ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

Tectis roofing underlays with condensation control
Tectis Oy

EPD HUB, HUB-5514
Published on 24.02.2026, last updated on 24.02.2026, valid until 23.02.2031

Life Cycle Assessment study has been performed in accordance with the requirements of EN 15804, EPD Hub PCR version 1.2 (24 Mar 2025) and JRC characterization factors EF 3.1.

Created with One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Tectis Oy
Address	Mänkimiehentie 19, 02780 Espoo, Finland
Contact details	info@tectis.fi
Website	www.tectis.fi

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804:2012+A2:2019/AC:2021 and ISO 14025
PCR	EPD Hub Core PCR Version 1.2, 24 Mar 2025 EN 17388-2 Flexible sheets for waterproofing - Part 2: Cradle to gate with options
Sector	Construction product
Category of EPD	Third party verified EPD
Parent EPD number	-
Scope of the EPD	Cradle to gate with options, A4-A5, and modules C1-C4, D
EPD author	Maarja-Liisa Nomm - Tectis 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

This EPD is intended for business-to-business and/or business-to-consumer communication. The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

PRODUCT

Product name	Tectis roofing underlays with condensation control
Additional labels	Roofproof, Anti'con Proof, Anti'con Basic, Anti'con Rankka, Anti'con Coverall, Ruukki 30, Ruukki 50 Plus, Anti'con Coverall, Anti'con Coverall Plannja
Product reference	05140; 05139; 07532; 07533; 07561; 07541; 97506; 97508; 97561; 07549; 07547; 17548; 17533; 17535; 17536; 17531; 17532; 95140; 97508; 97561; 02304; 02303; 02306; 02305; 96261; 96248
Place(s) of raw material origin	Finland, Asia
Place of production	Espoo, Finland; Pori, Finland; Tallinn, Estonia; Gyeongsangbuk-do, South-Korea; Nhu Quynh, Vietnam; Gothenburg, Sweden
Place(s) of installation and use	EU
Period for data	Calendar year 2024
Averaging in EPD	Multiple products and multiple factories
Variation in GWP-fossil for A1-A3 (%)	-3/+46
GTIN (Global Trade Item Number)	-
NOBB (Norwegian Building Product Database)	-
A1-A3 Specific data (%)	9,61

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 m^2
Declared unit mass	0,14 kg
Mass of packaging	0,00534 kg
GWP-fossil, A1-A3 ($kgCO_2e$)	0,61
GWP-total, A1-A3 ($kgCO_2e$)	0,6
Secondary material, inputs (%)	2,27
Secondary material, outputs (%)	24,3
Total energy use, A1-A3 (kWh)	2,3
Net freshwater use, A1-A3 (m^3)	0,01

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Tectis Oy is a forward-thinking, flexible, and committed Finnish family-owned company established in 1985. With strong roots in Finland and active operations in Estonia, Sweden, and Norway, Tectis combines local expertise with an international network to serve a wide range of clients across the building and construction sectors.

Our main customers include hardware stores, house factories, construction companies, as well as building designers and architects. Tectis offers high-quality solutions that ensure durability, efficiency and sustainability in construction.

Our core product range consists of underlayers, building membranes and papers, and a wide variety of sealing materials such as tapes, mastics, and sealing strips. These products are trusted by professionals and are widely available through hardware stores across the countries where Tectis operates.

PRODUCT DESCRIPTION

This Environmental Product Declaration (EPD) is valid for roofing underlay membranes manufactured by Tectis Oy.

The product group includes the following condensation protected underlays: Roofproof, Anti'con Basic, Anti'con Proof, Anti'con Rankka, and Anti'con Coverall. These products are used as secondary waterproofing layers in ventilated inclined roofs beneath various discontinuous roofing types. The non-woven fabric on the underside of the condensation protecting underlay binds condensation water that forms under different conditions and prevents it from draining into the roof structures. Proper ventilation will then dry the non-woven fabric. Their primary function is to protect roof structures against external moisture while managing condensation formed both beneath the discontinuous roofing on one hand, and beneath the roofing underlay on the other hand.

The products share similar material compositions and manufacturing processes, while differences between individual products relate mainly to mechanical performance level. These are for instance differences in condensation binding capacity (both as a result of differences in the non-woven fabric itself and the lamination technique), the friction of the surface layer (an extra safety measure during installation work), and differences in mechanical strength.

