Environmental Product Declaration

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

Foil Tapes - Group 1

from

3F GmbH

Programme:	The International EPD System, www.environdec.com
Programme operator:	EPD International AB
EPD Type:	EPD of multiple products based on the average product group
EPD registration number:	EPD-IES-0024565
Version date:	2025-11-06
Revision date	2026-02-24
Validity date:	2030-11-05
	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."

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
E-mail:	support@environdec.com

PCR and verification

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 v.2.0.1*
PCR review was conducted by: *PCR review was conducted by the Technical Committee of the International EPD® System. See https://environdec.com/about-us/the-international-epd-system-about-the-system for a list of members. Review chair: Rob Rouwette* *The review panel may be contacted via the Secretariat www.environdec.com/contact.*
Verification
External and independent ('third-party') verification of the declaration and data, according to ISO 14025:2006, via EPD verification through: ☒ Individual EPD verification without a pre-verified LCA/EPD tool Third-party verifier: *Stephen Forson, Viridis Pride Ltd, S.Forson@viridispride.com* Approved by: The International EPD® System
The procedure for follow-up of data during EPD validity involves a third-party verifier: ☐ Yes ☒ No

Ownership and limitations on use of EPD

The EPD owner has 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 characterization factors); and be valid at the time of comparison.

Information about the EPD owner

EPD owner: 3F GmbH
Contact: Marcus Bezler, m.bezler@3f-gmbh.de
Adresse: Daimlerstraße 4-8, 73655 Plüderhausen, Germany
Description of the organisation: 3F is a high-performance developer and manufacturer of technical adhesive tapes for a wide range of applications. Our products include transfer tapes and double-sided adhesive tapes with various backing materials, as well as foam tapes made from different types of foam. We also offer single-sided adhesive tapes, including those specifically designed for the construction industry, as well as adhesive coatings for contract manufacturing.
Product-related or management system-related certifications: ISO 9001- and 14001-certificates
LCA practitioner: Amit Lotan, Amit.lotan@carbonzero.se

Product information

Product name: Foil Tapes
Product identification: Group 1- Foil Tapes (6 products)
Products Description:
The adhesive tapes consist of a backing paper. that is coated with a water-based acrylic dispersion and then dried in an oven. After drying, a paper liner is laminated to the dried adhesive acrylic layer, which is removed when the adhesive tape is used. These adhesive tapes are used to seal and bond steep roofs. When used, only the paper liner is removed; the adhesive tape remains in place.
Visual representation of the products:


Description of production process: All liquid components (acrylate dispersion, thickener, and resins) are mixed, coated onto foil or paper at the desired layer thickness, and then dried in an oven. The adhesive tape is then wound up and cut to the desired width.
Technical or actual lifespan: 50 Years
UN CPC code: 36920 - Self-adhesive plates, sheet, film. Foil tapes, strips, and flat shapes
Name and location of production site: The product is being produced in Germany and sold in Denmark
List of products:

1. Alpha foil adhesive tape
2. Raw foil adhesive tape
3. Foil adhesive tape, green
4. Foil adhesive tape, Bravo green
5. Alpha Pro UV tape
6. Raw foil adhesive tape II

In group 1, there are several similar products with different names due to marketing needs:

- Alpha foil adhesive tape (Product Number 1) and Raw foil adhesive tape (Product Number 2) are the same products
- Alpha Pro UV tape (Product Number 5) + Raw foil adhesive tape II (Product Number 6) are the same products

Technical Specification:

Product	Adhesive carrier	Adhesive system	Release liner	Thickness (w/o liner)	Peel adhesion (std)	Breaking-force (std)	Elongation (std)	Peel strength (DIN 4108-11*)	Processing temp	Temperature resistance	Tack	Condensation water resistance	Aging resistance	UV stability
P1+P2 – Alpha + Raw foil adhesive tape	LDPE film, green, reinforced with scrim	Acrylic dispersion	Silicone-coated paper, brown	—	≥ 25 N/25 mm (DIN EN ISO 29862*)	≥ 25 N/25 mm (DIN EN 14410*)	100% (DIN EN 14410*)	Fulfills	+5 °C recommended	–30 °C to +100 °C	excellent	high	very high	—
P3 – Foil adhesive tape, green	LDPE film, green, reinforced with scrim	Acrylic dispersion (polyacrylate dispersion)	Silicone-coated paper, brown	0.26–0.28 mm (DIN EN 1942*)	—	≥ 25 N/25 mm (DIN EN 14410*)	100% (DIN EN 14410*)	Fulfills	+5 °C recommended	–30 °C to +100 °C	excellent	very high	—	—
P4 – Foil adhesive tape, Bravo green	LDPE film, green, reinforced with scrim	Acrylic dispersion	Silicone-coated paper, brown	0.24–0.26 mm (DIN EN 1942*)	≥ 25 N/25 mm (DIN EN ISO 20962*)	≥ 25 N/25 mm (DIN EN 14410*)	100% (DIN EN 14410*)	Fulfills	+5 °C recommended	–30 °C to +100 °C	high	high	very high	—
P5+P6 – Alpha Pro UV + Raw foil adhesive tape II	LDPE film, black, 2 years UV-stable[1], reinforced with	Acrylic dispersion	Silicone-coated paper, brown	0.29–0.31 mm (DIN EN 1942*)	≥ 25 N/25 mm (DIN EN ISO 29863*)	≥ 25 N/25 mm (DIN EN 14410*)	300% (DIN EN 14410*)	Fulfills	+5 °C recommended	–30 °C to +100 °C	high	high	—	2 years

