ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

EPD HUB, HUB-4593
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Pleiad Evo

Fagerhults Belysning AB

MANUFACTURER AND SITE

Manufacturer	Fagerhults Belysning AB
Address	Åvägen 1, 566 80 Habo, Sweden
Contact details	info@fagerhult.se
Website	www.fagerhult.com
Place of production	Habo, Sweden
Place(s) of raw material origin	Global, mainly EU
Place(s) of installation and use	Global
Period for data	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
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	Josefin Carlsson, Fagerhults Belysning AB
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☑ External verification
EPD verifier	Imane Uald Lamkaddam as an authorized verifier for EPD Hub

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.

PRODUCT SPECIFICATION

Product name	Pleiad Evo
Product number / reference	-
GTIN (Global Trade Item Number)	-
NOBB (Norwegian Building Product Database)	-
A1-A3 Specific data (%)	3,11

PRODUCT CLASSIFICATION

Declared operating voltage, Volt	220
Light source color temperature, Kelvin	3000
Protection index for water and dust (IP)	20
Impact resistance index (IK)	-
Luminous flux, Lumen	1039
Electrical power, Watt	8
Luminous efficiency, Lm/W	133

PRODUCT DESCRIPTION

Pleiad Evo is the latest addition to the Pleiad family- offering exceptional light treatment. The extremely light weight design utilises the reflector as the only cooling element within the fixture. One of the factors behind the success of all of our generations of Pleiad is the time-efficient, tool-free installation.
The housing needs only be placed in the right position and then installed automatically with the help of gravity technology. The rapid installation, combined with high efficiency and long life, ensures Pleiad Evo is an economical choice with a beneficial pay-off time.

ABOUT THE MANUFACTURER

Fagerhult creates premium lighting solutions that enhance human well-being in professional and public environments. With sustainability and connectivity at heart, we focus on office, education, healthcare, retail and outdoor applications. We work closely with customers and partners in the European market and provide lighting solutions globally – with tailor-made solutions for our customers. The Fagerhult brand includes two manufacturing sites and eleven sales companies located around Europe.

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 unit
Declared unit mass, kg	0,67
Mass of packaging, kg	0,19
Functional unit	Provide lighting that delivers an outgoing artificial luminous flux of 1,000 lumens during a reference lifetime of 35,000 hours, see appendix for details
Reference service life (hours)	100000
Assigned lifetime (hours)	100000
GWP-total, A1-A3 (kg CO_2e)	10,9
GWP-fossil, A1-A3 (kg CO_2e)	10,8
Secondary material, inputs (%)	21,1
Secondary material, outputs (%)	34,1
Total energy use, A1-A3 (kWh)	59,5
Net freshwater use, A1-A3 (m^3)	0,443

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

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, allocation has been done in the following ways:

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

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	29	Global, mainly EU
Minerals	0	-
Fossil materials	29	Global, mainly EU
Bio-based materials	0	-
Electronic parts	42	Global, mainly EU

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	0,0979

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.
A market-based approach is used in modelling the electricity mix utilized in the factory. The use of green energy in manufacturing is demonstrated through contractual instruments (GOs, RECs, etc), and its use is ensured throughout the validity period of this EPD.

The product is made of metals, plastics, and electronic components, including driver. All components are transported to the production facility, where the main manufacturing processes are associated with assembly of different parts and components. The product is packaged in a corrugated cardboard box. The product is being sent to the installation site on a wooden pallet wrapped in plastic film.

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.

