epd-norge
Global program operatør

Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

PFXP 3G2,5 Antitwin

onninen
Elektroskandia Norge
TECCON

The Norwegian EPD Foundation

Owner of the declaration:
Elektroskandia Norge AS

Product:
PFXP 3G2,5 Antitwin

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-4690-3916-EN

Registration number:
NEPD-4690-3916-EN

Issue date:
11.07.2023

Valid to:
11.07.2028

EPD Software:
LCA.no EPD generator ID: 67274

General information

Product

PFXP 3G2,5 Antitwin

Owner of the declaration:

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Program operator:

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The Norwegian EPD Foundation
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Manufacturer:

TECCON Norge AS

Declaration number:

NEPD-4690-3916-EN

Place of production:

TECCON Norge AS
Mekjarvik 18
4072 Randaberg, Norway

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 14001, ISO 9001

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:

977 454 700

Declared unit:

1 m PFXP 3G2,5 Antitwin

Issue date:

11.07.2023

Declared unit with option:

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

Valid to:

11.07.2028

Year of study:

Functional unit:

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: Jan Vestergaard, Teccon Norge AS

Reviewer of company-specific input data and EPD: Helge Aardal, Teccon Norge AS

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:

Vito D'Incognito - Take Care International

(no signature required)

Approved:

Håkon Hauan
Managing Director of EPD-Norway

Product

Product description:

PFXP LX 90 building wire to be used for indoor installations, non protected, installed in trunk or pipe on wall, sealing or in deck. Outdoor installed - mechanical protection is required.
Current rating shall be based on maximum 70° ambient temperature.
Packaging solution result in a "Non spinning" outlook.

Product specification

General: Factory Standard

Materials	kg	%
Plastic - Polyvinyl chloride (PVC)	0,10	60,99
Metal - Copper	0,06	39,01
Total	0,16	

Packaging	kg	%
Packaging - Cardboard	1,55	100,00
Total incl. packaging	1,71	

Technical data:

Construction standards Factory Standard
Conductor Rigid bare copper EN60228 class 1
Insulation - conductor XLPE
Conductor marking Colored acc. Cenelec
Conductor laying Twisted
Bedding PVC
Jacket PVC - lead free White
Marking PFXP LX 500V + Meter marking
Voltage - nominal Uo/U 300/500V
Voltage - test 2000V
Max Conductor temperature operation 90°
Max temperature at Short circuit 5s max 250°
Resistance insulation 1000M?*Km
Resistant to fire performance EN 50265-2-1; EN 60332-1-2
CPR EN 50575 compliance Eca
DoP DOP-0015/20
Temperature - operation -30 to + 70oC
Temperature - installation -5 to + 700C
Bending radius 5 x D

Market:

Nordic

Reference service life, product

30Y+

Reference service life, building or construction works

30Y+

LCA: Calculation rules

Declared unit:

1 m PFXP 3G2,5 Antitwin

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.

All major materials have been included. Substance representing <1% have not been included. This include folio film for packaging!

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. The allocation is made in accordance with the guidelines given in EN 15804.
Raw material - Information derived from manufactory and from a LCA generator
Processing: Derived from actual measurements during production of the individual units/stages

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.
Data from material supplier and the LCA generator has been accepted "As-Is"
Data from processing TECCON in-house has been repeated ongoingly without major deviations. Figures given in document are worst case values.

Materials	Source	Data quality	Year
Metal - Copper	ecoinvent 3.6	Database	2019
Packaging - Cardboard	ecoinvent 3.6	Database	2019
Plastic - Polyvinyl chloride (PVC)	ecoinvent 3.6	Database	2019

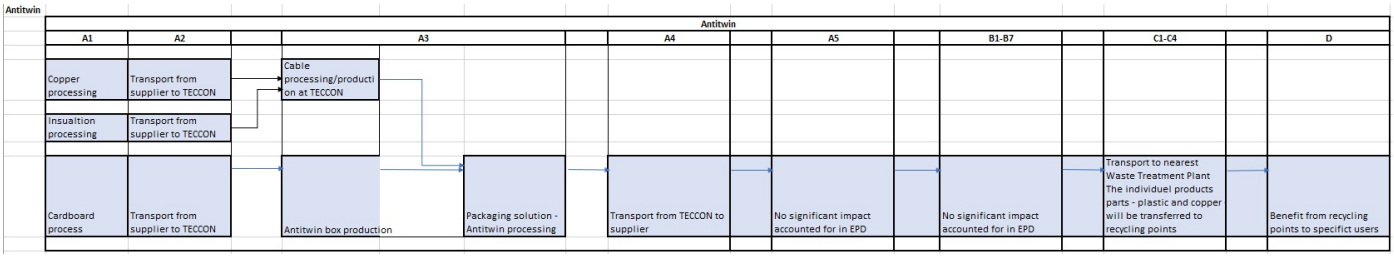
System boundaries (X=included, MND=module not declared, MNR=module not relevant)

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:

Cradle to Gate.
The following stages have been declared: A1-A4

The flowchart below illustrates the system boundaries of the analysis:



Additional technical information:

Article 1010423 Antitwin PFXP 3G2,5 represent the maximum energy consumption from the product family below - from a production volume perspective as follow:
Antitwin® PFXP 3G1,5mm² 1010204
Antitwin® PFXP 4G1,5mm² 1010206
Antitwin® PFXP 5G1,5mm² 1010208
Antitwin® PFXP 3G2,5mm² 1010210
Antitwin® PFXP 4G2,5mm² 1010212
Antitwin® PFXP 5G2,5mm² 1010214

LCA: Scenarios and additional technical information

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

Module A4 = In A4, a transport distance from the production site to Elektroskandia's warehouse in Langhus was included. A distance of 300 km was also added as additional transport to market.

