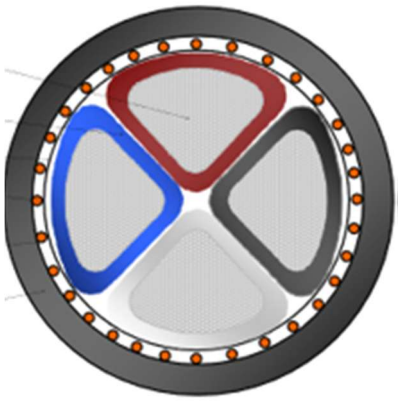
Environmental Product declaration

In accordance with ISO 14025 and EN 15804+A2

AXQJ 6225277 - AXQJ/IFSI AL 4X240/72 1KV



Disclamer: Image may not be identical to declared product but represents the product family

Owner of the declaration:
Cabelte - Cabos Eléctricos. S.A

Product name:
AXQJ 6225277-AXQJ/IFSI AL 4X240/72 1kV

Declared unit:
1 m of installed electrical cables or lines with a specific function. From cradle-to-grave and Module D, with activities needed for the study period of the construction.

Product category /PCR:
NPCR 027 - Part B for Electrical cables and wires. 01.03.2022. EPD Norge; NPCR PART A - Construction products and services. Version: 2.0. 24.03.2021.

Program holder and publisher:
The Norwegian EPD foundation

Declaration number:
NEPD-11246-11191

Registration number:
NEPD-11246-11191

Issue date: 02.06.2025

Valid to: 02.06.2030

EPD software:
Umberto 11.14.1

The Norwegian EPD Foundation

General information

Product:
AXQJ 6225277-AXQJ/IFSI AL 4X240/72 1kV

Program holder:
The Norwegian EPD Foundation
Post Box 5250 Majorstuen. 0303 Oslo. Norway
Phone: +47 23 08 80 00
E-mail: post@epd-norge.no

Declaration Number: NEPD-11246-11191

This declaration is based on Product Category Rules:
NPCR 027 - Part B for Electrical cables and wires. 01.03.2022.
EPD Norge; NPCR PART A - Construction products and services.
Version: 2.0. 24.03.2021. EPD Norge

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

Declared unit:
1 m of installed electrical cables or lines with a specific function. From cradle-to-grave with module D, activities needed for the study period of the construction.

Functional unit:
1 m of installed power cable. used to transmit a reference energy throughput of 1A over a period of 100 years.

Verification:
Independent verification of the declaration and data. according to ISO14025:2010
internal ☐ external ☒

Approved

Arch. Lucas Pedro Berman
(Senda - Environmental and Energy Consulting)
Independent verifier approved by EPD Norway

Owner of the declaration:
Cabelte - Cabos Eléctricos. S.A
Contact person: Manuela Carvalho
Phone: +351 961 870 595

Manufacturer:
Cabelte - Cabos Eléctricos. S.A
Rua de Espírito Santo
4410-420 Arcozelo. Vila Nova de Gaia. Portugal
Phone: +351 961 870 595

Place of production:
[Arcozelo unit: Rua de Espírito Santo
4410-420 Arcozelo. Vila Nova de Gaia. Portugal
Ribeirão unit: Avenida da Indústria. 382
4760-715 Ribeirão. Vila Nova de Famalicão. Portugal]

Management system:
ISO 9001
ISO 14001
ISO 45001

Organisation no:
[123456789MVA fill in]

Issue date:
02.06.2025

Valid to:
02.06.2030

Year of study:
[xxxx]

Comparability:
EPDs from other programmes than EPD Norge may not be comparable.

The EPD has been worked out by:
Cabelte - Cabos Eléctricos. S.A

Approved:

Håkon Hauan
Managing Director of EPD-Norway

Product

Product description:

AXQJ 6225277-AXQJ/IFSI AL 4X240/72 1kV
Low voltage power cable

Aluminium conductors

CPC Product's code 46310 (Insulated wire and cable; optical fibre cables)

Product specification:

Aluminium conductors
XLPE insulation
LSZH inner covering
Copper wire concentric conductor
LSZH outer sheath
Rated voltage: 0.6 / 1 (1.2) kV