Content declaration

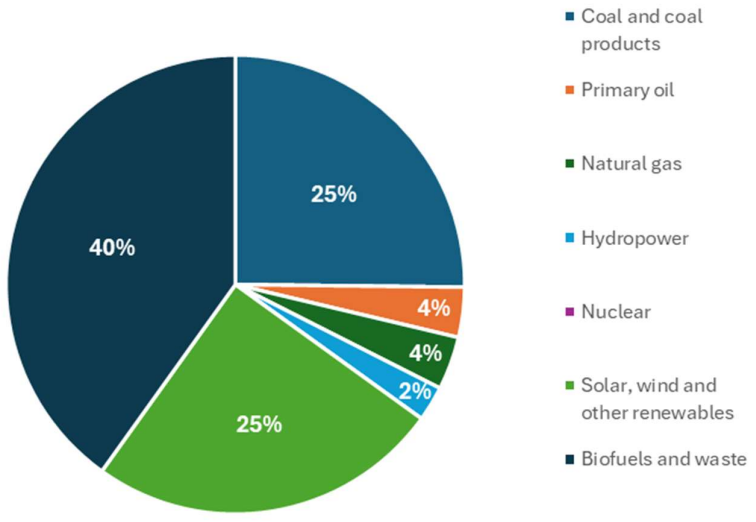
	Group 1 – Average Content			
Raw materials	Specific contents of each product are presented in the LCA Report.			
	Kg	**%**	**Biogenic materials weight % and kg C/FU**	**pre/post-consumer**
paper, both sides coated with silicone	9.00E-02	1.77E+01	0.04, 6.8E-03	0.00
water-based acrylic dispersion 1	2.35E-01	4.72E+01	0.00	0.00
water-based acrylic dispersion 2	5.03E-02	1.01E+01	0.00	0.00
water-based acrylic dispersion 3	7.16E-02	1.30E+01	0.00	0.00
tackifier rosin ester emulsion	6.47E-02	1.23E+01	0.00	0.00
liquid polyurethane thickener	2.48E-03	4.80E-01	0.00	0.00
PET skrim	4.00E-03	7.90E-01	0.00	0.00
PE-Foil	6.50E-02	1.28E+01	0.00	0.00
Total	5.83E-01	1.00E+02	0.04	0.00
Packaging				
cardboard sleeve	3.12E-02	6.15E+01	0.014, 2.8E-02	0.00
cardboard cutting	1.48E-03	2.90E+00	6.6E-04, 1.3E-03	0.00
Cardboard	1.81E-02	3.56E+01	8.15E-03, 0.016	0.00
Total	**5.08E-02**	**1.00E+02**	**0.023**	**0.00**

None of the raw materials used in this product, and at the time of production of the EPD, fall within the Candidate List of Substances of Very High Concern for the Authorization of the European Chemicals Agency. In any case, the eventual presence of Substances of Very High Concern would be reported in the safety data sheets for each product/product group.

