CONCERN

Substances of very high concern	EC	CAS
Lead in electronic components (diodes,	231-100-4	7439-92-1
2-(2 Hydroxy-5-T-Octylphenyl)	221-573-5	3147-75-9

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA Luminaire EPD Generator v2.2.9. The LCA and EPD have been prepared according to the reference standards, EN 50693, and ISO 14040/14044. Ecoinvent v3.10.1/3.11/3.12 and One Click LCA databases were used as sources of environmental data. Allocation used in Ecoinvent 3.10.1/3.11/3.12 environmental data sources follow the methodology 'allocation, cut-off, EN 15804+A2'.

PRODUCT LIFE CYCLE

MANUFACTURING (A1-A3)

The declared product consists of a polycarbonate base housing the electronic components and battery, and a polycarbonate light plate with a pictogram.
All components and materials are transported to the Teknoware Emergency Lighting Oy production facility in Lahti, Finland, where the emergency luminaires are designed, manufactured and tested. Manufacturing of the declared product takes place entirely in Lahti. The printed circuit boards (PCBs) used in the product are assembled in-house and subsequently integrated into the luminaire during final assembly. The main manufacturing processes comprise PCB assembly, assembly of mechanical and electrical components, battery installation, wiring, final luminaire assembly, testing and packaging.

The product stage (A1–A3) includes the extraction and processing of raw materials, manufacturing of components and packaging materials, transportation of materials and components to the manufacturing facility, and assembly of the finished product. Ancillary materials used during manufacturing are included where relevant.

Transportation distances for raw materials, components and packaging materials were estimated based on known manufacturing locations, transport modes and logistics routes. Where known, transportation was modelled using a combination of road freight and sea freight. Components manufactured in Europe were assumed to be transported primarily by road, while components sourced from outside Europe were assumed to be transported by a combination of air freight or sea freight and road transport. The nearest suitable port and transport route were used in estimating transportation distances. Conservative assumptions were applied where exact transportation data were unavailable. Road transportation was modelled using Euro 6 heavy goods vehicles. Sea transportation was modelled using average container ship freight datasets. The selected transport modes were considered representative of the company's typical logistics network.

The environmental impacts associated with manufacturing are based on primary data collected from the Lahti production facility. A market-based approach was used to model the electricity consumed during manufacturing.

Total electricity and district heat consumption for the manufacturing facility during 2023 were allocated to products based on the total annual production volume. The assessment also includes losses associated with electricity transmission and distribution.

The Lahti production facility operates an ISO 14001-certified environmental management system. Manufacturing waste is segregated into metal, plastic, electronic and packaging waste streams. Metal, plastic, electronic and packaging waste fractions are directed to material recovery and recycling where suitable recycling routes are available. Residual waste is sent for energy recovery through incineration. Production losses are included in the assessment and modelled according to the waste management practices applied at the facility. Where primary data were not available, conservative assumptions were applied.

The finished product is packaged in an FSC-certified cardboard box containing at least 70% recycled raw material. Each package includes a paper installation manual intended to be retained for the service life of the product. Product identification is provided using adhesive labels. Known quantities of packaging materials and ancillary materials were used in the assessment.

No allocation to co-products has been applied, as revenues from co-products are negligible. Production waste is modelled using the applicable waste treatment routes and default end-of-life assumptions in accordance with EN 50693.

TRANSPORT AND INSTALLATION (A4-A5)

The finished products are distributed from the Teknoware Emergency Lighting Oy production facility in Lahti, Finland, to customer locations.

The distribution of finished products from the manufacturing facility to customer locations was modelled using weighted-average transport distances based on sales volumes by destination country in 2023. Transportation was assumed to take place primarily by road freight within Europe. Deliveries to destinations outside Europe were modelled using a combination of road freight and sea freight, where applicable. Air freight was not considered unless specifically identified in the transport data.

Module A4 includes the transportation of the packaged product from the manufacturing facility to the installation site. Transport impacts were calculated using weighted average delivery distances based on historical sales volumes and destination countries.

The installation stage (A5) includes the treatment of packaging waste generated at the installation site.

Packaging waste is assumed to be collected and treated according to the applicable waste management routes.

