

ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN50693:2019, EN15804+A2 & ISO 14025

AccuRoll™ Dry Core (DC) Rollable Ribbon Fiber Optic Cable with dielectric Sheath
LIGHTERA LATAM S.A.



EPD HUB, HUB-6610

Published on 07.06.2026, last updated on 07.06.2026, valid until 06.06.2031

Life Cycle Assessment study has been performed in accordance with the requirements of EN 15804, EPD Hub PCR version 1.2 (24 Mar 2025) and JRC characterization factors EF 3.1.

GENERAL INFORMATION

MANUFACTURER

Manufacturer	LIGHTERA LATAM S.A.
Address	Rua Hasdrubal Bellegard, 820 - Cidade Industrial de Curitiba-PR, Brazil, 81460-120
Contact details	lightera@latam.lightera.com
Website	https://lightera.com/pt-br/

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EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 50693:2019, EN 15804:2012+A2:2019 and ISO 14025
PCR	EPD Hub Core PCR Version 1.2, 24 Mar 2025
Sector	Manufactured product
Category of EPD	Sister EPD
Parent EPD number	HUB-6136
Scope of the EPD	Cradle to gate with options, A4-A5, B6 and modules C1-C4, D
EPD author	Arthur Demarco Neto from LIGHTERA
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☒ External verification
EPD verifier	Vera Durão, as an authorised verifier acting for EPD Hub Limited

PRODUCT

Product name	AccuRoll™ Dry Core (DC) Rollable Ribbon Fiber Optic Cable with dielectric Sheath
Additional labels	-
Product reference	Products under ET05471 or descriptions AT-3GE8Y3X-NNN1
Place(s) of raw material origin	China, USA, Brazil, Japan, Europe, Korea
Place of production	Curitiba, Brazil
Place(s) of installation and use	USA
Period for data	01/11/2024 - 31/10/2025
Averaging in EPD	No grouping
Variation in GWP-fossil for A1-A3 (%)	-
GTIN (Global Trade Item Number)	-
NOBB (Norwegian Building Product Database)	-
A1-A3 Specific data (%)	80%

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 meter (1 m) of 288-fiber dielectric sheath optical cable
Declared unit mass	0,139328 kg
Mass of packaging	0,04264 kg
GWP-fossil, A1-A3 (kgCO ₂ e)	1,15
GWP-total, A1-A3 (kgCO ₂ e)	1,06
Secondary material, inputs (%)	1,81
Total energy use, A1-A3 (kWh)	4,4
Net freshwater use, A1-A3 (m ³)	0,01

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Lightera is a global leader in optical fiber and connectivity solutions, bringing together the expertise of Furukawa Electric, OFS, and Furukawa Electric LatAm. For decades, we have driven advancements in optical communications, shaping a more connected and sustainable world. Our legacy includes groundbreaking innovations in fiber optics, from the earliest fiber cables to state-of-the-art network solutions. As part of Furukawa Electric's 140-year tradition of excellence, we combine world-class technology with local expertise to deliver solutions that empower communities and businesses. Sustainability is at the core of our strategy, guiding our efforts to minimize environmental impact and promote circularity. We prioritize the UN Sustainable Development Goals most aligned with our vision, implementing initiatives that reduce carbon emissions, optimize energy efficiency, and conserve natural resources throughout the product life cycle. At Lightera, we are committed to building brighter, more connected communities while driving progress for people and the planet through innovative optical technologies.

PRODUCT DESCRIPTION

The AccuRoll DC RR Cable features a dry central core tube containing gel-free, water-blocking tape and up to 36 numbered rollable ribbon units—either 12-fiber ribbons (12 to 288 fibers). This design offers superior ribbon protection compared to other flexible ribbon cables. Surrounding the core is an additional water-blocking tape layer. The cable is finished with a robust polyethylene (PE) jacket that incorporates dielectric strength members for structural integrity. Ripcords are placed beneath the jacket to ensure quick and easy access during installation.

