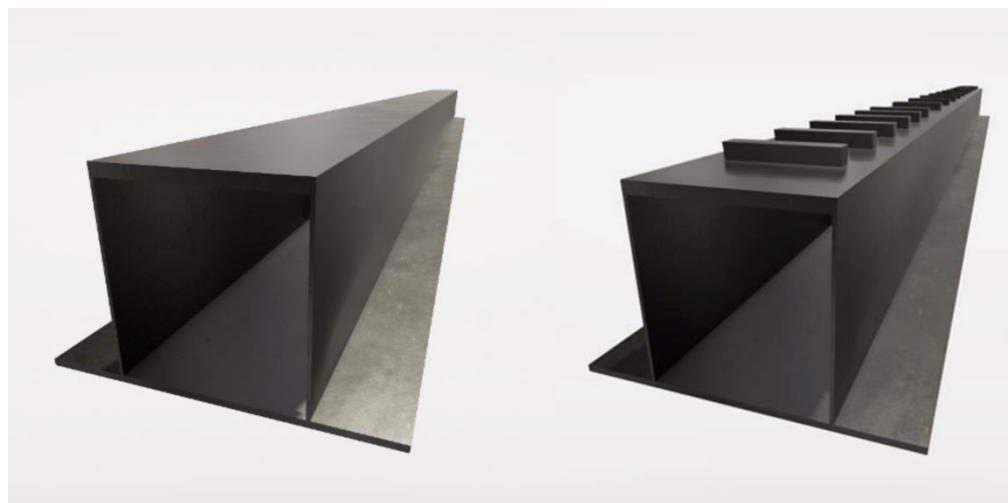


ENVIRONMENTAL PRODUCT DECLARATION

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

NORDEC QUATTRO B₂eAM and NORDEC COMPOSITE B₂eAM, 100 % recycled content
Nordec Group Oyj



EPD HUB, HUB-0431

Publishing date 12 May 2023, last updated on 12 May 2023, valid until 12 November 2024

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Nordec Group Oyj
Address	Itämerenkatu 5, 00180 Helsinki, Finland
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 1.0, 1 Feb 2022
Sector	Construction product
Category of EPD	Design phase EPD
Scope of the EPD	Cradle to gate with options, A4-A5, and modules C1-C4 and 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 certification <input checked="" type="checkbox"/> External verification
EPD verifier	H.N, 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	NORDEC QUATTRO B ₂ eAM and NORDEC COMPOSITE B ₂ eAM
Additional labels	WQ-beam, CWQ-beam
Place of production	Ylivieska, Finland and Riga, Latvia
Period for data	2021
Averaging in EPD	Multiple factories
Variation in GWP-fossil for A1-A3	Variability for factories: -1 %, +9 %

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 kg of painted NORDEC QUATTRO B ₂ eAM and COMPOSITE B ₂ eAM
Declared unit mass	1 kg
GWP-fossil, A1-A3 (kgCO ₂ e)	1,17
GWP-total, A1-A3 (kgCO ₂ e)	1,19
Secondary material, inputs (%)	127.0
Secondary material, outputs (%)	93
Total energy use, A1-A3 (kWh)	5.2
Total water use, A1-A3 (m ³ e)	0,0224

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Nordec is the leading provider of demanding frame structure solutions in the Nordic countries, operating also in Central Eastern Europe. Nordec has decades of experience in designing and delivering frame structures, envelopes and bridges, optimizing the whole value chain from design to installation.

PRODUCT DESCRIPTION

The EPD represents the slim-floor beam types NORDEC QUATTRO B₂eAM and NORDEC COMPOSITE B₂eAM produced in Nordec's factory in Ylivieska, Finland, as well as at our sub-contractor's factory in Riga, Latvia. NORDEC QUATTRO B₂eAMs and NORDEC COMPOSITE B₂eAMs are used in floors to support slab structures of any type. The beams can be designed as single-span, continuous or cantilever beams, enabling an optimized design solution for each project. The beams can be connected to steel, concrete or timber columns or walls. The product is produced from recycled steel, with a recycling content of close to 100 %, enabling a low carbon footprint.

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	0.002887

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 kg of painted NORDEC QUATTRO B ₂ eAM and COMPOSITE B ₂ eAM
Mass per declared unit	1 kg

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	Deconstr./demol.	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, flux for submerged arc welding, lubricating oils, cutting liquids and cleaning liquids. Packaging materials used are wood, cardboard, PE-film, PE-foam, PET-strips and metal clamps. 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 steel plates made from recycled steel, transported by lorry and ship to the production sites in Ylivieska, Finland,

and Riga, Latvia. The plates are shot blasted, cut to shape and length after which the beams are assembled and welded. The welded beams 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 an average of the routes to Helsinki (40 %), Stockholm (40 %) and Oslo (20 %). Method of transportation is lorry and ship. Transportation does not cause any losses as the beams 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, plastic, cardboard) 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 demolition

(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, no benefit is considered as the input steel is 100 % recycled. 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.