Materials		Quantity (kg/km)	Quantity (%)
FIO MAQ.Al.9.50mm -Tipo H12	Aluminium	2655.12	58%
XLPE BT 101 BK WANMA	Polyethylene	296.37	6%
LDPE NATURAL	Polyethylene	161.168	4%
FIO MAQ. Cu 8mm DIAM.	Copper	626.32	14%
HFFR REVIL GM 09	Polypropylene	731.06	16%
Total with exclusions		4470.00	98%
Total without exclusions		4584.00	100%
Final product (cable) (kg/km)		4445.69	
Packaging (reels)	Wood	557.00	

Market:

Norway

Study period:

100 years

LCA: Calculation rules

Declared unit:

1 m of installed electrical cables or lines with a specific function. From cradle-to-grave with module D, activities needed for the study period of the construction.

Cut-off criteria:

Were followed the PCRs indications
No relevant material or energy flows were excluded

Allocation:

Allocation rules based on physical relations were used to determine the consumption of electricity and natural gas of the aluminium wire production and to determine the wastes generated in production module.

Data quality:

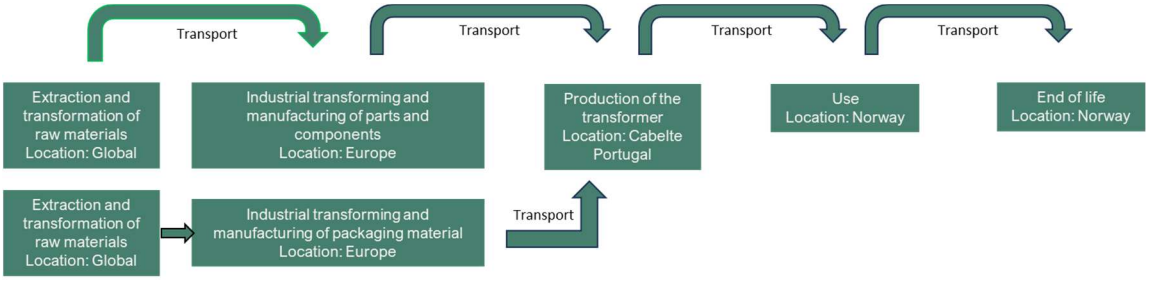
The highest quality feasible data was used. priority was given to primary activity data. a commercial database recognised and used

worldwide was selected and an effort was made to ensure that the values were as appropriate and representative as possible. It was therefore concluded that the quality of the data is high overall.

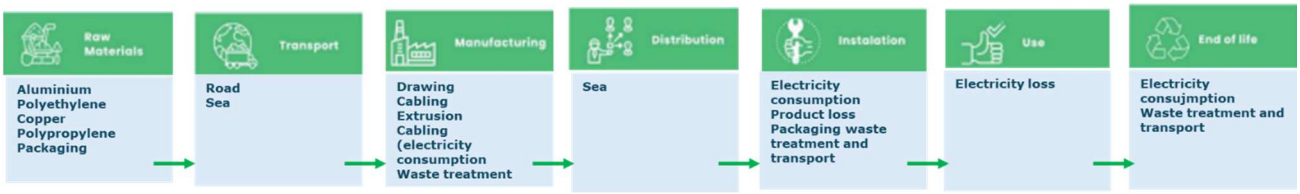
Materials	Source	Data quality	Year
FIO MAQ.Al.9.50mm -Tipo H12	Ecoinvent 3.10	Database	2023
XLPE BT 101 BK WANMA	Ecoinvent 3.10	Database	2023
LDPE NATURAL	Ecoinvent 3.10	Database	2023
FIO MAQ. Cu 8mm DIAM.	Ecoinvent 3.10	Database	2023
HFFR REVIL GM 09	Ecoinvent 3.10	Database	2023

System boundary:

All life cycle stages are to be included. is a cradle to grave study.



Schematic representation of the life cycle of the products under study with geographic location



Schematic representation of the life cycle of the products under study with main environmental factors

Additional technical information:
The reference product AXQJ 6225277-AXQJ/IFSI AL 4X240/72 1kV represents the entire product family based on the highest material consumption.
Other references of the same family:
AXQJ 6225266
AXQJ 6225268
AXQJ 6225269
AXQJ 6225270
AXQJ 6225271
AXQJ 6225273
AXQJ 6225275

LCA: Scenarios and additional technical information

The following information describes the scenarios and technical information in the different modules of the EPD.