Installation of the luminaire is assumed to be carried out using standard installation tools, including a battery-powered power drill. The electricity consumption associated with installation was estimated at 0.01 kWh per kilogram of product. Based on a product weight of 0.7932 kg, the resulting installation energy consumption is considered in module A5.

No significant ancillary installation materials are required for the installation of the product and therefore their environmental impacts are considered negligible. No significant waste is generated from the product itself during installation.

PRODUCT USE AND MAINTENANCE (B1-B7)

The declared product has a reference service life of 15 years. During normal operation, the emergency luminaire consumes electricity for illumination and, where applicable, charging and self-testing functions. The environmental impacts reported in module B6 are based on the electricity consumption of the product over its reference service life.

The impacts associated with electricity consumption include upstream fuel extraction and processing, electricity generation, direct emissions to air, and losses arising from electricity transmission and distribution.

The product requires only limited maintenance during its service life. Periodic inspection and functional testing are carried out in accordance with applicable emergency lighting regulations and site-specific maintenance procedures. Material and energy consumption associated with routine inspections are considered negligible and are therefore excluded from the assessment.

Depending on the product variant, emergency operation is provided either by an integrated energy storage system (such as a lithium iron phosphate ($LiFePO_4$) battery or Teknoware ESCAP supercapacitor) or by connection to a central battery system.

Replacement requirements for energy storage components, where applicable, are modelled according to the assumptions defined for the specific product variant. Module B4 includes the environmental impacts associated with replacement of components expected to require replacement during the reference service life. The product does not require operational water consumption during use. Therefore, module B7 is not applicable.

PRODUCT END OF LIFE (C1-C4, D)

At the end of its reference service life, the product is assumed to be removed from the building and collected separately for waste treatment. The consumption of energy and natural resources during product deconstruction and removal (Module C1) is considered negligible due to the limited effort required for dismantling and is therefore excluded from the assessment.

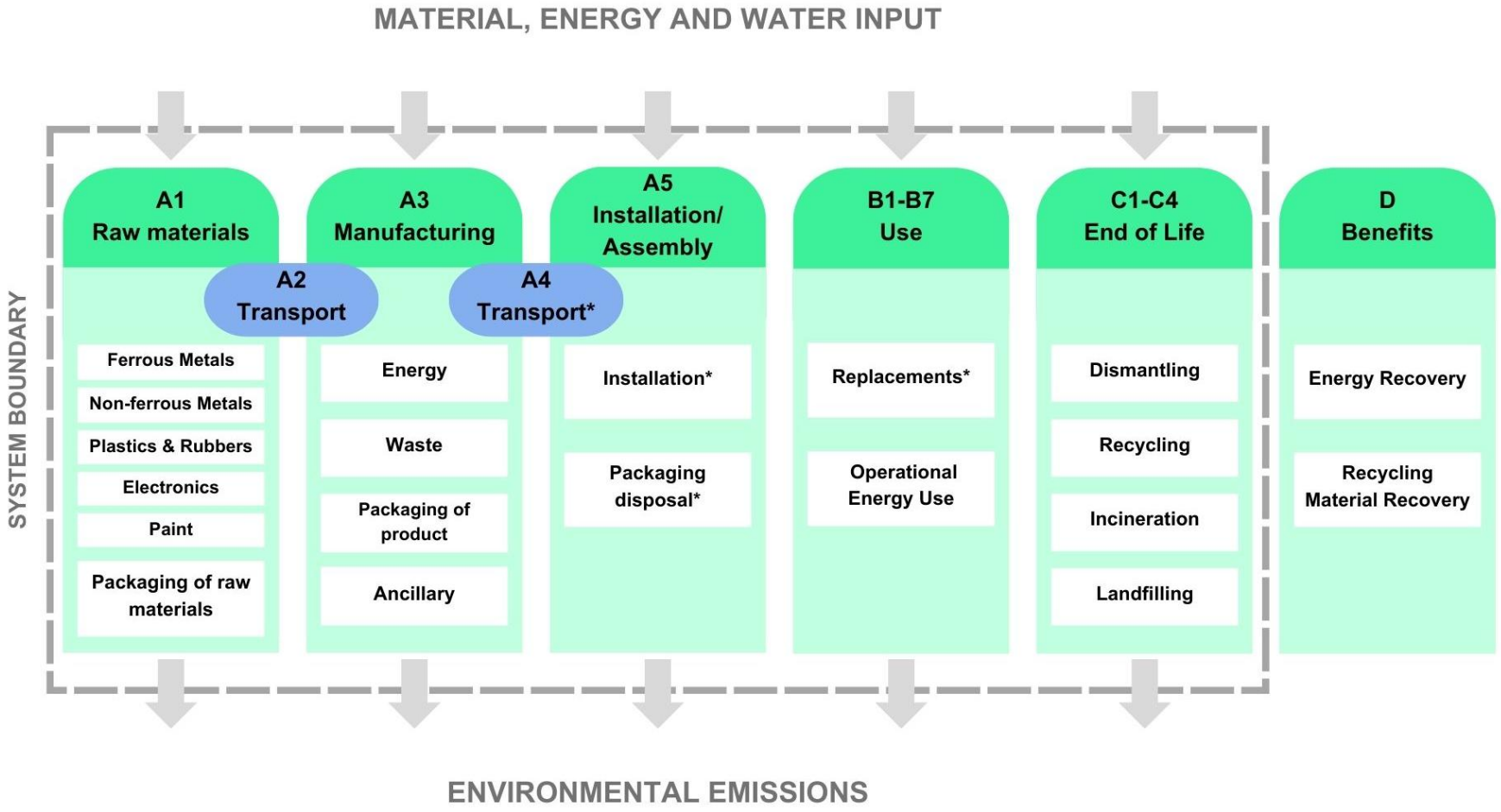
In Module C2, the end-of-life product is assumed to be transported 150 km by lorry from the demolition site to a waste treatment facility.