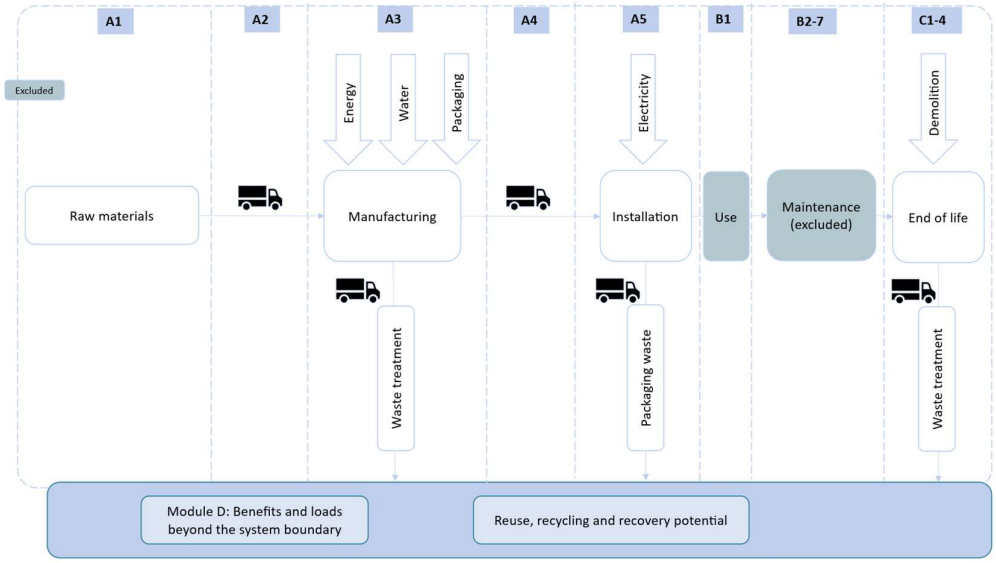
LCA information

Declared unit: 1m² of Foil Tape (Mass conversion is 5.83E-01kg per 1m²)
Technical Lifespan: 50 years
Time representativeness: Manufacturing data from 2024.
LCA software used: SimaPro v10.2.0.2, Ecoinvent 3.11. The characterization factors used in this study are based on PCR 2019:14 and EN 15804+A2 (based on EF 3.1).
Description of system boundaries: Cradle-to-gate with options, modules A1-A3, A4, A5, C1-C4, D
Life cycle stages not considered: B1-B7 modules – There are no environmental effects from this phase.
Cut-off Approach:
All input and output flows at the unit-process level were identified and included wherever life-cycle inventory (LCI) data were available; where data gaps occurred, conservative assumptions were used with average or generic datasets, and all such assumptions were documented. Quantitative cut-off criteria were set on both mass and primary energy at two levels: at the unit-process level, individual flows contributing ≤1% of either total mass or primary energy were eligible for exclusion; at the information-module level, the cumulative exclusions do not exceed 5% of the total mass and primary energy.
Allocation procedures: Allocation criteria are based on mass. They produce a range of specifications, including different materials. Data was provided in several formats, including per tonne, annual volume, and annual tonnage. These were converted to per tonne using mass allocation.
Mass conversion: 1m² of average tape group1 equals to 5.83E-01kg
Electricity used in manufacturing: The power mix is based on Germany's residual grid mix, as the manufacturing processes occur here. This has a total climate change of 0.0364CO2e per kWh.
Electricity residual mix of Germany - Association of Issuing Bodies (2024)

National electricity grid	Period	GWP-GHG [kg CO2 -eq/kWh]
DE	2024	0.0364



System diagram:



Modules declared, geographical scope, share of specific data (in GWP-GHG results), and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction 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	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	DE	DE	DE	DK	DK	-	-	-	-	-	-	-	DK	DK	DK	DK	DK
Specific data used	35%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	-22.98%/+13.22					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0					-	-	-	-	-	-	-	-	-	-	-	-

Using the EPD's table for A1–A3, the primary (specific) contributions to GWP-GHG are: Manufacturing & packaging (10%), Electricity generation used in manufacturing (15%), and A2 transport of inputs (10%)—total 35% specific data.

Declaration of data sources, reference years, and share of primary data:

Process	Source type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Manufacturing of the product and Packaging	Collected data	EPD owner	2024	Primary data	10%
The generation of electricity used in the manufacturing of a product	Database	Ecoinvent v3.11	2024	Primary data	15%
Transportation	Database	Ecoinvent v3.11	2024	Primary data	10%
Total share of primary data, of GWP-GHG results for A1-A3	35%				

Summary of data quality: Modules A1–A3 cover the production of raw materials and product manufacturing, while Module A4 accounts for transportation to sellers. Upstream processes typically rely on generic or EPD data, whereas manufacturer-specific or average data is used for both production and downstream transport stages. All data obtained from the year 2024
Transport to the sellers (A4) – Based on client data

Scenario information	Truck
Vehicle and fuel types	Truck-trailer, Euro 0 - 6 mix, 34 - 40t gross weight / 27t payload capacity Using 0.021 kg diesel per tkm
Distance /km	700
Capacity utilisation /%	61 Dataset default value
Bulk density of transported products/kg/m3	1000
Volume capacity utilization factor	1

A5, Construction installation
This stage includes disposing of the 'paper of both sides coated with silicone', which is part of the product and is peeled during taping, and the cardboard (sleeve, cutting, and cardboard), which is the packaging for the final product.
Disposal: For each product, the amounts are presented in Table 2 'Product specifications per packed declared unit (1m^2)'.

- Waste paperboard is 80% recycled and 20% disposed of for full incineration and produces 1.99 MJ/ton for electricity and 3.99MJ/ton thermal energy that will be presented in D stage.

B1-B7 Use stage
This stage includes no activities or emissions related to the product; therefore, B1-B7 is not declared.
C1 Deconstruction/Demolition
This stage involves deconstruction and/or demolition of the product at the end of its life. An excavator using 0.0075kg of diesel (per declared unit) for this process
C2 Transport
This stage represents the transport distance to the waste processing facility. Transport distance to waste processing is 80 km by truck to the recycling and landfill sites, and 130 km by truck to the incineration site.

