TopCell

Environmental Product Declaration

EPD In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

Natura 100 – Soft Wool from TopCell Sweden AB

Programme	The International EPD System, www.environdec.com
Programme operator	EPD International AB
Type of EPD	EPD of a single product from a manufacturer/service provider
EPD registration number	EPD-IES-0027758:001
Version date	2025-12-18
Validity date	2030-12-18

An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see www.environdec.com

EPD
INTERNATIONAL EPD SYSTEM

ECO PLATFORM EPD VERIFIED

GENERAL INFORMATION

Programme Information	
Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
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Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): ***PCR 2019:14 Construction products (EN 15804:A2) version 2.0.1***
PCR review was conducted by: ***The Technical Committee of the International EPD® System. Chair: Rob Rouwette (chair), Noa Meron (co-chair). Contact via info@environdec.com***
c-PCR, if applicable: c-*PCR-005 Thermal insulation products (EN16783:2024) (TO PCR 2019:14) v.1.0.0*

Third-party Verification
External and independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ **Individual EPD verification without a pre-verified LCA/EPD tool** Third-party verifier: Viktor Hakkarainen, CHM Analytics AB, viktor.hakkarainen@chm-analytics.com Approved by: International EPD System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison.
For further information about comparability, see EN 15804 and ISO 14025.

INFORMATION ABOUT EPD OWNER

Owner of the EPD:
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Address and contact information of the LCA practitioner commissioned by the EPD owner:
Daniel Böckin, Miljögiraff AB, daniel@miljogiraff.se

Description of the organisation:
TopCell develops and manufactures insulation products by upgrading raw biproduct material from the forest industry. The products are based on wooden fiber and has a high quality. They are suitable for building with wooden constructions. The insulation has very good properties with regards to energy efficiency, moisture, sound cancelling and fire protection.

TopCell are proud of their products and the environmental issues are taken into consideration in the decisions and processes. TopCell has just started their journey towards contributing to sustainable building and sustainable living.

Driven by conviction, personality and a belief of their material TopCell has produced a product that they are proud of.

PRODUCT INFORMATION

Product name: Natura 100

Product identification and description:
The TopCell Natura 100 insulation is used in insulation applications for walls, ceilings, roof and floor. The applications according to the standard are listed below.

Ceiling, roof, floor: DZ, DI, DEO, DES, VR
Wall: WAA, WH, WI, WTH, WTR

The TopCell Natura 100 is made from twig pulp from Nordic wood. The product is a biobased soft wool product. The nominal density is 50kg/m3 (for unpacked soft wool) but the density can vary between 45-50kg/m3. The soft wool has a λ = 0,038 W/mK (at density 45-50 kg/ m3). The product can be packed to a density of 65kg/m3 in walls and slanted roofs.

UN CPC code: 3211

Name and location of production site(s): TopCell Sweden AB, Söderbärke, Sweden.

CONTENT DECLARATION

Product content	Mass, kg	Post-consumer recycled material, mass-% of product	Biogenic material, mass-% of product	Biogenic material, kg C/product or declared unit
Twig pulp Domsjö	15,5	0	31,0	7,75
Twig pulp Borregard	28,8	0	57,5	14,4
Water/moisture	5	0	0	0
Fire retardant (SDA 440-11, dry substance left in material)	0,75	0	0	0
Total	50	0	88,5	22,1

Packaging materials	Mass, kg	Mass-% (versus the product)	Biogenic material, kg C/product or declared unit
Plastic packaging (primary)	0,0055	0,011	0
EU pallet	4,25	0,6	1,67
Stretch film	0,00085	0,0017	0

1 kg biogenic carbon in the product/packaging is equivalent to the uptake of 44/12 kg of CO_2.

Note that the twig pulp is rejected material that is normally waste managed, meaning that it is post-industrial recycled material.

The pallet weight and its biogenic content are based on the inherent properties of the pallet (i.e. weight per declared unit), while the calculated environmental impact results in the LCA model are based on the allocated flow, thus taking into account 100 reuses of the pallet.

The product contains no Substances of Very High Concern (SVHC).