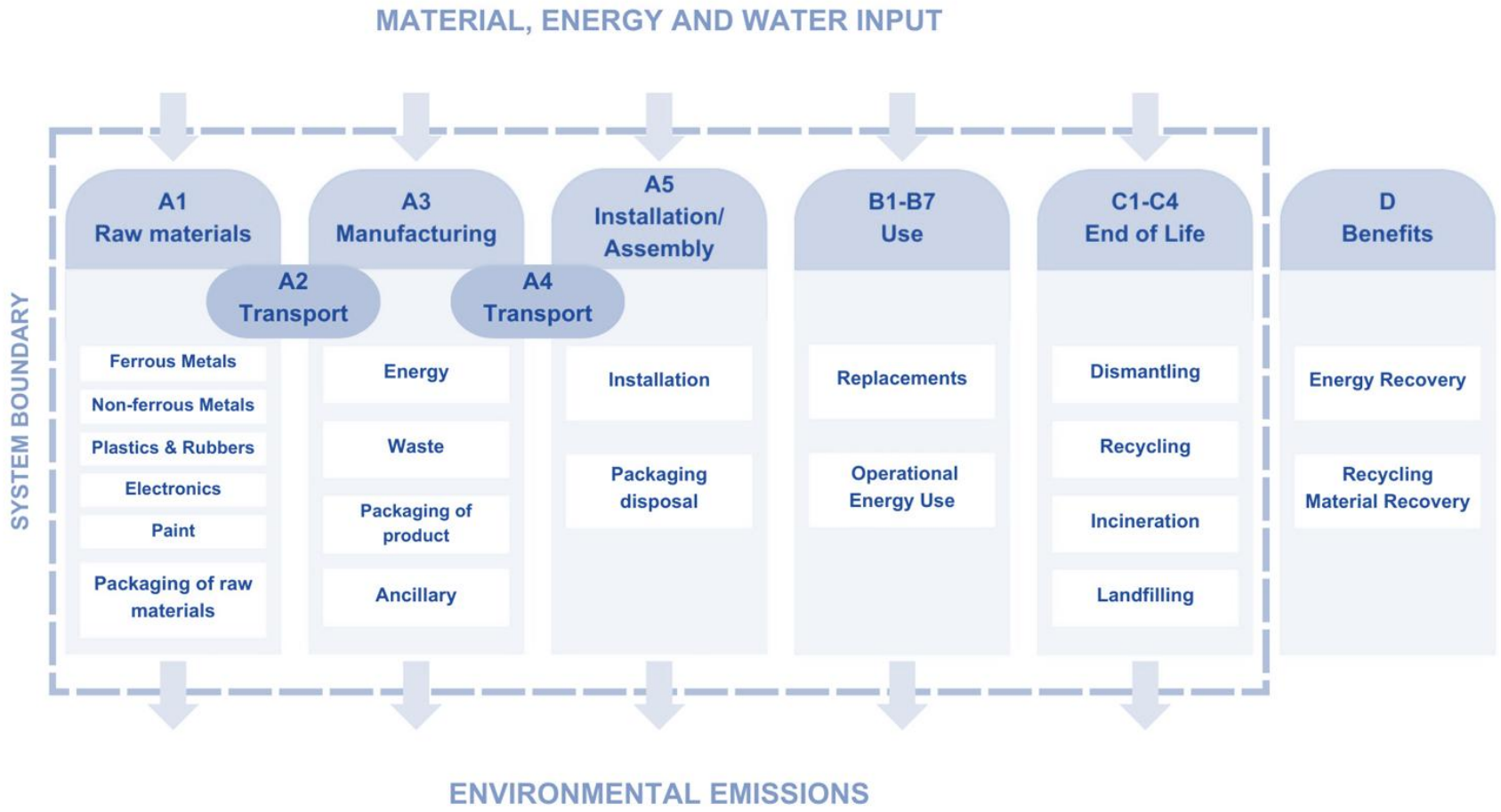
PRODUCT USE AND MAINTENANCE (B1-B7)

The product consume electricity during use phase and the scenario in this study is based on the Swedish electricity grid mix (B6). No energy savings due to controls are included in the scenario. The reference service life time is 100 000 hours and outgoing artificial luminous flux is 1039 lumens. A reference flow of 35 000 hours and 1000 lumens is presented as an appendix in this EPD. 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 following results refers to one unit of Pleiad Evo, with 1039 lumens for 100 000 hours. For reference flow of 1000 lumens for 35 000 hours, see appendix.

