

ENVIRONMENTAL PRODUCT DECLARATION

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

Low CO2 steel structures made from hot-rolled profiles, Oborniki factory.

Columns, beams, braces and trusses, made of recycled steel

Nordec Group Oyj



EPD HUB, HUB-0497

Published on 10 June 2023, last updated on 9 December 2024, valid until 10 June 2028

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: <input type="checkbox"/> Internal verification <input checked="" type="checkbox"/> External verification
EPD verifier	Magaly González Vázquez, 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	Low CO ₂ steel structures made from hot-rolled profiles
Additional labels	-
Product reference	-
Place of production	Oborniki, Poland
Period for data	01.01.2023-31.12.2023
Averaging in EPD	No averaging
Variation in GWP-fossil for A1-A3	-

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 kg of painted steel structure
Declared unit mass	1 kg
GWP-fossil, A1-A3 (kgCO ₂ e)	7,21E-01
GWP-total, A1-A3 (kgCO ₂ e)	7,11E-01
Secondary material, inputs (%)	104
Secondary material, outputs (%)	92.1
Total energy use, A1-A3 (kWh)	3.05
Net freshwater use, A1-A3 (m ³)	0.01

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

This EPD represents steel structures, such as columns, beams, braces and trusses, made of mainly hot-rolled open profiles, such as, but not restricted to, HEA-, HEB- and IPE-profiles. The steel structures are used in buildings, bridges and industrial projects. The hot-rolled profiles are made of recycled steel, with a recycling content of 100 %. Steel used for outfitting parts, mainly plates, is made of virgin steel. The steel structures are produced in Nordec's factory in Oborniki, Poland.

The broad range of different hot-rolled open profiles 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	EU
Minerals	-	-
Fossil materials	1	EU, UK
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	0.006277145

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 and steel strips. 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. Also VOC-emissions to air are considered. The study also

considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

The main raw material is hot-rolled open steel profiles, whereof 100 % is made from recycled steel in electric arc furnaces, as well as outfitting parts made of mostly virgin steel produced in blast furnaces. The steel is transported by lorry to the production site in Oborniki, Poland. The steel profiles are shot blasted and cut to length. The structure is assembled and outfitted with plates for connections and 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 factory 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 structures 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 (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 CO₂.

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.

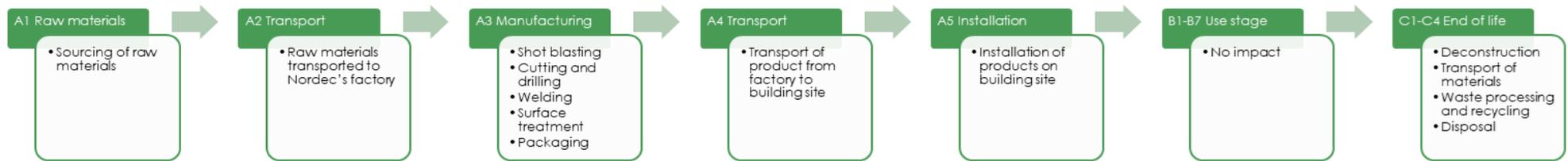
PRODUCT END OF LIFE (C1-C4, D)

The energy consumption of the demolition process is on average 10 kWh/m² (Bozdog, 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 structures 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 based on product specific production data whereas packaging materials, ancillary materials and manufacturing energy and waste are known on factory level and allocated to 1 kg of product.

Data type	Allocation
Raw materials	No allocation
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	No averaging
Averaging method	Not applicable
Variation in GWP-fossil for A1-A3	-

This EPD is product and factory specific and does not contain average calculations.