LCA INFORMATION

Declared unit: 1m^3 thermal insulation product with λ= 0,038W/mK. 1m^3 of product weighs 50kg.

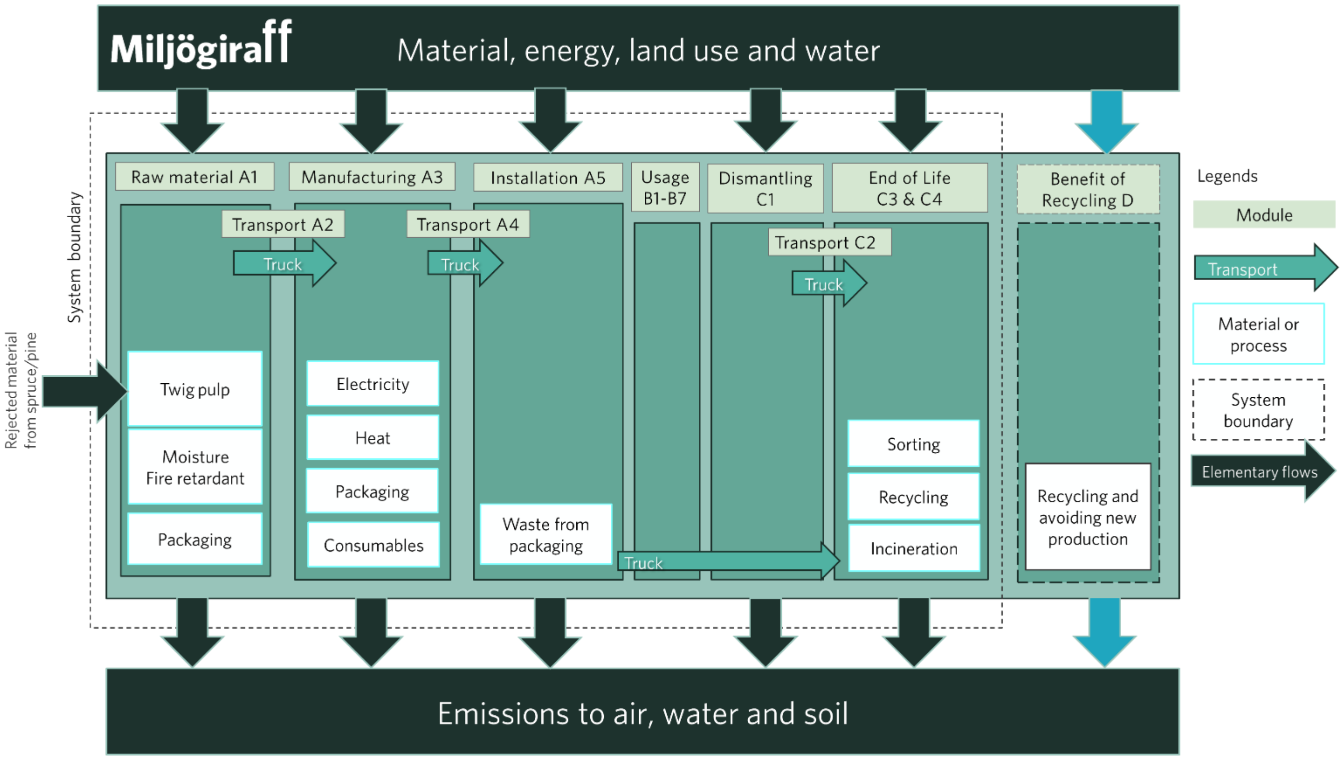
Time representativeness: 2025

Geographical scope: A1: EU/Sweden, A3-D: Sweden

Database(s) and LCA software used: ecoinvent 3.11, SimaPro 10.2

Description of system boundaries:
b) Cradle to gate with options, modules C1–C4, module D and with optional modules (A1–A3 + C + D and additional modules A4, A5 and B1-B7).

Process flow diagram:



More information:
The soft wool is made from twig pulp from rejected materials that are usually waste managed. TopCell has found a way to utilize the material. In the model, the material is regarded as waste. TopCell only pays a symbolic fee for handling the loading and handling the material. Previously, the treatment of the twig pulp has been a cost for the paper mills. Therefore, the pulp is modelled as waste in accordance with the polluter pays principle as specified in EN15804. Hence, the raw material carries no environmental burden up until the transport to TopCell.