All underlays are manufactured using multilayer laminates based on HDPE (high-density polyethylene) mesh with PE (polyethylene) coatings and non-woven surfaces. The products differ in thickness, number of material layers and overall material content, resulting in varying amounts of raw materials per square meter. The areal mass of the underlays included in this EPD ranges from 130 g/m² to 200 g/m². The representative product, Roofproof, with an areal mass of 140 g/m², is selected based on material composition and corresponds to an average of the five products included in the EPD.

In addition, certain product variants include supplementary functional components. For example, tape and an adhesive strip have been added to Anti'con Coverall to ensure watertight overlaps and to reduce the risk of water penetration into the roof structure or a separate watertightness PE-layer has been added to Anti'con Rankka and Anti'con Proof in order to achieve an extra level of watertightness (beyond any standards) also around the mechanical fastening details.

Differences in material content and functional components are the main characteristics responsible for variations in environmental impacts among the products within the group. In particular, differences in the origin of semi-finished products and the associated transport distances contribute to variations in the environmental impacts of individual products.

The products are tested according to the harmonized standard EN 13859-1: Flexible sheets for waterproofing - Definitions and characteristics of underlays - Part 1: Underlays for discontinuous roofing.
The testing covers essential performance characteristics such as watertightness, mechanical strength, resistance to ageing, and durability under defined exposure to UV-light and heat.
The products meet the applicable performance requirements of the standard for their intended use.

Further information can be found at:
www.tectis.fi

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	0	-
Minerals	0	-
Fossil materials	100	Finland, Asia
Bio-based materials	0	-

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0
Biogenic carbon content in packaging, kg C	0,0027

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 m^2
Mass per declared unit	0,14 kg
Functional unit	-
Reference service life	-

SUBSTANCES, REACH - VERY HIGH CONCERN

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

PRODUCT LIFE-CYCLE

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
x	x	x	x	x	ND	ND	ND	ND	ND	ND	ND	x	x	x	x	x		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/ demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Not declared = ND.

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

A market-based approach is used in modelling the electricity mix utilized in the factory.

Tectis roofing underlays with condensation control are manufactured by using a multi-stage industrial process that converts raw materials into high-performance, multilayer roofing membranes. The membranes consist primarily of a woven high-density polyethylene (HDPE) mesh, functional waterproof layers, and non-woven fabrics designed for moisture absorption and condensation control.

HDPE granules and PP (polypropylene) or PE (polyethylene) granules are loaded into dispensers. Additives such as color pigments and UV stabilizers may also be included to enhance product performance and durability. HDPE granules are extruded into yarns. The extruded yarns are cooled, stretched for strength, and woven into mesh, which serves as the structural reinforcement layer for the membranes. The HDPE mesh is laminated with additional functional layers. Depending on the product, the top surface is coated with a waterproof polyethylene film, and in some cases, a friction-enhancing layer is added to improve work safety.

For condensation-protected membranes, a non-woven fabric with moisture-binding capability is laminated to the underside. This fabric absorbs condensation that forms on the underside of the membrane, preventing dripping and allowing the moisture to evaporate through roof ventilation.

The multilayer laminate is first rewound into jumbo rolls. The jumbo rolls for the reference product are produced in South Korea, while for the majority of the products covered by this EPD they are produced in Finland and for one product in Vietnam. The jumbo rolls are then transported by truck and by sea to the converting sites in Estonia and Finland for converting into smaller retail rolls.

Production losses occurring during the manufacturing and converting stages are estimated at 1,43% of the total material input and are included in the LCA model. Production waste generated during manufacturing is managed based on site-specific waste contractor data, including actual shares of recycling and energy recovery. Transport of manufacturing waste to waste treatment facilities in module A3 are modeled using actual transport distances from each production site to the respective treatment facilities. Packaging includes labeling, stacking the finished rolls onto pallets with frames, and securing the pallets using stretch film and pallet cover to ensure protection during storage and transport against moisture, dust, and mechanical damage.

Finished rolls are stored in a dry facility and shipped to customers or distributors as needed.

All underlays are manufactured without added chalk or quality-reducing fillers and are suitable for long-term use in demanding climatic conditions. The materials used are selected for their durability, recyclability, and mechanical stability. The production processes are designed to minimize material waste, ensure dimensional consistency, and maintain high and consistent product quality for all membranes.

