ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

Structures made of hollow sections

Nordec Group Oyj

EPD HUB, HUB-2999

Published on 22.02.2025, last updated on 22.02.2025, valid until 21.02.2030

Created with One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Nordec Group Oyj
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Contact details	info@nordec.com
Website	nordec.com

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804+A2:2019 and ISO 14025
PCR	EPD Hub Core PCR Version 1.1, 5 Dec 2023
Sector	Construction product
Category of EPD	Third party verified EPD
Parent EPD number	-
Scope of the EPD	Cradle to gate with options, A4-A5, and modules C1-C4, D
EPD author	Dan Pada, Nordec Group Oyj
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☑ External verification
EPD verifier	Sarah Curpen, as an authorized verifier acting for EPD Hub Limited.

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

PRODUCT

Product name	Structures made of hollow sections
Additional labels	-
Product reference	-
Place of production	Ylivieska Finland, Peräseinäjoki Finland, Gargzdai Lithuania and Oborniki Poland
Period for data	01.01.2023-31.12.2023
Averaging in EPD	Multiple factories
Variation in GWP-fossil for A1-A3	-10,5 %, +12,8 %

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 kg of painted steel structure
Declared unit mass	1 kg
GWP-fossil, A1-A3 ($kgCO_2e$)	2,56E+00
GWP-total, A1-A3 ($kgCO_2e$)	2,54E+00
Secondary material, inputs (%)	16
Secondary material, outputs (%)	93
Total energy use, A1-A3 (kWh)	8.5
Net freshwater use, A1-A3 (m^3)	0.02

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Nordec is the leading provider of frame structure solutions in the Nordic countries, operating also in Central Eastern Europe. Nordec has decades of experience in designing, producing and delivering frame structures and envelopes for buildings and bridges and industry, optimizing the whole value chain from design to installation. Nordec has 4 factories for the steel structure production in Finland, Poland and Lithuania.
Sustainability is an integral part of Nordec's strategy and the development of low-carbon products and solutions is of high priority. We want to minimize the environmental impact of our products by optimizing material usage and waste. We work together with our material suppliers and customers to find the most sustainable solutions for each project.

PRODUCT DESCRIPTION

The EPD represents steel structures made from hollow sections, both cold-formed and hot-rolled, at Nordec's factories in Ylivieska (Finland), Peräseinäjoki (Finland), Gargzdai (Lithuania) and Oborniki (Poland).
Steel structures represented in this EPD include, but is not restricted to, beams, columns, trusses and braces. The streel structures are used in all types of buildings, industrial projects and infrastructure. The steel sturctures are most often delivered painted from factory, reducing the use of chemicals on site and amount of work to be done on site. Different painting systems, including intumescent coating, are used and chosen based on project requirements.
The broad range of different hollow sections, shapes, thicknesses and dimensions allows the product to be designed efficiently, using the full potential of the material, and allowing for products of varying size, length and use.

Further information can be found at nordec.com.

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	99	Europe
Minerals	-	-
Fossil materials	1	Europe
Bio-based materials	-	-

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0
Biogenic carbon content in packaging, kg C	0.00608

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 kg of painted steel structure
Mass per declared unit	1 kg
Functional unit	-
Reference service life	-

SUBSTANCES, REACH - VERY HIGH CONCERN

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

PRODUCT LIFE-CYCLE

SYSTEM BOUNDARY

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

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

Modules not declared = MND. Modules not relevant = MNR

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Ancillary materials used are steel shots for shot blasting, welding gases, lubricating oils and cutting liquids. Packaging materials used are wood, cardboard, metal strips and plastic film. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. Waste treatment include landfilling of inert materials and treatment and incineration of hazardous oils and liquids. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

The main raw material is cold-formed and hot finished hollow sections, whereof on average 16 % is made from recycled steel, made in electric arc furnaces, or mixed together with virgin steel in blast furnaces. Additionally hot-rolled steel plates are used for outfitting parts, mainly produced from virgin steel. The steel is transported by lorry and ship to the production sites. The hollow sections and steel plates are shot blasted and cut to shape and length. The structure is assembled, equipped with outfitting parts, after which all parts are welded together. The welded structures are painted and packed for transportation.

TRANSPORT AND INSTALLATION (A4-A5)

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

Distance and method of transportation from the factories to the building sites is calculated as a weighted average of the actual transports in the year studied (2023). Method of transportation is lorry and ship. Transportation does not cause any losses as the products are packaged properly and secured to the trailer.

