Product Environmental Profile

Family technical name: FREETOX N2XOH 0,6/1 kV Unipolar

Reference product name: CB/N2XOH 0.6/1 kV 240 mm2

6370
kg CO_2 eq.
Climate change - total

2,82700
kg Sb eq.
Resource use - minerals
& metals (ADPe)

410,6
m^3
Net use of fresh water

123489
MJ
Total Primary Energy

The above environmental impacts are "cradle to gate" or "Manufacturing phase" values (A1-A3)

PEP ecopassport N°:	NXNS-00339-V01.01-EN	Product Category Rules:	PEP-PCR-ed4-EN-2021 09 06
		Product Specific Rules:	PSR-0001-ed4-EN-2022 11 16
Verifier accreditation N°:	VH18	Program information & documents:	www.pep-ecopassport.org
Date of publication:	01-2024	Validity period:	5 years

Independent verification of the declaration and data, in accordance with ISO 14025 : 2006

Internal ☐   External ☒

The PCR critical review was conducted by a panel of experts chaired by Julie Orgelet (Ddemain).

PEP are compliant with XP C08-100-1 :2016 or EN 50693
The elements of the present PEP cannot be compared with elements from another program.

Compliant with ISO 14025: 2006 "Environmental labels and declarations - Type III environmental declarations".

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Nexans Corporate Social Responsibility commitment

Corporate Social Responsibility which is the confluence between environmental, economic and social aspects, is an integral part of the Nexans's strategy. Nexans has been supporting the **United Nations Global Compact** since December 2008 and has implemented internal action plans to integrate Sustainable Development at all levels. It includes responsible governance, healthy and safe working environment for employees, reduced global carbon footprint through the **Nexans Carbon Neutrality strategy.**
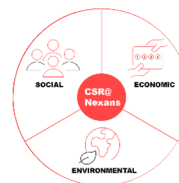
Reference Product description

CB/N2XOH 0.6/1 kV 240 mm2

Copper cable insulated with cross-linked polyethylene (XLPE) and thermoplastic sheath Halogen free, for an operating temperature of 90°C. It has the marking special METRIUM. Special application in poorly ventilated environments and places with high influx of public.

Products covered:

The aforementioned products belong to the category Wires, Cables and Accessories of the Product Category Rules (PCR) from the PEP ecopassport® program.

The PEP concern all the products in the range FREETOX N2XOH 0,6/1 kV Unipolar and the reference product of the PEP is CB/N2XOH 0.6/1 kV 240 mm2.

Functional unit:

To transmit energy expressed for 1A over a distance of 1km during 30 years and a 70% use rate, in accordance with the relevant standards, detailed in the data sheet available on our website www.nexans.com.
Lifetime and use rate correspond to the Building - Residential / Tertiary / Industrial application as defined in the table given in Appendix 1 of the specific rules for wires, cables and accessories.

This PEP has been drawn up considering the following parameters:

• 1km for manufacturing, distribution and end-of-life stages

• 1km and 1A for the use stage

The potential impact of the use stage shall be calculated by the PEP user considering the real amperage through the product during the use phase by multiplying the impact by the square of the intensity. This PEP is valid in the intensity range taking into account the maximum allowable intensity.

Constituent materials
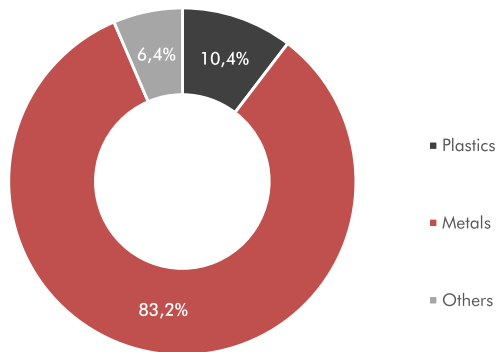
The total mass of the reference product and packaging is 2509,14kg/km. Constituent materials are distributed as given in the graph.

Nexans has implemented necessary procedures to ensure product compliance with the relevant standards when products are put on the market.

Plastics 10,4% · Metals 83,2% · Others 6,4%

Manufacturing

- All the products in the range FREETOX N2XOH 0,6/1 kV Unipolar are manufactured in Peru.
- The electricity mix model for the manufacturing stage is from Peru.
- All Nexans sites in Peru have implemented a certified Environmental Management System according to ISO14001 standard.

Packaging designed to reduce environmental impacts:

- Packaging was designed according to the applicable standard (Directive 94/62/EC).
- The packaging considered to transport the reference product is a Wooden drum. It is considered to be used 1 time.