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	1,04E+01	7,31E-02	4,44E-01	1,09E+01	6,69E-02	3,70E-01	ND	ND	ND	ND	ND	2,99E+01	ND	0,00E+00	1,88E-02	2,48E-01	1,22E-01	0,00E+00
GWP – fossil	kg CO_2e	1,03E+01	7,31E-02	4,50E-01	1,08E+01	6,68E-02	2,45E-02	ND	ND	ND	ND	ND	2,64E+01	ND	0,00E+00	1,88E-02	2,48E-01	1,22E-01	0,00E+00
GWP – biogenic	kg CO_2e	3,73E-02	1,39E-05	-4,57E-01	-4,20E-01	1,51E-05	3,46E-01	ND	ND	ND	ND	ND	4,80E-01	ND	0,00E+00	4,11E-06	-5,89E-05	-1,31E-05	0,00E+00
GWP – LULUC	kg CO_2e	1,78E-02	2,80E-05	4,51E-01	4,69E-01	2,99E-05	5,48E-06	ND	ND	ND	ND	ND	2,97E+00	ND	0,00E+00	8,32E-06	3,42E-05	5,78E-06	0,00E+00
Ozone depletion pot.	kg CFC_{-11}e	2,51E-06	1,36E-09	1,99E-07	2,71E-06	9,87E-10	1,18E-10	ND	ND	ND	ND	ND	7,92E-07	ND	0,00E+00	2,63E-10	2,40E-10	1,20E-10	0,00E+00
Acidification potential	mol H^+e	9,39E-02	5,88E-04	6,21E-03	1,01E-01	2,28E-04	4,14E-05	ND	ND	ND	ND	ND	3,24E-01	ND	0,00E+00	6,27E-05	1,90E-04	5,01E-05	0,00E+00
EP-freshwater[2)]	kg Pe	1,18E-02	4,16E-06	1,65E-04	1,20E-02	5,20E-06	1,70E-06	ND	ND	ND	ND	ND	2,34E-02	ND	0,00E+00	1,46E-06	1,00E-05	9,00E-07	0,00E+00
EP-marine	kg Ne	1,38E-02	1,66E-04	3,43E-03	1,74E-02	7,49E-05	4,50E-05	ND	ND	ND	ND	ND	4,77E-02	ND	0,00E+00	2,03E-05	5,77E-05	1,24E-04	0,00E+00
EP-terrestrial	mol Ne	1,52E-01	1,83E-03	2,60E-02	1,80E-01	8,15E-04	1,48E-04	ND	ND	ND	ND	ND	4,88E-01	ND	0,00E+00	2,21E-04	5,62E-04	2,26E-04	0,00E+00
POCP ("smog")[3)]	kg NMVOCe	4,72E-02	6,10E-04	3,70E-03	5,16E-02	3,36E-04	5,35E-05	ND	ND	ND	ND	ND	1,30E-01	ND	0,00E+00	8,73E-05	1,53E-04	6,57E-05	0,00E+00
ADP-minerals & metals[4)]	kg Sbe	2,70E-03	1,64E-07	3,92E-06	2,70E-03	1,86E-07	4,41E-08	ND	ND	ND	ND	ND	3,18E-03	ND	0,00E+00	6,17E-08	5,04E-07	1,74E-08	0,00E+00
ADP-fossil resources	MJ	1,40E+02	1,02E+00	6,13E+00	1,47E+02	9,70E-01	1,16E-01	ND	ND	ND	ND	ND	3,54E+03	ND	0,00E+00	2,64E-01	2,84E-01	9,06E-02	0,00E+00
Water use[5)]	m^3e depr.	3,91E+00	4,56E-03	1,46E+01	1,85E+01	4,79E-03	3,43E-03	ND	ND	ND	ND	ND	1,95E+02	ND	0,00E+00	1,22E-03	1,95E-02	8,14E-03	0,00E+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	7,39E-07	5,83E-09	6,83E-08	8,14E-07	6,69E-09	6,96E-10	ND	ND	ND	ND	ND	2,70E-06	ND	0,00E+00	1,49E-09	1,86E-09	6,85E-10	0,00E+00
Ionizing radiation[6)]	kBq U235e	1,05E+00	1,03E-03	3,69E-02	1,09E+00	8,45E-04	3,96E-04	ND	ND	ND	ND	ND	2,54E+02	ND	0,00E+00	2,13E-04	2,02E-03	1,15E-04	0,00E+00
Ecotoxicity (freshwater)	CTUe	2,32E+02	1,08E-01	6,11E+00	2,38E+02	1,37E-01	4,62E-01	ND	ND	ND	ND	ND	4,43E+02	ND	0,00E+00	4,17E-02	5,37E-01	4,27E+00	0,00E+00
Human toxicity, cancer	CTUh	9,83E-09	1,21E-11	5,78E-10	1,04E-08	1,10E-11	5,70E-12	ND	ND	ND	ND	ND	5,22E-08	ND	0,00E+00	3,20E-12	2,90E-11	2,87E-11	0,00E+00
Human tox. non-cancer	CTUh	5,84E-07	6,06E-10	2,03E-08	6,05E-07	6,28E-10	2,83E-10	ND	ND	ND	ND	ND	2,73E-06	ND	0,00E+00	1,65E-10	1,41E-09	1,26E-09	0,00E+00
SQP[7)]	-	6,00E+01	8,07E-01	7,25E+01	1,33E+02	9,77E-01	8,83E-02	ND	ND	ND	ND	ND	8,34E+02	ND	0,00E+00	1,58E-01	2,04E-01	1,34E-01	0,00E+00