Stages	Description	Data sources and additional information
Upstream **(A1)** Production (extraction. treatment. transformation. etc.) of raw materials	This process takes place globally	The composition of each raw material and component of the product derives from the ERP software. From there. given the difficulty to obtain information from the suppliers along the upstream chain. we resorted to the use of commercial database. taking into account the data availability at Ecoinvent data base.

Upstream **(A1)** Production of finished product packaging. including packaging for distribution in the reference market segment	Similar to what was described in the previous point	Machine wire aluminium is produced in the Ribeirão Cabelte's unit and then it's considered a component for the production of the cables. Similar to what was described in the previous point

Stages	Description	Data sources and additional information
Upstream **(A2)** Transport of raw materials and semi-finished products along the entire supply chain	The environmental impact indicators associated with the transport of raw materials for the manufacture of raw materials and components to direct suppliers (tier 1) are included in their manufacturing process.	The impacts associated with the transport from direct suppliers (tier 1) to Cabelte were determined taking into account the amount of materials and the distance between the suppliers and Cabelte. Ecoinvent's market activities (include transport along the upstream chain). Ecoinvent's market activities (include transport to costumer)

Stages	Description	Data sources and additional information
Core **(A3)** Production of the cables	This activity takes place at Cabelte Portugal	Primary data was used. Physical allocation rules were used to determine the energy (natural gas and electricity) consumption and the waste production of the aluminium wire manufacturing. For the production of the cables. was considered the electricity consumption (through equipment's technical data was determined the electricity consumption and through the velocity of the machines was determined the time required). To determine the waste generated by the cable's production a physical allocation rule was used. Electricity production. photovoltaic. 570 kWp open ground installation. multi-SI PT The GWP is 0.017 kg CO2e/kWh (Cabelte has warranties of origin. all the energy comes from renewable resources and the photovoltaic energy has the highest contribution).

Stages	Description	Data sources and additional information
Distribution **(A4)** Cable's distribution	This process consists in the transportation of the cable from Cabelte Portugal to installation site of the country of destiny (Norway)	Sea transportation The distance between Portugal and Norway was determined *Transport. freight. sea. container ship. heavy fuel oil GLO* was used to model the sea transportation The type of vehicle is a container ship The fuel consumed is heavy fuel oil The distance is 2557.61 km *Transport. freight. lorry > 32 metric ton. EURO 4. RER* was used to model the road transportation The type of vehicle is a lorry The fuel consumed is diesel The distance is 737 km

Stages	Description	Data sources and additional information
Installation **(A5)** Installation stage	In this process are used mainly manual tools.	The impacts of installation are related to the waste resulting from the packaging of the product. from the product's loss (5%) and from the energy consumption. Electricity. low voltage. residual mix. NO was used to model electricity consumption. The GWP is 598.61 g CO2e/kWh Product loss (5%): 222.3 kg Electricity consumption: 53 kWh

Stages	Description	Data sources and additional information
Use **(B1)** Use and maintenance stage	This product was projected and manufactured in a way that no preventive maintenance is expected.	Study period: 100 years Electricity. low voltage. residual mix. NO was used to model electricity consumption.

Stages	Description	Data sources and additional information
	No scheduled interventions for maintenance are expected. The cable dissipates energy due to the Joule effect according to the formula: $E_{use}\ [\frac{J}{km}] = R_{linear} * I^2 * RSL$ Where: Euse is the energy dissipated by the cable during its operating time. • Rlinear is the linear resistivity of the cable. expressed in Ω/km • I2 is the current. expressed in A • RSL is the reference service life of the product	The GWP is 598.61 g CO2e/kWh Rlinear: 2.57E-02 Ω/km I: 1A Electricity consumption (loss): 9 kWh

Stages	Description	Data sources and additional information
Deinstallation **(C1)**	In this process are used mainly manual tools.	The impacts of deinstallation are related to the energy consumption. Electricity. low voltage. residual mix. NO was used to model electricity consumption. The GWP is 598.61 g CO2e/kWh.