Energy consumption for installation on site is assumed to be the same as for demolition (C1), i.e. 0,01 kWh/kg, as diesel used in the building machinery.

Packaging materials (cardboard, plastic, wood and steel) are recycled or incinerated for energy recovery, which is considered in this model, as well as direct emissions to the air of carbon dioxide to balance emissions of biogenic CO_2.

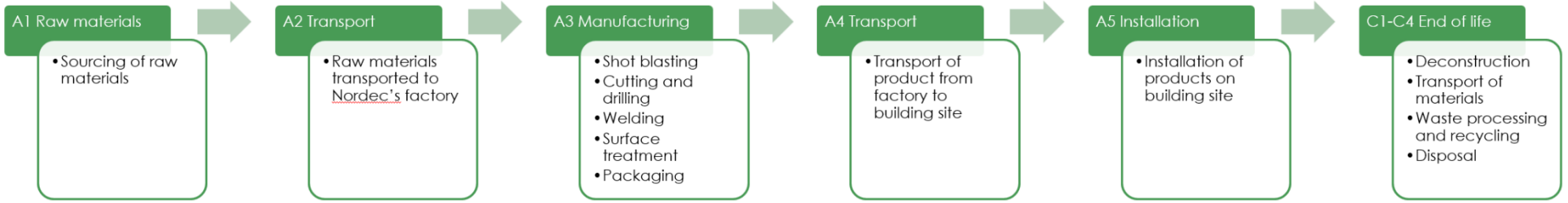
PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD does not cover the use phase.
Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

The energy consumption of the demolition process is on average 10 kWh/m2 (Bozdag, Ö. & Secer, M. 2007). Considering an average mass of 1000 kg/m2 of a concrete building, the energy consumption for demoltion (C1) can be assumed to be 0,01 kWh/kg. The source of energy is diesel used in the building machinery.
100 % of the steel beams are assumed to be collected during demolition and transported 50 km by lorry (C2) for further treatment.
Based on data from the European Steel Association, the recycling rate of steel from construction is assumed to be 93 % (C3). The remaining 7 % is taken to landfill for final disposal (C4). Due to the recycling process the end-of-life product is converted back into recycled steel (D), however, benefit is considered only for the virgin steel, not for the recycled steel. The benefit from the packaging material recovery is considered.

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.
Fastening materials are excluded from A5 as they form a very small part of the installed product and are not always part of the scope of delivery. The paint coating has not been separated from the steel for waste processing as it is assumed the paint is not removed before recycling and any impacts are deemed to be negligible.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways.
Raw materials are allocated by economic values, with the steel scrap considered as by-product. Packaging materials and ancillary materials area known on factory level and allocated to 1 kg of product.

Data type	Allocation
Raw materials	Allocated by economic values
Packaging material	Allocated by mass or volume
Ancillary materials	Allocated by mass or volume
Manufacturing energy and waste	Allocated by mass or volume

AVERAGES AND VARIABILITY

Type of average	Multiple factories
Averaging method	Averaged by shares of total mass
Variation in GWP-fossil for A1-A3	-10,5 %, +12,8 %

Primary data and raw material data represents the manufacturers manufacturing sites Ylivieska, Peräseinäjoki, Gargzdai and Oborniki. The data was used to calculate average impacts for the product. The variability of the production data or the emissions between the manufacturing sites did not amount to more than 13 % for the relevant data. Variation is caused mainly by slightly different raw material sources. The data was averaged by calculating a weighted average of the sites consumption of raw materials, energy, and production of wastes. The share of production volume (mass) per each site was used in the weighting

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.10 and One Click LCA databases as sources of environmental data.

