

ENVIRONMENTAL PRODUCT DECLARATION

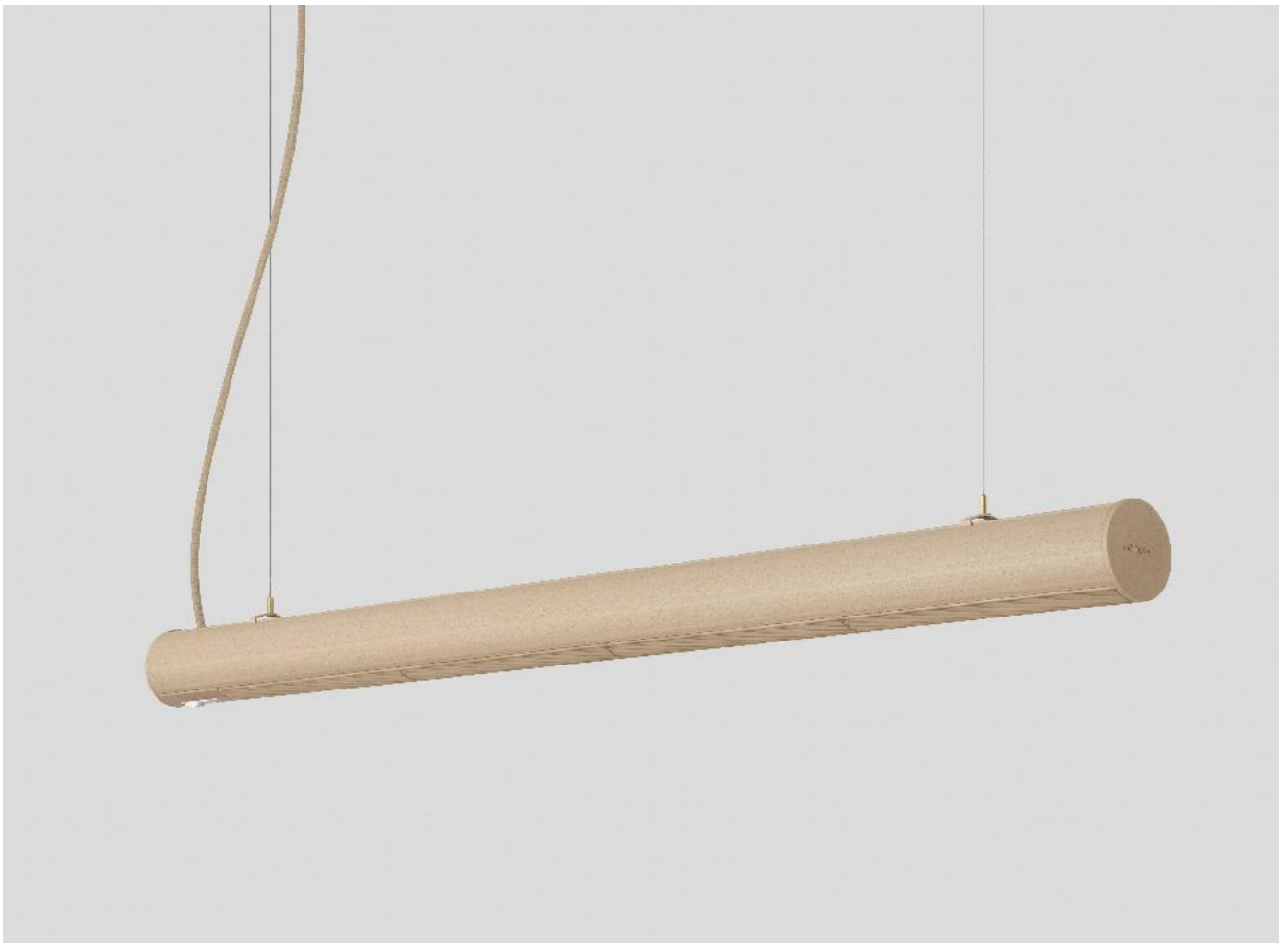
IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

EPD HUB, HUB-7565

Published on 18.09.2026, last updated on 18.09.2026, valid until 17.09.2031

Superdupertube, direct - indirect

Ateljé Lyktan 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	Ateljé Lyktan AB
Address	Fyrvaktaregatan 7, 296 35 Åhus, Sweden
Contact details	info@ateljelyktan.se
Website	www.ateljelyktan.com
Place of production	Åhus, Sweden
Place(s) of raw material origin	Global, mainly Europe
Place(s) of installation and use	Sweden
Period for data	01-01-2025 to 31-12-2025

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	Rasmus Warelus, Ateljé Lyktan AB
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