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 v3.8, Plastics Europe, Federal LCA Commons 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 ₂ e	5,31E-01	6,30E-02	1,17E-01	7,11E-01	2,04E-01	2,67E-02	MND	3,31E-03	8,15E-03	2,99E-02	8,11E-04	-1,74E-02						
GWP – fossil	kg CO ₂ e	5,19E-01	6,30E-02	1,39E-01	7,21E-01	2,04E-01	3,67E-03	MND	3,31E-03	8,14E-03	2,40E-02	3,69E-04	-1,73E-02						
GWP – biogenic	kg CO ₂ e	-7,49E-03	0,00E+00	-2,18E-02	-2,93E-02	0,00E+00	2,30E-02	MND	0,00E+00	0,00E+00	5,87E-03	4,42E-04	-1,22E-05						
GWP – LULUC	kg CO ₂ e	1,86E-02	2,36E-05	7,27E-05	1,87E-02	7,72E-05	4,63E-07	MND	3,30E-07	3,26E-06	3,12E-05	3,48E-07	-5,46E-06						
Ozone depletion pot.	kg CFC ₋₁₁ e	1,21E-08	1,45E-08	1,21E-08	3,86E-08	4,82E-08	7,52E-10	MND	7,07E-10	1,89E-09	2,58E-09	1,49E-10	-7,23E-10						
Acidification potential	mol H ⁺ e	2,44E-03	2,67E-04	8,75E-04	3,59E-03	1,22E-03	3,72E-05	MND	3,44E-05	2,31E-05	2,75E-04	3,47E-06	-1,01E-04						
EP-freshwater ²⁾	kg Pe	1,10E-05	4,99E-07	4,37E-06	1,59E-05	1,35E-06	1,53E-08	MND	1,10E-08	5,81E-08	1,04E-06	3,86E-09	-4,23E-07						
EP-marine	kg Ne	4,14E-04	7,92E-05	2,17E-04	7,10E-04	3,48E-04	1,65E-05	MND	1,52E-05	4,62E-06	5,83E-05	1,20E-06	-8,30E-06						
EP-terrestrial	mol Ne	4,07E-03	8,74E-04	2,77E-03	7,72E-03	3,84E-03	1,80E-04	MND	1,67E-04	5,13E-05	6,72E-04	1,32E-05	-1,82E-04						
POCP (“smog”) ³⁾	kg NMVOCe	1,53E-03	2,76E-04	1,44E-03	3,25E-03	1,16E-03	4,93E-05	MND	4,59E-05	1,97E-05	1,84E-04	3,84E-06	-7,39E-05						
ADP-minerals & metals ⁴⁾	kg Sbe	2,72E-06	1,64E-07	3,77E-07	3,26E-06	4,65E-07	3,65E-09	MND	1,68E-09	2,95E-08	2,74E-06	8,47E-10	-2,67E-07						
ADP-fossil resources	MJ	5,70E+00	9,43E-01	1,40E+00	8,05E+00	3,09E+00	4,84E-02	MND	4,45E-02	1,21E-01	2,87E-01	1,01E-02	-1,84E-01						
Water use ⁵⁾	m ³ e depr.	1,46E-01	4,25E-03	8,29E-02	2,33E-01	1,39E-02	1,12E-03	MND	1,20E-04	5,67E-04	4,88E-03	3,21E-05	2,06E-03						

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

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

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	1,49E-08	6,85E-09	8,57E-09	3,04E-08	2,29E-08	9,59E-10	MND	9,22E-10	6,56E-10	3,74E-09	6,98E-11	-9,40E-10						
Ionizing radiation ⁶⁾	kBq U235e	1,26E-02	4,59E-03	5,21E-03	2,24E-02	1,58E-02	2,19E-04	MND	2,05E-04	6,36E-04	1,72E-03	4,57E-05	-2,18E-03						
Ecotoxicity (freshwater)	CTUe	6,28E+00	8,34E-01	2,05E+00	9,16E+00	2,53E+00	3,23E-02	MND	2,68E-02	1,01E-01	1,35E+00	6,59E-03	-4,06E-01						
Human toxicity, cancer	CTUh	1,02E-09	2,16E-11	1,72E-10	1,21E-09	7,14E-11	1,73E-12	MND	1,03E-12	3,11E-12	4,02E-11	1,65E-13	8,31E-11						
Human tox. non-cancer	CTUh	5,01E-09	8,29E-10	5,04E-09	1,09E-08	2,64E-09	5,23E-11	MND	1,94E-11	9,90E-11	1,74E-09	4,31E-12	4,26E-10						
SQP ⁷⁾	-	1,82E+00	9,92E-01	2,95E+00	5,76E+00	3,43E+00	7,90E-03	MND	5,79E-03	8,61E-02	5,72E-01	2,16E-02	-1,09E-01						

