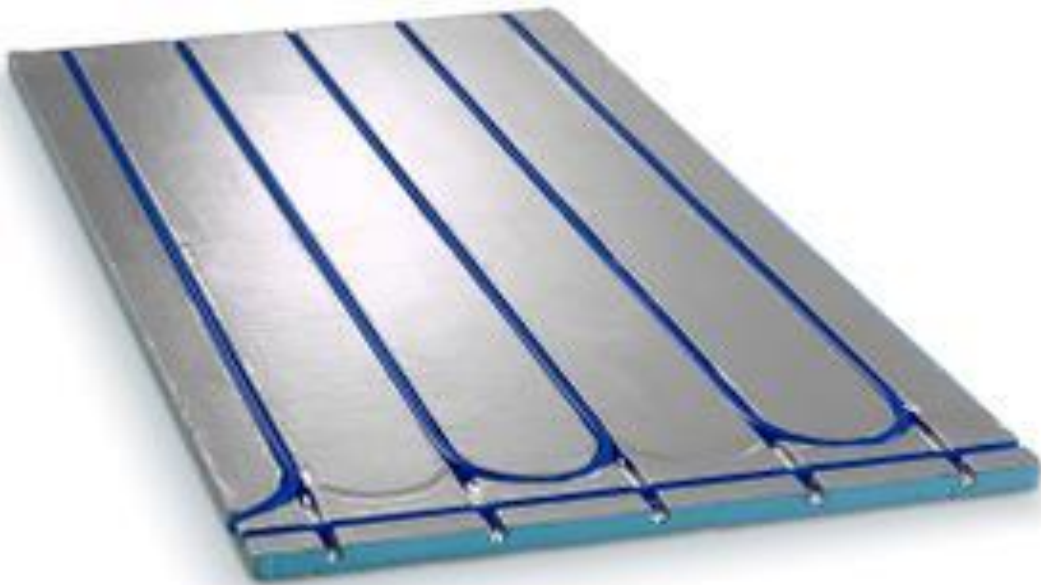


Environmental Product Declaration

NORDIC FOS

In accordance with ISO 14025 and EN 15804+A2:2019 for:

NORDIC FOS Floor Heating Plate *from Nordic Fos*



Programme:	The International EPD [®] System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-10737
Publication date:	31-10-2023 (version 1)
Valid until:	31-10-2028 (version 1)

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

This EPD covers multiple products with the following 4 item numbers: Nordic Fos Floor heating Plate 161941, 121651, 202531, 162541, based on worst-case results of Nordic Fos Floor heating Plate 202531.

General information

Owner of the declaration and manufacturer:

Nordic Fos A/S, A. P. Møllers Allé 55 - DK 2791 Dragør- Denmark. Email: info@nordicfos.com Phone: +45 44240111

Declaration issued: 31-10-2023 (version 1)

EPD Prepared by: Bureau Veritas HSE, Denmark, Odyssefs Papagiannidis, Peter Bendtsen.

EPD Verified by: HÅLLBARHETSJOUREN AB, Audit Team:
Camilla Landen, EPD Lead verifier.

Standards: ISO 14025 and EN 15804+A2:2019.

Statements: This report records that the LCA based information and the additional information declared in the EPD meets the requirements of the European Standard EN 15804:2012+A2:2019 and PCR 2019:14 v 1.2.5. the alignment with other standards as well GPI 4, ISO 14040, ISO 14044.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same 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 equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Scope: This LCA study is intended to be used in a cradle-to-gate with options (A1-A5, C1-C4 and D) EPD covering the following Floor heating plate in table 1, all produced by Nordic Fos A/S at the same production site. The EPD will be accessible on <https://nordicfos.com/> together with product information, providing information for business-to-business communication. The Geographical scope is Europe and the product follows the **UN CPC 54631, Heating equipment installation services n.e.c.**

About Nordic Fos

Nordic Fos is a Danish Company, which since its founding has produced high quality products at competitive prices. NORDIC Fos' first underfloor heating panels were developed in 2002.

The first underfloor heating panels that we developed in 2002 were based on a specially developed plywood of only 15 mm and with 11 crossed layers of wood. We then glued on a 0.3 mm aluminium heat distribution plate. At the time, it was the thinnest and most advanced underfloor heating system on the market and was installed in many construction and renovation projects.

Since 2017, we have manufactured NORDIC underfloor heating panels in high-pressure XPS, and today they have a long-term compressive strength of 40 t/m².