The product contains electronic components and, depending on the product variant, may also contain an integrated energy storage device, such as a lithium iron phosphate ($LiFePO_4$) battery or a supercapacitor. These components are assumed to be separately collected and subjected to appropriate depollution and treatment processes prior to material recovery, energy recovery or disposal. The waste processing stage (Module C3) is modelled in accordance with EN 50693:2019. The treatment sequence includes depollution, separation of components and material fractions, dismantling, crushing, shredding, sorting, recycling, material recovery, energy recovery and final disposal. Default end-of-life treatment scenarios from Table G.4 of EN 50693:2019 have been applied to the product materials and components where specific treatment data were not available.

Module C4 includes the final disposal of material fractions that are not recovered through recycling or energy recovery processes.

The product contains materials with recycling and energy recovery potential, including metals, plastics and electronic components. Recovered material fractions are assumed to replace the production of equivalent virgin raw materials, while energy recovered from waste incineration is assumed to substitute conventional electricity and heat production.

LIFE CYCLE FLOW DIAGRAM



*If module declared as per scope of the EPD

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	1,31E+01	6,93E-01	-1,84E-01	1,36E+01	8,46E-01	5,05E-01	ND	ND	ND	ND	ND	1,12E+02	ND	0,00E+00	3,48E-02	1,17E+00	6,02E-01	-2,23E+00
GWP – fossil	kg CO_2e	1,31E+01	6,93E-01	3,27E-01	1,41E+01	8,46E-01	2,33E-02	ND	ND	ND	ND	ND	1,12E+02	ND	0,00E+00	3,48E-02	1,17E+00	6,02E-01	-2,22E+00
GWP – biogenic	kg CO_2e	8,91E-03	1,36E-04	-5,25E-01	-5,16E-01	6,60E-05	4,82E-01	ND	ND	ND	ND	ND	2,51E-01	ND	0,00E+00	7,59E-06	-9,60E-05	-5,05E-05	-3,33E-03
GWP – LULUC	kg CO_2e	1,79E-02	2,50E-04	1,46E-02	3,27E-02	6,80E-05	2,25E-05	ND	ND	ND	ND	ND	3,43E-01	ND	0,00E+00	1,54E-05	3,10E-05	8,41E-06	-3,89E-03
Ozone depletion pot.	kg CFC_{-11}e	3,61E-07	1,36E-08	9,34E-09	3,84E-07	1,30E-08	2,80E-10	ND	ND	ND	ND	ND	2,06E-06	ND	0,00E+00	4,86E-10	5,19E-10	3,17E-10	-1,38E-08
Acidification potential	mol H^+e	8,70E-02	2,84E-03	1,58E-03	9,14E-02	3,51E-03	9,83E-05	ND	ND	ND	ND	ND	6,57E-01	ND	0,00E+00	1,16E-04	3,43E-04	1,62E-04	-5,21E-02
EP-freshwater[2)]	kg Pe	7,93E-03	4,52E-05	1,87E-04	8,16E-03	1,33E-05	6,63E-06	ND	ND	ND	ND	ND	1,04E-01	ND	0,00E+00	2,70E-06	9,43E-06	2,33E-06	-3,04E-03
EP-marine	kg Ne	1,28E-02	8,92E-04	8,27E-04	1,46E-02	1,41E-03	7,21E-05	ND	ND	ND	ND	ND	1,03E-01	ND	0,00E+00	3,75E-05	1,65E-04	5,89E-04	-3,40E-03
EP-terrestrial	mol Ne	1,35E-01	9,74E-03	5,47E-03	1,50E-01	1,54E-02	2,70E-04	ND	ND	ND	ND	ND	9,24E-01	ND	0,00E+00	4,09E-04	1,45E-03	7,60E-04	-4,14E-02
POCP ("smog")[3)]	kg NMVOCe	6,48E-02	3,84E-03	1,40E-03	7,00E-02	4,99E-03	1,06E-04	ND	ND	ND	ND	ND	3,04E-01	ND	0,00E+00	1,61E-04	3,69E-04	2,07E-04	-1,23E-02
ADP-minerals & metals[4)]	kg Sbe	7,98E-04	2,21E-06	1,35E-06	8,02E-04	2,35E-07	1,58E-07	ND	ND	ND	ND	ND	1,51E-03	ND	0,00E+00	1,14E-07	3,07E-07	5,14E-08	-6,77E-04
ADP-fossil resources	MJ	2,21E+02	9,69E+00	4,83E+00	2,36E+02	1,12E+01	3,04E-01	ND	ND	ND	ND	ND	2,60E+03	ND	0,00E+00	4,88E-01	3,80E-01	2,02E-01	-2,69E+01
Water use[5)]	m^3e depr.	4,16E+00	4,70E-02	1,99E-01	4,41E+00	1,66E-02	7,20E-03	ND	ND	ND	ND	ND	7,09E+01	ND	0,00E+00	2,26E-03	7,90E-02	3,85E-02	-6,62E-01