C3 Waste processing

This stage includes any necessary waste treatment. Each final product is disposed of after 50 years of lifespan. It is assumed that each tape, which is primarily a plastic mixture, will be treated in accordance with Denish's statistics for plastic end-of-life. The disposal will be: 45% - Incineration, 53% - Recycling, from which credit will be presented in D stage. And 2% for the landfill that will be presented in C4.

C4 Final Disposal

This includes any material that is landfilled.

At the end of its lifetime, the product will be disposed of in landfills at a rate of 2%.

D Benefits and loads beyond the system boundary

For each product, the amounts are presented in Table 2 ‘Product specifications per packed declared unit (1m2)’.

From A5 - packaging of the final product + one side of a peeled paper from the tape during assembly is 20% recycled and 80% disposed of for full incineration, producing 1.99MJ/ton for electricity and 3.99MJ/ton thermal energy.

From C3 – Final product disposed of is being treated according to Denish statistics for plastic mixture: 45% - Incineration, 53% - Recycling.

For plastic mixture waste, 1 kg produces 3.93 MJ of electricity and 7.97 MJ of thermal heat. And 26% of each product is recycled, thereby representing recovered plastic material.

Environmental performance

The estimated impact results are only relative statements and 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 (module C) should be considered when using the results of the production stage (modules A1-A3).

Average of Group 1 (Declared unit – 1m^2)

Using EN15804 reference package EF3.1

Mandatory impact category indicators according to EN 15804 +A2

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Climate change-Total	kg CO2 eq	1.42E+00	1.67E-01	1.40E-01	1.44E-03	4.29E-03	4.42E-01	1.97E-02	-4.49E-01
Climate change - Biogenic	kg CO2 eq	-1.43E-01	0.00E+00	1.35E-01	0.00E+00	0.00E+00	0.00E+00	8.00E-03	0.00E+00
Climate change - Fossil	kg CO2 eq	1.50E+00	1.67E-01	4.66E-03	1.44E-03	4.28E-03	4.42E-01	1.17E-02	-4.47E-01
Climate change - Land use and LU change	kg CO2 eq	6.29E-02	7.47E-05	1.41E-06	3.75E-07	1.92E-06	4.17E-06	8.50E-07	-1.38E-03
Ozone depletion	kg CFC11 eq	9.59E-08	2.12E-09	6.33E-11	7.91E-11	5.44E-11	2.06E-10	3.51E-11	-1.94E-08
Acidification	mol H+ eq	1.41E-02	5.70E-04	3.88E-05	6.24E-06	1.46E-05	9.71E-05	1.00E-05	-1.41E-03
Eutrophication, freshwater	kg P eq	7.44E-05	2.07E-06	5.41E-08	8.86E-09	5.32E-08	1.05E-07	1.60E-08	-1.19E-05
Eutrophication, marine	kg N eq	1.84E-03	1.77E-04	1.69E-05	8.66E-07	4.55E-06	4.67E-05	8.10E-06	-2.98E-04
EP-terrestial	mol N eq	1.53E-02	1.96E-03	1.75E-04	9.40E-06	5.04E-05	4.80E-04	4.09E-05	-3.28E-03
Photochemical ozone formation	kg NMVOC eq	6.55E-03	7.72E-04	4.44E-05	1.19E-05	1.98E-05	1.20E-04	1.69E-05	-2.08E-03
Resource use, m&m	kg Sb eq	1.22E-05	5.47E-07	8.48E-09	1.02E-09	1.40E-08	1.94E-08	2.56E-09	-1.81E-06
Resource use, fossils	MJ	2.71E+01	2.31E+00	3.36E-02	8.32E-02	5.92E-02	9.56E-02	3.09E-02	-1.22E+01
Water use	m3 depriv.	1.06E+00	1.07E-02	4.72E-03	8.10E-05	2.76E-04	2.35E-03	-2.02E-02	-2.35E-01

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: There is a discouragement of the use of the results of modules A1-A3 (A1-A5 for services) without considering the results of module C

Additional mandatory and voluntary impact category indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-GHG[1]	kg CO2 eq	1.56E+00	1.67E-01	5.00E-03	1.44E-03	4.29E-03	4.42E-01	1.17E-02	-4.49E-01
PM	Disease incidence	9.08E-08	1.29E-08	3.27E-10	6.09E-11	3.30E-10	4.43E-10	2.22E-10	-1.33E-08
IRP	kBq U235 eq.	5.75E-02	7.24E-04	2.38E-05	7.52E-06	1.86E-05	1.78E-04	1.00E-05	-5.56E-02
ETP-fw	CTUe	1.27E+01	4.25E-01	2.43E-01	3.48E-03	1.09E-02	8.66E-01	4.25E-01	-2.11E+00
HTTP-c	CTUh	7.30E-10	2.79E-11	1.15E-11	2.33E-13	7.16E-13	3.74E-11	7.79E-13	-8.37E-11
HTTP-nc	CTUh	3.61E-08	1.43E-09	4.60E-10	7.07E-12	3.66E-11	1.31E-09	1.36E-10	-2.55E-09
SQP	Dimensionless	2.08E+01	1.36E+00	9.95E-03	5.02E-03	3.48E-02	2.09E-02	7.29E-02	-1.83E+00