It is our clear idea to continue the development of NORDIC floor heating systems that promote the green transition. With our products, there is a focus on sensible material choices, just as we incorporate the principles of "Cradle to Cradle". In addition, we are always working on new production methods that effectively leave a smaller CO2 footprint on our planet. We do that, among other things by collaborating with the Technological Institute and the University of Southern Denmark to develop the next generation of "Industry 4.0" process plants, using the latest robotic technology.

Product information

Product represented

NORDIC FOS Floor heating plate 202531 is the worst case product that represents all 4 products in the group.



Figure 1: Picture of the NORDIC FOS product covered in this project report.

Product description

This product is manufactured by Nordic Fos in the production plants located in Dragør, A. P. Møllers Allé 55 - DK 2791, Denmark.

The manufacturing process starts from raw materials purchased from suppliers and stored in the plant. Bulk raw materials are stored in specific silos and added mostly automatically in the production line, according to

the formula of the product. Other raw materials, supplied in bags or big bags, are stored in their warehouse and added manually. The production is a discontinuous process, in which all the components are mechanically mixed in batches.

The finished product is then packaged in bags, put on wooden pallets, and stored in the ‘Finished Products’ section Nordic Fos’s warehouse. The quality of final products is controlled before the sale.

The product is supplied from production in dry form and is covered by the **UN CPC 54631, Heating equipment installation services n.e.c.**

Table 1: Product information for the product covered by this EPD.

Product name		Article no.	Description
Danish	English		
NORDIC FOS Gulvvarmeplade 161941 nr. 1	NORDIC FOS Floor Heating Plate 161941	161941	1,193 kg/m2 Thickness: 20mm
NORDIC FOS Gulvvarmeplade 121651 nr. 2	NORDIC FOS Floor Heating Plate 121651	121651	1,021 kg/m2 Thickness: 16mm
NORDIC FOS Floor Gulvvarmeplade 202531 nr. 3	NORDIC FOS Floor Heating Plate 202531	202531	1,246 kg/m2 Thickness: 24mm
NORDIC FOS Gulvvarmeplade 162541 nr. 4	NORDIC FOS Floor Heating Plate 162541	162541	1,221 kg/m2 Thickness: 24 mm

Declared Unit

The declared unit (DU) is 1 kg of dry-packed finished product. This EPD describes the environmental impact of 1 kg of dry-packed floor heating plate. The reason for using 1m2 is that the product consumption varies depending on the density of XPS and aluminium and it is easier to communicate the EPD results per 1m2 instead of 1kg.

Reference service life

According to Nordic Fos experience, the Reference Service Life (RSL) of floor heating plate is not applicable, as B1-B7 modules are not declared and not assessed. The product does not need maintenance or replacement during its service life, if professionally used and properly installed.

Technical data

The product is designed, produced based on application class. The XPS insulation plate is CE marked with standard number DS-EN 13164. The XPS plate also follows the common technical system for declaration of building insulation DS-EN 13172.

Content declaration

Content declaration including packaging covering the Nordic Fos floor heating plate in this EPD.

Table 2: Content declaration, which covers the Nordic Fos floor heating plate products.

Nordic Fos floor heating plate			
Product components	Weight % per m2	Post-consumer material, weight-%	Renewable material, weight-%
XPS	59-70	0%	0%
Aluminium	29-35	0%	0%
Tape	1-5	0%	0%

Table 3: Packaging of final product and raw material packaging Content declaration, which covers the Nordic Fos floor heating plate product.

Packaging of the final product per 1 plate (16 plates per wooden pallet)				
Product	NORDIC FOS Floor Heating Plate 161941 nr. 1	NORDIC FOS Floor Heating Plate 121651 nr. 2	NORDIC FOS Floor Heating Plate 202531 nr. 3	NORDIC FOS Floor Heating Plate 162541 nr. 4
Packaging weight in kg	15,57	15,58	15,59	15,59
Product NF _/m^2	1,19	1,02	1,25	1,22
Packaging + product per 1kg/m2				
Paper	0,00E+00	0,00E+00	0,00E+00	0,00E+00
LDPE film	2,24E-01	2,62E-01	2,14E-01	2,19E-01
Cardboard	8,97E-01	1,06E+00	8,78E-01	8,96E-01
Wood	1,22E+01	1,42E+01	1,16E+01	1,19E+01
Packaging of raw material per 1 kg/m2				
Plastic	1,48E-03	1,73E-03	1,42E-03	1,45E-03
Cardboard	4,32E-02	5,04E-02	4,13E-02	4,22E-02
Wood	9,13E-02	1,07E-01	8,74E-02	8,92E-02
Paper	0,00E+00	0,00E+00	0,00E+00	0,00E+00

During the life cycle of the product no hazardous substance listed in the “Candidate List of Substances of Very High Concern (SVHC) for authorization” has been used in a percentage higher than 0.1% of the weight of the product.

