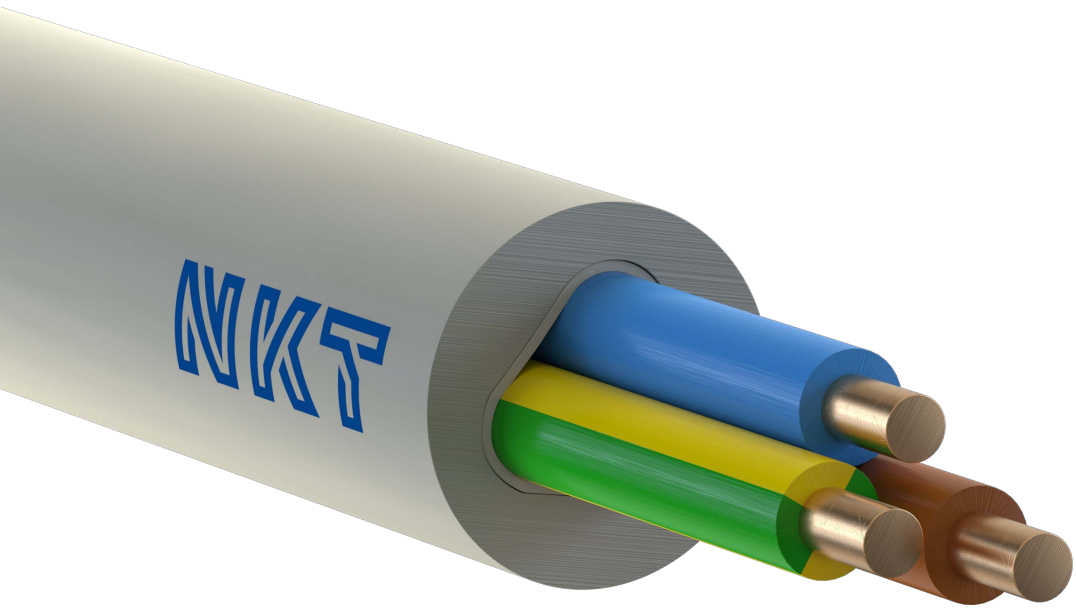
epd-norge
Global program operatør

Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

NOIKLX 90 3G1,5



The Norwegian EPD Foundation

Owner of the declaration:
NKT A/S

Product:
NOIKLX 90 3G1,5

Declared unit:
1 m

This declaration is based on Product Category Rules:
CEN Standard EN 15804:2012+A2:2019 serves as core PCR
NPCR 027:2020 Part B for Electrical cables and wires

Program operator:
The Norwegian EPD Foundation

Declaration number:

NEPD-4776-4025-EN

Registration number:

NEPD-4776-4025-EN

Issue date: 07.08.2023

Valid to: 07.08.2028

EPD Software:
LCA.no EPD generator ID: 69427

General information

Product

NOIKLX 90 3G1,5

Owner of the declaration:

NKT A/S
Contact person: Matheo Roehr
Phone:
e-mail: matheo.roehr@nkt.com

Program operator:

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Manufacturer:

NKT (Denmark A/S)
Toftegårdsvej 25
DK-4550 Asnaes, Denmark

Declaration number: NEPD-4776-4025-EN

Place of production:

NKT production site Warszowice (Poland)
ul. Gajowa No. 3
PL-43-254 Warszowice, Poland

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR
NPCR 027:2020 Part B for Electrical cables and wires

Management system:

ISO 9001, ISO 14001

Statement of liability:

The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Organisation no:

957 338 690

Declared unit:

1 m NOIKLX 90 3G1,5

Issue date: 07.08.2023

Declared unit with option:

A1,A2,A3,A4,A5,C1,C2,C3,C4,D

Valid to: 07.08.2028

Year of study:

2021

Functional unit:

1 m of NOIKLX 90 3G1,5 installed electrical cable used to transmit a reference electric current of 1A over 30 years, including waste treatment at end-of-life.

Comparability:

EPD of construction products may not be comparable if they not comply with EN 15804 and seen in a building context.