Modules A5 = 2 % product losses during installation are estimated by the company. No energy use has been quantified since installation in buildings is often done by manual labour. Use of portable electrical devices (e.g., drill) usually have low energy requirements falling under the cut-off criterion of 1%.

Module C1 = de-construction in buildings is often done by manual labour. Use of portable electrical devices (e.g., drill) usually have low energy requirements falling under the cut-off criterion of 1%.

Module C2 = 85 km is added as default transport to waste treatment in C2.

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 plastics 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)
Truck, 16-32 tonnes, EURO 6 (kgkm) - RER	36,7 %	988	0,043	l/tkm	42,48

Assembly (A5)	Unit	Value			
	kg/DU	1,55			
Product loss during installation (percentage of cable)	Units/DU	0,02			
Waste, cardboard and paper, to average treatment - A5 including transport (kg)	kg	1,55			

Waste processing (C3)	Unit	Value			
Aluminium to recycling (kg)	kg/DU	0,06			
Copper to recycling (kg)	kg	0,04			
Waste treatment of polyvinylchloride (PVC), incineration with energy recovery and fly ash extraction (kg)	kg	0,05			
Waste treatment of polyvinylchloride (PVC), incineration with energy recovery and fly ash extraction (kg)	kg/DU	0,10			

Disposal (C4)	Unit	Value			
Landfilling of aluminium (kg)	kg/DU	0,01			
Landfilling of ashes from incineration of Polyvinylchloride (PVC), process per kg ashes and residues (kg)	kg	0,02			
Landfilling of ashes from incineration of Polyvinylchloride (PVC), process per kg ashes and residues (kg)	kg/DU	0,02			
Landfilling of copper (kg)	kg	0,02			
Landfilling of plastic mixture (kg)	kg	0,05			

Benefits and loads beyond the system boundaries (D)	Unit	Value			
Substitution of electricity, in Norway (MJ)	MJ	0,15			
Substitution of electricity, in Norway (MJ)	MJ/DU	1,56			
Substitution of primary copper with net scrap (kg)	kg	0,02			
Substitution of primary copper with net scrap (kg)	kg/DU	0,04			
Substitution of thermal energy, district heating, in Norway (MJ)	MJ	2,24			
Substitution of thermal energy, district heating, in Norway (MJ)	MJ/DU	16,45			

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	2,77E-01	2,84E-01	6,95E+01	3,08E-02	4,10E+00	0	0	2,91E-01	1,51E-02	-2,75E-01
	GWP-fossil	kg CO_2 -eq	2,85E+00	2,84E-01	6,94E+01	3,08E-02	1,51E+00	0	0	2,90E-01	1,51E-02	-2,70E-01
	GWP-biogenic	kg CO_2 -eq	-2,58E+00	1,17E-04	9,82E-02	1,28E-05	2,59E+00	0	0	1,18E-04	4,91E-06	-1,04E-03
	GWP-luluc	kg CO_2 -eq	4,74E-03	1,01E-04	5,88E-02	1,10E-05	1,29E-03	0	0	2,27E-05	1,39E-06	-3,91E-03
	ODP	kg CFC11 -eq	3,34E-07	6,43E-08	1,31E-05	6,98E-09	2,81E-07	0	0	9,54E-09	8,63E-10	-7,89E-03
	AP	mol H+ -eq	6,94E-02	8,16E-04	6,43E-01	8,86E-05	1,45E-02	0	0	1,68E-04	3,24E-05	-2,75E-02
	EP-FreshWater	kg P -eq	7,06E-04	2,27E-06	7,67E-04	2,46E-07	3,00E-05	0	0	8,55E-07	1,43E-07	-1,89E-04
	EP-Marine	kg N -eq	4,39E-03	1,61E-04	9,02E-02	1,75E-05	2,02E-03	0	0	4,10E-05	1,56E-05	-1,39E-03
	EP-Terrestial	mol N -eq	5,42E-02	1,81E-03	1,00E+00	1,96E-04	2,22E-02	0	0	4,40E-04	1,13E-04	-2,01E-02
	POCP	kg NMVOC -eq	1,56E-02	6,92E-04	3,09E-01	7,51E-05	6,79E-03	0	0	1,24E-04	3,20E-05	-5,48E-03
	ADP-minerals&metals[1]	kg Sb -eq	1,86E-04	7,84E-06	1,84E-04	8,51E-07	8,81E-06	0	0	6,12E-07	3,57E-08	-1,50E-04
	ADP-fossil[1]	MJ	4,27E+01	4,29E+00	9,70E+02	4,66E-01	2,11E+01	0	0	3,82E-01	7,76E-02	-3,01E+00
	WDP[1]	m^3	2,36E+02	4,15E+00	8,95E+03	4,51E-01	1,85E+02	0	0	7,80E+00	1,31E+00	-1,79E+01