Resource use indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	2.30E+00	9.52E-03	2.51E+00	2.12E-04	7.33E-04	3.27E-03	4.88E-04	-1.28E+00
PERM	MJ	3.41E+00	0.00E+00	-3.41E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	5.70E+00	9.52E-03	-9.00E-01	2.12E-04	7.33E-04	3.27E-03	4.88E-04	-1.28E+00
PENRE	MJ	2.05E+01	7.55E-01	1.05E+00	8.30E-02	5.81E-02	5.96E+00	3.19E-02	-1.23E+01
PENRM	MJ	6.89E+00	0.00E+00	-1.02E+00	0.00E+00	0.00E+00	-5.87E+00	0.00E+00	0.00E+00
PENRT	MJ	2.74E+01	7.55E-01	3.35E-02	8.30E-02	5.81E-02	8.63E-02	3.19E-02	-1.23E+01
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m3	3.38E-02	1.01E-04	1.64E-04	2.41E-06	7.75E-06	4.99E-04	-4.68E-04	-7.10E-03

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

[1] 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 CO_2 is set to zero.

Waste indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HW	kg	1.42E+02	9.01E-01	2.33E+00	2.34E-02	6.94E-02	6.65E+00	3.99E-02	-1.48E+01
NHW	kg	1.51E+03	1.79E+00	3.63E+01	4.02E-02	1.36E-01	4.89E+01	1.74E-01	-4.92E+02
RW	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Output flow indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
CR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	1.01E-02	0.00E+00	1.12E-01	0.00E+00	0.00E+00	2.19E-01	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	5.57E-02	0.00E+00	0.00E+00	7.31E-01	0.00E+00	0.00E+00
ETE	MJ	0.00E+00	0.00E+00	1.12E-01	0.00E+00	0.00E+00	1.48E+00	0.00E+00	0.00E+00

Information describing the biogenic carbon content at the factory gate

Biogenic carbon content	Unit (expressed per declared unit)
Biogenic carbon content in the product	4.00E-02 kg C
Biogenic carbon content in accompanying packaging	2.3E-02 kg C
Note:	1 kg of biogenic carbon in the product/packaging is equivalent to the uptake of 44/12 kg of CO2.

Additional LCA results

Environmental impact performance from 100% scenarios

In addition to the most probable scenario, results from the corresponding 100% scenarios are added in this section.

Mandatory impact category indicators according to EN 15804

Results per functional or declared unit													
Indicator	**Unit**	**C2 100% RC**	**C2 100% INC**	**C2 100% LF**	**C3 100% RC**	**C3 100% INC**	**C3 100% LF**	**C4 100% RC**	**C4 100% INC**	**C4 100% LF**	**D 100% RC**	**D 100% INC**	**D 100% LF**
Climate change-Total	kg CO_2 eq.	7.22E-03	1.17E-02	7.22E-03	4.14E-04	1.06E+00	0.00E+00	0.00E+00	0.00E+00	4.11E-02	-1.53E+00	-1.42E-01	-4.32E-03
Climate change - Biogenic	kg CO_2 eq.	2.29E-06	3.72E-06	2.29E-06	2.12E-05	9.69E-05	0.00E+00	0.00E+00	0.00E+00	2.14E-05	1.67E-01	-6.75E-04	-2.08E-05
Climate change - Fossil	kg CO_2 eq.	7.21E-03	1.17E-02	7.21E-03	3.92E-04	1.06E+00	0.00E+00	0.00E+00	0.00E+00	4.11E-02	-1.69E+00	-1.39E-01	-4.24E-03
Climate change - Land use and LU change	kg CO_2 eq.	3.23E-06	5.25E-06	3.23E-06	1.59E-06	9.85E-06	0.00E+00	0.00E+00	0.00E+00	2.99E-06	-1.92E-03	-1.81E-03	-5.58E-05
ODP	kg CFC 11 eq.	5.79E-11	1.40E-10	5.79E-11	2.16E-12	4.60E-10	0.00E+00	0.00E+00	0.00E+00	1.14E-10	-4.36E-08	-1.68E-08	-2.52E-09
AP	mol H^+ eq.	1.38E-05	3.77E-05	1.38E-05	3.94E-07	2.16E-04	0.00E+00	0.00E+00	0.00E+00	3.28E-05	-5.71E-03	-2.15E-04	-3.19E-05
EP-freshwater	kg P eq.	2.78E-03	1.37E-07	2.78E-03	2.40E-09	2.35E-07	0.00E+00	0.00E+00	0.00E+00	5.21E-08	-4.88E-05	-7.81E-07	-1.15E-07
EP-marine	kg N eq.	4.42E-06	1.17E-05	4.42E-06	8.78E-08	1.04E-04	0.00E+00	0.00E+00	0.00E+00	2.64E-05	-1.09E-03	-7.03E-05	-1.05E-05
EP-terrestrial	mol N eq.	4.87E-05	1.30E-04	4.87E-05	1.13E-06	1.07E-03	0.00E+00	0.00E+00	0.00E+00	1.34E-04	-1.21E-02	-7.93E-04	-1.18E-04
POCP	kg NMVOC eq.	1.92E-05	5.11E-05	1.92E-05	2.69E-07	2.67E-04	0.00E+00	0.00E+00	0.00E+00	5.50E-05	-7.63E-03	-2.65E-04	-3.96E-05
ADP-minerals&metals	kg Sb eq.	1.33E-08	3.62E-08	1.33E-08	1.29E-09	4.37E-08	0.00E+00	0.00E+00	0.00E+00	8.36E-09	-9.77E-06	-3.93E-07	-5.79E-08
ADP-fossil	MJ	5.81E-02	1.53E-01	5.81E-02	9.84E-03	2.17E-01	0.00E+00	0.00E+00	0.00E+00	1.01E-01	-3.84E+01	-4.53E+00	-6.72E-01
WDP	m^3	2.63E-04	7.10E-04	2.63E-04	1.29E-04	5.29E-03	0.00E+00	0.00E+00	0.00E+00	-6.58E-02	-8.68E-01	-4.87E-02	-7.20E-03