Further information can be found at:
<https://lightera.com/pt-br/>

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	0	-
Minerals	31,97	Asia, North America, Brazil, EU
Fossil materials	68,03	Asia, North America, Brazil, EU
Bio-based materials	0	-

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	0,037

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 meter (1 m) of 288-fiber dielectric sheath optical cable
Mass per declared unit	0,139328 kg
Functional unit	One optical fiber used to transmit communication signals on 1m at the wavelength of 1310 nm and 1550nm, for 20 years and at a rate of use of 100.0% in accordance with the standards in force on product spec sheet and as defined in PSR-0001-ed4-EN2022 11 16.
Reference service life	20 years

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	ND	ND	ND	ND	ND	x	ND	ND	x	x	x	x		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/ demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Not declared = ND.

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. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

A market-based approach is used in modelling the electricity mix utilized in the factory. The environmental impacts assessed during the product stage include the production of raw materials, packaging components, and other supplementary materials. This stage also accounts for the fuels consumed by fork-lifts and the management of waste generated throughout the manufacturing processes at production sites.

The cable manufactured at the Curitiba facility uses A1 raw materials sourced from Asia, Europe, the United States, and Brazil, including optical fibers, polymers, aramid, glass yarns, and strength members. These inputs follow international sea routes or national road transport, contributing to the weighted average distances in A2 logistics. Upon arrival, materials undergo a standard fiber-optic cable manufacturing sequence involving buffering, loose-tube formation, application of water-blocking components, core stranding, and extrusion of sheaths and jacketing. Process losses from these A3 steps are sent to landfill.

Production at the Curitiba plant is powered by electricity sourced through I-REC certified renewable energy. Final packaging uses wooden reels wrapped with polionda to protect the product during handling, storage, and transport. The use of green energy in manufacturing is demonstrated through contractual instruments RECs and its use is ensured throughout the validity period of this EPD. Market based approach was used for electricity modelling

All the products are manufactured in Brazil and reference year for the collected data is 2025.

Process includes inputs and outputs related to production (extraction, treatment, transformation) and transportation of raw materials necessary to manufacture the optical fiber cables.

To form the rollable ribbons, 250 μm optical fibers are partially bonded to each other at intermittent points.

Loose buffer tube construction consists of rollable ribbon fibers bundled together and enclosed within a protective plastic tube, together with a water blocking element. The tube is then sent to the jacketing line, where dielectric strength members are added and a thermoplastic polyethylene sheath is extruded as final protection. Cables are tested and packaged using wooden reels and plastic covers. Once packaged, the fiber optic cables are shipped to customers.

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. 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.

The cable's primary end-use market is the United States, and therefore an average shipping distance of 10,430 km plus distances from factory to the ports by lorry has been considered for A4 transport. Packaging consists of a wooden reel and a protective polionda (polypropylene) plastic film.

At the end of life (A5), disposal routes for plastic packaging follow global averages reported by Geyer et al. (2017): 79% of plastic packaging is landfilled, 12% is incinerated, and 9% is recycled (Geyer et al., 2017. Production, use, and fate of all plastics ever made).

Wooden reels follow global wood-use disposal patterns, with approximately 15% of wood packaging entering recycling streams, based on <https://www.businesswaste.co.uk/your-waste/waste-wood-collection/wood-recycling-facts-and-statistics/> and 85% landfilling.