PRODUCT SPECIFICATION

Product name	Superdupertube, direct - indirect
Product number / reference	-
GTIN (Global Trade Item Number)	-
NOBB (Norwegian Building Product Database)	-
A1-A3 Specific data (%)	2,51

PRODUCT CLASSIFICATION

Declared operating voltage, Volt	230
Light source color temperature, Kelvin	3000
Protection index for water and dust (IP)	20
Impact resistance index (IK)	-
Luminous flux, Lumen	3300
Electrical power, Watt	31
Luminous efficiency, lm/w	106

PRODUCT DESCRIPTION

Superdupertube, direct-indirect is an innovative linear lighting luminaire that offers high-quality lighting (colour temperature 3000 K, colour rendering CRI ≥ 80 and lifespan L100 100,000 hours) and brings a natural aesthetic to all sorts of offices and other indoor creative spaces.

The declared unit represents one luminaire. This EPD refers to the Superdupertube, direct-indirect luminaire with a diagonal louvre in combination with a linear optical film, providing direct and indirect light distribution. The representative luminaire has a length of 1,143 mm and is supplied as a complete, operational unit including all components necessary for installation and use, such as wire suspension, LED modules, double DALI/CLO drivers, and a 3 m connection cable. The product provides artificial lighting throughout its assigned technical lifetime of 100,000 hours, corresponding to an estimated reference service life (RSL) of 40 years under typical office conditions (2,500 operating hours per year).

The product is manufactured and tested in accordance with relevant European standards for luminaires, including EN 60598 and other applicable product-specific standards.

ABOUT THE MANUFACTURER

Ateljé Lyktan develops sustainable, energy-efficient lighting designed for long-term use. Founded in 1934, the company is based in Åhus, Sweden.

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 unit
Declared unit mass, kg	2,937
Mass of packaging, kg	0,901
Functional unit	Provide lighting that delivers an outgoing artificial luminous flux of 1,000 lumens during a reference lifetime of 35,000 hours
Reference service life (years)	40
Assigned lifetime (hours)	100000
GWP-total, A1-A3 (kg CO₂e)	23,1
GWP-fossil, A1-A3 (kg CO₂e)	24,3
Secondary material, inputs (%)	22
Secondary material, outputs (%)	17
Total energy use, A1-A3 (kWh)	152
Net freshwater use, A1-A3 (m³)	2,65E-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	Reuse, Recovery, Recycling
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demo.	Transport	Waste processing	Disposal		

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	Allocated by mass
Manufacturing energy and waste	Allocated by mass

The reference service life time is 100,000 hours and the outgoing artificial luminous flux is 3,300 lumen. Operational energy use is based on the declared electrical power of the luminaire and an office-use scenario of 2,500 operating hours per year over the declared service life. The electricity dataset and reference year used for B6 are documented in the methodology and bibliography sections. Based on the assigned technical lifetime of 100,000 hours, this corresponds to an estimated reference service life of 40 years under the office-use scenario applied in this study. The product is intended for permanent installation in office and other indoor commercial environments.

Where high-voltage electricity production datasets have been used for foreground manufacturing energy, these have been adjusted with a factor of 1.10 to account conservatively (10%) for transformation and distribution losses and thereby better represent low-voltage electricity consumption at site. Guarantees of Origin exist.

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	7,54	Global, mainly Europe
Minerals	0	
Fossil materials	61,22	Global, mainly Europe
Bio-based materials	0	
Electronic parts	31,24	Global, mainly Europe

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	0,379

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 v3.1

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. 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.

Co-product allocation is neglected as revenue of co-product is very low. Hence, the waste undergoes a conservative waste treatment as per the default end-of-life values of EN 50693.

TRANSPORT AND INSTALLATION (A4-A5)

Ateljé Lyktan's main customers are located in southern and central Sweden. Transportation distances from the manufacturing site to customer locations are based on sales volume-based weighted averages. Where exact destination data are unavailable, conservative assumptions are applied. Stockholm is used as a conservative approximation representing the location of the company's main customers. Finished products are therefore transported by lorry approximately 560 km from the production facility in Åhus to the installation site.

Transport impacts include exhaust emissions from fuel combustion, upstream impacts from fuel production, and related infrastructure processes. A full-load

assumption is applied. Product losses during transport are considered negligible due to protective packaging.

The installation stage includes the handling of packaging waste generated at the construction site. The luminaire is delivered as a complete, ready-to-install unit. No product material losses, additional installation materials, or energy consumption during installation are assumed, as these are considered negligible under normal installation conditions.

Environmental impacts from installation are therefore limited to packaging waste. The amount of packaging waste is small and follows the standard waste treatment routes applied in the LCA model, including recycling, incineration with energy recovery, and landfill.

PRODUCT USE AND MAINTENANCE (B1-B7)

The product consumes electricity during use phase and the scenario in this study is based on the Swedish electricity grid mix. Energy savings due to usage of control gear are not included in the main scenario.