100% RC: 100% recycling, 100% INC: 100% incineration with energy recovery, 100% LF: 100% landfill

Additional mandatory and voluntary impact category indicators

Results per functional or declared unit													
Indicator	**Unit**	**C2 100% RC**	**C2 100% INC**	**C2 100% LF**	**C3 100% RC**	**C3 100 % INC**	**C3 100% LF**	**C4 100% RC**	**C4 100% INC**	**C4 100% LF**	**D 100% RC**	**D 100% INC**	**D 100% LF**
GWP-GHG	kg CO_2 eq.	7.21E-03	1.17E-02	3.91E-04	3.91E-04	1.06E+00	0.00E+00	0.00E+00	0.00E+00	4.11E-02	-1.69E+00	-1.39E-01	-4.24E-03
PM	Disease incidence	3.27E-10	8.51E-10	3.27E-10	4.08E-12	9.87E-10	0.00E+00	0.00E+00	0.00E+00	7.24E-10	-5.56E-08	-1.45E-09	-2.13E-10
IRP	kBq U235 eq.	1.87E-05	4.79E-05	1.87E-05	3.47E-04	5.50E-04	0.00E+00	0.00E+00	0.00E+00	3.27E-05	-5.78E-02	-8.35E-02	-1.22E-02
ETP-fw	CTUe	8.43E-03	2.81E-02	8.43E-03	2.68E-04	1.93E+00	0.00E+00	0.00E+00	0.00E+00	1.39E+00	-3.55E+00	-1.01E-01	-1.50E-02
HTTP-c	CTUh	2.15E-11	1.85E-12	2.15E-11	3.61E-14	8.33E-11	0.00E+00	0.00E+00	0.00E+00	2.54E-12	-4.82E-09	-1.69E-11	-2.51E-12
HTTP-nc	CTUh	3.62E-11	9.44E-11	3.62E-11	1.69E-12	2.92E-09	0.00E+00	0.00E+00	0.00E+00	4.43E-10	-1.15E-08	-5.66E-10	-8.34E-11
SQP	Dimensionless	3.47E-02	8.97E-02	3.47E-02	2.37E-03	4.76E-02	0.00E+00	0.00E+00	0.00E+00	2.38E-01	-6.72E+00	-6.13E-01	-8.99E-02

Resource use indicators

Results per functional or declared unit													
Indicator	**Unit**	**C2 100% RC**	**C2 100% INC**	**C2 100% LF**	**C3 100% RC**	**C3 100 % INC**	**C3 100% LF**	**C4 100% RC**	**C4 100% INC**	**C4 100% LF**	**D 100% RC**	**D 100% INC**	**D 100% LF**
PERE	MJ	7.33E-04	2.04E-03	7.33E-04	6.08E-03	1.46E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.25E+00	-1.47E+00	0.00E+00
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	7.33E-04	2.04E-03	7.33E-04	6.08E-03	1.46E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.25E+00	-1.47E+00	0.00E+00
PENRE	MJ	5.81E-02	1.53E-01	5.81E-02	9.84E-03	2.17E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.66E+01	-4.53E+00	0.00E+00
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.54E+00	0.00E+00	0.00E+00
PENRT	MJ	5.81E-02	1.53E-01	5.81E-02	9.84E-03	2.17E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.21E+01	-4.53E+00	0.00E+00
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	7.75E-06	2.11E-05	7.75E-06	1.05E-05	1.11E-03	1.05E-05	0.00E+00	0.00E+00	-1.53E-03	-6.94E-03	-2.76E-03	-4.05E-04