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. This impact category deals mainly with the eventual impact of low-dose ionizing radiation on 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	1,68E+01	1,42E-02	5,65E+01	7,33E+01	1,33E-02	-2,43E+00	ND	ND	ND	ND	ND	2,43E+03	ND	0,00E+00	3,62E-03	3,69E-02	2,14E-03	0,00E+00
Renew. PER as material	MJ	0,00E+00	0,00E+00	3,12E+00	3,12E+00	0,00E+00	-3,12E+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	1,68E+01	1,42E-02	5,96E+01	7,64E+01	1,33E-02	-5,55E+00	ND	ND	ND	ND	ND	2,43E+03	ND	0,00E+00	3,62E-03	3,69E-02	2,14E-03	0,00E+00
Non-re. PER as energy	MJ	1,35E+02	1,02E+00	5,46E+00	1,41E+02	9,70E-01	-5,12E-01	ND	ND	ND	ND	ND	3,54E+03	ND	0,00E+00	2,64E-01	-3,22E+00	-3,41E+00	0,00E+00
Non-re. PER as material	MJ	5,19E+00	0,00E+00	5,88E-01	5,78E+00	0,00E+00	-5,88E-01	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	-2,52E+00	-2,67E+00	0,00E+00
Total use of non-re. PER	MJ	1,40E+02	1,02E+00	6,04E+00	1,47E+02	9,70E-01	-1,10E+00	ND	ND	ND	ND	ND	3,54E+03	ND	0,00E+00	2,64E-01	-5,74E+00	-6,08E+00	0,00E+00
Secondary materials	kg	1,41E-01	0,00E+00	0,00E+00	1,41E-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	6,81E-03	4,48E-06	7,28E-02	7,96E-02	5,24E-06	1,02E-06	ND	ND	ND	ND	ND	3,14E-03	ND	0,00E+00	1,51E-06	1,26E-05	1,55E-06	0,00E+00
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	1,04E-01	1,30E-04	3,39E-01	4,43E-01	1,43E-04	-9,66E-05	ND	ND	ND	ND	ND	4,64E+00	ND	0,00E+00	3,49E-05	3,81E-04	-9,05E-05	0,00E+00