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 the 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 and the transportation method is assumed to be lorry.

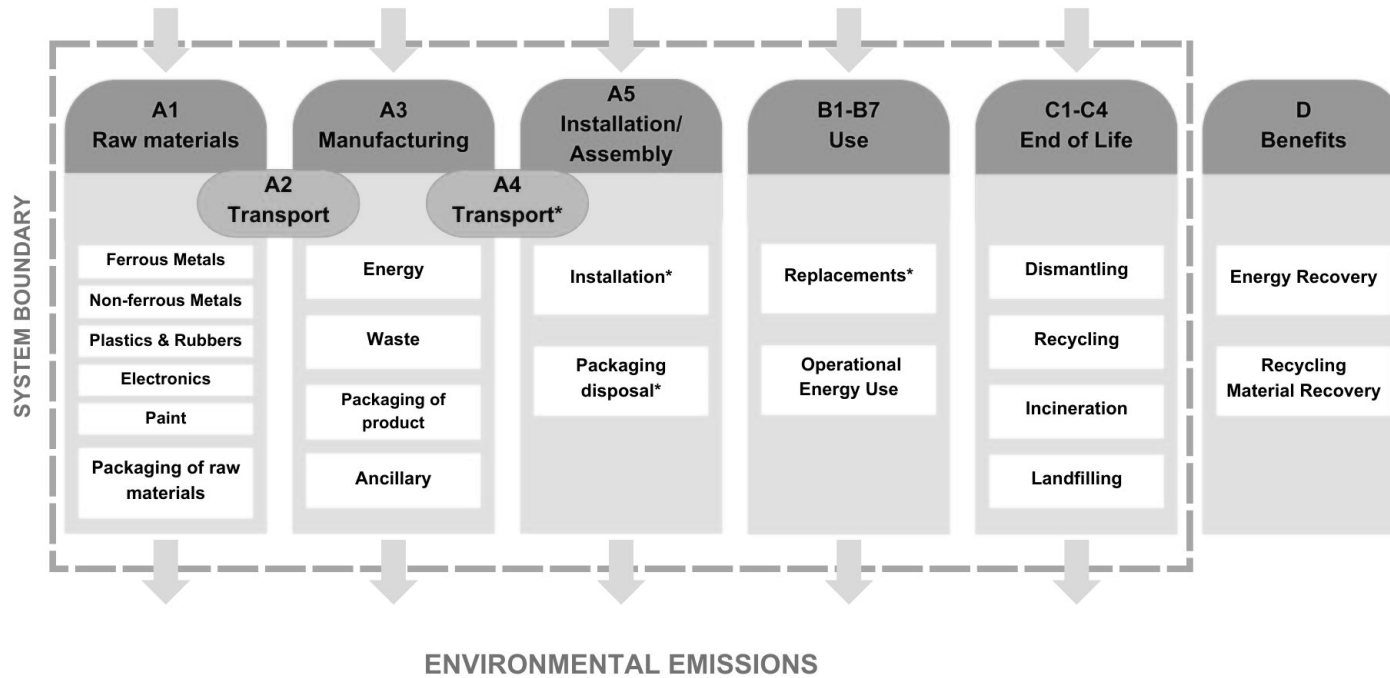
The declared end-of-life scenario is representative of current waste treatment practices in Sweden and reflects one of the most likely end-of-life routes for this type of luminaire. According to EN 50693:2019, the sequence of treatment operations occurring to the product shall include depollution, fractions 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 50693:2019 are applied for the treatment of materials in different waste treatment methods and are used consistently throughout the model for metals, plastics, electronic components, and other material fractions.

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 is assumed to substitute conventional electricity and heat production.

Module D includes potential benefits and loads beyond the system boundary associated with recycling and energy recovery. Recovered materials are assumed to substitute primary material production, while energy recovered from incineration is assumed to substitute conventional electricity and heat production. The associated benefits and loads are reported in Module D.