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

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy ⁸⁾	MJ	2,65E+00	1,13E-02	3,35E-01	3,00E+00	3,89E-02	3,43E-04	MND	2,54E-04	1,76E-03	4,42E-02	8,78E-05	-3,48E-02						
Renew. PER as material	MJ	6,76E-02	0,00E+00	1,74E-01	2,41E-01	0,00E+00	-1,84E-01	MND	0,00E+00	0,00E+00	-5,34E-02	-4,02E-03	0,00E+00						
Total use of renew. PER	MJ	2,72E+00	1,13E-02	5,09E-01	3,24E+00	3,89E-02	-1,84E-01	MND	2,54E-04	1,76E-03	-9,21E-03	-3,93E-03	-3,48E-02						
Non-re. PER as energy	MJ	5,65E+00	9,43E-01	1,39E+00	7,99E+00	3,09E+00	4,84E-02	MND	4,45E-02	1,21E-01	2,87E-01	1,01E-02	-1,84E-01						
Non-re. PER as material	MJ	4,75E-02	0,00E+00	-7,15E-03	4,04E-02	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	-3,76E-02	-2,83E-03	0,00E+00						
Total use of non-re. PER	MJ	5,70E+00	9,43E-01	1,38E+00	8,03E+00	3,09E+00	4,84E-02	MND	4,45E-02	1,21E-01	2,49E-01	7,28E-03	-1,84E-01						
Secondary materials	kg	1,04E+00	2,74E-04	1,06E-03	1,05E+00	8,92E-04	2,28E-05	MND	1,74E-05	4,13E-05	3,08E-04	2,12E-06	5,77E-03						
Renew. secondary fuels	MJ	2,70E-05	2,83E-06	1,33E-05	4,31E-05	7,45E-06	7,99E-08	MND	5,70E-08	4,54E-07	1,57E-05	5,55E-08	-1,20E-06						
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00						
Use of net fresh water	m ³	4,69E-03	1,21E-04	1,04E-03	5,85E-03	3,98E-04	-1,33E-07	MND	2,70E-06	1,55E-05	1,39E-04	1,11E-05	-3,22E-04						

8) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	7,44E-02	1,21E-03	5,34E-02	1,29E-01	3,34E-03	6,24E-05	MND	5,96E-05	1,38E-04	2,21E-03	0,00E+00	-5,85E-03						
Non-hazardous waste	kg	4,98E-01	2,02E-02	2,77E-01	7,95E-01	5,62E-02	1,52E-02	MND	4,19E-04	2,45E-03	5,59E-02	7,00E-02	-4,55E-02						
Radioactive waste	kg	3,08E-05	6,35E-06	3,15E-06	4,03E-05	2,13E-05	3,26E-07	MND	3,13E-07	8,34E-07	1,26E-06	0,00E+00	-6,38E-07						

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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00						
Materials for recycling	kg	0,00E+00	0,00E+00	3,16E-02	3,16E-02	0,00E+00	3,09E-04	MND	0,00E+00	0,00E+00	9,30E-01	0,00E+00	0,00E+00						
Materials for energy rec	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,48E-02	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00						
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,34E-01	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 ⁹⁾	kg CO ₂ e	5,19E-01	6,30E-02	1,39E-01	7,21E-01	2,04E-01	3,67E-03	MND	3,31E-03	8,14E-03	2,40E-02	3,69E-04	-1,73E-02						

9) 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.

Magaly González Vázquez, as an authorized verifier acting for EPD Hub Limited

09.12.2024



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: 1,176E-1 kgCO₂e

GWP fossil: 1,176E-1 kgCO₂e

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

Oborniki: Heat and power co-generation, biogas, gas engine (Reference product: electricity, high voltage). Ecoinvent 3.8. 0,47 kgCO₂e/kWh

INDOOR AIR EMISSIONS

The ready product does not cause any indoor air emissions.