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	6,29E-07	5,33E-08	1,46E-08	6,97E-07	9,91E-09	1,31E-09	ND	ND	ND	ND	ND	2,35E-06	ND	0,00E+00	2,76E-09	2,20E-09	1,36E-09	-1,92E-07
Ionizing radiation[6)]	kBq U235e	1,44E+00	1,21E-02	3,64E-02	1,49E+00	3,43E-03	3,40E-03	ND	ND	ND	ND	ND	7,19E+01	ND	0,00E+00	3,95E-04	1,80E-03	2,93E-04	-2,50E-01
Ecotoxicity (freshwater)	CTUe	3,44E+02	1,26E+00	3,07E+00	3,49E+02	5,43E-01	1,49E+00	ND	ND	ND	ND	ND	3,96E+02	ND	0,00E+00	7,71E-02	2,32E+00	1,99E+00	-4,15E+01
Human toxicity, cancer	CTUh	1,22E-08	1,19E-10	1,02E-10	1,24E-08	5,45E-11	1,11E-11	ND	ND	ND	ND	ND	3,78E-08	ND	0,00E+00	5,91E-12	1,04E-10	6,60E-11	-6,04E-09
Human tox. non-cancer	CTUh	3,93E-07	5,96E-09	2,50E-09	4,01E-07	8,57E-09	6,00E-10	ND	ND	ND	ND	ND	1,96E-06	ND	0,00E+00	3,05E-10	3,88E-09	2,84E-09	-6,15E-07
SQP[7)]	-	5,13E+01	5,62E+00	1,36E+01	7,05E+01	1,04E+00	1,62E-01	ND	ND	ND	ND	ND	5,79E+02	ND	0,00E+00	2,91E-01	1,53E-01	2,31E-01	-2,01E+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	1,97E+01	1,64E-01	-1,81E+00	1,80E+01	4,51E-02	-5,65E+00	ND	ND	ND	ND	ND	7,14E+02	ND	0,00E+00	6,69E-03	3,17E-02	6,07E-03	-4,12E+00
Renew. PER as material	MJ	0,00E+00	0,00E+00	4,49E+00	4,49E+00	0,00E+00	-4,49E+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
Total use of renew. PER	MJ	1,97E+01	1,64E-01	2,68E+00	2,25E+01	4,51E-02	-1,01E+01	ND	ND	ND	ND	ND	7,14E+02	ND	0,00E+00	6,69E-03	3,17E-02	6,07E-03	-4,12E+00
Non-re. PER as energy	MJ	1,92E+02	9,69E+00	4,92E+00	2,07E+02	1,12E+01	3,04E-01	ND	ND	ND	ND	ND	2,60E+03	ND	0,00E+00	4,88E-01	-1,73E+01	-1,75E+01	-2,69E+01
Non-re. PER as material	MJ	2,87E+01	0,00E+00	1,47E-02	2,87E+01	0,00E+00	-1,47E-02	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	-1,44E+01	-1,44E+01	0,00E+00
Total use of non-re. PER	MJ	2,21E+02	9,69E+00	4,93E+00	2,36E+02	1,12E+01	2,89E-01	ND	ND	ND	ND	ND	2,60E+03	ND	0,00E+00	4,88E-01	-3,16E+01	-3,18E+01	-2,69E+01