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	2,32E-07	1,74E-08	5,17E-06	1,89E-09	1,12E-07	0	0	1,09E-09	3,69E-10	-1,07E-07
	IRP[2]	kgBq U235 -eq	1,75E-01	1,88E-02	6,85E+00	2,04E-03	1,44E-01	0	0	1,86E-03	4,22E-04	-1,24E-02
	ETP-fw[1]	CTUe	4,98E+02	3,18E+00	7,76E+02	3,45E-01	2,75E+01	0	0	1,83E+01	1,93E+01	-2,53E+02
	HTP-c[1]	CTUh	1,11E-08	0,00E+00	9,12E-08	0,00E+00	2,08E-09	0	0	4,00E-11	9,00E-12	-3,61E-09
	HTP-nc[1]	CTUh	9,14E-07	3,47E-09	4,25E-07	3,77E-10	2,84E-08	0	0	4,31E-09	3,41E-10	-3,04E-07
	SQP[1]	dimensionless	2,48E+02	3,00E+00	5,47E+02	3,26E-01	1,65E+01	0	0	1,39E-01	2,43E-01	-1,35E+01

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	3,15E+00	6,14E-02	1,37E+02	6,67E-03	2,82E+00	0	0	4,88E-02	6,99E-03	-1,07E+01
	PERM	MJ	4,24E+01	0,00E+00	0,00E+00	0,00E+00	-4,15E+01	0	0	0,00E+00	0,00E+00	0,00E+00
	PERT	MJ	4,55E+01	6,14E-02	1,37E+02	6,67E-03	-3,87E+01	0	0	4,88E-02	6,99E-03	-1,07E+01
	PENRE	MJ	4,06E+01	4,29E+00	9,78E+02	4,66E-01	2,12E+01	0	0	3,82E-01	7,76E-02	-3,00E+00
	PENRM	MJ	2,18E+00	0,00E+00	0,00E+00	0,00E+00	2,08E-03	0	0	-2,08E+00	0,00E+00	0,00E+00
	PENRT	MJ	4,27E+01	4,29E+00	9,78E+02	4,66E-01	2,12E+01	0	0	-1,70E+00	7,76E-02	-3,00E+00
	SM	kg	4,50E-02	0,00E+00	0,00E+00	0,00E+00	9,04E-04	0	0	0,00E+00	1,60E-04	4,63E-02
	RSF	MJ	2,45E-01	2,20E-03	2,28E+00	2,39E-04	5,10E-02	0	0	8,82E-04	1,64E-04	2,30E-03
	NRSF	MJ	1,17E-01	7,86E-03	1,35E+00	8,53E-04	3,13E-02	0	0	0,00E+00	8,28E-04	-5,59E-01
	FW	m^3	6,32E-02	4,59E-04	2,95E-01	4,98E-05	7,82E-03	0	0	9,14E-03	7,96E-05	-1,94E-02

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	1,70E-02	2,21E-04	6,34E-02	2,40E-05	4,64E-03	0	0	0,00E+00	4,62E-03	-1,89E-03
	NHWD	kg	3,80E-01	2,09E-01	1,78E+00	2,27E-02	1,64E+00	0	0	0,00E+00	1,15E-01	-1,16E-01
	RWD	kg	1,62E-04	2,92E-05	7,01E-03	3,17E-06	1,46E-04	0	0	0,00E+00	2,75E-07	-1,01E-05

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	0,00E+00	0,00E+00	0,00E+00
	MFR	kg	0,00E+00	0,00E+00	7,04E-03	0,00E+00	2,77E+00	0	0	9,27E-02	4,62E-06	-1,81E-03
	MER	kg	0,00E+00	0,00E+00	9,70E-09	0,00E+00	1,11E-01	0	0	1,45E-01	4,01E-06	-2,39E-04
	EEE	MJ	0,00E+00	0,00E+00	1,35E-03	0,00E+00	2,61E-01	0	0	1,48E-01	4,15E-05	-5,85E-04
	EET	MJ	0,00E+00	0,00E+00	2,04E-02	0,00E+00	3,94E+00	0	0	2,24E+00	6,28E-04	-8,85E-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	7,11E-01

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, Estonia (kWh)	ecoinvent 3.6	926,93	g CO2-eq/kWh
Electricity, Norway (kWh)	ecoinvent 3.6	24,33	g CO2-eq/kWh

Dangerous substances

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

Indoor environment

No effect on in-door 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	2,88E+00	2,84E-01	7,73E+01	3,08E-02	1,62E+00	0	0	2,91E-01	1,01E-02	-1,89E-01

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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