The fire retardant is diammonium phosphate.

Manufacturing at TopCell follows the steps below:

1. The raw material is transported to TopCell and arrives at the raw material storage.
2. The raw material is transported from the storage and is loaded into “loading pockets” using a loader.
3. From the loading pockets the raw material is fed to a transporter.
4. Then the transporter is used to transport the material to a fragmentation machine.
5. The fragmentation of the material uses electrical motors. During fragmentation, DAP is portioned.
6. Then another transporter is used to transport the material from the fragmentation to the drying oven.
7. The raw material is dried in the drying oven. The oven uses hot air that is blown through the fibre material via a fan. The air is taken from the outdoor and passes a heat battery where steam heats the air.
8. The material is transported from the drying oven to an “elevation transporter”
9. The “elevation transporter” transports the material to a “mix transporter”
10. The material is fed from the “mix transporter” to an air transport where the material is mixed with the material from the filters
11. The air transporter transports the material to a cyclone that will drop the material to a buffer conveyor.
12. The buffer conveyor delivers the material to another transporter which leads the material to a press.
13. The press compresses the material about 3 times to bales that are packaged in plastic packaging.

Waste that occurs in the manufacturing is dust that goes to a filter. The dust is then mixed back into the product again so that TopCell reaches 100% material usage. No waste is therefore reported in the manufacturing process.

The steam for the dryer is generated by a pellet boiler. The use of electricity for manufacturing is calculated as an average for the entire production site. It is based on a reading of the electricity measurement equipment for incoming electricity. Since compressed air is driven by separate energy sources they are handled as electricity consumption. The electricity for manufacturing comes from hydropower, with a carbon footprint of 0,051 kg CO2 eq./kWh.

The finished product is packaged in a primary PE packaging and wrapped in a stretch film. The bales are transported on wooden pallets (in trucks run on HVO fuel with a default 50% capacity utilization) to an installation site, estimated to be an average of 75 km away.

The soft wool is installed in buildings by opening the bales and using a machine that blows the wool into the space it is supposed to fill. There is no spillage and any soft wool not used is transported back to TopCell and used in another site. No ancillary materials, water or resource use are needed and there are no direct emissions to air, soil or water. An electricity consumption of 0,7143 kWh/m3 installed soft wool is required, modelled with a Swedish regional low voltage market mix. Plastic waste is sent to waste management (56% recycling, 44% incineration) while the wooden pallets are reused at least 100 times before being incinerated.

Since thermal insulation products do not require maintenance, repair, replacement, refurbishment, operational energy use or operational water use, they have no environmental impact in the use phase.

The final handling includes dismantling of the product, also energy and materials used for preparation for waste treatment and final waste treatment. Electricity used at end-of-life is modelled as Swedish regional medium voltage market mix. The product is relatively new on the market as the production started up in September 2021. TopCell has designed the product for recycling in their own process. After the product has served its purpose, a vacuum machine could be used to collect the soft wool which could then be returned to TopCell and mixed into the process again with new material. TopCell estimates that the product can be installed in a house for 100 years, meaning that a collection system is not yet in place and has not been tested. 50% is assumed to be incinerated and thus transported 130 km transport by diesel truck to a facility for waste treatment. The remaining 50% is assumed to be recycled and thus transported back to TopCell the same distance as to the installation site, i.e. 75 km with an HVO truck.

The standard EN16783:2017 states that thermal insulation products can be sorted for recycling or for energy recovery and that the scenarios can vary. Boverket states that 55% of waste from the construction sector has been recycled in Sweden for the year 2022. Thus, the number 50% was chosen as a conservative recycling rate for Topcell's product. The remaining 50% of the soft wool is modelled as going to incineration, as this is a common scenario in Sweden. Additionally, the end-of-life scenarios for 100% recycling and 100% incineration are also presented separately, according to the PCR 2019:14.