Electricity consumption is modeled using country-specific residual mixes or a consumption electricity mix without renewables as a substitute where needed.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

Average transport distances to retailers vary due to the company's multiple production and distribution locations across different countries. The transport distances are calculated as a sales-weighted average distance. The transportation method is assumed to be lorry and ferry. Vehicle capacity utilization volume factor is assumed to be 100% which means full load. In reality, it may vary but as role of transportation emissions in total results is small, the variety in load is assumed to be negligible. Empty returns are not taken into account as it is assumed that return trips are used by the transportation company to serve the needs of other customers.

Transportation does not cause losses as product is packaged properly. Environmental impacts from installation into the building include generation of waste packaging materials (A5) and release of biogenic carbon dioxide from wood pallets and cardboard cores.

Installation waste is assumed to be 0%, as the product is supplied in standardized roll dimensions and cutting waste is considered negligible. Installation is performed manually by mechanically fixing the membranes to the supporting structure using staples. Electrically powered installation equipment is generally not required, however, a small amount of electricity is considered in the study when electrically powered fastening tools are used for securing the underlay.

PRODUCT USE AND MAINTENANCE (B1-B7)

The use phase is not accounted into the assessment because it is not applicable.
Air, soil, and water impacts during the use phase have not been studied.

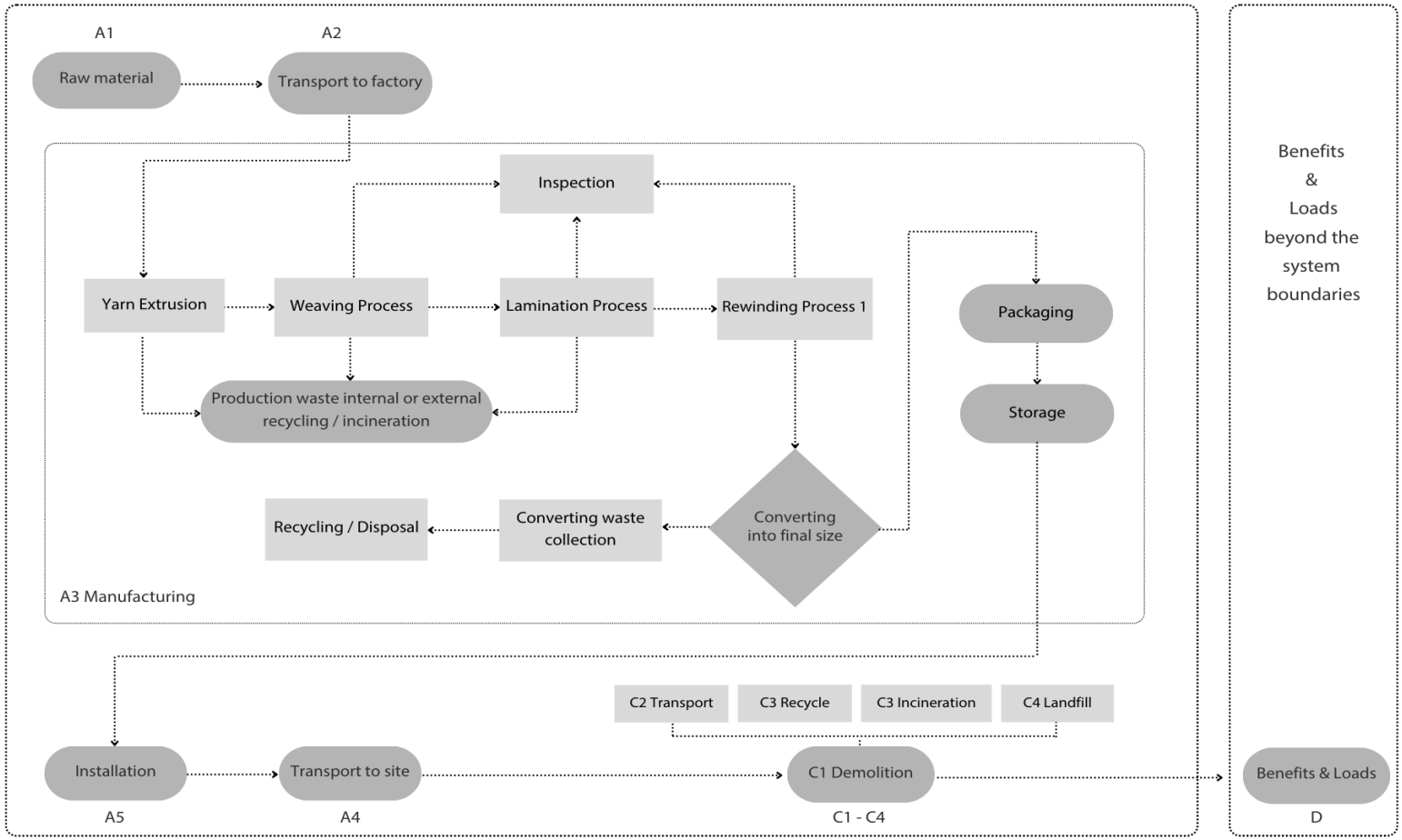
PRODUCT END OF LIFE (C1-C4, D)