LCA information

Product category rules (PCR)

PCR 2019:14 Construction products (EN 15804:A2) Version 1.2.5.

Time representativeness

Data from factory (primary data) is from 2023.

Database(s) and LCA software used

LCA Software: Simapro 9.5

Database: Most processes in the LCA Software have been modelled using the EcoInvent database 3.9.1. The database was available in SimaPro as local LCI process libraries, allowing for background data integration. Instead of using generic data for the main components including XPS and the suppliers of those raw materials were contacted and specific EPD for their raw materials were used.

The impact models used are the ones included in the SimaPro method named EN 15804 +A2 Method V1.00 / EF 3.0 normalization and weighting set. The chosen LCIA categories are the ones used in EN 15804+A2 as implemented in SimaPro 9.5 The connection between impact categories and indicators covered in this study along with the disclaimers for some indicators can be seen in Table 5.

Cut-off criteria for initial inclusion of inputs and outputs

The general rules for cut-off of inputs and outputs follow the requirements in EN 15804, 6.3.5, where the total of neglected input flows per module shall be a maximum of 5 % of energy usage and mass and 1 % of energy usage and mass for unit processes. Recycling processes and benefits for recycled plastic packaging is regarded as below cut-off criterion of 1%.

Particular care should be taken to include material and energy flows known to have the potential to cause significant emissions into air and water or soil related to the environmental indicators presented in EN 15804.

The LCA study are based on known specific activity data for packing materials and 100% product prescription. Loss of product during installation is regarded below-cut off. The energy needed to break the product is less than 0,1% of the total life cycle energy, so it is part of the cut-off rules of this study.

Allocation principles and procedures

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. In this study, as per EN 15804, allocation is conducted in the following order.

1. Allocation should be avoided.
2. Allocation should be based on physical properties (e.g. mass, volume) when the difference in revenue is small.
3. Allocation should be based on economic values.

The “Allocation, cut-off by classification” system model that has been chosen subdivides multi-product activities by allocation, based on physical, economic, mass or other properties. By-products of waste

treatment processes are cut-off, as are all by-products classified as recyclable. Markets in this model include all activities in proportion to their current production volume.

However, there are no co-products, and therefore no allocation between products beside the energy.

The product is designed for reuse, recycling or recovery. The product is expected to be sent for recovery of XPS and Aluminium material after end of life and a small fraction leads to landfill with other construction waste.

However, the wrapping plastic used under transport to the costumers, are expected to be recycled, as it is a pure plastic material and can easily be sorted for recycling at the recipient.

Description of system boundaries

This study covers a cradle-to-gate with options (A1-A5, C1-C4 and D) EPD.

Table 4: Life cycle stages covered by this LCA study.

	Product stage		Installation processes		Use stage							End of life stage			Reuse-Recovery-Recycling-potential			
	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	
Module	A1-A3																	D
	Production of commodities, raw materials	Product manufacture	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4			
Modules declared	X		X	X	N D	N D	N D	N D	N D	N D	N D	X	X	X	X			X
Geography	Europe	Denmark	Europe															
Process type	Upstream	Processes the manufacture has influence over	Downstream															
Data type	0 % share of specific data in % GWP-GHG	Specific	-															
Variation – products	The potential results of the worst product NORDIC FOS Floor Heating Plate 202531 nr. 3 are declared in this EPD. a) 4,24% variation between NORDIC FOS		-															

	<p>Floor Heating Plate 202531 no 3 and NORDIC FOS Floor Heating Plate 161941 b) 9,14% variation between NORDIC FOS Floor Heating Plate 202531 no 3 and NORDIC FOS Floor Heating Plate 121651 c) 0,00% variation between NORDIC FOS Floor Heating Plate 202531 no 3 and NORDIC FOS Floor Heating Plate 202531 no 3 d) 18,06% between NORDIC FOS Floor Heating Plate 202531 and NORDIC FOS Floor Heating Plate 162541</p>			
<p>Variation – sites</p>	<p>Manufactured in one site</p>			

Figure 2 (system figure) includes the generic processes retrieved from the Ecoinvent database 3.8 and describe the ingredients in the Nordic Fos products in absence of specific data. The suppliers of those raw materials were contacted and specific EPD information for their raw materials were used.