Module D aims to describe potential benefits or loads that can be related to material and energy recovery as well as reuse outside the system boundary. Recycled material or energy has the potential to replace primary resources that would otherwise have been used in new products if the recycled material had not been available. This benefit is calculated with the D-module. For products that contain recycled material as raw material, the recycled share is deducted to avoid double counting. The scenarios included are based on the end of life model in module C (and A5 for the packaging waste) and representative for one of the most probable alternatives. Module D is modelled according to the values in the table below.

Type of material and amount			**Waste treatment statistics**		
Material	**Share of recycled content in material**	**Amount per declared unit (kg)**	**Share Recycling**	**Share incineration**	**Share landfilling**
Wood	0%	0,0425	0%	100%	0%
Plastic (primary)	20%	0,275	56%	44%	0%
Plastic (stretch film)	100%	0,0425	56%	44%	0%
Soft wool	0%	50	50%	50%	0%

Modules declared and geographical scope:

	Product stage			Distribution/ installation stage		Use stage							End-of-life stage				Beyond product life cycle
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	EU/SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE

The data was originally collected in 2022, after which the LCA and EPD process was put on hold. The project was restarted in 2025, building on the previous model but collecting data on any changes that had occurred since then. Consequently, the collected data is representative for production in 2025, and includes primary data on ingredients, manufacturing, energy use, consumables, packaging, production waste and internal transports.

The process for production of diammonium phosphate contributed more than 30% to at least one core indicator, while its data quality in terms of technical representativeness was assessed as “Fair”. The process was used despite this, since there were no other, more specific, options in the ecoinvent database.

Process	Source type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Diammonium phosphate production	Database	Ecoinvent 3.11	2024	Secondary data	0%
Packaging film production	Database	Ecoinvent 3.11	2024	Secondary data	0%
Wood pellet production	Database	Ecoinvent 3.11	2024	Secondary data	0%
Fatty acid methyl ester production, estherification of rape oil	Database	Ecoinvent 3.11	2024	Secondary data	0%
Manufacturing of product in A3 (including electricity, heat, internal transports)	Collected data	EPD owner	2025	Primary data	38%
Other processes	Database	Ecoinvent 3.11	2024	Secondary data	0%
Total share of primary data, of GWP-GHG results for A1-A3					38%

The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data, to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories.

Cut-off - Overview of excluded activities and aspects, according to cut-off rules:

Excluded processes	**Reason**
Production of capital goods for manufacturing (machines and facilities)	Excluded according to PCR (except for energy generation)
Chemical consumption in manufacturing	Cleaning chemicals and lubrication have not been included. The chemicals are estimated to represent less than 1% of total energy use, material use and environmental impact based on expert judgement of Miljögiraff and because the chemicals that account for high consumption of oils account for only 0.5%. Additionally, the toxic hazards for chemicals used in small amounts are regulated in other methods such as REACH and self-control programs.
Hand tools and work clothes	Hand tools and work clothes are estimated by expert judgement of Miljögiraff and TopCell to correspond to less than 1% of the total environmental impact, based on low amounts needed per declared unit.
Supplier packaging	ICB tanks hold 1100 kg of substance and are sent back to be refilled and reused, meaning that the contribution per DU is negligible in terms of total energy use, material use and environmental impact.
Product packaging	Labels are cut off due to low amount per declared unit

Below is a data quality assessment of processes that contribute more than 10% of the GWP-GHG results in modules A1-A3, or more than 10% of the GWP-GHG results in modules A4-C, according to the PCR:

Process in model	**Source**	**Representativeness**		
	Database/collected data/EPD	**Geographical**	**Technical**	**Time**
Diammonium phosphate {RER}| diammonium phosphate production | Cut-off, U	Ecoinvent 3.11	Good	Fair	Very good
Packaging film, low density polyethylene {GLO}| market for packaging film, low density polyethylene | Cut-off, U	Ecoinvent 3.11	Fair	Fair	Very good
Wood pellet, measured as dry mass {RER}| market for wood pellet, measured as dry mass | Cut-off, U	Ecoinvent 3.11	Good	Fair	Very good
Fatty acid methyl ester {Europe without Switzerland}| esterification of rape oil | Cut-off, U	Ecoinvent 3.11	Good	Good	Very good
Fatty acid methyl ester {CH}| esterification of rape oil | Cut-off, U	Ecoinvent 3.11	Fair	Good	Very good

Allocation: No allocation in primary data was done, but allocation still occurs in the background database, ecoinvent.
Infrastructure and capital goods are excluded for all processes except for electricity and heat, according to the PCR.
The characterization methods used for the environmental performance indicators are based on version EF3.1 of the EN 15804 reference package.