ENVIRONMENTAL IMPACT DATA

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	2,31E+00	1,34E-01	9,84E-02	2,54E+00	9,47E-02	2,66E-02	MND	MND	MND	MND	MND	MND	MND	3,61E-03	9,50E-03	2,81E-02	9,66E-04	-5,66E-01
GWP – fossil	kg CO_2e	2,31E+00	1,33E-01	1,20E-01	2,56E+00	9,47E-02	3,95E-03	MND	MND	MND	MND	MND	MND	MND	3,61E-03	9,50E-03	2,11E-02	4,38E-04	-5,66E-01
GWP – biogenic	kg CO_2e	-8,15E-03	0,00E+00	-2,21E-02	-3,02E-02	0,00E+00	2,27E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	7,01E-03	5,28E-04	0,00E+00
GWP – LULUC	kg CO_2e	7,17E-03	5,25E-05	5,76E-05	7,28E-03	3,95E-05	4,20E-07	MND	MND	MND	MND	MND	MND	MND	3,13E-07	3,16E-06	2,49E-05	2,27E-07	1,01E-04
Ozone depletion pot.	kg CFC-$_{11}$e	4,47E-08	2,04E-09	1,71E-09	4,84E-08	1,39E-09	5,96E-11	MND	MND	MND	MND	MND	MND	MND	5,52E-11	1,89E-10	2,83E-10	1,27E-11	-1,96E-09
Acidification potential	mol H^+e	8,19E-03	4,56E-04	5,27E-04	9,18E-03	8,90E-04	3,53E-05	MND	MND	MND	MND	MND	MND	MND	3,25E-05	1,98E-05	2,50E-04	3,10E-06	-1,57E-03
EP-freshwater[2)]	kg Pe	2,62E-04	1,20E-06	3,97E-06	2,68E-04	7,44E-07	1,72E-08	MND	MND	MND	MND	MND	MND	MND	1,27E-08	7,41E-08	1,03E-06	4,30E-09	4,95E-05
EP-marine	kg Ne	1,85E-03	1,48E-04	9,76E-05	2,09E-03	2,42E-04	1,63E-05	MND	MND	MND	MND	MND	MND	MND	1,51E-05	4,63E-06	5,40E-05	1,18E-06	-2,26E-04
EP-terrestrial	mol Ne	1,92E-02	1,63E-03	1,10E-03	2,19E-02	2,69E-03	1,78E-04	MND	MND	MND	MND	MND	MND	MND	1,65E-04	5,13E-05	6,26E-04	1,29E-05	-5,16E-03
POCP ("smog")[3)]	kg NMVOCe	6,16E-03	6,73E-04	3,90E-04	7,22E-03	8,52E-04	5,28E-05	MND	MND	MND	MND	MND	MND	MND	4,93E-05	3,29E-05	1,85E-04	4,62E-06	-1,68E-03
ADP-minerals & metals[4)]	kg Sbe	7,43E-06	3,75E-07	1,48E-07	7,95E-06	2,23E-07	2,60E-09	MND	MND	MND	MND	MND	MND	MND	1,29E-09	3,16E-08	1,49E-06	6,94E-10	-5,25E-06
ADP-fossil resources	MJ	2,48E+01	1,93E+00	1,37E+00	2,81E+01	1,32E+00	5,08E-02	MND	MND	MND	MND	MND	MND	MND	4,72E-02	1,34E-01	2,82E-01	1,07E-02	-5,12E+00
Water use[5)]	m^3e depr.	3,03E-01	9,29E-03	2,13E-02	3,33E-01	5,76E-03	5,95E-04	MND	MND	MND	MND	MND	MND	MND	1,15E-04	6,53E-04	5,03E-03	3,00E-05	1,06E-01

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

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8)]	MJ	1,43E+00	2,60E-02	1,05E+00	2,51E+00	1,57E-02	-2,47E-01	MND	MND	MND	MND	MND	MND	MND	2,89E-04	2,29E-03	5,24E-02	9,95E-05	-3,82E-01
Renew. PER as material	MJ	5,31E+00	0,00E+00	-8,50E-02	5,22E+00	0,00E+00	-1,82E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	-4,69E+00	-3,53E-01	0,00E+00
Total use of renew. PER	MJ	6,74E+00	2,60E-02	9,70E-01	7,73E+00	1,57E-02	-4,29E-01	MND	MND	MND	MND	MND	MND	MND	2,89E-04	2,29E-03	-4,63E+00	-3,53E-01	-3,82E-01
Non-re. PER as energy	MJ	2,50E+01	1,93E+00	1,16E+00	2,81E+01	1,32E+00	4,97E-02	MND	MND	MND	MND	MND	MND	MND	4,72E-02	1,34E-01	2,82E-01	1,07E-02	-5,12E+00
Non-re. PER as material	MJ	5,30E+00	0,00E+00	-2,65E-01	5,03E+00	0,00E+00	-1,09E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	-4,68E+00	-3,52E-01	0,00E+00
Total use of non-re. PER	MJ	3,03E+01	1,93E+00	8,92E-01	3,31E+01	1,32E+00	4,86E-02	MND	MND	MND	MND	MND	MND	MND	4,72E-02	1,34E-01	-4,40E+00	-3,41E-01	-5,12E+00
Secondary materials	kg	2,61E-01	8,26E-04	9,53E-04	2,63E-01	5,66E-04	2,52E-05	MND	MND	MND	MND	MND	MND	MND	1,96E-05	6,20E-05	3,44E-04	2,70E-06	5,09E-01
Renew. secondary fuels	MJ	2,52E-05	1,05E-05	4,88E-06	4,06E-05	5,98E-06	7,66E-08	MND	MND	MND	MND	MND	MND	MND	5,12E-08	7,84E-07	1,60E-05	5,58E-08	-2,82E-05
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	1,77E-02	2,78E-04	9,52E-04	1,89E-02	1,70E-04	6,23E-06	MND	MND	MND	MND	MND	MND	MND	3,06E-06	1,80E-05	1,49E-04	1,11E-05	-1,89E-02

6) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	8,92E-02	3,24E-03	7,84E-03	1,00E-01	2,13E-03	1,50E-04	MND	MND	MND	MND	MND	MND	MND	5,27E-05	1,95E-04	1,85E-03	1,19E-05	-2,02E-01
Non-hazardous waste	kg	1,02E+00	6,06E-02	1,52E-01	1,23E+00	3,78E-02	1,56E-02	MND	MND	MND	MND	MND	MND	MND	7,20E-04	4,12E-03	6,67E-02	2,73E-04	8,25E+00
Radioactive waste	kg	1,37E-04	4,37E-07	1,34E-06	1,39E-04	2,56E-07	6,48E-09	MND	MND	MND	MND	MND	MND	MND	5,18E-09	4,31E-08	6,14E-07	1,67E-09	1,63E-06

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	5,28E-02	0,00E+00	4,22E-02	9,50E-02	0,00E+00	6,06E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	9,30E-01	0,00E+00	0,00E+00
Materials for energy rec	kg	1,21E-03	0,00E+00	4,34E-03	5,55E-03	0,00E+00	1,44E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	4,79E-05	0,00E+00	0,00E+00	4,79E-05	0,00E+00	1,31E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

ENVIRONMENTAL IMPACTS – GWP-GHG / GWP-IOBC - THE INTERNATIONAL EPD SYSTEM

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG / GWP-IOBC[7)]	kg CO_2e	2,31E+00	1,33E-01	1,20E-01	2,56E+00	9,47E-02	3,95E-03	MND	MND	MND	MND	MND	MND	MND	3,61E-03	9,50E-03	2,11E-02	4,38E-04	-5,66E-01

7) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product as defined by IPCC AR 5 (IPCC 2013). In addition, the characterisation factors for the flows - CH4 fossil, CH4 biogenic and Dinitrogen monoxide - were updated in line with the guidance of IES PCR 1.2.5 Annex 1. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterization factor for biogenic CO2 is set to zero.

VERIFICATION STATEMENT

VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with reference standard, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The digital background data for this EPD

Why does verification transparency matter? Read more online
This EPD has been generated by One Click LCA EPD generator, which has been verified and approved by the EPD Hub.

THIRD-PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of the data collected and used in the LCA calculations, the way the LCA-based calculations have been carried out, the presentation of environmental data in the EPD, and other additional environmental information, as present with respect to the procedural and methodological requirements in ISO 14025:2010 and reference standard.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.

Sarah Curpen, as an authorized verifier acting for EPD Hub Limited.
22.02.2025

VERIFIED ISO 14025

ANNEX 1 – ADDITIONAL INFORMATION FOR NORWAY

The following self-declared data are given to meet the requirements for Norway.

MODULE A4, TRANSPORT FROM PRODUCTION SITE TO OSLO

GWP total: 1,22E-01 $kgCO_2e$
GWP fossil: 1,22E-01 $kgCO_2e$

DANGEROUS SUBSTANCES

The ready product does not contain any dangerous substances according to REACH or the Norwegian priority list in amounts greater than 0,1 % (1000 ppm).

ELECTRICITY IN MANUFACTURING PROCESS, MODULE A3

Ylivieska: Electricity production, hydro, run-of-river (Reference product: electricity, high voltage). Ecoinvent 3.10. 0,0044 $kgCO_2e/kWh$
Peräseinäjoki: Electricity production, hydro, run-of-river (Reference product: electricity, high voltage). Ecoinvent 3.10. 0,0044 $kgCO_2e/kWh$
Gargzdai: Electricity production, wind, 1-3MW turbine, onshore (Reference product: electricity, high voltage). Ecoinvent 3.10. 0,014 $kgCO_2e/kWh$
Oborniki: Electricity production, wind, 1-3MW turbine, onshore (Reference product: electricity, high voltage). Ecoinvent 3.10. 0,0177 $kgCO_2e/kWh$

INDOOR AIR EMISSIONS

The ready product does not cause any indoor air emissions.