LIFE CYCLE FLOW DIAGRAM

MATERIAL, ENERGY AND WATER INPUT



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 ₂ e	2,30E+01	1,85E-01	-9,39E-02	2,31E+01	2,31E-01	1,32E+00	ND	ND	ND	ND	ND	1,34E+02	ND	0,00E+00	8,61E-02	2,20E+00	1,12E+00	-1,02E+00
GWP – fossil	kg CO ₂ e	2,28E+01	1,85E-01	1,24E+00	2,43E+01	2,31E-01	5,06E-02	ND	ND	ND	ND	ND	1,19E+02	ND	0,00E+00	8,60E-02	2,20E+00	1,12E+00	-4,47E+00
GWP – biogenic	kg CO ₂ e	1,18E-01	4,53E-05	-1,37E+00	-1,26E+00	5,24E-05	1,27E+00	ND	ND	ND	ND	ND	3,84E+00	ND	0,00E+00	1,88E-05	-2,62E-04	-9,63E-05	3,46E+00
GWP – LULUC	kg CO ₂ e	3,47E-02	8,30E-05	3,96E-02	7,44E-02	1,04E-04	2,67E-05	ND	ND	ND	ND	ND	1,16E+01	ND	0,00E+00	3,81E-05	1,22E-04	2,17E-05	-9,89E-03
Ozone depletion pot.	kg CFC ₁₁ e	2,21E-05	2,67E-09	5,77E-08	2,21E-05	3,42E-09	5,43E-10	ND	ND	ND	ND	ND	4,06E-06	ND	0,00E+00	1,20E-09	1,25E-09	6,82E-10	-3,27E-08
Acidification potential	mol H ⁺ e	3,06E-01	6,34E-04	1,22E-02	3,19E-01	7,89E-04	1,97E-04	ND	ND	ND	ND	ND	1,39E+00	ND	0,00E+00	2,87E-04	8,87E-04	3,27E-04	-2,13E-01
EP-freshwater ²⁾	kg Pe	2,77E-02	1,58E-05	5,83E-04	2,83E-02	1,80E-05	7,64E-06	ND	ND	ND	ND	ND	1,02E-01	ND	0,00E+00	6,69E-06	3,52E-05	5,05E-06	-1,19E-02
EP-marine	kg Ne	3,12E-02	2,07E-04	4,53E-03	3,59E-02	2,59E-04	1,81E-04	ND	ND	ND	ND	ND	2,18E-01	ND	0,00E+00	9,29E-05	3,57E-04	1,10E-03	-1,02E-02
EP-terrestrial	mol Ne	3,56E-01	2,25E-03	5,27E-02	4,11E-01	2,82E-03	6,27E-04	ND	ND	ND	ND	ND	2,32E+00	ND	0,00E+00	1,01E-03	3,23E-03	1,52E-03	-1,36E-01
POCP (“smog”) ³⁾	kg NMVOCe	1,31E-01	9,28E-04	1,08E-02	1,42E-01	1,16E-03	2,50E-04	ND	ND	ND	ND	ND	5,91E-01	ND	0,00E+00	3,99E-04	8,44E-04	4,22E-04	-4,11E-02
ADP-minerals & metals ⁴⁾	kg Sbe	4,75E-03	5,18E-07	4,91E-06	4,75E-03	6,45E-07	2,70E-07	ND	ND	ND	ND	ND	1,25E-02	ND	0,00E+00	2,83E-07	1,38E-06	1,06E-07	-3,19E-03
ADP-fossil resources	MJ	3,64E+02	2,67E+00	1,70E+01	3,84E+02	3,36E+00	5,56E-01	ND	ND	ND	ND	ND	1,47E+04	ND	0,00E+00	1,21E+00	1,17E+00	4,58E-01	-5,51E+01
Water use ⁵⁾	m ³ e depr.	9,37E+00	1,39E-02	7,78E-01	1,02E+01	1,66E-02	1,23E-02	ND	ND	ND	ND	ND	6,75E+02	ND	0,00E+00	5,60E-03	1,55E-01	7,18E-02	-1,91E+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	1,53E-06	1,84E-08	1,66E-07	1,72E-06	2,32E-08	3,24E-09	ND	ND	ND	ND	ND	1,19E-05	ND	0,00E+00	6,83E-09	6,88E-09	3,24E-09	-5,27E-07
Ionizing radiation ⁶⁾	kBq U235e	2,26E+00	2,32E-03	1,18E-01	2,38E+00	2,92E-03	2,12E-03	ND	ND	ND	ND	ND	1,04E+03	ND	0,00E+00	9,77E-04	7,29E-03	6,15E-04	-5,11E-01
Ecotoxicity (freshwater)	CTUe	1,27E+03	1,03E+00	8,89E+01	1,36E+03	4,75E-01	3,81E+00	ND	ND	ND	ND	ND	1,41E+04	ND	0,00E+00	1,91E-01	4,45E+00	3,72E+00	-1,83E+02
Human toxicity, cancer	CTUh	3,18E-08	3,04E-11	9,84E-10	3,29E-08	3,82E-11	2,55E-11	ND	ND	ND	ND	ND	1,83E-07	ND	0,00E+00	1,46E-11	2,09E-10	1,59E-10	-2,78E-08
Human tox. non-cancer	CTUh	2,40E-06	1,73E-09	2,92E-08	2,43E-06	2,17E-09	1,39E-09	ND	ND	ND	ND	ND	1,09E-05	ND	0,00E+00	7,55E-10	8,52E-09	6,75E-09	-2,87E-06
SQP ⁷⁾	-	1,46E+02	2,68E+00	1,66E+02	3,15E+02	3,38E+00	3,75E-01	ND	ND	ND	ND	ND	3,85E+03	ND	0,00E+00	7,21E-01	6,06E-01	5,93E-01	-2,37E+02