The disassembly of the product is assumed to be done manually, so no energy use is included in the assessment. It is assumed that the membranes are collected separately and transported to a waste treatment facility. The product is transported to different waste treatment facilities depending on the disposal route. Average transport distances are assumed to be 800 km for recycling, 100 km for incineration, 50 km for landfill and the transportation method is assumed to be lorry (C2). End-of-life scenario considers statistics from Plastics Europe (2022), with the following waste treatment distribution: 24% recycling, 49% incineration with energy recovery, and 27% landfill. Locally an additional calculation will be necessary based on the local applicable waste treatment scenario.

Module C3 accounts for energy and resource inputs for sorting and treating of materials for recycling. Landfilled materials are included in module C4. Potential benefits from recycling and energy recovery of the product and its packaging are reported in Module D. In Module D, recycled polymer materials are assumed to replace virgin polymer production, and energy recovered from incineration is assumed to replace average electricity and heat production from primary energy sources.

MANUFACTURING PROCESS

PRODUCTION FLOWCHART



LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded.

VALIDATION OF DATA

Data collection for production, transport, and packaging was conducted using time and site-specific information, as defined in the general information section on page 1 and 2. Upstream process calculations rely on generic data as defined in the Bibliography section. Manufacturer-provided specific and generic data were used for the product's manufacturing stage. The analysis was performed in One Click LCA EPD Generator, with the 'Cut-Off, EN 15804+A2' allocation method, and characterization factors according to EN 15804:2012+A2:2019/AC:2021 and JRC EF 3.1.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

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

All estimations and assumptions regarding the cut off criteria and the allocation are declared in the part "Cut-off Criteria except the estimations/assumptions below:

- Module A1: Chemical production, organic is assumed as a proxy for the admixtures.

- Module A3: Converting waste generated during the manufacturing process is partially reused on-site as packaging material. Although the data point Market for waste polyethylene was used to represent this flow, the material originates from internal scrap and is reused within the same system boundary. Therefore, its environmental burden is already accounted for in the manufacturing stage (A3) and its transportation is included in A5. The packaging enters the installation waste stage (A5) and is modeled accordingly.

- Module A3 Manufacturing: The manufacturing stage includes four separate locations in different countries. Each site is modeled individually based on its specific processes, energy use, and geographic context. No averaging or consolidation of impacts has been applied across sites. Transport between production sites is included in A5, based on actual distances and logistics routes.

- Module A2, A4, A5 & C2: Vehicle capacity utilization volume factor is assumed to be 1 which means full load. It may vary but as the role of transportation emission in total results is small, the variety in load is assumed to be negligible.

- Module A5: Packaging waste is declared as installation waste.

- Module C2: The product is transported to different waste treatment facilities depending on the disposal route, with transport distances varying accordingly.

- Module C3, C4, D: The product undergoes separate collection and a certain percentage of it is assumed to be recycled, incinerated and landfilled (scenario is as per EN 50693). Ash from incineration processes is assumed negligible. The recycled end-of-life materials are assumed to serve as secondary raw materials in manufacturing while the materials incinerated displace electricity and heat production.

PRODUCT & MANUFACTURING SITES GROUPING

Type of grouping	Multiple products and multiple factories
Grouping method	Based on a representative product
Variation in GWP-fossil for A1-A3, %	-3/+46

This EPD represents an average of five condensation-protective roofing underlay products with densities ranging from 130 g/m² to 200 g/m², with or without adhesive strips, all manufactured by Tectis Oy using the same raw materials and production technology.