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	1,29E+00	1,38E-03	3,78E-02	1,33E+00	1,64E-03	9,93E-04	ND	ND	ND	ND	ND	3,61E+00	ND	0,00E+00	4,60E-04	5,71E-03	4,74E-02	0,00E+00
Non-hazardous waste	kg	3,81E+01	2,62E-02	9,04E-01	3,90E+01	3,04E-02	2,56E-01	ND	ND	ND	ND	ND	1,20E+02	ND	0,00E+00	8,62E-03	1,52E-01	5,50E-01	0,00E+00
Radioactive waste	kg	2,61E-04	2,54E-07	9,36E-06	2,71E-04	2,07E-07	1,01E-07	ND	ND	ND	ND	ND	5,42E-02	ND	0,00E+00	5,23E-08	4,95E-07	2,85E-08	0,00E+00

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	1,08E-01	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	2,29E-01	0,00E+00	0,00E+00
Materials for energy rec	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	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	2,31E-01	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	1,10E+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	9,39E-02	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	4,62E-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	1,31E-01	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	6,36E-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_2e	1,03E+01	7,26E-02	9,65E-01	1,13E+01	6,65E-02	3,83E-02	ND	ND	ND	ND	ND	2,96E+01	ND	0,00E+00	1,87E-02	2,48E-01	1,22E-01	0,00E+00
Ozone depletion Pot.	kg CFC_{-11}e	1,81E-06	1,08E-09	1,41E-07	1,96E-06	7,87E-10	9,59E-11	ND	ND	ND	ND	ND	6,86E-07	ND	0,00E+00	2,10E-10	2,06E-10	9,95E-11	0,00E+00
Acidification	kg SO_2e	7,83E-02	4,61E-04	3,94E-03	8,27E-02	1,74E-04	3,14E-05	ND	ND	ND	ND	ND	2,71E-01	ND	0,00E+00	4,80E-05	1,50E-04	3,62E-05	0,00E+00
Eutrophication	kg PO_4^3e	2,47E-02	7,11E-05	9,23E-03	3,40E-02	4,24E-05	2,00E-05	ND	ND	ND	ND	ND	3,37E-02	ND	0,00E+00	1,17E-05	2,89E-05	1,80E-05	0,00E+00
POCP ("smog")	kg C_2H_4e	5,01E-03	2,91E-05	2,94E-04	5,33E-03	1,55E-05	5,85E-06	ND	ND	ND	ND	ND	1,47E-02	ND	0,00E+00	4,30E-06	8,90E-06	3,48E-06	0,00E+00
ADP-elements	kg Sbe	2,70E-03	1,60E-07	3,89E-06	2,70E-03	1,82E-07	4,27E-08	ND	ND	ND	ND	ND	3,18E-03	ND	0,00E+00	6,03E-08	4,97E-07	1,45E-08	0,00E+00
ADP-fossil	MJ	1,22E+02	1,00E+00	5,49E+00	1,29E+02	9,57E-01	1,09E-01	ND	ND	ND	ND	ND	1,87E+02	ND	0,00E+00	2,60E-01	2,52E-01	8,88E-02	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	1,03E+01	7,31E-02	9,01E-01	1,13E+01	6,69E-02	2,45E-02	ND	ND	ND	ND	ND	2,94E+01	ND	0,00E+00	1,88E-02	2,48E-01	1,22E-01	0,00E+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, heat, steam and air conditioning, heat from wood fuel co-generation, Heat and power co-generation, wood chips, 6667 kW, state-of-the-art 2014, Sweden, ecoinvent 3.10.1, 0.0026 kgCO2e/MJ
2. Energy supply, electricity production, solar photovoltaic, Electricity production, photovoltaic, 3kWp slanted-roof installation, multi-Si, panel, mounted, Sweden, ecoinvent 3.10.1, 0.10 kgCO2e/kWh
3. Manufacturing, coke and refined petroleum products, refined petroleum products, Esterification of rape oil, Sweden, ecoinvent 3.10.1, -0.800003 kgCO2e/kg
4. Energy supply, electricity production, hydro, Electricity production, hydro, reservoir, non-alpine region, Sweden, ecoinvent 3.10.1, 0.0506 kgCO2e/kWh