ENVIRONMENTAL PERFORMANCE

LCA results of the product(s) - main environmental performance results

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks. The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3).

Mandatory impact category indicators according to EN 15804

Results per functional or declared unit																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2 eq.	**-7,7 E+01**	1,1E +00	5,3E-01	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	2,5E-02	1,0E +00	8,1E +01	0,0E +00	-1,3 E+00
GWP-fossil	kg CO_2 eq.	**3,6E +00**	7,2E-01	4,6E-01	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	2,1E-02	8,3E-01	2,7E-01	0,0E +00	-1,3 E+00
GWP-biogenic	kg CO_2 eq.	**-8,1 E+01**	3,5E-01	6,3E-02	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	9,2E-04	1,6E-01	8,1E +01	0,0E +00	0,0E +00
GWP-luluc	kg CO_2 eq.	**1,8 E-01**	4,2E-02	2,7E-03	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	2,6E-03	1,9E-02	4,1E-04	0,0E +00	-7,7 E-02
ODP	kg CFC 11 eq.	**1,2E-07**	4,1E-08	1,0E-09	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	7,0E-10	3,0E-08	4,0E-09	0,0E +00	-3,1 E-08
AP	mol H^+ eq.	**9,0E-02**	2,0E-02	3,8E-04	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	1,3E-04	1,0E-02	3,9E-03	0,0E +00	-1,1 E-02
EP-freshwater	kg P eq.	**3,4E-04**	1,4E-04	1,7E-06	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	7,8E-07	6,7E-05	2,3E-06	0,0E +00	-5,6 E-05
EP-marine	kg N eq.	**3,3E-02**	1,8E-02	6,9E-05	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	2,9E-05	8,6E-03	2,0E-03	0,0E +00	-3,0 E-03
EP-terrestrial	mol N eq.	**1,9E-01**	8,6E-02	8,4E-04	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	3,7E-04	4,5E-02	2,1E-02	0,0E +00	-4,3 E-02
POCP	kg NMVOC eq.	**2,9E-02**	3,6E-03	2,1E-04	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	8,7E-05	3,8E-03	5,3E-03	0,0E +00	-1,0 E-02
ADP-minerals& metals*	kg Sb eq.	**1,6E-06**	3,6E-07	2,9E-06	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	4,2E-07	1,8E-07	9,0E-08	0,0E +00	-3,8 E-06
ADP-fossil*	MJ	**5,7E +01**	6,9E +00	3,4E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	3,2E +00	9,8E +00	2,7E +00	0,0E +00	-1,1 E+02
WDP*	m^3	**3,1E +00**	2,9E-01	4,8E-02	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	4,2E-02	1,4E-01	4,1E-02	0,0E +00	-1,4 E+00
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption															