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:

Data type	Allocation
Raw materials	Allocated by economic values
Packaging materials	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 volume
Variation in GWP-fossil for A1-A3	Variability for factories: -1 %, +9 %

Primary data represents the manufacturers manufacturing sites Ylivieska and Riga. The data was used to calculate average impacts for the product. The variability of the primary data or the emissions between the manufacturing sites did not amount to more than 10 % for the relevant data. The primary 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 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. Ecoinvent and One Click LCA databases were used 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	9,19E-1	1,44E-1	1,23E-1	1,19E0	5,62E-2	2,74E-2	MND	MND	MND	MND	MND	MND	MND	3,31E-3	8,18E-3	2,03E-2	3,7E-4	-5,07E-3
GWP – fossil	kg CO ₂ e	9,05E-1	1,44E-1	1,25E-1	1,17E0	5,66E-2	3,5E-3	MND	MND	MND	MND	MND	MND	MND	3,31E-3	8,14E-3	2,04E-2	3,69E-4	-5E-3
GWP – biogenic	kg CO ₂ e	-4,48E-3	4,55E-4	-1,69E-3	-5,71E-3	1,23E-4	2,39E-2	MND	MND	MND	MND	MND	MND	MND	3E-6	2,83E-5	-5,36E-5	9,4E-7	-5,8E-5
GWP – LULUC	kg CO ₂ e	1,77E-2	5,25E-5	1,65E-4	1,79E-2	2,74E-5	3,99E-7	MND	MND	MND	MND	MND	MND	MND	3,3E-7	3,26E-6	2,67E-5	3,48E-7	-7,56E-6
Ozone depletion pot.	kg CFC ₁₁ e	7,76E-8	3,46E-8	1,5E-8	1,27E-7	1,3E-8	7,31E-10	MND	MND	MND	MND	MND	MND	MND	7,07E-10	1,89E-9	2,52E-9	1,49E-10	-2,71E-10
Acidification potential	mol H ⁺ e	4,35E-3	7,52E-4	6,03E-4	5,71E-3	8,22E-4	3,59E-5	MND	MND	MND	MND	MND	MND	MND	3,44E-5	2,31E-5	2,59E-4	3,47E-6	-3,85E-5
EP-freshwater ²⁾	kg Pe	1,43E-3	9,9E-7	3,01E-6	1,44E-3	3,21E-7	1,32E-8	MND	MND	MND	MND	MND	MND	MND	1,1E-8	5,81E-8	1,09E-6	3,86E-9	-1,96E-7
EP-marine	kg Ne	8,82E-4	2,54E-4	1,09E-4	1,25E-3	2,02E-4	1,59E-5	MND	MND	MND	MND	MND	MND	MND	1,52E-5	4,62E-6	5,46E-5	1,2E-6	-4,56E-6
EP-terrestrial	mol Ne	8,29E-3	2,79E-3	1,19E-3	1,23E-2	2,24E-3	1,74E-4	MND	MND	MND	MND	MND	MND	MND	1,67E-4	5,13E-5	6,32E-4	1,32E-5	-5,34E-5
POCP (“smog”) ³⁾	kg NMVOCe	2,45E-3	8,31E-4	3,58E-3	6,86E-3	6,16E-4	4,77E-5	MND	MND	MND	MND	MND	MND	MND	4,59E-5	1,97E-5	1,74E-4	3,84E-6	-1,5E-5
ADP-minerals & metals ⁴⁾	kg Sbe	2,27E-6	3,43E-7	2,18E-7	2,83E-6	1,13E-7	2,3E-9	MND	MND	MND	MND	MND	MND	MND	1,68E-9	2,95E-8	2,74E-6	8,47E-10	-4,86E-9
ADP-fossil resources	MJ	1,56E1	2,21E0	1,69E0	1,95E1	8,31E-1	4,65E-2	MND	MND	MND	MND	MND	MND	MND	4,45E-2	1,21E-1	2,76E-1	1,01E-2	-6,5E-2
Water use ⁵⁾	m ³ e depr.	5,46E-1	1,02E-2	2,66E-2	5,83E-1	3,33E-3	6,51E-4	MND	MND	MND	MND	MND	MND	MND	1,2E-4	5,67E-4	5,35E-3	3,21E-5	-8,04E-4