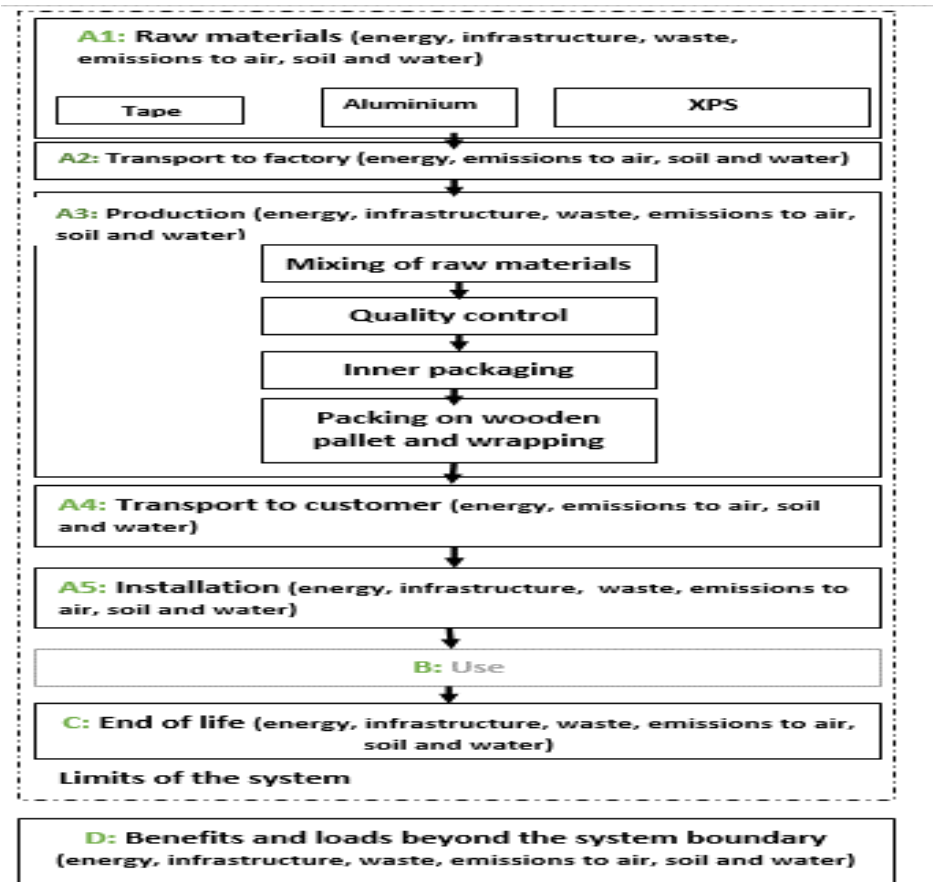


Figure 2: Limits of the system in this study

Product stage (A1-A3):

- A1-A2: extraction, supply and transport of raw materials and packaging to Nordic Fos. Raw materials are purchased from European suppliers.
- A3: manufacturing process of product and its packaging and waste management from the same process. Nordic Fos A/S gets 20% of their electricity from photovoltaic panels for solar energy produced at Dragør. The rest 80% is modelled as Danish residual mix of different energy source according to GPI 4 rules. All transformation data, transmission network data and energy losses are still as in the original input from Ecoinvent 3.9.

The wind and solar energy datasets include operation and maintenance expenditures as well as infrastructure inputs.

At the moment, the class of onshore 1-3 MW wind turbines is approximated with a >3MW onshore wind turbine consisting of the infrastructure datasets for the "wind power construction "(as part of the danish residual mix) respectively and the "network connection construction". The wind turbine's parts are defined to be everything except for the network connection, i.e., rotor, nacelle, tower, and foundation.

These datasets include:

- electricity inputs produced in Denmark and from imports
- the transmission networks
- direct emissions to air (ozone and N2O).
- electricity losses during transmission

Approximately 1 kWh is used to produce 1 kg product. This number is calculated by dividing the total energy consumption at the location of Nordic Fos with the total production volume of all their products.

A3 covers dosage and milling of the XPS to prepare the floor heating plate and aluminium raw materials and additives to ensure that the product meets desired properties and packaging material consumption. Packaging product materials consist of the paper, cardboard material, wooden pallet and LDPE used as wrapping material. The wooden pallet is part of a return system. A calculation has been already made that the wooden pallet can hold at least 16 bags of product and it was used to calculate how much wrapping foil is needed.