Distribution

The transportation scenario for the impact assessment of the distribution stage is local, considering:
- 1000 km covered by truck.

Installation

Installation processes for the reference product are considered out of the scope of the study, according to the Product Specific Rules document for "Wires, Cables and Accessories" from PEP ecopassport® program. Only 5% of product losses and packaging disposal is considered in this stage.

Use

The use scenario considers the operation of the reference product in Building - Residential / Tertiary / Industrial, with:

- Reference Lifetime (RLT) = 30 years
- Current intensity (A):   1
- Number of active conductor(s):   1
- Use rate = 70 %
- Cable resistance* (ohm/km):   7,54E-02

(*According to standard IEC 60228)

Considering the aforementioned hypotheses, the energy consumption over the RLT at use stage is 13,87 kWh/km.

This value is calculated for I=1 A. For the effective consumption of the cable installed, multiply the value given by the square of intensity.

- The electricity mix considered at use stage is Peru.
- No maintenance is necessary to ensure the operation of the cable during the considered reference lifetime.

The reference lifetime mentioned in this PEP corresponds to an average data used for impact calculation, taking into account the average time a cable might be installed in a system before being disposed. It CANNOT BE considered as an equivalent to the guaranteed product technical lifetime.

End-of-life

- The transportation scenario chosen for the impact analysis associated with end-of-life stage is 1000 km covered by truck.
- The assumed electricity mix model for end-of-life stage is Peru.

The cables are recycled through a grinding process for the separation of polymers and metal parts. The separated materials are then assumed to be recycled, incinerated or landfilled.

If the customer wants to recycle their cables at the end-of-life, Nexans has the know-how of cables recycling at their end-of-life through the structure named Nexans Recycling Services (recycling.services@nexans.com), to offer a complete solution for the recycling of polymers and metals.

III. ENVIRONMENTAL IMPACTS

The reference product CB/N2XOH 0.6/1 kV 240 mm2 belongs to the Product Category Rules (PEP-PCR-ed4-EN-2021 09 06) and Product Specific Rules (PSR-0001-ed4-EN-2022 11 16) from the PEP ecopassport® program. According to the PCR, the life cycle impact assessment of the reference product takes into account manufacturing, distribution, installation, use and end-of-life stages.

All the necessary hypotheses to evaluate the environmental impacts of the reference product lifecycle are presented in the previous sections (electricity mix models, use scenario, etc). The software used to perform the evaluation is EIME 5.9.4, with the Nexans-2023-10 database.

Representativeness: the study is representative of cable production in Peru with a local scenario for distribution. The electricity model for use is Peru and the model for end-of-life is Peru.

Mandatory indicators:

Environmental indicator/flows	Unit	Manufacturing (A1-A3)	Distribution (A4)	Installation* (A5)	Use (B6)	End-of-life (C1-C4)	TOTAL
Climate change - total (GWP)	kg CO_2 eq.	6,37E+03	1,27E+02	4,61E+02	7,02E+00	3,89E+03	1,09E+04
Climate change - fossil (GWPf)	kg CO_2 eq.	5,93E+03	1,27E+02	4,39E+02	7,01E+00	3,73E+03	1,02E+04
Climate change - biogenic (GWPb)	kg CO_2 eq.	4,41E+02	0,00E+00	2,19E+01	1,42E-02	1,63E+02	6,26E+02
Climate change - land use & land use change (GWPlu)	kg CO_2 eq.	1,24E-04	0,00E+00	0,00E+00	0,00E+00	8,26E-03	8,38E-03
Ozone layer depletion (ODP)	kg CFC-11 eq.	1,50E-03	1,94E-07	7,40E-05	1,42E-08	1,11E-04	1,69E-03
Acidification potential of soil and water (AP)	mol H+ eq.	3,81E+02	8,01E-01	1,81E+01	1,21E-02	4,08E+01	4,40E+02
Eutrophication - freshwater (Epf)	kg PO43- eq.	1,63E-01	4,74E-05	1,85E-03	1,27E-07	9,24E+00	9,40E+00
Eutrophication - marine (Epm)	kg N eq.	1,12E+01	3,75E-01	4,13E-01	2,40E-03	6,26E+00	1,82E+01
Eutrophication - terrestrial (Ept)	mol N eq.	1,27E+02	4,12E+00	4,05E+00	2,66E-02	7,62E+01	2,11E+02
Photochemical ozone formation - human health (POCP)	kg NMVOC eq.	5,79E+01	1,04E+00	2,35E+00	8,09E-03	1,84E+01	7,97E+01
Resource use - minerals & metals (ADPe)	kg Sb eq.	2,83E+00	4,98E-06	1,41E-01	3,51E-07	2,79E-01	3,25E+00
Resource use - fossils (ADPf)	MJ	1,11E+05	1,76E+03	6,52E+03	1,04E+02	6,74E+03	1,26E+05
Water use (WU)	m3 eq.	1,76E+04	4,80E-01	8,88E+02	1,44E-01	4,09E+03	2,26E+04
Use of renewable primary energy excluding renewable primary energy used as raw material (PERE)	MJ	9,43E+03	2,35E+00	4,68E+02	3,67E+01	4,76E+03	1,47E+04
Use of renewable primary energy used as raw material (PERM)	MJ	3,12E+03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,12E+03
Total use of renewable primary energy resources (PERT)	MJ	1,25E+04	2,35E+00	4,68E+02	3,67E+01	4,76E+03	1,78E+04
Non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (PENRE)	MJ	9,85E+04	1,76E+03	5,91E+03	1,04E+02	6,74E+03	1,13E+05
Use of non renewable primary energy resources used as raw materials (PENRM)	MJ	1,24E+04	0,00E+00	6,14E+02	0,00E+00	0,00E+00	1,30E+04
Total use of non-renewable primary energy resources (PENRT)	MJ	1,11E+05	1,76E+03	6,52E+03	1,04E+02	6,74E+03	1,26E+05
Use of secondary material (SM)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels (RSF)	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of non renewable secondary fuels (NRSF)	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water (FW)	m3	4,11E+02	1,12E-02	2,07E+01	3,34E-03	9,53E+01	5,27E+02
Hazardous waste disposed (HWD)	kg	2,59E+05	0,00E+00	1,30E+04	2,38E-02	9,36E-01	2,72E+05
Non hazardous waste disposed (NHWD)	kg	4,19E+02	4,44E+00	1,94E+02	7,38E-01	1,15E+03	1,77E+03
Radioactive waste disposed	kg	3,98E-01	3,16E-03	2,23E-02	3,91E-04	2,84E-02	4,52E-01
Components for reuse (CRU)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling (MFR)	kg	2,22E+01	0,00E+00	6,46E+00	0,00E+00	1,25E+03	1,28E+03
Materials for energy recovery (MER)	kg	1,37E+01	0,00E+00	8,22E+01	0,00E+00	1,26E+02	2,22E+02
Exported Energy (EE)	MJ	0,00E+00	0,00E+00	7,28E+01	0,00E+00	0,00E+00	7,28E+01

Installation stage includes only packaging disposal. Impacts related to installation processes might be completed by the PEP user.

Environmental indicator/flows	Unit	Total
Biogenic carbon content - product (BC-pro)	kg of C	0,00E+00
Biogenic carbon content - packaging (BC-pack)	kg of C	6,49E+01

Biogenic carbon storage is calculated according to the 0/0 assessment methodology.

Optional indicators:

Environmental indicator/flow	Unit	Manufacturing (A1-A3)	Distribution (A4)	Installation* (A5)	Use (B6)	End-of-life (C1-C4)	TOTAL
Total Primary Energy (TPE)	MJ	1,23E+05	1,77E+03	6,99E+03	1,41E+02	1,15E+04	1,44E+05
EF-particulate matter (EF-PM)	Disease occurance	2,28E-03	6,51E-06	1,09E-04	8,98E-08	3,04E-04	2,70E-03
Ionising radiation, human health (IR)	kg U235 eq.	6,16E+05	3,08E-01	3,04E+04	4,45E-02	1,59E+02	6,47E+05
Ecotoxicity, freshwater (Eco-fw)	CTUe	1,73E+05	8,52E+01	8,56E+03	1,03E+01	9,77E+05	1,16E+06
Human toxicity, cancer (HT-c)	CTUh-c	3,96E-02	2,22E-09	1,98E-03	6,51E-10	8,78E-06	4,16E-02
Human toxicity, non-cancer (HT-nc)	CTUh-nc	4,84E-03	2,40E-07	2,42E-04	7,80E-09	6,31E-04	5,71E-03
Land use (LU)	No dimension	4,92E+02	0,00E+00	1,02E+01	1,59E-01	1,93E+04	1,98E+04

Environmental indicators are calculated according to JRC method - EF3.0.