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.*

Additional mandatory and voluntary impact category indicators

Results per functional or declared unit

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG**	kg CO_2 eq.	**3,9E+00**	7,6E-01	4,6E-01	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	2,4E-02	8,5E-01	2,7E-01	0,0E+00	-1,4E+00
PM	disease inc.	**9,8E-07**	1,9E-07	2,2E-09	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	1,3E-09	1,2E-07	4,5E-08	0,0E+00	-2,1E-07
IR***	kBq U-235 eq	**2,4E-01**	1,1E-02	1,2E-01	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	1,1E-01	5,5E-03	1,8E-02	0,0E+00	-3,4E+00
ETP-FW*	CTUe	**1,6E+01**	5,5E+00	4,1E-01	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	8,7E-02	2,8E+00	2,4E+00	0,0E+00	-3,8E+00
HTTP-C*	CTUh	**3,3E-09**	7,4E-10	5,0E-11	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	1,2E-11	3,8E-10	5,0E-10	0,0E+00	-9,5E-10
HTTP-NC*	CTUh	**1,9E-07**	7,6E-08	3,0E-09	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	5,5E-10	3,8E-08	3,9E-08	0,0E+00	-2,9E-08
Land use, SQP*	Pt	**4,3E+02**	8,3E+01	8,9E-01	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	7,7E-01	3,8E+01	2,2E-01	0,0E+00	-1,3E+02
Acronyms	PM: Particulate Matter, IRP: Ionizing Radiation - Human Health, ETP-FW: Ecotoxicity Potential – Freshwater, HTP-C: Human Toxicity Potential – Cancer, HTP-NC: Human Toxicity Potential – Non-Cancer, SQP: Soil Quality Potential Index															

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*
*** Disclaimer: This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO2 is set to zero.*
**** Disclaimer: 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.*

Resource use indicators

The use of primary energy resources is calculated according to option B in Annex 3 in PCR Construction Products v.2.0.1.

Results per functional or declared unit

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	**1,1E+02**	2,0E+01	2,1E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	2,0E+00	9,1E+00	3,4E-01	0,0E+00	-9,4E+01
PERM	MJ	**7,5E+02**	0,0E+00	-8,1E+01	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	-6,7E+02	0,0E+00	0,0E+00
PERT	MJ	**8,7E+02**	2,0E+01	-7,9E+01	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	2,0E+00	9,1E+00	-6,7E+02	0,0E+00	-9,4E+01
PENRE	MJ	**6,1E+01**	7,5E+00	3,4E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	3,2E+00	1,0E+01	2,9E+00	0,0E+00	-1,1E+02
PENRM	MJ	**2,0E-01**	0,0E+00	-2,0E-01	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
PENRT	MJ	**6,1E+01**	7,5E+00	3,2E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	3,2E+00	1,0E+01	2,9E+00	0,0E+00	- 1,1E+02

SM	kg	**0,0E +00**	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00
RSF	MJ	**0,0E +00**	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00
NRSF	MJ	**0,0E +00**	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00
FW	m^3	**1,3E-01**	7,2E-02	1,1E-03	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	0,0E +00	8,4E-04	3,3E-02	5,0E-03	0,0E +00	-2,7 E-02
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water															

Waste indicators

Results per functional or declared unit																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-hazardous waste disposed	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Radioactive waste disposed	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Output flow indicators

Results per functional or declared unit																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Material for recycling	kg	0	0	0,15	0	0	0	0	0	0	0	0	0	25	0	0
Materials for energy recovery	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exported energy, electricity	MJ	0	0	1,5	0	0	0	0	0	0	0	0	0	114	0	0
Exported energy, thermal	MJ	0	0	3,4	0	0	0	0	0	0	0	0	0	266	0	0

Additional LCA results (other environmental performance results) of the product(s)

Below are presented the results in modules A5, C2, C3 and D for alternative end of life scenarios, specifically one scenario where all waste is sent to incineration and on where all waste is sent to recycling.