Waste indicators

Results per functional or declared unit														
Indicator	**Unit**	**C1**	**C2 100% RC**	**C2 100% INC**	**C2 100% LF**	**C3 100% RC**	**C3 100% INC**	**C3 100% LF**	**C4 100% RC**	**C4 100% INC**	**C4 100% LF**	**D 100% RC**	**D 100% INC**	**D 100% LF**
Hazardous waste disposed of	kg	2.34E-02	6.94E-02	2.58E-01	9.93E-02	5.79E-03	1.47E+01	0.00E+00	0.00E+00	0.00E+00	1.24E-01	-4.83E+01	-2.31E+00	-3.42E-01
Non-hazardous waste disposed of	kg	4.02E-02	1.36E-01	1.48E+00	5.68E-04	6.49E-02	4.46E+02	0.00E+00	0.00E+00	0.00E+00	1.09E+00	-7.52E+00	-2.64E+01	-3.91E-03
Radioactive waste disposed	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Output flow indicators

Results per functional or declared unit														
Indicator	**Unit**	**C1**	**C2 100 % RC**	**C2 100 % INC**	**C2 100 % LF**	**C3 100 % RC**	**C3 100 % INC**	**C3 100 % LF**	**C4 100 % RC**	**C4 100 % INC**	**C 100 % LF**	**D 100 % RC**	**D 100 % INC**	**D 100 % LF**
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.13E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-4.13E+02	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.13E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.13E+02	0.00E+00
Exported energy, electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.62E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.17E+00	0.00E+00

Additional LCA results
Variation Across Environmental Impacts

Impact category	Unit	Min A1–A3 (Group 1)		A1–A3 Average (Group 1)	Max A1–A3 (Group 1)	
GWP-total	kg CO2 eq	1.42E+00	-10.31%	1.56E+00	1.66E+00	5.63%
ODP	kg CFC11 eq	9.22E-08	-3.97%	9.59E-08	9.94E-08	3.54%
AP	mol H+ eq	1.20E-02	-17.63%	1.41E-02	1.62E-02	13.22%
EP, marine	kg N eq	1.49E-03	-22.98%	1.84E-03	2.09E-03	12.17%
EP, freshwater	kg P eq	6.83E-05	-9.04%	7.44E-05	7.88E-05	5.51%
EP, terrestrial	mol N eq	1.42E-02	-7.84%	1.53E-02	1.62E-02	5.36%
POCP	kg Sb eq	5.88E-03	-11.39%	6.55E-03	6.74E-03	2.82%
ADPE	MJ	2.43E+01	-11.23%	2.71E+01	3.00E+01	9.73%
ADPF	m3 depriv.	1.05E+00	-0.88%	1.06E+00	1.13E+00	6.02%

Disclaimers

ILCD classification	Indicator	Disclaimer
ILCD Type 1	Global warming potential (GWP)	None
	Depletion potential of the stratospheric ozone layer (ODP)	None
	Potential incidence of disease due to PM emissions (PM)	None
ILCD Type 2	Acidification potential, Accumulated Exceedance (AP)	None
	Eutrophication potential, Fraction of nutrients reaching freshwater end compartment (EP-freshwater)	None
	Eutrophication potential, Fraction of nutrients reaching marine end compartment (EP-marine)	None
	Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	None
	Formation potential of tropospheric ozone (POCP)	None
	Potential Human exposure efficiency relative to U235 (IRP)	1
ILCD Type 3	Abiotic depletion potential for non-fossil resources (ADP-minerals & metals)	2
	Abiotic depletion potential for fossil resources (ADP-fossil)	2
	Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	2
	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	2
	Potential Comparative Toxic Unit for humans (HTP-c)	2
	Potential Comparative Toxic Unit for humans (HTP-nc)	2
	Potential Soil Quality Index (SQP)	2
Disclaimer 1 – This impact category primarily addresses the eventual impact of low-dose ionizing radiation on human health in the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure, or radioactive waste disposal in underground facilities. Potential ionizing radiation from soil, radon, and some construction materials is also not measured by this indicator.		
Disclaimer 2 – The results of this environmental impact indicator shall be used with care, as the uncertainties are high or there is limited experience with the indicator.		