General information on verification of EPD from EPD tools:

Independent verification of data, other environmental information and the declaration according to ISO 14025:2010, § 8.1.3 and § 8.1.4. Verification of each EPD is made according to EPD-Norway's guidelines for verification and approval requiring that tools are i integrated into the company's environmental management system, ii the procedures for use of the EPD tool are approved by EPD-Norway, and iii the process is reviewed annually by an independent third party verifier. See Appendix G of EPD-Norway's General Programme Instructions for further information on EPD tools

Development and verification of EPD:

The declaration is created using EPD tool lca.tools ver EPD2022.03, developed by LCA.no. The EPD tool is integrated in the company's management system, and has been approved by EPD Norway. Approval number:

Developer of EPD: Ann Aittamaa

Reviewer of company-specific input data and EPD: Matheo Roehr

Verification of EPD tool:

Independent third party verification of the EPD tool, background data and test-EPD in accordance with EPDNorway's procedures and guidelines for verification and approval of EPD tools. Approval number: NEPDT32.

Third party verifier:

Approved:

Håkon Hauan
Managing Director of EPD-Norway

Vito D'Incognito - Take Care International

(no signature required

Product

Product description:

Where halogen-free and environmentally friendly cables are required. For fixed installation in dry and wet rooms and outside as well as in the open air. Can be laid in the ground. May be bricked in and embedded directly. Not suitable for embedment in vibrated concrete. Conductor insulation must be protected against light exposure. Installation to be performed by a licensed electrician only.

Product specification

Conductor: Copper, solid cl. 1
PEX insulation: Filling sheath, thermoplastic compound
Outer sheath: Thermoplastic compound, UV-stabilized

Materials	kg	%
HFFR Polyolefin	0,04	46,57
Plastic - Polyethylene	0,01	9,38
Metal - Copper	0,04	44,05
Total	0,09	

Technical data:

NOIKLX 90 3G1,5
Standard applied: NKT factory standard no. 008

Rated voltage: 300/500V
Test voltage: 2 kV AC
Operating temperature: 90°C
Conductor temperature: 90 °C
Max. short-circuit temperature: 250 °C
Min. handling temperature: -15 °C
Max. storage temperature: 40 °C
Color of the sheath: Light grey
Smoke density: IEC 61034
Fire test: IEC 60332-1
CPR fire class: Eca
Emission of corrosive gases: IEC 60754-1, EN 50267-2-1
Conductivity - pH change: IEC 60754-2, EN 50267-2-3
Min. bending radius: 1-5 core (1,5-2,5mm2): 5 x cable diameter
Max. pulling force: 50 N/mm2 on conductors
CE-conformity: Low Voltage Directive

Market:

Denmark

Reference service life, product

30 years. As defined in appendix 1 of the PEP Ecopassport PSR.

Reference service life, building or construction works

30 years.

LCA: Calculation rules

Declared unit:

1 m NOIKLX 90 3G1,5

Cut-off criteria:

All major raw materials and all the essential energy is included. The production processes for raw materials and energy flows with very small amounts (less than 1%) are not included. These cut-off criteria do not apply for hazardous materials and substances.

Allocation:

The allocation is made in accordance with the provisions of EN 15804. Incoming energy and water and waste production in-house is allocated equally among all products through mass allocation. Effects of primary production of recycled materials is allocated to the main product in which the material was used. The recycling process and transportation of the material is allocated to this analysis.

Data quality:

Specific data for the product composition are provided by the manufacturer. The data represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on EPDs according to EN 15804 and different LCA databases. The data quality of the raw materials in A1 is presented in the table below.

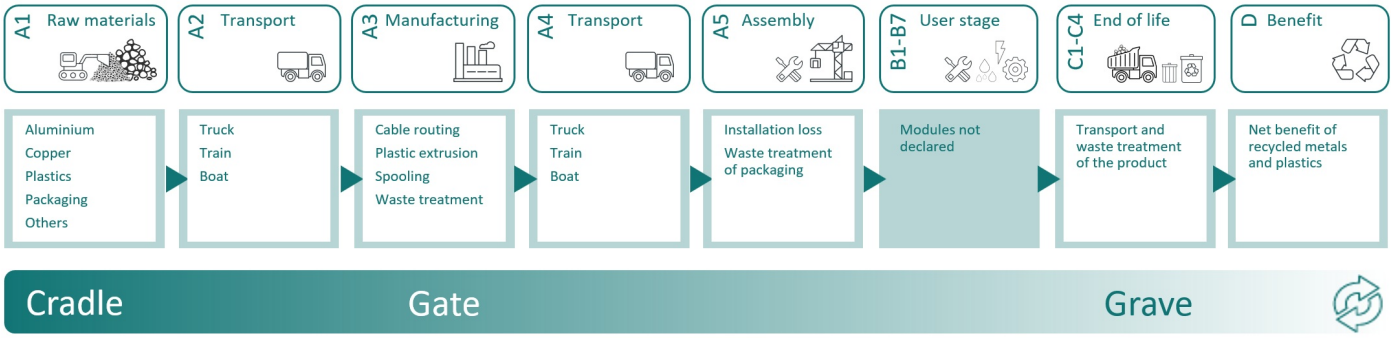
Materials	Source	Data quality	Year
HFFR Polyolefin	ecoinvent 3.6	Database	2019
Metal - Copper	ecoinvent 3.6	Database	2019
Plastic - Polyethylene	ecoinvent 3.6	Database	2019