V. EXTRAPOLATION RULES FOR THE PRODUCT FAMILY FREETOX N2XOH 0,6/1 kV Unipolar

General information

The extrapolation rules have been calculated based on the environment impact assessment results of 3 products in the range FREETOX N2XOH 0,6/1 kV Unipolar. The reference product is CB/N2XOH 0.6/1 kV 240 mm2. The weight of reference product is 2333,421 kg/km.

The reference product has 1 active conductor(s) and a resistivity of 0,0754 ohm/km/active conductor.

The extrapolation rules below apply to 1000m of product. In the following sections, the product weight is expressed in kg for 1000m of cable, where applicable.

Extrapolation rules for each life cycle stage

Life cycle stage	Applicable extrapolation principle	Formula to calculate each environmental indicator	Example: If the product weight is 2343,421 kg/km, each indicator value shall be calculated with:	Mean deviation of extrapolation rule
Manufacturing	Linear variation versus weight	Indicator = a x Cable weight + b	Indicator = (2343,421 x a) + b	5,03%
Distribution	Linear variation versus weight	Indicator = a x Cable weight + b	Indicator = 2343,421 x a + b.	0,68%
Installation	Linear variation versus weight	Indicator = a x Cable weight + b	Indicator = 2343,421 x a + b.	7,18%
Use	Variation versus resistivity ratio	Indicator = (Product Resistivity / Reference product Resistivity) x (Nb of active conductors / Nb of active conductors in the reference product) x Indicator value for Reference Product $Y = 1$ for a mono cable $Y = 2$ for a dual cable $Y = X/1$ for a multi (X) cable $Z = 0,0014$ for category 5e $Z = 0,0017$ for category 6 $Z = 0,0021$ for category 6a $Z = 0,0021$ for category 7 $Z = 0,0021$ for category 7a $Z = 0,0021$ for category 7+	Example: If the product resistivity is 1,2 ohm/km & has 1 active conductor, Indicator = (1,2/0,0754) x (1/1) x indicator of reference product.	0,00%
End of life	Linear variation versus weight	Indicator = a x Cable weight + b	Indicator = (2343,421 x a) + b	3,94%

Table to be considered for extrapolation calculations of different life cycle stages:

	Manufacturing		Distribution		Installation		End of life	
	a	b	a	b	a	b	a	b
GWP	2,70E+00	6,02E+01	5,42E-02	-2,71E-02	1,97E-01	2,19E+00	1,67E+00	5,01E+00
GWPf	2,51E+00	6,26E+01	5,42E-02	-2,71E-02	1,87E-01	2,31E+00	1,59E+00	7,61E+00
GWPb	1,90E-01	-2,46E+00	0,00E+00	0,00E+00	9,45E-03	-1,21E-01	7,10E-02	-2,59E+00
GWPlu	5,39E-08	-1,98E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,59E-06	-1,32E-04
ODP	6,48E-07	-1,18E-05	8,31E-11	-4,08E-11	3,20E-08	-6,55E-07	4,83E-08	-1,68E-06
AP	1,65E-01	-5,68E+00	3,43E-04	-1,71E-04	7,85E-03	-2,66E-01	1,77E-02	-6,19E-01
Epf	6,96E-05	6,44E-04	2,03E-08	-1,00E-08	7,38E-07	1,31E-04	4,02E-03	-1,47E-01
Epm	4,83E-03	-7,66E-02	1,61E-04	-7,92E-05	1,77E-04	-1,15E-03	2,72E-03	-9,05E-02
Ept	5,48E-02	-9,09E-01	1,76E-03	-8,72E-04	1,74E-03	-1,04E-02	3,31E-02	-1,10E+00
POCP	2,50E-02	-4,10E-01	4,45E-04	-2,17E-04	1,01E-03	-1,09E-02	8,00E-03	-2,66E-01
ADPe	1,23E-03	-4,51E-02	2,13E-09	-1,04E-09	6,14E-05	-2,25E-03	1,22E-04	-4,46E-03
ADPf	4,63E+01	3,13E+03	7,56E-01	-3,75E-01	2,70E+00	2,38E+02	2,89E+00	-3,50E+00
WU	7,62E+00	-1,61E+02	2,06E-04	-1,02E-04	3,84E-01	-7,80E+00	1,78E+00	-5,99E+01
PÈRE	4,00E+00	9,62E+01	1,01E+03	-4,97E-04	1,99E-01	4,57E+00	2,06E+00	-5,53E+01
PERM	1,35E+00	-2,55E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	5,35E+00	7,07E+01	1,01E-03	-4,97E-04	1,99E-01	4,57E+00	2,06E+00	-5,53E+01
PENRE	4,18E+01	1,18E+03	7,56E-01	-3,75E-01	2,48E+00	1,41E+02	2,89E+00	-3,50E+00
PENRM	4,52E+00	1,95E+03	0,00E+00	0,00E+00	2,23E-01	9,69E+01	0,00E+00	0,00E+00