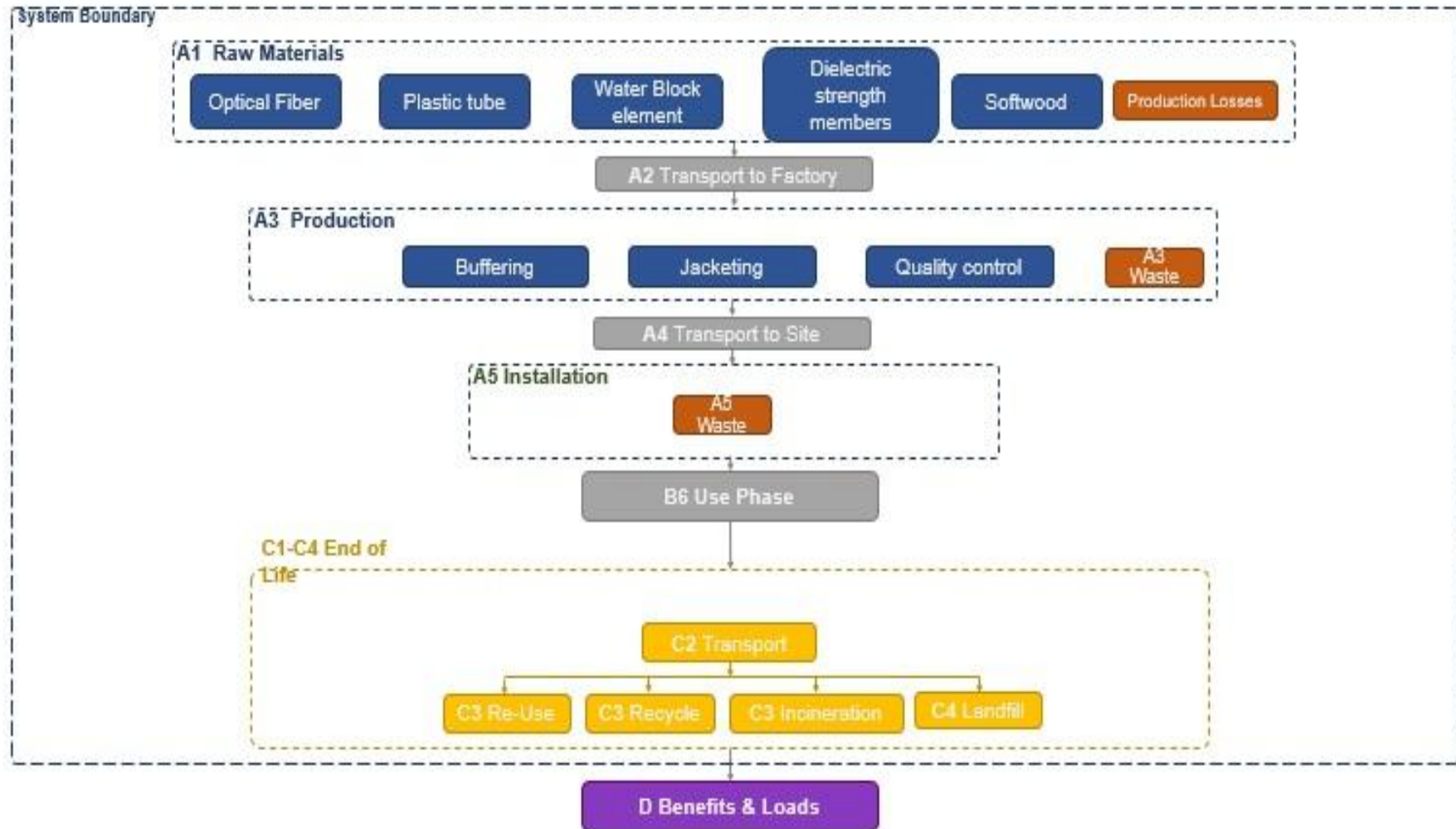
PRODUCT USE AND MAINTENANCE (B1-B7)

No cleaning, servicing, repairs, or refurbishment were considered. Energy use during operation, were applied to stage B6, and was represented as use-phase losses based on the IEC 61156-5 standard. The loss values for OS2 fiber category was followed the 10GBASE-LR protocol. Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

At end of life, the cable is disassembled and transported to a waste-treatment facility. The optical fiber is assumed to be 100% landfilled. Plastic materials follow the global disposal distribution from Geyer et al. (2017), Production, Use, and Fate of All Plastics Ever Made, with 25% landfilled, 50% incinerated with energy recovery, and 25% incinerated without energy recovery; Module D quantifies the net benefits and loads associated with material recovery from A5 and C3. Recovered steel is modeled with both a recycling load and a recycling benefit. Plastic fractions contribute Module D benefits through avoided production of virgin polyethylene (HDPE/LDPE) and through exported heat and electricity from incineration. Wood packaging contributes additional credits through recycling and energy recovery according to global end-of-life wood management scenarios.

SYSTEM DIAGRAM



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.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded.