System boundaries (X=included, MND=module not declared, MNR=module not relevant)

Product stage			Construction installation stage		Use stage							End of life stage				Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
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

System boundary:

The flowchart below illustrates the system boundaries of the analysis:



Additional technical information:

The EPD covers the specific cable NOIKLX 90 3G1,5.

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

Module A4 = An average distance between the factory and the market is considered.

Modules A5 = 2 % product losses during installation are estimated by the company. No energy use for installation has been quantified since this operation is assumed to be done with other products and should be assessed at a construction works level. Cable drums are reused and assumed under the cut-off criterion of 1%.

Module C1 = For both buildings and construction works, cables will be taken out as part of a larger demolition. The energy use for cable removal compared to other heavier materials is assumed to be low. This module can therefore be included with zero impact.

Module C2 = An average distance between the market and the waste treatment facility is considered.

Modules C3 and C4 = Waste treatment of the product follows the default values provided in EN 50693, Product Category Rules for life cycle assessments of electronic and electrical products and systems, table G.4. This table specified how different types of raw materials used in A1 will likely be treated during the end-of-life of the product. Waste treatments in C3 include material recycling and incineration with and without energy recovery and fly ash extraction. Disposal in C4 consist of landfilling of different waste fractions and of ashes.

Module D = The recyclability of metals and plastics allows the producers a credit for the net scrap that is produced at the end of a product's life. The benefits from recycling of net scrap are described in formula from EN 15804:2012+A2:2019. Substitution of heat and electricity generated by the incineration with energy recovery of plastic insulation and other parts is also calculated in module D.

Transport from production place to user (A4)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Ship, Ferry, Sea (km)	50,0 %	50	0,034	l/tkm	1,70
Truck, 16-32 tonnes, EURO 6 (km) - Europe	36,7 %	1160	0,043	l/tkm	49,88

Assembly (A5)	Unit	Value			
Product loss during installation (percentage of cable)	Units/DU	0,02			

Transport to waste processing (C2)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, 16-32 tonnes, EURO 6 (km) - Europe	36,7 %	300	0,043	l/tkm	12,90

Waste processing (C3)	Unit	Value			
Copper to recycling (kg)	kg	0,02			
Waste treatment of plastic mixture, incineration with energy recovery and fly ash extraction (kg)	kg	0,02			
Waste treatment of polyethylene (PE), incineration with energy recovery and fly ash extraction (kg)	kg	0,00			

Disposal (C4)	Unit	Value			
Landfilling of ashes from incineration of Plastic mixture, process per kg ashes and residues (kg)	kg	0,00			
Landfilling of ashes from incineration of Polyethylene (PE), process per kg ashes and residues (kg)	kg	0,00			
Landfilling of copper (kg)	kg	0,02			
Landfilling of plastic mixture (kg)	kg	0,02			

Benefits and loads beyond the system boundaries (D)	Unit	Value			
Substitution of electricity (MJ)	MJ	0,04			
Substitution of primary copper with net scrap (kg)	kg	0,02			
Substitution of thermal energy, district heating (MJ)	MJ	0,59			

LCA: Results

The LCA results are presented below for the declared unit defined on page 2 of the EPD document.