PENRT	4,63E+01	3,13E+03	7,56E-01	-3,75E-01	2,70E+00	2,38E+02	2,89E+00	-3,50E+00
SM	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	1,77E-01	-3,75E+00	4,79E-06	-2,40E-06	8,93E-03	-1,82E-01	4,14E-02	-1,39E+00
HWD	1,13E+02	-4,14E+03	0,00E+00	0,00E+00	5,64E+00	-2,06E+02	3,97E-04	1,12E-02
NHWD	1,76E-01	7,62E+00	1,90E-03	-9,40E-04	8,35E-02	-1,37E+00	4,83E-01	2,31E+01
RWD	1,72E-04	-3,65E-03	1,35E-06	-6,63E-07	9,63E-06	-2,22E-04	1,17E-05	1,14E-03
CRU	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	9,13E-03	1,16E+00	0,00E+00	0,00E+00	2,59E-03	4,89E-01	5,43E-01	-1,99E+01
MER	4,07E-03	4,23E+00	0,00E+00	0,00E+00	3,54E-02	-6,59E-01	4,73E-02	1,66E+01
EE	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,14E-02	-5,94E-01	0,00E+00	0,00E+00
TPE	5,16E+01	3,20E+03	7,57E-01	-3,71E-01	2,90E+00	2,43E+02	4,95E+00	-5,88E+01
EF-PM	9,89E-07	-3,21E-05	2,79E-09	-1,36E-09	4,72E-08	-1,52E-06	1,32E-07	-4,62E-06
IR	2,67E+02	-7,34E+03	1,32E-04	-6,46E-05	1,32E+01	-4,04E+02	6,89E-02	-2,37E+00
Eco-fw	7,48E+01	-2,11E+03	3,65E-02	-1,81E-02	3,71E+00	-1,01E+02	4,25E+02	-1,56E+04
HT-c	1,72E-05	-6,31E-04	9,52E-13	-4,72E-13	8,63E-07	-3,16E-05	3,82E-09	-1,39E-07
HT-nc	2,10E-06	-7,67E-05	1,03E-10	-5,07E-11	1,05E-07	-3,81E-06	2,75E-07	-1,01E-05
LU	1,99E-01	2,81E+01	0,00E+00	0,00E+00	3,68E-03	1,63E+00	8,38E+00	-3,07E+02

VI. PRODUCTS COVERED BY THE PEP

The products covered by the given PEP are represented in the below table with a: ●

The below table also provides the maximun linear resistance (ohm/km) of core at 20°C in D.C for 7 wires according to the standard IEC 60228 for each cable included in the cable in the family FREETOX N2XOH 0,6/1 kV Unipolar.

Section (mm²)	Resistance (ohm/km)	N° of CONDUCTORS																		
		1	2	3	4	5	6	7	8	9	10	12	14	19	21	24	27	30	37	40
0,5	36																			
0,75	24,5																			
1	18,1																			
1,5	12,1																			
2,5	7,41	●																		
4	4,61	●																		
6	3,08	●																		
10	1,83	●																		
16	1,15	●																		
25	0,727	●																		
35	0,524	●																		
50	0,387	●																		
70	0,268	●																		
95	0,193	●																		
120	0,153	●																		
150	0,124	●																		
185	0,0991	●																		
240	0,0754	●																		
300	0,0601	●																		
400	0,047	●																		
500	0,0366	●																		
630	0,0283	●																		
800	0,0221																			
1000	0,0176																			
1200	0,0151																			
1400	0,0129																			
1600	0,0113																			
1800	0,0101																			
2000	0,009																			
2500	0,0072																			

For all products covered by this PEP, weight (kg/km) of each product & number of active conductors* in the cable are mentioned in the technical datasheet, which can be obtained from the Nexans website.

*Number of active conductors = total number of conductors - neutral conductor (if applicable). If there is no neutral conductor in the cable, the number of active conductors = total number of conductors. The technical datasheet mentions if there is a neutral or not in a given cable.