Stages	Description	Data sources and additional information
EoL **(C2-C4)** End of life	The end of life took into account EN50693_2019. table G.4	The waste management operations and the waste transport were considered Total mass (kg) / Material recovery (kg) / Material recovery rate (%) 4445.69 / 2367.62 / 53% Total mass (kg) / Energy recovery (kg) / Energy recovery rate (%) 4445.69 / 518.35 / 12% Waste transportation: *Transport. freight. lorry. all sizes. EURO4 to generic market for transport. freight. lorry. unspecified (RER Europe)* was used to model waste transportation to waste processing Distance estimated to waste processing: 100 km

Stages	Description	Data sources and additional information
D Benefits and loads	In module D the net impacts are calculated by adding the impacts connected to the recycling or recovery processes from beyond the system boundary (after the end-of waste state) up to the point of functional equivalence where the secondary material or energy	The end-of-life boundary of the construction product system is set where outputs of the system under study have reached the end-of-waste state. The recyclability of metals allows a credit that is produced at the end of a products life. The benefits and loads are described in EN 15804:2012+A2:2019.

Stages	Description		
D Benefits and loads	MR in	16.46	Aluminium scrap (materials)
	MR out	1848.46	Aluminium to recycle (EoL)
	MR in	29.21	Copper scrap (materials)
	MR out	373.74	Copper to recycle (EoL)

Y*(MMRin-MMRout) (Aluminium)=	1*(16.46-1848.46)	-1832
Y*(MMRin-MMRout) (Copper) =	1*29.21-373.74)	-344.54

Benefits	Not using primary aluminium and copper Substitution of primary aluminium and copper

Loads	Recycling the aluminium and the copper

System boundaries (X=icluded. MND=module not declared. MNR=module not relevant)

Product stage			Assembly stage		Use stage							End of life stage				Beyond 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	x	x	x	x	x	x	x	x	x	x	x	x

LCA: Results

Environmental impact

Parameter	Unit	A1-A3	A4	A5	B1-B5	B6	B7	C1	C2	C3	C4	D
GWP Total	kg CO2 -eq.	9.57E+00	1.05E-01	2.69E-01	0.00E+00	3.85E-03	0.00E+00	8.88E-03	1.28E-02	1.26E+00	3.72E-03	-1.51E+01
GWP Biogenic	kg CO2-Eq	-1.82E-01	2.91E-05	1.99E-01	0.00E+00	1.09E-06	0.00E+00	2.50E-06	7.08E-06	2.07E-03	-1.91E-02	7.69E-02
GWP-luluc	kg CO2-Eq	1.23E-01	4.20E-05	1.79E-05	0.00E+00	5.19E-07	0.00E+00	1.20E-06	4.35E-06	3.49E-04	8.30E-06	-1.68E-03
GWP-fossil	kg CO2-Eq	9.63E+00	1.05E-01	6.97E-02	0.00E+00	3.84E-03	0.00E+00	8.87E-03	1.28E-02	1.26E+00	2.28E-02	-1.52E+01
HTP-c	CTUh	5.09E-08	5.69E-10	1.14E-10	0.00E+00	5.08E-12	0.00E+00	1.17E-11	7.76E-11	1.32E-09	5.85E-11	-1.99E-08
HTP-nc	CTUh	1.17E-06	9.92E-10	9.41E-10	0.00E+00	5.14E-11	0.00E+00	1.19E-10	1.51E-10	1.25E-08	5.97E-08	-1.50E-09
PM	Disease incidences	8.02E-07	7.94E-09	1.40E-09	0.00E+00	4.37E-11	0.00E+00	1.01E-10	1.27E-09	1.88E-08	1.06E-09	-9.40E-07
ODP	kg CFC11-eq.	1.31E-07	1.87E-09	4.46E-10	0.00E+00	6.14E-11	0.00E+00	1.42E-10	2.52E-10	4.81E-09	1.68E-10	-4.71E-08
POCP	kg C2H4 -eq.	5.08E-02	1.19E-03	1.25E-04	0.00E+00	7.80E-06	0.00E+00	1.80E-05	7.84E-05	1.13E-03	6.74E-05	-7.34E-02
IRP	kBq U235-Eq	1.02E+00	1.40E-03	3.20E-03	0.00E+00	8.11E-04	0.00E+00	1.87E-03	2.21E-04	3.20E-02	2.63E-04	-7.77E-01
ETP-fw	CTUe	1.10E+03	1.25E+00	2.17E+00	0.00E+00	1.05E-01	0.00E+00	2.43E-01	1.73E-01	3.96E+01	2.79E+03	-1.91E+03
EP-freshwater	kg P-eq	1.06E-02	5.75E-06	9.21E-06	0.00E+00	1.42E-06	0.00E+00	3.27E-06	8.52E-07	1.25E-04	1.17E-06	-2.53E-02
EP-marine	kg N-eq	1.27E-02	3.54E-04	4.48E-05	0.00E+00	2.51E-06	0.00E+00	5.79E-06	1.86E-05	3.68E-04	1.60E-04	-2.49E-02
EP-terrestrial	mol N -eq	1.46E-01	3.91E-03	4.10E-04	0.00E+00	2.56E-05	0.00E+00	5.90E-05	2.03E-04	3.66E-03	1.98E-04	-2.83E-01
AP	kg SO2 -eq.	1.50E-01	1.29E-03	1.32E-04	0.00E+00	1.18E-05	0.00E+00	2.71E-05	4.97E-05	1.67E-03	5.06E-05	-1.51E-01
ADPE	MJ	1.31E+02	1.41E+00	3.73E-01	0.00E+00	5.78E-02	0.00E+00	1.33E-01	1.82E-01	3.79E+00	1.49E-01	-1.48E+02
ADPM	kg Sb-eq.	1.26E-03	2.23E-07	1.20E-07	0.00E+00	2.62E-08	0.00E+00	6.04E-08	3.46E-08	3.95E-06	2.20E-08	-8.43E-05
SQP	points	6.15E+01	1.03E+00	1.33E-01	0.00E+00	8.32E-03	0.00E+00	1.92E-02	1.83E-01	1.59E+00	2.46E-01	-3.43E+01
WDP	m3 world-Eq deprived	8.96E+00	6.14E-03	4.25E-02	0.00E+00	8.79E-04	0.00E+00	2.03E-03	9.13E-04	7.34E-01	2.49E-03	-1.40E+00