Therefore, presuming 25 use cycles is reasonable for one pallet, in average 1/25 of the manufacturing and waste handling of one pallet should be allocated to at least the 16 bags of product(s) transported in one pallet use cycle or 1/16 for 1 bag of product. Therefore, the waste from the same process is assessed as raw material waste and will be used in subsequent process or directed to incineration.

During production, there is spillage from milling the XPS plate at the manufacturing line of Nordic Fos, as seen in Table 5.

Table 5: Spillage/ loss from milling process of the XPS plate

Product name		XPS spillage	Description
NORDIC FOS Floor Heating Plate 161941		23%	1,193 kg/m2 Thickness: 20mm

NORDIC FOS Floor Heating Plate 121651		8%	1,021 kg/m2 Thickness: 16mm
NORDIC FOS Floor Heating Plate 202531		18%	1,246 kg/m2 Thickness: 24mm
NORDIC FOS Floor Heating Plate 162541		10%	1,221 kg/m2 Thickness: 24 mm

Construction process stage (A4-A5):

- A4: distribution to typical Customer by transport of packaged product from production gate to end user (building site). The customers of Nordic Fos are primarily from Denmark. The distance has in the present LCA study been estimated to be 500km via road transport by a Euro 6 lorry of 32 metric ton.
- A5: installation of product into building is done manually with tools and does not entail blending energy. No industry standard exists, and PCR does not provide further guidance for any losses or spillage. Justification comes from the product sheet: <https://nordicfos.com/dk/shop/alle/gulvvarmeplader/nordic-gulvvarmeplade-hoejde-25-mm-1>
The electricity mix is modelled with Danish residual mix, and it is considered as an adequate choice, but since more than 90% of the market is in Denmark.

Use stage (B1-B7):

- B1 to B7 are not declared (ND) as they are not applicable: the product does not need maintenance or replacement during its RSL, if professionally used and properly installed.

End of life stage (C1-C4):

- C1: deconstruction and demolition of the product into the building. Floor heating plates are typically not considered as part of the structure of the building. However, during the building destruction, the quantity of extra energy required to break this application can be neglected compared to the energy required to demolish the structure of the building and are therefore not included in this LCA study. The energy needed to break the product is less than 0,1% of the total life cycle energy, so it is part of cut/off rules.
- C2: transport of waste product from demolition to recycling/disposal facility that is waste collection. The distance covered is 50 km via road transport by a Euro 6 lorry of 32 metric ton.
- C3: The XPS and aluminium are recycled and incinerated and a small fraction is disposed of at landfill site according to EU Recycling Rates according to PEF Annex C, seen in Table 5.
- C4: Waste disposal to landfill including physical pre-treatment.

D Reuse-Recovery-Recycling potential

Module D calculates the potential environmental benefits of the recycling or reuse of materials. This product has considerable benefits due to recycling of XPS and aluminium according to EU Recycling Rates and studies.

Table 6: EU Recycling Rates according to PEF Annex C and References from published studies and surveys.

	Recycling	Incineration	Landfill	Total	Loss during recycling (%)	Source
Aluminium*	95%	0%	5%	100%	70	Chancerel, P.; Rotter, V.S.: Edelmetallrückgewinnung aus Elektround

						Elektronikaltgeräten durch Aufbereitung [Recovering precious metals from waste electrical and electronic equipment by preprocessing]. In: Müll & Abfall 02/2009.
Plastic	29%	32%	39%	100%	22	Schmidt, J. H., Holm, P., Merrild, A., Christensen, P., 2007. Life cycle assessment of the waste hierarchy – A Danish case study on waste paper. Waste Management 27 (2007) 1519–1530.
LDPE	29%	32%	39%	100%	22	Schmidt, J. H., Holm, P., Merrild, A., Christensen, P., 2007. Life cycle assessment of the waste hierarchy – A Danish case study on waste paper. Waste Management 27 (2007) 1519–1530.
XPS (Extruded Polystyrene)	6%	88%	6%	100%	5	Conversio, 2018a), Cowi survey of EPS and XPS in the Baltic Sea
	Recycling	Incineration	Landfill	Total		
Cardboard	75%	11%	14%	100%	10	Dehoust, M., & Merz, G. (2016). Umweltpotenziale der getrennten Erfassung und des Recyclings von Wertstoffen im Dualen System.
Paper	75%	11%	14%	100%	22	Merrild et al. (2008) and Wang et al. (2012)