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	3,81E+01	3,67E-02	1,66E+02	2,04E+02	4,60E-02	-1,49E+01	ND	ND	ND	ND	ND	9,29E+03	ND	0,00E+00	1,65E-02	1,26E-01	1,25E-02	-2,71E+01
Renew. PER as material	MJ	0,00E+00	0,00E+00	1,18E+01	1,18E+01	0,00E+00	-1,18E+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	3,81E+01	3,67E-02	1,77E+02	2,16E+02	4,60E-02	-2,67E+01	ND	ND	ND	ND	ND	9,29E+03	ND	0,00E+00	1,65E-02	1,26E-01	1,25E-02	-2,71E+01
Non-re. PER as energy	MJ	3,22E+02	2,67E+00	1,72E+01	3,42E+02	3,36E+00	5,56E-01	ND	ND	ND	ND	ND	1,47E+04	ND	0,00E+00	1,21E+00	-3,15E+01	-3,22E+01	-5,50E+01
Non-re. PER as material	MJ	4,23E+01	0,00E+00	5,75E-02	4,24E+01	0,00E+00	-5,75E-02	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	-2,12E+01	-2,12E+01	0,00E+00
Total use of non-re. PER	MJ	3,65E+02	2,67E+00	1,73E+01	3,84E+02	3,36E+00	4,98E-01	ND	ND	ND	ND	ND	1,47E+04	ND	0,00E+00	1,21E+00	-5,27E+01	-5,34E+01	-5,50E+01
Secondary materials	kg	6,45E-01	0,00E+00	0,00E+00	6,45E-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	3,07E-02	1,45E-05	9,38E-02	1,25E-01	1,82E-05	4,48E-06	ND	ND	ND	ND	ND	1,42E-02	ND	0,00E+00	6,90E-06	4,72E-05	9,00E-06	-9,83E-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	2,50E-01	3,95E-04	1,44E-02	2,65E-01	4,96E-04	-1,10E-04	ND	ND	ND	ND	ND	1,57E+01	ND	0,00E+00	1,60E-04	2,80E-03	-3,27E-04	-8,98E-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	3,27E+00	4,86E-03	8,52E-02	3,36E+00	5,69E-03	4,18E-03	ND	ND	ND	ND	ND	1,48E+01	ND	0,00E+00	2,10E-03	4,23E-02	1,80E-01	-1,08E+00
Non-hazardous waste	kg	1,27E+02	9,08E-02	2,39E+00	1,30E+02	1,05E-01	6,32E-01	ND	ND	ND	ND	ND	5,44E+02	ND	0,00E+00	3,95E-02	1,13E+00	3,08E+00	-7,56E+01
Radioactive waste	kg	5,66E-04	5,69E-07	3,01E-05	5,96E-04	7,16E-07	5,38E-07	ND	ND	ND	ND	ND	2,22E-01	ND	0,00E+00	2,39E-07	1,79E-06	1,54E-07	-1,28E-04

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	7,46E-01	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	4,98E-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	4,53E-01	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	1,02E+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	1,91E-01	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	4,31E+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	2,41E-01	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	5,93E+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 ₂ e	2,28E+01	1,84E-01	1,29E+00	2,43E+01	2,30E-01	1,66E-01	ND	ND	ND	ND	ND	1,31E+02	ND	0,00E+00	8,56E-02	2,20E+00	1,12E+00	-4,46E+00
Ozone depletion Pot.	kg CFC ₁₁ e	1,49E-05	2,13E-09	5,93E-08	1,49E-05	2,73E-09	4,43E-10	ND	ND	ND	ND	ND	3,79E-06	ND	0,00E+00	9,61E-10	1,09E-09	5,81E-10	-2,75E-08
Acidification	kg SO ₂ e	2,62E-01	4,84E-04	8,12E-03	2,71E-01	6,02E-04	1,51E-04	ND	ND	ND	ND	ND	1,15E+00	ND	0,00E+00	2,20E-04	6,72E-04	2,34E-04	-1,88E-01
Eutrophication	kg PO ₄ ³ e	8,66E-02	1,19E-04	3,66E-03	9,03E-02	1,47E-04	1,36E-04	ND	ND	ND	ND	ND	1,66E-01	ND	0,00E+00	5,34E-05	1,69E-04	1,22E-04	-8,05E-03
POCP ("smog")	kg C ₂ H ₄ e	1,92E-02	4,29E-05	7,82E-04	2,00E-02	5,37E-05	3,93E-05	ND	ND	ND	ND	ND	6,41E-02	ND	0,00E+00	1,97E-05	4,14E-05	2,29E-05	-7,98E-03
ADP-elements	kg Sbe	4,74E-03	5,05E-07	4,81E-06	4,75E-03	6,29E-07	2,64E-07	ND	ND	ND	ND	ND	1,25E-02	ND	0,00E+00	2,76E-07	1,33E-06	8,15E-08	-3,19E-03
ADP-fossil	MJ	3,27E+02	2,64E+00	1,49E+01	3,45E+02	3,31E+00	5,20E-01	ND	ND	ND	ND	ND	9,09E+02	ND	0,00E+00	1,19E+00	1,05E+00	4,48E-01	-4,71E+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 ₂ e	2,29E+01	1,85E-01	1,28E+00	2,43E+01	2,31E-01	5,06E-02	ND	ND	ND	ND	ND	1,31E+02	ND	0,00E+00	8,61E-02	2,20E+00	1,12E+00	-4,48E+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.