GWP Global warming potential; ODP Depletion potential of the stratospheric ozone layer; POCP Formation potential of tropospheric photochemical oxidants; AP Acidification potential of land and water; EP Eutrophication potential; ADPM Abiotic depletion potential for non fossil resources; ADPE Abiotic depletion potential for fossil resources; Human toxicity potential – cancer effects (HTP-c); Human toxicity potential – non-cancer effects (HTP-nc); Particulate matter emissions potential (PM); Ionizing radiation potential – human health (IRP); Eco-toxicity potential – freshwater (ETP-fw); Soil quality potential (SQP); Water (use) deprivation potential (WDP)

Resource use

Parameter	Unit	A1-A3	A4	A5	B1-B5	B6	B7	C1	C2	C3	C4	D
CEDNR	MJ	1.31E+02	1.41E+00	3.73E-01	0.00E+00	5.78E-02	0.00E+00	1.33E-01	1.82E-01	3.79E+00	1.49E-01	-1.48E+02
CEDR	MJ	3.85E+01	1.89E-02	2.91E-02	0.00E+00	4.96E-03	0.00E+00	1.15E-02	2.88E-03	4.45E-01	3.65E-03	-5.67E+00
SM	kg	8.77E-02	6.30E-04	1.26E-04	0.00E+00	8.17E-06	0.00E+00	1.89E-05	7.86E-05	1.23E-03	7.57E-05	1.89E-01
RSF	MJ	7.04E-02	5.85E-06	5.21E-06	0.00E+00	6.02E-08	0.00E+00	1.39E-07	9.91E-07	1.10E-04	1.31E-06	-6.00E-04
FW	m3	2.13E-01	1.72E-04	9.96E-04	0.00E+00	5.43E-05	0.00E+00	1.25E-04	2.64E-05	1.72E-02	-1.28E-03	-1.48E-02
PENRT	MJ	1.31E+02	1.41E+00	3.73E-01	0.00E+00	5.78E-02	0.00E+00	1.33E-01	1.82E-01	3.79E+00	1.49E-01	-1.48E+02
PENRE	MJ	1.31E+02	1.41E+00	3.73E-01	0.00E+00	5.78E-02	0.00E+00	1.33E-01	1.82E-01	3.79E+00	1.49E-01	-1.48E+02
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	3.85E+01	1.89E-02	2.91E-02	0.00E+00	4.96E-03	0.00E+00	1.15E-02	2.88E-03	4.45E-01	3.65E-03	-5.67E+00
PERE	MJ	3.85E+01	1.89E-02	2.91E-02	0.00E+00	4.96E-03	0.00E+00	1.15E-02	2.88E-03	4.45E-01	3.65E-03	-5.67E+00
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Cumulative Energy Demand. Non-Renewable Sources (CEDNR); Cumulative Energy Demand. Renewable Sources (CEDR); Use of secondary materials (SM); Use of renewable secondary fuels (RSF); Net use of fresh water (FW); Total use of non renewable primary energy (PENRT); Use of non renewable primary energy – Selection; Use of non renewable primary energy as energy carrier (PENRE); Use of non renewable primary energy resources used as raw materials (PENRM); Total use of renewable primary energy (PERT); Use of renewable primary energy – Selection; Use of renewable primary energy as energy carrier (PERE); Use of renewable primary energy resources used as raw materials (PERM)