LDPE	29%	32%	39%	100%	22	Schmidt, J. H., Holm, P., Merrild, A., Christensen, P., 2007. Life cycle assessment of the waste hierarchy – A Danish case study on waste paper. Waste Management 27 (2007) 1519–1530.
Wood	30%	32%	39%	100%	10	Dehoust, M., & Merz, G. (2016). Umweltpotenziale der getrennten Erfassung und des Recyclings von Wertstoffen im Dualen System.
	Recycling	Incineration	Landfill			
EU recycling rates	0%	45%	55%	100%	-	

Environmental performance

All the environmental impacts have been calculated in SimaPro and with the EN 15804 + A2 Method, which takes all the methods defined by the European Standard EN 15804 + A2 into account.

All the LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

The chosen LCIA categories are the ones used in EN 15804+A2 as implemented in SimaPro 9.5 and can be seen in Table 5.

Table 7: The connection between impact categories and indicators covered in this study.

Impact Category	Indicator	Unit	Original reference
Climate Change - Fossil	Global Warming Potential fossil (GWP-fossil)	Kg CO ₂ eq. (Carbon dioxide)	Baseline model of 100 years of the IPCC based on IPCC 2021
Climate Change - Biogenic	Global Warming Potential biogenic (GWP-biogenic)	Kg CO ₂ eq. (Carbon dioxide)	Baseline model of 100 years of the IPCC based on IPCC 2013
Climate Change – Land Use and Land Use Change (LULUC)	Global Warming Potential Land use and land use change (GWP-LULUC)	Kg CO ₂ eq. (Carbon dioxide)	Baseline model of 100 years of the IPCC based on IPCC 2013
Climate Change - Total	Global Warming Potential total (GWP-total)	Kg CO ₂ eq. (Carbon dioxide)	Baseline model of 100 years of the IPCC based on IPCC 2021

Ozone Depletion	Depletion potential of the stratospheric ozone layer (ODP)	Kg CFC 11 eq. (Trichlorofluoromethane)	Steady-state ODPs, WMO 2014.
Acidification	Acidification potential, Accumulated Exceedance (AP)	Mol H+ eq. (Hydrogen ions)	Accumulated Exceedance, Seppälä et al. 2006, Posch et al., 2008.
Eutrophication aquatic freshwater	Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EP-freshwater)	Kg P eq. (Phosphorous)	EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe.
Eutrophication aquatic marine	Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EP-marine)	Kg N eq. (Nitrogen)	EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe.
Eutrophication terrestrial	Eutrophication potential, Accumulated Exceedance (EP-Terrestrial)	Mol N eq. (Nitrogen)	Accumulated Exceedance, Seppälä et al. 2006, Posch et al.
Photochemical ozone formation	Formation potential of tropospheric ozone (POCP)	Kg NMVOC eq. (Non-methane volatile organic compounds)	LOTOS-EUROS, Van Zelm et al., as applied in ReCiPe.
Depletion of abiotic resources – Minerals and metals	Abiotic depletion potential for non-fossil resources (ADP-minerals & metals)**	Kg sb eq. (Antimony)	CML 2002, Guinée et al., 2002, and van Ooers et al. 2002
Depletion of abiotic resources – Fossil fuels	Abiotic depletion potential for fossil resources (ADP-fossil)**	MJ, net calorific value (Megajoules)	CML 2002, Guinée et al., 2002, and van Ooers et al. 2002
Water Use	Water (user) deprivation potential, deprivation-weighted water consumption (WDP)**	m ³ world eq. Deprived	Available Water Remaining (AWARE) Boulay et al., 2016.
Particulate matter emissions	Potential incidence of disease due to PM emissions (PM)	Disease incidence	SETAP-UNEP, Fantke et al 2016
Ionising radiation, human health	Potential Human exposure efficiency relative to U235 (IRP)*	kBq U235 eq. (kiloBecquerel)	Human health effect model as developed by Dreicer et al. 1995 update by Freischknecht et al., 2000
Ecotoxicity (freshwater)	Potential comparative Toxic Units for ecosystems (ETP-fw)**	CTUe (Comparative Toxic Units ecosystems)	UseTox version 2 until the modified USEtox model is available from EC-JRC
Human toxicity, cancer effects	Potential comparative Toxic Units for humans (HTP-c)**	CTUh (Comparative Toxic Units humans)	UseTox version 2 until the modified USEtox model is available from EC-JRC
Human toxicity, non-cancer effects	Potential comparative Toxic Units for humans (HTP-nc)**	CTUh (Comparative Toxic Units humans)	UseTox version 2 until the modified USEtox model is available from EC-JRC
Land use related impacts/soil quality	Potential Soil Quality index (SQP)**	Dimensionless	Soil quality index based on LANCA.