Environmental impact												
	Indicator	**Unit**	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
	GWP-total	kg CO_2 -eq	5,02E-01	1,21E-02	3,68E-03	1,74E-02	8,81E-03	0	4,36E-03	6,05E-02	3,02E-03	-3,97E-02
	GWP-fossil	kg CO_2 -eq	4,94E-01	1,21E-02	3,36E-03	1,74E-02	8,71E-03	0	4,36E-03	6,05E-02	3,02E-03	-3,94E-02
	GWP-biogenic	kg CO_2 -eq	7,76E-03	4,99E-06	3,01E-04	7,11E-06	9,42E-05	0	1,81E-06	1,15E-06	2,54E-07	-1,74E-04
	GWP-luluc	kg CO_2 -eq	3,58E-04	4,34E-06	2,23E-05	6,31E-06	5,99E-06	0	1,55E-06	2,10E-07	1,42E-07	-1,56E-04
	ODP	kg CFC11 -eq	4,93E-06	2,74E-09	6,56E-10	3,92E-09	9,87E-08	0	9,88E-10	1,14E-10	1,40E-10	-2,51E-04
	AP	mol H+ -eq	3,37E-02	3,79E-05	6,53E-05	6,45E-05	1,87E-04	0	1,25E-05	1,21E-05	3,64E-06	-6,06E-03
	EP-FreshWater	kg P -eq	3,28E-04	9,63E-08	2,02E-07	1,37E-07	1,46E-06	0	3,48E-08	1,02E-08	6,65E-09	-4,10E-05
	EP-Marine	kg N -eq	1,20E-03	7,68E-06	1,98E-05	1,36E-05	1,49E-05	0	2,48E-06	5,79E-06	4,21E-06	-2,57E-04
	EP-Terrestial	mol N -eq	1,69E-02	8,58E-05	3,13E-04	1,52E-04	2,09E-04	0	2,77E-05	5,98E-05	1,46E-05	-3,94E-03
	POCP	kg NMVOC -eq	5,41E-03	3,17E-05	5,61E-05	5,26E-05	5,48E-05	0	1,06E-05	1,44E-05	4,73E-06	-1,07E-03
	ADP-minerals&metals[1]	kg Sb -eq	9,23E-05	3,32E-07	3,02E-08	4,69E-07	1,65E-06	0	1,20E-07	5,70E-09	3,59E-09	-3,38E-05
	ADP-fossil[1]	MJ	6,97E+00	1,83E-01	3,09E-02	2,61E-01	1,19E-01	0	6,59E-02	7,43E-03	1,08E-02	-3,70E-01
	WDP[1]	m^3	7,38E+00	1,76E-01	2,51E-02	2,48E-01	3,80E-01	0	6,38E-02	4,96E-02	1,80E-01	1,35E+00

GWP-total = Global Warming Potential total; 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

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

1. 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

Remarks to environmental impacts

Additional environmental impact indicators

Indicator		Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
	PM	Disease incidence	6,56E-08	7,38E-10	9,03E-10	1,05E-09	6,78E-10	0	2,67E-10	5,20E-11	6,80E-11	-1,38E-08
	IRP[2]	kgBq U235 -eq	1,32E-02	7,99E-04	1,14E-04	1,14E-03	3,56E-04	0	2,88E-04	1,80E-05	6,17E-05	-7,13E-04
	ETP-fw[1]	CTUe	2,51E+02	1,35E-01	5,92E-01	1,93E-01	2,37E+00	0	4,89E-02	1,04E-01	9,54E+00	-5,58E+01
	HTP-c[1]	CTUh	6,09E-09	0,00E+00	7,00E-12	0,00E+00	4,00E-11	0	0,00E+00	3,00E-12	0,00E+00	-7,88E-10
	HTP-nc[1]	CTUh	5,38E-07	1,48E-10	2,01E-10	2,10E-10	2,92E-09	0	5,30E-11	1,37E-10	1,30E-11	-6,74E-08
	SQP[1]	dimensionless	3,80E+00	1,27E-01	2,39E+00	1,79E-01	1,08E-01	0	4,61E-02	1,31E-03	3,04E-02	-1,03E+00

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 = Potential Soil Quality Index (dimensionless)

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

1. 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
2. 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.