ENVIRONMENTAL IMPACT DATA, RESULTS PER FUNCTIONAL 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-C

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total ¹⁾	kg CO ₂ éq/FU	2,44E+00	1,96E-02	-9,95E-03	2,45E+00	2,46E-02	1,41E-01	ND	ND	ND	ND	ND	1,43E+01	ND	0,00E+00	9,13E-03	2,33E-01	1,19E-01	-1,08E-01
GWP – fossil	kg CO ₂ éq/FU	2,42E+00	1,96E-02	1,32E-01	2,57E+00	2,45E-02	5,36E-03	ND	ND	ND	ND	ND	1,26E+01	ND	0,00E+00	9,12E-03	2,33E-01	1,19E-01	-4,74E-01
GWP – biogenic	kg CO ₂ éq/FU	1,25E-02	4,81E-06	-1,46E-01	-1,33E-01	5,56E-06	1,35E-01	ND	ND	ND	ND	ND	4,08E-01	ND	0,00E+00	1,99E-06	-2,78E-05	-1,02E-05	3,67E-01
GWP – LULUC	kg CO ₂ éq/FU	3,68E-03	8,80E-06	4,19E-03	7,89E-03	1,10E-05	2,83E-06	ND	ND	ND	ND	ND	1,23E+00	ND	0,00E+00	4,04E-06	1,29E-05	2,30E-06	-1,05E-03
Ozone depletion pot.	kg CFC ₁₁ e/FU	2,34E-06	2,83E-10	6,12E-09	2,35E-06	3,62E-10	5,76E-11	ND	ND	ND	ND	ND	4,31E-07	ND	0,00E+00	1,28E-10	1,33E-10	7,24E-11	-3,46E-09
Acidification potential	mole H ⁺ e/FU	3,24E-02	6,72E-05	1,29E-03	3,38E-02	8,37E-05	2,09E-05	ND	ND	ND	ND	ND	1,48E-01	ND	0,00E+00	3,04E-05	9,41E-05	3,46E-05	-2,26E-02
EP-freshwater ²⁾	kg Pe/FU	2,94E-03	1,68E-06	6,18E-05	3,01E-03	1,91E-06	8,10E-07	ND	ND	ND	ND	ND	1,08E-02	ND	0,00E+00	7,10E-07	3,73E-06	5,36E-07	-1,27E-03
EP-marine	kg Ne/FU	3,31E-03	2,20E-05	4,80E-04	3,81E-03	2,75E-05	1,92E-05	ND	ND	ND	ND	ND	2,32E-02	ND	0,00E+00	9,85E-06	3,78E-05	1,17E-04	-1,08E-03
EP-terrestrial	mol Ne/FU	3,77E-02	2,39E-04	5,59E-03	4,36E-02	2,99E-04	6,65E-05	ND	ND	ND	ND	ND	2,46E-01	ND	0,00E+00	1,07E-04	3,43E-04	1,61E-04	-1,44E-02
POCP (“smog”) ³⁾	kg NMVOCe/F	1,38E-02	9,84E-05	1,14E-03	1,51E-02	1,23E-04	2,66E-05	ND	ND	ND	ND	ND	6,27E-02	ND	0,00E+00	4,23E-05	8,95E-05	4,47E-05	-4,36E-03
ADP-minerals & metals ⁴⁾	kg Sbe/FU	5,03E-04	5,49E-08	5,21E-07	5,04E-04	6,84E-08	2,87E-08	ND	ND	ND	ND	ND	1,33E-03	ND	0,00E+00	3,00E-08	1,47E-07	1,13E-08	-3,38E-04
ADP-fossil resources	MJ/FU	3,87E+01	2,84E-01	1,81E+00	4,07E+01	3,56E-01	5,90E-02	ND	ND	ND	ND	ND	1,55E+03	ND	0,00E+00	1,28E-01	1,24E-01	4,86E-02	-5,84E+00
Water use ⁵⁾	m ³ e priv. /FU	9,94E-01	1,47E-03	8,26E-02	1,08E+00	1,76E-03	1,30E-03	ND	ND	ND	ND	ND	7,16E+01	ND	0,00E+00	5,94E-04	1,64E-02	7,62E-03	-2,03E-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 /FU	1,63E-07	1,95E-09	1,76E-08	1,82E-07	2,46E-09	3,44E-10	ND	ND	ND	ND	ND	1,26E-06	ND	0,00E+00	7,24E-10	7,30E-10	3,44E-10	-5,59E-08
Ionizing radiation ⁶⁾	kBq U235e/FU	2,40E-01	2,46E-04	1,25E-02	2,53E-01	3,10E-04	2,25E-04	ND	ND	ND	ND	ND	1,10E+02	ND	0,00E+00	1,04E-04	7,73E-04	6,52E-05	-5,42E-02
Ecotoxicity (freshwater)	CTUe/FU	1,34E+02	1,10E-01	9,43E+00	1,44E+02	5,04E-02	4,04E-01	ND	ND	ND	ND	ND	1,50E+03	ND	0,00E+00	2,02E-02	4,72E-01	3,95E-01	-1,94E+01
Human toxicity, cancer	CTUh/FU	3,38E-09	3,23E-12	1,04E-10	3,48E-09	4,05E-12	2,71E-12	ND	ND	ND	ND	ND	1,94E-08	ND	0,00E+00	1,55E-12	2,22E-11	1,69E-11	-2,95E-09
Human tox. non-cancer	CTUh/FU	2,54E-07	1,83E-10	3,09E-09	2,58E-07	2,31E-10	1,47E-10	ND	ND	ND	ND	ND	1,16E-06	ND	0,00E+00	8,01E-11	9,03E-10	7,16E-10	-3,04E-07
SQP ⁷⁾	-/FU	1,55E+01	2,84E-01	1,76E+01	3,34E+01	3,59E-01	3,97E-02	ND	ND	ND	ND	ND	4,08E+02	ND	0,00E+00	7,64E-02	6,43E-02	6,28E-02	-2,52E+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. 8) PER = Primary energy resources.