*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.

**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

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

Core environmental impact indicators

Table 8: Core environmental impact results for the product Nordic Fos floor heating plate.

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP- total	kg CO ₂ eq.	9,55E+00	1,53E+00	7,61E-01	0	2,26E-04	5,16E+00	2,13E-02	-1,14E+00
GWP-fossil	kg CO ₂ eq.	9,29E+00	2,25E-01	2,63E-02	0	2,26E-04	5,08E+00	9,56E-03	-1,11E+00
GWP-biogenic	kg CO ₂ eq.	2,05E-01	1,31E+00	7,35E-01	0	2,24E-07	2,54E-02	1,17E-02	-7,08E-03
GWP-luluc	kg CO ₂ eq.	6,30E-02	4,77E-04	-1,24E-04	0	1,10E-07	5,73E-02	1,52E-06	-1,73E-02
ODP	kg CFC 11 eq.	1,38E-07	5,47E-09	5,08E-10	0	4,80E-12	7,33E-08	2,71E-11	-2,91E-08
AP	mol H ⁺ eq.	3,42E-02	1,53E-04	1,73E-05	0	4,82E-07	1,58E-02	1,12E-05	-5,07E-03
EP-freshwater	kg P eq.	2,33E-03	-2,61E-06	6,13E-05	0	1,57E-08	1,40E-03	5,00E-07	-4,69E-04
EP-marine	kg N eq.	5,32E-03	2,35E-05	1,32E-04	0	1,22E-07	2,34E-03	6,02E-05	-7,49E-04
EP-terrestrial	mol N eq.	5,19E-02	-1,16E-04	7,06E-05	0	1,24E-06	2,13E-02	3,62E-05	-6,88E-03
POCP	kg NMVOC eq.	2,29E-02	3,16E-04	4,00E-05	0	7,48E-07	8,97E-03	1,65E-05	-2,99E-03
ADP-minerals&metals**	kg Sb eq.	1,95E-05	8,63E-07	-6,11E-08	0	7,21E-10	4,12E-06	3,53E-09	-1,88E-06
ADP-fossil**	MJ	1,30E+02	2,69E+00	-6,77E-02	0	3,13E-03	3,71E+01	2,77E-02	-1,43E+01
WDP **	m ³	3,14E+00	6,28E-02	5,28E-03	0	1,29E-05	2,16E-01	9,70E-04	-8,22E-02
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								

Additional environmental impact indicators

Table 9: Additional environmental impact results for the product Nordic Fos floor heating plate

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-GHG	kg CO ₂ eq.	9,35E+00	2,25E-01	2,61E-02	0	2,26E-04	5,14E+00	9,57E-03	-1,13E+00
PM	disease inc.	3,72E-07	-1,56E-08	-8,27E-09	0	1,64E-11	1,84E-07	1,93E-10	-5,67E-08
IRP*	kBq U235 eq	1,06E+00	-1,80E-02	-3,83E-03	0	4,24E-06	6,53E-01	7,96E-05	-2,29E-01
ETP-fw**	CTUe	1,59E+01	2,24E+00	2,60E-02	0	1,66E-03	1,01E+01	7,54E-02	-3,25E+00
HTP-c**	CTUh	9,31E-09	9,04E-11	5,83E-12	0	1,00E-13	7,90E-09	1,44E-12	-2,37E-09
HTP-nc**	CTUh	1,47E-07	1,48E-09	1,87E-10	0	2,86E-12	1,13E-07	5,79E-11	-3,39E-08
SQP**	Dimensionless	1,57E+01	-2,87E+01	-1,93E+00	0	1,89E-03	2,68E+00	4,99E-02	-1,05E+00

Acronyms	<p>GWP-GHG: The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.</p> <p>PM = Particulate Matter emissions; IRP = Ionizing radiation, human health; ETP-fw = Eco-toxicity, freshwater; HTP-c = Human toxicity, cancer effects; HTP-nc = Human toxicity, non-cancer effects; SQP = Land use related impacts/Soil quality.</p>
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Use of resources