End of life – Waste and output flow

Parameter	Unit	A1-A3	A4	A5	B1-B5	B6	B7	C1	C2	C3	C4	D
NHWD	kg	4.89E+01	3.65E-02	2.24E-01	0.00E+00	7.12E-03	0.00E+00	1.64E-02	5.30E-03	1.51E+00	2.00E+00	-3.22E+01
HWD	kg	2.29E+00	2.00E-03	1.07E-02	0.00E+00	3.79E-04	0.00E+00	8.76E-04	2.64E-04	1.89E-01	8.18E-04	-3.18E+00
RWD	kg	2.62E-04	3.45E-07	7.88E-07	0.00E+00	2.00E-07	0.00E+00	4.60E-07	5.46E-08	7.94E-06	6.44E-08	-1.85E-04
MFR	kg	7.33E-03	5.80E-05	2.72E-05	0.00E+00	3.88E-06	0.00E+00	8.95E-06	1.38E-06	5.01E-01	2.03E-02	4.01E-02
MER	kg	1.05E-05	5.12E-08	1.84E-08	0.00E+00	9.39E-10	0.00E+00	2.17E-09	7.95E-09	2.80E-07	1.02E-08	2.22E-06
EEE	MJ	1.89E-02	1.69E-04	2.62E-03	0.00E+00	1.08E-03	0.00E+00	2.49E-03	2.73E-05	2.02E-02	2.08E-02	-1.26E-03
EET	MJ	4.18E-02	1.96E-04	1.29E-04	0.00E+00	3.13E-05	0.00E+00	7.21E-05	3.34E-05	6.76E-03	7.40E-03	-2.60E-03
RE	MJ	6.07E-02	3.64E-04	2.75E-03	0.00E+00	1.11E-03	0.00E+00	2.56E-03	6.07E-05	2.69E-02	2.82E-02	-3.86E-03

Non-hazardous waste disposed (NHWD); Hazardous waste disposed (HWD); Medium- and low-level radioactive waste disposed (MLRWD & LLRWD); High-level radioactive waste disposed (HLRWD); Materials for recycling (MFR); Materials for energy recovery (MER); Exported energy. electric (EEE); Exported energy. thermal (EET); Recovered energy (RE)

Biogenic Content

Parameter	Unit	Value
Biogenic carbon content in accompanying packaging	Kg C	2.48E+02
Biogenic carbon content in product	Kg C	0.00E+00

Additional requirements

Dangerous substances

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

Bibliography

LCA Report	LCA Report AXQJ 6225277, May 2025.
ISO 14025:2010	Environmental labels and declarations - Type III environmental declarations - Principles and procedures
ISO 14044:2006	Environmental management - Life cycle assessment - Requirements and guidelines
ISO 14040:2006/Amd 1:2020	Environmental management — Life cycle assessment — Principles and framework
ISO 14044:2006/ Amd 1:2017/ Amd 2:2020	Environmental management — Life cycle assessment — Requirements and guidelines
NPCR 027 - Part B	Electrical cables and wires. 01.03.2022. EPD Norge
NPCR PART A	Construction products and services. Version: 2.0. 24.03.2021. EPD Norge
EN 50693:2019	Product category rules for life cycle assessments of electronic and electrical products and systems
EN 15804:2012+A2:2019/AC:2021	Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products.

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