The representative product reflects the typical material composition, production process and environmental performance of the entire product group.

The EPD covers the production, converting, and storage processes carried out at sites located in South Korea, Finland, Vietnam, Estonia and Sweden. The South Korean site represents the raw material production for the representative product modelled in this EPD. Additionally, raw material production for the majority of the products covered by this EPD takes place in Finland, and for one product in Vietnam.

The Estonian and Finnish sites represent converting, packaging, and associated storage activities for the declared product group, while Swedish site represents only storage of finished products and does not include any production or converting activities for the declared product group.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator for EPD Hub V3 and EPD Process Certification v3.2.3. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.10.1/3.11 and One Click LCA databases as sources of environmental data. Allocation used in Ecoinvent 3.10.1/3.11 environmental data sources follow the methodology 'allocation, Cut-off, EN 15804+A2'.

In module A5 (installation waste), an average EU scenario for packaging waste management has been applied, based on data from EUROSTAT:
Steel packaging -
https://ec.europa.eu/eurostat/databrowser/view/env_waspac__custom_13967225/default/table?lang=en
Plastic packaging -
https://ec.europa.eu/eurostat/databrowser/view/env_waspac__custom_8519242/default/table?lang=en
Wooden packaging -
https://ec.europa.eu/eurostat/databrowser/view/env_waspac__custom_8519174/default/table?lang=en
Paper packaging -
https://ec.europa.eu/eurostat/databrowser/view/env_waspac__custom_8519259/default/table?lang=en

Data on manufacturing waste (A3) generated during the converting process are based on confirmation from Eesti Keskkonnateenused AS concerning waste treatment methods.

End-of-life scenario considers statistics from Plastics Europe (2022) -
https://plasticseurope.org/wp-content/uploads/2021/10/BC_Table.pdf

ENVIRONMENTAL IMPACT DATA

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	5,48E-01	4,13E-03	5,27E-02	6,05E-01	1,76E-02	1,01E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,92E-03	2,16E-01	4,55E-03	-1,73E-01
GWP – fossil	kg CO_2e	5,47E-01	4,12E-03	5,97E-02	6,11E-01	1,76E-02	2,69E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,92E-03	2,16E-01	4,55E-03	-1,72E-01
GWP – biogenic	kg CO_2e	4,84E-04	9,32E-07	-7,11E-03	-6,62E-03	3,49E-06	7,39E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,38E-06	-3,73E-06	-2,39E-06	-7,52E-04
GWP – LULUC	kg CO_2e	4,53E-04	1,84E-06	5,25E-05	5,07E-04	6,21E-06	3,01E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,45E-06	3,70E-06	2,78E-07	-1,65E-04
Ozone depletion pot.	kg $CFC\text{-}_{11}$e	1,33E-08	6,09E-11	9,12E-10	1,42E-08	3,50E-10	3,74E-11	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,38E-10	4,37E-11	1,10E-11	-3,83E-09
Acidification potential	mol H^+e	2,05E-03	1,41E-05	1,25E-03	3,32E-03	5,50E-05	1,69E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,46E-05	3,56E-05	3,02E-06	-8,09E-04
EP-freshwater[2)]	kg Pe	1,27E-04	3,21E-07	4,33E-06	1,32E-04	1,17E-06	1,07E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,60E-07	8,51E-07	4,47E-08	-6,78E-05
EP-marine	kg Ne	4,12E-04	4,62E-06	3,17E-04	7,33E-04	1,85E-05	3,23E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,83E-06	1,87E-05	1,01E-05	-1,29E-04
EP-terrestrial	mol Ne	4,27E-03	5,03E-05	3,51E-03	7,83E-03	2,02E-04	4,90E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,62E-05	1,66E-04	1,23E-05	-1,32E-03
POCP ("smog")[3)]	kg NMVOCe	2,33E-03	2,07E-05	9,74E-04	3,33E-03	8,62E-05	8,06E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,79E-05	4,25E-05	5,36E-06	-6,63E-04
ADP-minerals & metals[4)]	kg Sbe	3,41E-06	1,15E-08	1,07E-07	3,53E-06	5,75E-08	6,69E-08	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,27E-08	2,57E-08	9,58E-10	-7,66E-07
ADP-fossil resources	MJ	1,27E+01	5,98E-02	7,54E-01	1,35E+01	2,47E-01	7,69E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,75E-02	3,74E-02	9,44E-03	-3,91E+00
Water use[5)]	m^3e depr.	2,26E-01	2,96E-04	9,87E-03	2,36E-01	1,21E-03	2,23E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,79E-04	5,65E-03	4,63E-05	-5,09E-02