Table 10: Resource use - Nordic Fos floor heating plate

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	1,77E+01	3,40E-01	1,38E+00	0	4,92E-05	3,33E-03	1,14E-03	-4,54E+00
PERM	MJ	2,56E+00	0,00E+00	1,34E+00	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	2,02E+01	3,40E-01	1,38E+00	0	4,92E-05	1,50E+01	1,14E-03	-4,54E+00
PENRE	MJ	1,38E+02	4,69E+00	1,14E-01	0	3,33E-03	3,94E+01	2,95E-02	-1,21E+01
PENRM	MJ	6,64E-01	0,00E+00	5,47E-01	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	1,38E+02	4,69E+00	4,33E-01	0	3,33E-03	3,94E+01	2,95E-02	-1,21E+01
SM	kg	0,00E+00	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	3,17E+00	6,36E-02	5,69E-03	0	1,31E-05	1,90E-01	9,74E-04	-7,45E-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 resources; 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 production

Table 11: Waste - Nordic Fos floor heating plate

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed	kg	0	0	0	0	0	0	0	0
Non-hazardous waste disposed	kg	0	0	0	0	0	0	0	0
Radioactive waste disposed	kg	0	0	0	0	0	0	0	0

Output flows

Table 12: Output flows - Nordic Fos floor heating plate

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D

Components for re-use	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
Material for recycling	kg	6,0E-02	0,0E+00	5,5E-02	0,0E+00	0,0E+00	4,1E-01	0,0E+00	0,0E+00
Materials for energy recovery	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
Exported energy, electricity	MJ	4,6E-02	0,0E+00	3,5E-02	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Exported energy, thermal	MJ	4,4E-01	0,0E+00	3,3E-01	0,0E+00	0,0E+00	8,0E-03	0,0E+00	0,0E+00

Information on biogenic carbon content

Table 13: Biogenic Carbon - Nordic Fos floor heating plate

	Unit	Quantity
Biogenic carbon content in product	kg C	0
Biogenic carbon content in packaging	kg C	3,29E-03

Results per functional or declared unit. Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO2.

Information related to Sector EPD

This is an individual EPD.

Differences versus previous versions

This is the first version of this EPD.

References

- Project Report - Nordic Fos floor heating plate, Nordic Fos, August 2023
- General Programme Instruction of the International EPD® System. Version 4.
- ISO 14025:2010 Environmental labels and declarations-Type III Environmental Declarations-Principles and procedures
- ISO 14040:2006 Environmental Management-Life Cycle Assessment-Principles and framework
- ISO 14044:2006 Environmental Management-Life Cycle Assessment-Requirements and guidelines
- PCR 2019:14 Construction products (EN 15804:A2) version 1.2.5
- EN 15804:2012+A2:2019 Sustainability of construction works-Environmental Product Declarations-Core rules for the product category of construction products designed, produced based on application class reference: ISO 10508. Class 4 Underfloor heating and low-temperature radiators. Class 5 High temperature radiators.
- ISO 22319 / ISO 24033 / ISO 21003.

Programme-related information and verification

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but registered in different EPD programs, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same

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 equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Programme:	The International EPD® System EPD International AB Box 210 60 SE-100 31 Stockholm Sweden www.environdec.com info@environdec.com
EPD registration number:	S-P-10737
Publication date:	31-10-2023
Valid until:	31-10-2028

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 1.2.5.
PCR review was conducted by: The Technical Committee of the International EPD® System. Chair: Claudia Peña. Contact via info@environdec.com
Independent third-party verification of the declaration and data, according to ISO 14025:2006: <input type="checkbox"/> EPD process certification <input checked="" type="checkbox"/> EPD verification
Third party verifier(s): HÅLLBARHETSJOUREN AB, CAMILLA LANDÉN.
Procedure for follow-up of data during EPD validity involves third party verifier: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Contact information

EPD owner

Nordic Fos
A. P. Møllers Allé 55
2791, Dragør, Denmark.
Email: info@nordicfos.com
Phone: +4544240111
<https://www.nordicfos.com/>

NORDIC FOS

LCA author

Bureau Veritas HSE, Danmark
Odyssefs Papagiannidis
Oldenborgsgade 25-31
7000, Fredericia, Danmark
www.bvhse.dk
infohse@dk.bureauveritas.com



Programme operator

the International EPD® System
www.environdec.com



3rd party verifier

First version:

HÅLLBARHETSJOURN AB,
CAMILLA LANDÉN
Company address:
KYRKHULTSVÄGEN 5
Organisation number: 559167-
2224
Email:
hallbarhetsjouren@gmail.com
Phone: +46-79-3477033

HÅLLBARHETSJOURN AB