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/FU	4,04E+00	3,89E-03	1,76E+01	2,16E+01	4,88E-03	-1,58E+00	ND	ND	ND	ND	ND	9,85E+02	ND	0,00E+00	1,76E-03	1,34E-02	1,33E-03	-2,87E+00
Renew. PER as material	MJ/FU	0,00E+00	0,00E+00	1,26E+00	1,26E+00	0,00E+00	-1,26E+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/FU	4,04E+00	3,89E-03	1,88E+01	2,29E+01	4,88E-03	-2,84E+00	ND	ND	ND	ND	ND	9,85E+02	ND	0,00E+00	1,76E-03	1,34E-02	1,33E-03	-2,87E+00
Non-re. PER as energy	MJ/FU	3,42E+01	2,84E-01	1,83E+00	3,63E+01	3,56E-01	5,90E-02	ND	ND	ND	ND	ND	1,55E+03	ND	0,00E+00	1,28E-01	-3,34E+00	-3,42E+00	-5,84E+00
Non-re. PER as material	MJ/FU	4,49E+00	0,00E+00	6,10E-03	4,50E+00	0,00E+00	-6,10E-03	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	-2,24E+00	-2,24E+00	0,00E+00
Total use of non-re. PER	MJ/FU	3,87E+01	2,84E-01	1,84E+00	4,08E+01	3,56E-01	5,29E-02	ND	ND	ND	ND	ND	1,55E+03	ND	0,00E+00	1,28E-01	-5,59E+00	-5,66E+00	-5,84E+00
Secondary materials	kg/FU	6,84E-02	0,00E+00	0,00E+00	6,84E-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/FU	3,25E-03	1,53E-06	9,95E-03	1,32E-02	1,93E-06	4,75E-07	ND	ND	ND	ND	ND	1,51E-03	ND	0,00E+00	7,32E-07	5,01E-06	9,54E-07	-1,04E-04
Non-ren. secondary fuels	MJ/FU	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	m³/FU	2,65E-02	4,19E-05	1,53E-03	2,81E-02	5,26E-05	-1,16E-05	ND	ND	ND	ND	ND	1,67E+00	ND	0,00E+00	1,70E-05	2,97E-04	-3,47E-05	-9,52E-03