Transport scenario documentation - A4
1. Transport, freight, lorry >32 metric ton, EURO5, 722.0 km

Installation scenario documentation - A5 (Waste materials data source)
1. Kraft paper production, 8.0E-4 kg
2. Polyethylene terephthalate production, granulate, amorphous, 0.0117 kg
3. Injection moulding, 0.0117 kg
4. Packaging film production, low density polyethylene, 0.0045 kg
5. Corrugated board box production, 0.0952 kg
6. Eur-flat pallet production, 0.006 unit

Use stages scenario documentation - B6-B7 (Energy data source)
1. Energy supply, electricity transformation and distribution, distribution low voltage, Market for electricity, low voltage, Sweden, 800.0 kWh

TRANSPORT SCENARIO DOCUMENTATION - A4

Scenario parameter	Value
Capacity utilization (including empty return) %	50 %
Bulk density of transported products / kg/m³	0
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	-
Water use / m³	-
Other resource use / kg	-
Direct emissions to ambient air, soil and water / kg	-

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	-
Power output of equipment / kW	
Characteristic performance, e.g., energy efficiency, emissions, variation of performance with capacity utilization, etc. / Units as appropriate	
Further assumptions for scenario development, e.g., frequency and period of use, number of occupants / Units as appropriate	

END OF LIFE SCENARIO DOCUMENTATION

Scenario information	Value
Collection process – kg collected separately	0,67
Collection process – kg collected with mixed construction waste	0
Recovery process – kg for re-use	0
Recovery process – kg for recycling	0,229
Recovery process – kg for energy recovery	0
Disposal (total) – kg for final deposition	0,317
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

APPENDIX

Pleiad Evo

The following methodology can be applied to compare environmental performance of different lighting solutions. According to IEC PAS 63629, the functional unit follows;
"Provide lighting that delivers an outgoing artificial luminous flux of 1,000 lumens during a reference lifetime of 35,000 hours".

By converting the results to ensure the functional unit, a reference flow is used. The reference flow is calculated as following;
(1,000 lumens/outgoing luminous flux of the declared unit) x (35,000 hours/lifetime in hours of the declared unit).

The declared unit delivers an outgoing artificial luminous flux of 1,039 lumens during a reference lifetime of 100,000 hours. The reference flow scaling factor is given by the following calculation;
(1,000/1,039) x (35,000/100,000) = 0,3369

The results of the reference flow is given by multiplying the scaling factor with the results based on the declared unit. Which gives the following results for GWP total in A1-A5, B6, C1-C4 and D;

Reference flow, GWP total

A1	A2	A3	A4	A5	B6	C1	C2	C3	C4	D
3,50E+00	2,46E-02	1,50E-01	2,25E-02	1,25E-01	1,01E+01	0,00E+00	6,33E-03	8,35E-02	4,11E-02	0,00E+00

The assigned life time of the luminaire is 100,000 h corresponds to an operational life time depending on the light operation hours in buildings according to EN15193;

Building type	Annual operating hours	Operational life time in years
Residential buildings	3500	29
Offices	2500	40
Education	2000	50
Hospitals	5000	20
Hotels	5000	20
Restaurants	2500	40
Sports facilities	4000	25
Wholesale and retail services	5000	20
Manufacturing factories	4000	25

As stated in the EPD, the calculations are based on a Swedish electricity grid mix on low voltage for year 2024. Be aware of this value depending on specific requirements.

Furthermore, the calculations does not include any energy saving from using controls. If a light management system is applicable, a reduction factor can be used. The factor should represent a relevant scenario for any project. The factors to be applied are presented in the table below according to IEC PAS 63629.

Light Management Function	Reduction	Factor
No controls	0	1,00
Daylight controls	25%	0,75
Presence controls	25%	0,75
Presence and daylight controls	45%	0,55
Luminaire capable of communicating with an external Light Management System	50%	0,50