Secondary materials	kg	6,78E-02	0,00E+00	0,00E+00	6,78E-02	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	1,59E-02	5,45E-05	3,25E-02	4,84E-02	6,51E-06	1,83E-06	ND	ND	ND	ND	ND	3,44E-03	ND	0,00E+00	2,79E-06	1,38E-05	4,19E-06	-3,78E-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	1,14E-01	1,28E-03	4,81E-03	1,20E-01	5,48E-04	4,98E-05	ND	ND	ND	ND	ND	2,25E+00	ND	0,00E+00	6,46E-05	1,39E-03	-2,19E-04	-2,65E-02

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	1,28E+00	1,41E-02	1,93E-02	1,31E+00	4,87E-03	1,83E-03	ND	ND	ND	ND	ND	6,58E+00	ND	0,00E+00	8,50E-04	2,10E-02	4,58E-02	-3,39E-01
Non-hazardous waste	kg	4,41E+01	2,94E-01	5,02E-01	4,49E+01	1,00E-01	2,43E-01	ND	ND	ND	ND	ND	5,09E+02	ND	0,00E+00	1,59E-02	5,66E-01	1,55E+00	-1,84E+01
Radioactive waste	kg	3,64E-04	3,00E-06	9,30E-06	3,76E-04	8,33E-07	8,70E-07	ND	ND	ND	ND	ND	1,85E-02	ND	0,00E+00	9,67E-08	4,44E-07	7,37E-08	-6,19E-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	0,00E+00	0,00E+00	0,00E+00	2,87E-01	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	8,14E-02	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	0,00E+00	0,00E+00	0,00E+00	1,61E-01	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	5,54E+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	6,80E-02	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	2,33E+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	8,50E-02	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	3,21E+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_2e	1,30E+01	6,89E-01	3,47E-01	1,40E+01	8,42E-01	6,80E-02	ND	ND	ND	ND	ND	1,12E+02	ND	0,00E+00	3,46E-02	1,17E+00	6,01E-01	-2,21E+00
Ozone depletion Pot.	kg CFC_{-11}e	3,14E-07	1,08E-08	7,64E-09	3,33E-07	1,03E-08	2,30E-10	ND	ND	ND	ND	ND	1,72E-06	ND	0,00E+00	3,88E-10	4,58E-10	2,73E-10	-1,17E-08
Acidification	kg SO_2e	7,34E-02	2,19E-03	1,13E-03	7,67E-02	2,57E-03	7,76E-05	ND	ND	ND	ND	ND	5,60E-01	ND	0,00E+00	8,87E-05	2,52E-04	1,16E-04	-4,57E-02
Eutrophication	kg PO_4^3e	4,11E-02	4,70E-04	6,55E-04	4,22E-02	5,17E-04	5,49E-05	ND	ND	ND	ND	ND	7,25E-02	ND	0,00E+00	2,16E-05	7,57E-05	6,18E-05	-2,37E-03
POCP (“smog”)	kg C_2H_4e	1,17E-02	1,81E-04	1,03E-04	1,19E-02	1,94E-04	1,62E-05	ND	ND	ND	ND	ND	3,05E-02	ND	0,00E+00	7,95E-06	1,60E-05	1,12E-05	-2,00E-03