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	2,36E-08	4,13E-10	2,75E-09	2,68E-08	1,38E-09	1,72E-10	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,52E-10	2,61E-10	6,84E-11	-6,54E-09
Ionizing radiation[6)]	kBq U235e	2,40E-02	5,21E-05	1,28E-03	2,54E-02	3,15E-04	3,86E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,24E-04	1,70E-04	9,38E-06	-2,91E-02
Ecotoxicity (freshwater)	CTUe	3,56E+00	8,47E-03	1,43E-01	3,72E+00	3,24E-02	4,49E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,28E-02	5,84E-02	1,41E-02	-8,04E-01
Human toxicity, cancer	CTUh	1,32E-10	6,81E-13	2,00E-11	1,52E-10	3,00E-12	1,86E-12	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,18E-12	8,78E-12	2,22E-13	-2,67E-11
Human tox. non-cancer	CTUh	4,02E-09	3,87E-11	3,00E-10	4,36E-09	1,55E-10	5,60E-11	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,12E-11	3,45E-10	4,38E-11	-1,29E-09
SQP[7)]	-	2,33E+00	6,02E-02	8,89E-01	3,28E+00	1,47E-01	2,70E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,80E-02	3,77E-02	2,20E-02	-7,07E-01

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator; 7) SQP = Land use related impacts/soil quality.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8)]	MJ	5,39E-01	8,20E-04	5,54E-02	5,96E-01	4,27E-03	-4,70E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,69E-03	2,76E-03	1,48E-04	-3,13E-01
Renew. PER as material	MJ	0,00E+00	0,00E+00	7,32E-02	7,32E-02	0,00E+00	-7,32E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,16E-02
Total use of renew. PER	MJ	5,39E-01	8,20E-04	1,29E-01	6,69E-01	4,27E-03	-1,20E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,69E-03	2,76E-03	1,48E-04	-2,91E-01
Non-re. PER as energy	MJ	6,93E+00	5,98E-02	6,81E-01	7,67E+00	2,47E-01	6,58E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,75E-02	-4,07E+00	-1,48E+00	-3,91E+00
Non-re. PER as material	MJ	5,73E+00	0,00E+00	-7,15E-02	5,66E+00	0,00E+00	-9,32E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	-4,12E+00	-1,53E+00	1,45E+00
Total use of non-re. PER	MJ	1,27E+01	5,98E-02	6,09E-01	1,33E+01	2,47E-01	5,65E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,75E-02	-8,19E+00	-3,00E+00	-2,46E+00
Secondary materials	kg	3,18E-03	2,55E-05	1,13E-03	4,34E-03	1,13E-04	6,66E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,47E-05	1,45E-04	3,42E-06	3,58E-02
Renew. secondary fuels	MJ	3,14E-03	3,24E-07	2,40E-03	5,53E-03	1,43E-06	1,31E-07	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,64E-07	1,06E-06	6,40E-08	-3,11E-06
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	2,12E-05	2,12E-05	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	5,52E-03	8,85E-06	1,56E-04	5,69E-03	3,32E-05	5,94E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,31E-05	5,01E-05	-1,41E-04	-1,65E-03

8) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	3,54E-02	1,01E-04	1,39E-03	3,69E-02	3,54E-04	3,82E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,40E-04	2,08E-03	1,66E-05	-1,09E-02
Non-hazardous waste	kg	1,89E+00	1,88E-03	2,82E-02	1,92E+00	7,48E-03	1,63E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,95E-03	8,31E-02	1,89E-01	-6,08E-01
Radioactive waste	kg	5,86E-06	1,28E-08	3,17E-07	6,19E-06	7,83E-08	8,31E-07	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,09E-08	4,33E-08	2,30E-09	-7,41E-06