Resource use												
Indicator		Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
	PERE	MJ	7,09E-01	2,61E-03	5,00E-01	3,69E-03	2,48E-02	0	9,44E-04	3,92E-04	9,78E-04	-4,32E-01
	PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	PERT	MJ	7,09E-01	2,61E-03	5,00E-01	3,69E-03	2,48E-02	0	9,44E-04	3,92E-04	9,78E-04	-4,32E-01
	PENRE	MJ	5,91E+00	1,83E-01	3,10E-02	2,61E-01	9,77E-02	0	6,59E-02	7,43E-03	1,08E-02	-3,70E-01
	PENRM	MJ	1,09E+00	0,00E+00	0,00E+00	0,00E+00	1,04E-03	0	0,00E+00	-1,04E+00	0,00E+00	0,00E+00
	PENRT	MJ	7,00E+00	1,83E-01	3,10E-02	2,61E-01	9,88E-02	0	6,59E-02	-1,04E+00	1,08E-02	-3,70E-01
	SM	kg	9,07E-03	0,00E+00	1,32E-06	0,00E+00	1,35E-04	0	0,00E+00	0,00E+00	7,96E-05	1,05E-02
	RSF	MJ	7,63E-03	9,32E-05	1,91E-05	1,32E-04	3,78E-04	0	3,38E-05	8,59E-06	2,03E-05	9,46E-04
	NRSF	MJ	7,11E-03	3,32E-04	1,12E-04	4,67E-04	3,87E-05	0	1,21E-04	0,00E+00	1,91E-05	-1,59E-02
	FW	m^3	8,92E-03	1,95E-05	1,58E-05	2,76E-05	1,35E-04	0	7,05E-06	5,83E-05	1,38E-05	-1,24E-03

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 materials; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

End of life - Waste

Indicator		Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
	HWD	kg	3,42E-03	9,41E-06	5,01E-04	1,34E-05	6,27E-05	0	3,40E-06	0,00E+00	7,19E-04	-4,09E-04
	NHWD	kg	1,34E-01	8,83E-03	1,29E-03	1,24E-02	3,65E-03	0	3,21E-03	0,00E+00	4,02E-02	-1,85E-02
	RWD	kg	1,33E-05	1,25E-06	1,74E-07	1,78E-06	3,55E-07	0	4,49E-07	0,00E+00	7,32E-08	-6,18E-07

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

End of life - Output flow

Indicator		Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
	CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	MFR	kg	1,09E-05	0,00E+00	4,20E-05	0,00E+00	4,63E-04	0	0,00E+00	2,31E-02	2,34E-06	-4,11E-04
	MER	kg	2,55E-05	0,00E+00	2,01E-08	0,00E+00	4,90E-04	0	0,00E+00	2,45E-02	2,00E-06	-5,42E-05
	EEE	MJ	4,74E-05	0,00E+00	1,03E-03	0,00E+00	8,06E-04	0	0,00E+00	3,92E-02	2,07E-05	-1,33E-04
	EET	MJ	7,17E-04	0,00E+00	1,56E-02	0,00E+00	1,22E-02	0	0,00E+00	5,93E-01	3,14E-04	-2,01E-03

CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported energy electrical; EET = Exported energy thermal

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

Biogenic Carbon Content

Indicator	Unit	At the factory gate
Biogenic carbon content in product	kg C	0,00E+00
Biogenic carbon content in accompanying packaging	kg C	0,00E+00

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO2

Additional requirements

Greenhouse gas emissions from the use of electricity in the manufacturing phase

National production mix from import, low voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process (A3).

Electricity mix	Data source	Amount	Unit
Electricity, renewable with guarantee of origin, low voltage, Poland (kWh) - NKT	ecoinvent 3.6	71,22	g CO2-eq/kWh

Dangerous substances

The product contains no substances given by the REACH Candidate list or the Norwegian priority list.

Indoor environment

Additional Environmental Information

Additional environmental impact indicators required in NPCR Part A for construction products											
Indicator	**Unit**	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
GWPIOBC	kg CO_2 -eq	5,01E-01	1,21E-02	2,46E-03	1,74E-02	8,71E-03	0	4,36E-03	6,05E-02	3,34E-04	-2,06E-02

GWP-IOBC: Global warming potential calculated according to the principle of instantaneous oxidation. In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator GWP-IOBC is required as it declares climate impacts calculated according to the principle of instantaneous oxidation. GWP-IOBC is also referred to as GWP-GHG in context to Swedish public procurement legislation.

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EPD Norway (2022). NPCR 027 Part B for electrical cables and wires. The Norwegian EPD foundation. Version 2.0 published 01.03.2022.

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