Mandatory impact category indicators

		100% incineration				100% recycling			
Indicator	**Unit**	**A5**	**C2**	**C3**	**D**	**A5**	**C2**	**C3**	**D**
GWP-total	kg CO_2 eq.	1,1E+00	1,0E+00	8,2E+01	7,3E+01	3,1E-02	1,0E+00	8,1E+01	2,1E-02
GWP-fossil	kg CO_2 eq.	1,0E+00	1,0E+00	4,9E-01	2,0E+00	2,7E-02	6,6E-01	4,8E-02	-2,7E-01
GWP-biogenic	kg CO_2 eq.	6,3E-02	2,2E-04	8,1E+01	7,1E+01	9,3E-04	3,3E-01	8,1E+01	2,9E-01
GWP-luluc	kg CO_2 eq.	2,7E-03	1,6E-05	4,2E-04	-3,1E-01	2,7E-03	3,9E-02	4,0E-04	-7,3E-05
ODP	kg CFC 11 eq.	1,1E-09	2,3E-08	7,1E-09	-8,5E-08	9,8E-10	3,8E-08	7,8E-10	2,0E-08
AP	mol H^+ eq.	4,4E-04	2,6E-03	7,4E-03	2,0E-02	3,2E-04	1,8E-02	4,3E-04	-4,6E-04
EP-freshwater	kg P eq.	1,7E-06	6,2E-07	4,4E-06	-6,5E-05	1,7E-06	1,3E-04	1,6E-07	-6,0E-07
EP-marine	kg N eq.	1,0E-04	9,8E-04	3,8E-03	-9,9E-05	4,1E-05	1,6E-02	2,0E-04	-9,6E-05
EP-terrestrial	mol N eq.	1,2E-03	1,1E-02	4,0E-02	-4,6E-02	5,3E-04	7,9E-02	2,2E-03	-1,0E-03
POCP	kg NMVOC eq.	2,9E-04	4,3E-03	9,9E-03	6,3E-03	1,4E-04	3,3E-03	6,4E-04	-1,8E-03
ADP-minerals&metals*	kg Sb eq.	2,9E-06	2,6E-08	1,1E-07	2,6E-03	2,9E-06	3,3E-07	6,6E-08	5,5E-09
ADP-fossil*	MJ	3,4E+00	1,3E+01	4,2E+00	-3,2E+02	3,4E+00	6,4E+00	1,1E+00	-1,2E+01
WDP*	m^3	4,8E-02	4,3E-03	7,5E-02	-3,2E+00	4,7E-02	2,7E-01	6,9E-03	-2,1E-01

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.*

Additional mandatory and voluntary impact category indicators

		100% incineration				100% recycling			
Indicator	**Unit**	**A5**	**C2**	**C3**	**D**	**A5**	**C2**	**C3**	**D**
GWP-GHG**	kg CO2 eq	1,0E+00	1,0E+00	4,9E-01	2,6E+00	3,1E-02	7,0E-01	4,8E-02	-2,7E-01
PM	disease inc.	2,3E-09	6,6E-08	7,7E-08	-1,3E-07	2,0E-09	1,7E-07	1,2E-08	-3,2E-09
IR***	kBq U-235 eq	1,2E-01	1,3E-03	1,9E-02	-1,3E+01	1,2E-01	9,7E-03	1,7E-02	7,4E-05
ETP-FW*	CTUe	5,1E-01	4,7E-01	4,8E+00	1,3E+01	3,3E-01	5,1E+00	3,0E-02	1,6E-01
HTTP-C*	CTUe	5,9E-11	6,7E-11	1,0E-09	-1,3E-10	4,2E-11	6,8E-10	4,2E-12	5,6E-12
HTTP-NC*	CTUe	3,5E-09	6,6E-09	7,8E-08	5,1E-08	2,5E-09	7,0E-08	1,3E-10	-2,7E-10
Land use, SQP*	Pt	8,9E-01	1,7E-02	3,3E-01	-5,2E+02	8,9E-01	7,6E+01	1,2E-01	-7,1E+00

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*
*** Disclaimer: This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO2 is set to zero.*
**** Disclaimer: 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.*

ABBREVIATIONS

Abbreviation	**Definition**
General Abbreviations	
EN	European Norm (Standard)
EF	Environmental Footprint
GPI	General Programme Instructions
ISO	International Organization for Standardization
CEN	European Committee for Standardization
CPC	Central product classification
SVHC	Substances of Very High Concern

REFERENCES

a) General Programme Instructions of International EPD System. Version. 5.0.1
b) PCR 2019:14 Construction products (EN 15804:A2) version 2.0.1
c) *c-PCR-005 (To PCR 2019:14) Thermal insulation products, version 1.0.0*
d) *EN 15804:2012+A2:2019/AC:2021, Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products*
e) *EN16783:2017, Thermal insulation products – Product Category Rules (PCR) for factory made and in-situ formed products for preparing environmental product declarations*
f) *LCA of Natura 100 – Soft wool by TopCell Sweden AB, Miljögiraff report 1931, 2025-12-18*

VERSION HISTORY

Original Version of the EPD, 2025-12-18