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	1,49E0	2,87E-2	5,73E-1	2,09E0	8,97E-3	-1,1E-1	MND	MND	MND	MND	MND	MND	MND	2,54E-4	1,76E-3	4,89E-2	8,78E-5	-1,37E-2
Renew. PER as material	MJ	6,05E-2	0E0	8,56E-2	1,46E-1	0E0	-8,57E-2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	-5,62E-2	-4,23E-3	5,16E-4
Total use of renew. PER	MJ	1,55E0	2,87E-2	6,58E-1	2,23E0	8,97E-3	-1,96E-1	MND	MND	MND	MND	MND	MND	MND	2,54E-4	1,76E-3	-7,31E-3	-4,15E-3	-1,32E-2
Non-re. PER as energy	MJ	1,28E1	2,21E0	1,57E0	1,66E1	8,31E-1	4,48E-2	MND	MND	MND	MND	MND	MND	MND	4,45E-2	1,21E-1	2,76E-1	1,01E-2	-6,5E-2
Non-re. PER as material	MJ	4,25E-2	0E0	9,55E-4	4,35E-2	0E0	-1,61E-3	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	-3,95E-2	-2,98E-3	3,36E-3
Total use of non-re. PER	MJ	1,29E1	2,21E0	1,57E0	1,67E1	8,31E-1	4,32E-2	MND	MND	MND	MND	MND	MND	MND	4,45E-2	1,21E-1	2,37E-1	7,13E-3	-6,16E-2
Secondary materials	kg	1,27E0	6,28E-4	1,33E-3	1,27E0	2,7E-4	2,04E-5	MND	MND	MND	MND	MND	MND	MND	1,74E-5	4,13E-5	3,07E-4	2,12E-6	5,34E-5
Renew. secondary fuels	MJ	1,3E-4	5,54E-6	2,05E-4	3,41E-4	1,7E-6	6,76E-8	MND	MND	MND	MND	MND	MND	MND	5,7E-8	4,54E-7	1,6E-5	5,55E-8	-1,52E-6
Non-ren. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m ³	2,11E-2	2,93E-4	1E-3	2,24E-2	9,03E-5	1,19E-6	MND	MND	MND	MND	MND	MND	MND	2,7E-6	1,55E-5	1,62E-4	1,11E-5	-5,07E-5

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	5,23E-1	2,38E-3	1,09E-2	5,37E-1	9,42E-4	6,11E-5	MND	MND	MND	MND	MND	MND	MND	5,96E-5	1,38E-4	1,88E-3	0E0	-3,89E-4
Non-hazardous waste	kg	2,15E0	4,13E-2	1,26E-1	2,31E0	1,32E-2	8,32E-3	MND	MND	MND	MND	MND	MND	MND	4,19E-4	2,45E-3	5,99E-2	7E-2	-1,56E-2
Radioactive waste	kg	5,9E-5	1,53E-5	6,17E-6	8,04E-5	5,78E-6	3,2E-7	MND	MND	MND	MND	MND	MND	MND	3,13E-7	8,34E-7	1,62E-6	0E0	-3,48E-7

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	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	0E0	0E0	0E0	0E0	0E0	6,18E-5	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	9,3E-1	0E0	0E0
Materials for energy rec	kg	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	7,16E-2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO ₂ e	9,39E-1	1,43E-1	1,23E-1	1,2E0	5,62E-2	3,46E-3	MND	MND	MND	MND	MND	MND	MND	3,27E-3	8,07E-3	2E-2	3,61E-4	-4,91E-3
Ozone depletion Pot.	kg CFC ₁₁ e	5,04E-8	2,74E-8	1,27E-8	9,05E-8	1,03E-8	5,79E-10	MND	MND	MND	MND	MND	MND	MND	5,6E-10	1,5E-9	2,04E-9	1,18E-10	-2,21E-10
Acidification	kg SO ₂ e	3,74E-3	5,72E-4	5,01E-4	4,81E-3	6,58E-4	2,56E-5	MND	MND	MND	MND	MND	MND	MND	2,45E-5	1,9E-5	2,09E-4	2,62E-6	-3,28E-5
Eutrophication	kg PO ₄ ³ e	2,05E-3	1,27E-4	1,54E-4	2,33E-3	8,31E-5	6,79E-6	MND	MND	MND	MND	MND	MND	MND	5,69E-6	4,1E-6	6,9E-5	5,65E-7	-7,11E-6
POCP ("smog")	kg C ₂ H ₄ e	2,44E-4	1,89E-5	2,76E-5	2,91E-4	1,86E-5	5,75E-7	MND	MND	MND	MND	MND	MND	MND	5,36E-7	9,59E-7	7,9E-6	1,1E-7	-1,46E-6
ADP-elements	kg Sbe	2,49E-6	3,33E-7	2,1E-7	3,03E-6	1,1E-7	2,23E-9	MND	MND	MND	MND	MND	MND	MND	1,65E-9	2,88E-8	2,74E-6	8,35E-10	-4,87E-9
ADP-fossil	MJ	1,28E1	2,21E0	1,68E0	1,67E1	8,31E-1	4,65E-2	MND	MND	MND	MND	MND	MND	MND	4,45E-2	1,21E-1	2,76E-1	1,01E-2	-6,38E-2

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.

HaiHa Nguyen, as an authorized verifier acting for EPD Hub Limited

12.05.2023



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: 9,816E-2 kgCO₂e

GWP fossil: 9,788E-2 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

Ylivieska: Electricity production, hydro, run-of-river. ecoinvent 3.8. 0,0041 kgCO₂e/kWh

Riga: Market for electricity, medium voltage, Latvian mix. ecoinvent 3.8. 0,55 kgCO₂e/kWh

INDOOR AIR EMISSIONS

The ready product does not cause any indoor air emissions.