ADP-elements	kg Sbe	7,88E-04	2,16E-06	1,37E-06	7,92E-04	2,27E-07	1,56E-07	ND	ND	ND	ND	ND	1,51E-03	ND	0,00E+00	1,11E-07	2,80E-07	3,84E-08	-6,76E-04
ADP-fossil	MJ	1,97E+02	9,49E+00	4,17E+00	2,10E+02	1,12E+01	2,45E-01	ND	ND	ND	ND	ND	1,34E+03	ND	0,00E+00	4,81E-01	3,51E-01	1,98E-01	-2,30E+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	1,31E+01	6,93E-01	3,41E-01	1,41E+01	8,46E-01	2,33E-02	ND	ND	ND	ND	ND	1,12E+02	ND	0,00E+00	3,48E-02	1,17E+00	6,02E-01	-2,22E+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, Electricity, medium voltage, residual mix, Finland, ecoinvent 3.10.1, 0.66 kgCO2e/kWh
2. District heat, District Heat, Finland, 2022, Finland, LCA study for country specific district heating based on IEA, OneClickLCA 2024, 0.18 kgCO2e/kWh

TRANSPORT SCENARIO DOCUMENTATION - A4

Scenario parameter	Value
Capacity utilization (including empty return) %	50 %
Bulk density of transported products / kg/m³	299
Volume capacity utilization factor (factor: =1 or <1 or ≥1 for compressed or nested packaged products)	1

Transportation method

1. Transport, freight, lorry >32 metric ton, EURO5, 131.22 km
2. Transport, freight, aircraft, all distances to generic market for transport, freight, aircraft, unspecified, 634.15 km

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

Energy data source

1. Energy supply, electricity transformation and distribution, distribution low voltage, Market group for electricity, low voltage, Europe, 0.0123 kWh

Installation scenario documentation - A5 (Waste materials data source)

Treatment of waste paperboard, unsorted, sorting, EU-82%
'Treatment of waste paperboard, municipal incineration, EU-9%
Treatment of waste paperboard, sanitary landfill,EU-9%

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	2,6
Characteristic performance, e.g., energy efficiency, emissions, variation of performance with capacity utilization, etc. / Units as appropriate	Power consumption during trickle charge 2,6 W.
Further assumptions for scenario development, e.g., frequency and period of use, number of occupants / Units as appropriate	-

Energy data source

1. Energy supply, electricity transformation and distribution, distribution low voltage, Market group for electricity, low voltage, Europe, 341.64 kWh

END OF LIFE SCENARIO DOCUMENTATION - C1-C4, D

Scenario information	Value
Collection process – kg collected separately	1,204
Collection process – kg collected with mixed construction waste	0
Recovery process – kg for re-use	0
Recovery process – kg for recycling	0,08
Recovery process – kg for energy recovery	0
Disposal (total) – kg for final deposition	0,62
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.

Program assistant: Xinyuan Zhang

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

ANNEX I: PRODUCT VARIANT RESULTS

Product Name	Mass	A1-A3, EN 15804+A1	A1-A3, EN 15804+A2		
		GWP	GWP_{-total}	$GWP_{-fossil}$	$GWP_{-biogenic}$
ESC 80 ESCAP with up to 30 m viewing distance (Reference product)	1,204 kg	14,0	13,6	14,1	-0,52
ESC 80 ESCAP with up to 20 m viewing distance	0,804 kg	10,8	10,6	10,8	-0,26
ESC 80 ESCAP with up to 26 m viewing distance	0,904 kg	11,6	11,4	11,7	-0,32
ESC 90 ESCAP Emergency Exit Light	0,758 kg	11,1	11,0	11,2	-0,26