Abbreviations

Abbreviation	Definition
General Abbreviations	
EN	European Norm (Standard)
EPD	Environmental Product Declaration
EF	Environmental Footprint
GPI	General Programme Instructions
ISO	International Organization for Standardization
LCA	Life Cycle Assessment
PCR	Product Category Rules
c-PCR	Complementary Product Category Rules
CEN	European Committee for Standardization
CLC	Co-location centre
CPC	Central product classification
GHS	Globally harmonized system of classification and labelling of chemicals
GRI	Global Reporting Initiative
Environmental Impact Indicators (EN 15804)	
GHG	Greenhouse gas
GWP	Global Warming Potential (kg CO_2 eq.)
GWP-fossil	Global Warming Potential from fossil sources (kg CO_2 eq.)
GWP-biogenic	Global Warming Potential from biogenic sources (kg CO_2 eq.)
GWP-luluc	Global Warming Potential from land use and land use change (kg CO_2 eq.)
GWP-total	Total Global Warming Potential (kg CO_2 eq.)
GWP-GHG	Global Warming Potential for greenhouse gases (kg CO_2 eq.)
ODP	Ozone Depletion Potential (kg CFC-11 eq.)
AP	Acidification Potential (mol H^+ eq.)
EP	Eutrophication Potential
EP-freshwater	Freshwater eutrophication potential (kg P eq.)
EP-marine	Marine eutrophication potential (kg N eq.)
EP-terrestrial	Terrestrial eutrophication potential (mol N eq.)
POCP	Photochemical Ozone Creation Potential (kg NMVOC eq.)
ADP	Abiotic Depletion Potential
ADP-minerals&metals	Abiotic depletion potential for non-fossil resources (kg Sb eq.)
ADP-fossil	Abiotic depletion potential for fossil resources (MJ)
WDP	Water Deprivation Potential (m^3)
Resource Use Indicators	
PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials (MJ)
PERM	Use of renewable primary energy resources as raw materials (MJ)
PERT	Total use of renewable primary energy resources (MJ)
PENRE	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (MJ)
PENRM	Use of non-renewable primary energy resources used as raw materials (MJ)
PENRT	Total use of non-renewable primary energy resources (MJ)
SM	Use of secondary material (kg)
RSF	Use of renewable secondary fuels (MJ)
NRSF	Use of non-renewable secondary fuels (MJ)
FW	Use of net fresh water (m^3)
Waste Indicators	

HW	Hazardous Waste (disposed) (kg)
NHW	Non-Hazardous Waste (disposed) (kg)
RW	Radioactive Waste (disposed) (kg)
Output Flow Indicators	
CFR	Components for Reuse (kg)
MR	Material for Recycling (kg)
MER	Materials for Energy Recovery (kg)
EEE	Exported Energy, Electricity (MJ)
EET	Exported Energy, Thermal (MJ)
Lifecycle Stages / Modules	
A1	Raw material supply
A2	Transport
A3	Manufacturing
A4	Transport to the site
A5	Construction/Installation
B1	Use
B2	Maintenance
B3	Repair
B4	Replacement
B5	Refurbishment
B6	Operational energy use
B7	Operational water use
C1	Deconstruction/Demolition
C2	Transport to waste processing
C3	Waste processing
C4	Disposal
D	Reuse-Recovery-Recycling potential
Other Relevant Terms	
SVHC	Substances of Very High Concern
EC No.	European Community Number
CAS No.	Chemical Abstracts Service Number
MJ	Megajoule
kg	Kilogram
m^3	Cubic Meter
NMVOC	Non-Methane Volatile Organic Compounds
Sb eq.	Antimony Equivalents
P eq.	Phosphorus Equivalents
N eq.	Nitrogen Equivalents
CFC-11 eq.	Chlorofluorocarbon-11 Equivalents
CO_2 eq.	Carbon Dioxide Equivalents
kg C	Kilograms of Carbon
kg CO_2 eq.	Kilograms of Carbon Dioxide Equivalent
ND	Not Declared

References

EN 15804:2012+A2	Sustainability of construction works – Environmental product declaration – Core rules for the product category of construction products
EPD International (2024)	General Programme Instructions of the International EPD® System, version 5.0
ISO 14020:2022	International Standard ISO 14020 – Environmental statements and programs for products – Principles and general requirements
ISO 14025:2006	International Standard ISO 14025 – Environmental labels and declarations — Type III environmental declarations — Principles and procedures
ISO 14040:2006	International Standard ISO 14040: Environmental Management – Life cycle assessment – Principles and framework. Second edition 2006-07-01
ISO 14044:2006	International Standard ISO 14044: Environmental Management – Life cycle assessment – Requirements and Guidelines
PCR 2019:14	Construction products v2.0.1
Ecoinvent	Ecoinvent Database V3.11
Simapro	SimaPro software V10.2.0.2
Electricity Grid Mix	Electricity residual mix of Germany - Association of Issuing Bodies (2024)
Waste Scenarios, Statistics Denmark	https://www.dst.dk/en

Version history

Version 1.0 09.17.2025

Version 1.1 02.24.2026