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/FU	3,47E-01	5,15E-04	9,03E-03	3,56E-01	6,03E-04	4,44E-04	ND	ND	ND	ND	ND	1,57E+00	ND	0,00E+00	2,23E-04	4,49E-03	1,90E-02	-1,14E-01
Non-hazardous waste	kg/FU	1,35E+01	9,63E-03	2,54E-01	1,38E+01	1,12E-02	6,70E-02	ND	ND	ND	ND	ND	5,77E+01	ND	0,00E+00	4,18E-03	1,20E-01	3,27E-01	-8,02E+00
Radioactive waste	kg/FU	6,00E-05	6,03E-08	3,20E-06	6,33E-05	7,59E-08	5,71E-08	ND	ND	ND	ND	ND	2,36E-02	ND	0,00E+00	2,54E-08	1,90E-07	1,64E-08	-1,36E-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 re-use	kg/FU	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/FU	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,91E-02	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	5,28E-02	0,00E+00	0,00E+00
Materials for energy rec	kg/FU	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/FU	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,81E-02	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	1,09E+00	0,00E+00	0,00E+00
Exported energy: Electricity	MJ/FU	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,02E-02	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	4,58E-01	0,00E+00	0,00E+00
Exported energy: Heat	MJ/FU	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,55E-02	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	6,29E-01	0,00E+00	0,00E+00

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO ₂ éq./FU	2,42E+00	1,95E-02	1,37E-01	2,58E+00	2,44E-02	1,76E-02	ND	ND	ND	ND	ND	1,39E+01	ND	0,00E+00	9,08E-03	2,33E-01	1,18E-01	-4,73E-01
Ozone depletion Pot.	kg CFC ₁₁ e/FU	1,58E-06	2,26E-10	6,29E-09	1,59E-06	2,89E-10	4,70E-11	ND	ND	ND	ND	ND	4,02E-07	ND	0,00E+00	1,02E-10	1,16E-10	6,16E-11	-2,92E-09
Acidification	kg SO ₂ e/FU	2,78E-02	5,14E-05	8,62E-04	2,87E-02	6,39E-05	1,60E-05	ND	ND	ND	ND	ND	1,22E-01	ND	0,00E+00	2,33E-05	7,13E-05	2,48E-05	-2,00E-02
Eutrophication	kg PO ₄ ³ e/FU	9,18E-03	1,26E-05	3,89E-04	9,58E-03	1,56E-05	1,44E-05	ND	ND	ND	ND	ND	1,76E-02	ND	0,00E+00	5,67E-06	1,79E-05	1,30E-05	-8,53E-04
POCP (“smog”)	kg C ₂ H ₄ e/FU	2,04E-03	4,55E-06	8,29E-05	2,12E-03	5,69E-06	4,17E-06	ND	ND	ND	ND	ND	6,79E-03	ND	0,00E+00	2,09E-06	4,39E-06	2,42E-06	-8,47E-04
ADP-elements	kg Sbe/FU	5,03E-04	5,35E-08	5,10E-07	5,03E-04	6,68E-08	2,80E-08	ND	ND	ND	ND	ND	1,33E-03	ND	0,00E+00	2,93E-08	1,41E-07	8,65E-09	-3,38E-04
ADP-fossil	MJ/FU	3,47E+01	2,80E-01	1,58E+00	3,66E+01	3,51E-01	5,51E-02	ND	ND	ND	ND	ND	9,64E+01	ND	0,00E+00	1,26E-01	1,11E-01	4,76E-02	-4,99E+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 ₂ e/FU	2,42E+00	1,96E-02	1,36E-01	2,58E+00	2,45E-02	5,36E-03	ND	ND	ND	ND	ND	1,38E+01	ND	0,00E+00	9,13E-03	2,33E-01	1,19E-01	-4,75E-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 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 production, hydro, Electricity production, hydro, run-of-river, Sweden,ecoinvent 3.11, 0.0044 kgCO₂e/kWh
2. 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 3.11, 0.0026 kgCO₂e/MJ

Transport scenario documentation - A4

1. Transport, freight, lorry >32 metric ton, EURO5, 560.0 km

Installation scenario documentation - A5 (Energy data source)

Installation scenario documentation - A5 (Waste materials data source)

1. Corrugated board box production, 0.901 kg
2. Eur-flat pallet production, 9.52381E-4 unit

TRANSPORT SCENARIO DOCUMENTATION - A4

Scenario parameter	Value
Capacity utilization (including empty return) %	50 %
Bulk density of transported products / kg/m ³	169
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 / m ³	0
Other resource use / kg	0

Direct emissions to ambient air, soil and water / kg

0

END OF LIFE SCENARIO DOCUMENTATION

Scenario information	Value
Collection process – kg collected separately	2,937
Collection process – kg collected with mixed construction waste	0
Recovery process – kg for re-use	0
Recovery process – kg for recycling	0,5
Recovery process – kg for energy recovery	0
Disposal (total) – kg for final deposition	1,54
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