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	0,00E+00	0,00E+00	2,36E-03	2,36E-03	0,00E+00	1,93E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	3,40E-02	0,00E+00	0,00E+00
Materials for energy rec	kg	0,00E+00	0,00E+00	4,37E-04	4,37E-04	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,17E-03	ND	ND	ND	ND	ND	ND	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	3,84E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	4,60E-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	5,33E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	6,40E-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	5,43E-01	4,10E-03	5,95E-02	6,06E-01	1,75E-02	2,83E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,88E-03	2,16E-01	4,35E-03	-1,69E-01
Ozone depletion Pot.	kg $CFC_{-11}e$	1,09E-08	4,86E-11	7,30E-10	1,17E-08	2,78E-10	3,30E-11	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,10E-10	3,68E-11	8,78E-12	-3,15E-09
Acidification	kg SO_2e	1,69E-03	1,07E-05	9,98E-04	2,70E-03	4,18E-05	1,23E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,84E-05	2,55E-05	2,24E-06	-6,82E-04
Eutrophication	kg PO_4^3e	7,89E-03	2,62E-06	1,81E-04	8,08E-03	1,06E-05	2,23E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,68E-06	7,93E-06	1,47E-06	-1,69E-03
POCP (“smog”)	kg C_2H_4e	1,79E-04	9,57E-07	5,20E-05	2,32E-04	3,98E-06	7,58E-07	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,68E-06	1,88E-06	8,42E-07	-5,62E-05
ADP-elements	kg Sbe	3,36E-06	1,12E-08	1,06E-07	3,48E-06	5,62E-08	6,68E-08	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,22E-08	2,43E-08	9,30E-10	-7,57E-07
ADP-fossil	MJ	1,23E+01	5,90E-02	7,33E-01	1,31E+01	2,42E-01	2,23E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,54E-02	3,45E-02	9,29E-03	-3,40E+00

ADDITIONAL INDICATOR – GWP-GHG

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG[9)]	kg CO_2e	5,48E-01	4,12E-03	5,98E-02	6,12E-01	1,76E-02	2,72E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,92E-03	2,16E-01	4,55E-03	-1,73E-01

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. In addition, the characterisation factors for the flows – CH4 fossil, CH4 biogenic and Dinitrogen monoxide – were updated. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterisation factor for biogenic CO2 is set to zero.

SCENARIO DOCUMENTATION

DATA SOURCES

Manufacturing energy scenario documentation

1. District Heat, Finland, 2022, Finland, One Click LCA, 0.18 kgCO2e/kWh
2. Electricity, low voltage, residual mix, Finland, Ecoinvent, 0.65 kgCO2e/kWh
3. Heat production, natural gas, at industrial furnace >100kW, Albania, Ecoinvent, 0.0773 kgCO2e/MJ
4. Market for propane, burned in building machine, World, Ecoinvent, 0.0945 kgCO2e/MJ
5. Electricity, low voltage, residual mix, Estonia, Ecoinvent, 0.62 kgCO2e/kWh
6. Electricity, low voltage, residual mix, Sweden, Ecoinvent, 0.0983 kgCO2e/kWh
7. Diesel combusted in building machine, World, One Click LCA, 3.38 kgCO2e/l
8. Electricity, consumption mix w/o renewables, SouthKorea, 2023, South Korea, One Click LCA, 0.97 kgCO2e/kWh

Transport scenario documentation - A4 (Transport resources)

1. Market for transport, freight, lorry 16-32 metric ton, EURO5, 100,57 km
2. Market for transport, freight, lorry 16-32 metric ton, EURO5, 229 km
3. Market for transport, freight, lorry 16-32 metric ton, EURO5, 296 km

Transport scenario documentation A4

Scenario parameter	Value
Capacity utilization (including empty return) %	100
Bulk density of transported products	5,01E+02
Volume capacity utilization factor	1

Installation scenario documentation - A5 (Installation resources)

1. Steel production, converter, low-alloyed, Ecoinvent, 2.5E-4 kg
2. Hot rolling, steel, Ecoinvent, 2.5E-4 kg
3. Zinc coating, coils, Ecoinvent, 1.6E-5 m2
4. Market for electricity, low voltage, Ecoinvent, 0.01 kWh

Installation scenario documentation - A5 (Installation waste)

1. Treatment of metal scrap, mixed, for recycling, unsorted, sorting, Ecoinvent, Materials for recycling, 1.7E-4 kg
2. Treatment of scrap steel, inert material landfill, Ecoinvent, 3.9E-5 kg
3. Treatment of waste polyethylene, for recycling, unsorted, sorting, Ecoinvent, Materials for recycling, 1.1E-4 kg
4. Treatment of waste polyethylene, municipal incineration, Ecoinvent, 1.0E-4 kg
5. Exported Energy: Electricity, Ecoinvent, 7.1E-4 MJ
6. Exported Energy: Electricity, Ecoinvent, 0.0031 MJ
7. Exported Energy: Electricity, Ecoinvent, 3.3E-5 MJ
8. Exported Energy: Thermal, Ecoinvent, 9.8E-4 MJ
9. Exported Energy: Thermal, Ecoinvent, 0.0043 MJ
10. Exported Energy: Thermal, Ecoinvent, 4.6E-5 MJ
11. Treatment of waste polyethylene, sanitary landfill, Ecoinvent, 6.5E-5 kg
12. Treatment of waste wood, post-consumer, sorting and shredding, Ecoinvent, Materials for recycling, 0.0015 kg
13. Treatment of waste wood, untreated, municipal incineration, Ecoinvent, 0.0014 kg
14. Treatment of waste wood, untreated, sanitary landfill, Ecoinvent, 0.0018 kg
15. Treatment of waste paper, unsorted, sorting, Ecoinvent, Materials for recycling, 1.5E-4 kg
16. Treatment of waste packaging paper, municipal incineration, Ecoinvent, 1.5E-5 kg
17. Treatment of waste packaging paper, sanitary landfill, Ecoinvent, 1.6E-5 kg

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

1. Treatment of waste polyethylene, for recycling, unsorted, sorting, Ecoinvent, Materials for recycling, 0.017 kg
2. Treatment of waste polyethylene, for recycling, unsorted, sorting, Ecoinvent, Materials for recycling, 0.017 kg
3. Treatment of waste polyethylene, municipal incineration, Ecoinvent, 0.034 kg
4. Treatment of waste polyethylene, municipal incineration, Ecoinvent, 0.034 kg
5. Exported Energy: Electricity, Ecoinvent, 0.23 MJ
6. Exported Energy: Electricity, Ecoinvent, 0.23 MJ
7. Exported Energy: Thermal, Ecoinvent, 0.32 MJ
8. Exported Energy: Thermal, Ecoinvent, 0.32 MJ
9. Treatment of waste polyethylene, sanitary landfill, Ecoinvent, 0.019 kg
10. Treatment of waste polyethylene, sanitary landfill, Ecoinvent, 0.019 kg

Scenario information	Value
Scenario assumptions e.g. transportation	C1 - Deconstruction: The product is manually removed during building demolition, negligible energy consumption. C2 - Transport to waste treatment: The product is transported to different waste treatment facilities depending on the disposal route. Average transport distances are assumed to be 800 km for recycling, 100 km for incineration and 50 km for landfill using a 16 t to 32 t truck (50% Euro 4, 50% Euro 5) according to the cPCR. C3 - Waste processing: The material is being sorted and directed to the respective waste treatment operations, 24% recycling (0,034kg), 49% incineration with energy recovery (0,069 kg). Disposal: The non-recyclable fraction, 27% (0.038 kg), is disposed of in landfill.

THIRD-PARTY VERIFICATION STATEMENT

EPD Hub declares that this EPD is verified in accordance with ISO 14025 by an independent, third-party verifier. The project report on the Life Cycle Assessment and the report(s) on features of environmental relevance are filed at EPD Hub. EPD Hub PCR and ECO Platform verification checklist are used.

EPD Hub is not able to identify any unjustified deviations from the PCR and EN 15804+A2 in the Environmental Product Declaration and its project report.

EPD Hub maintains its independence as a third-party body; it was not involved in the execution of the LCA or in the development of the declaration and has no conflicts of interest regarding this verification.

The company-specific data and upstream and downstream data have been examined as regards plausibility and consistency. The publisher is responsible for ensuring the factual integrity and legal compliance of this declaration.

The software used in creation of this LCA and EPD is verified by EPD Hub to conform to the procedural and methodological requirements outlined in ISO 14025:2010, ISO 14040/14044, EN 15804+A2, and EPD Hub Core Product Category Rules and General Program Instructions.

Verified tools

Tool verifier: Magaly Gonzalez Vazquez
Tool verification validity: 27 March 2025 - 26 March 2028

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

24.02.2026