No process were excluded

VALIDATION OF DATA

Data collection for production, transport, and packaging was conducted using time and site-specific information, as defined in the general information section on page 1 and 2. Upstream process calculations rely on generic data as defined in the Bibliography section. Manufacturer-provided specific and generic data were used for the product's manufacturing stage. The analysis was performed in One Click LCA EPD Generator, with the 'Cut-Off, EN 15804+A2' allocation method, and characterization factors according to EN 15804:2012+A2:2019/AC:2021 and JRC EF 3.1.

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	No allocation
Packaging material	No allocation
Ancillary materials	No allocation
Manufacturing energy and waste	Allocated by mass or volume

The energy consumption reported in Module A3 is based on measured, facility specific data. We extracted from internal databases the total energy used by the Curitiba plant between November 2024 to October 2025, along with the total produced mass in the same period. Using these primary data, we calculated the site's energy intensity (kWh/kg). A simple proportional calculation ("rule of three") was then applied using the cable's mass per meter to determine the energy consumption per meter of the product under study.

For transportation (A2), the purchase mix of each supplier in the last period was considered.

Sporadic air purchases were disregarded.

Maritime segments were calculated based port to port distance.

Distances were considered from the point of supply and not from the point of production. In these items, whenever possible, it is prudent to use the "Market" resource, which includes transportation segments.

Selection of raw materials is based on available EPDs.

PRODUCT & MANUFACTURING SITES GROUPING

Type of grouping	No grouping
Grouping method	Not applicable
Variation in GWP-fossil for A1-A3, %	-

The selected configurations represent the most commercially relevant products within the declared product family, covering the lower, intermediate and upper range of fiber counts. Together with the scaling table in Annex I, they ensure full representativeness of the product portfolio covered by this EPD

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator for EPD Hub V3 and EPD Process Certification v3.2.5. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.10.1/3.11/3.12 and One Click LCA databases as sources of environmental data. Allocation used in Ecoinvent 3.10.1/3.11/3.12 environmental data sources follow the methodology 'allocation, Cut-off, EN 15804+A2'.

This EPD has been created using One Click LCA EPD Generator for EPD Hub V3 and EPD Process Certification v3.2.3. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.10.1/3.11 and One Click LCA databases as sources of environmental data. Allocation used in Ecoinvent 3.10.1/3.11 environmental data sources follow the methodology 'allocation, Cut-off, EN 15804+A2'.

Other references used:

PCR-ed4-EN-2021 09 06-Product Category Rules for Electrical, Electronic and HVAC-R Products

PSR-0001-ed4-EN-2022 11 16 Specific Rules for Wires, Cables and Accessories

BusinessWaste. (n.d.). Wood recycling facts and statistics. Retrieved March 5, 2026, from <https://www.businesswaste.co.uk/your-waste/waste-wood-collection/wood-recycling-facts-and-statistics/>

Geyer et al., 2017. Production, use, and fate of all plastics ever made

ENVIRONMENTAL IMPACT DATA

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

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	1,14E+00	2,56E-02	-1,11E-01	1,06E+00	3,60E-02	1,96E-01	ND	ND	ND	ND	ND	1,53E-03	ND	0,00E+00	6,63E-04	1,17E-01	6,88E-02	-5,35E-02
GWP – fossil	kg CO ₂ e	1,10E+00	2,56E-02	2,28E-02	1,15E+00	3,60E-02	6,19E-02	ND	ND	ND	ND	ND	1,44E-03	ND	0,00E+00	6,63E-04	1,17E-01	6,88E-02	-4,44E-02
GWP – biogenic	kg CO ₂ e	3,87E-02	4,40E-06	-1,34E-01	-9,51E-02	6,72E-06	1,34E-01	ND	ND	ND	ND	ND	5,30E-05	ND	0,00E+00	1,40E-07	-6,89E-06	-7,96E-06	-9,04E-03
GWP – LULUC	kg CO ₂ e	1,08E-03	1,38E-05	6,06E-05	1,15E-03	1,80E-05	6,00E-05	ND	ND	ND	ND	ND	3,78E-05	ND	0,00E+00	2,70E-07	9,03E-07	9,90E-07	-5,49E-05
Ozone depletion pot.	kg CFC-11e	7,25E-08	3,72E-10	1,01E-09	7,38E-08	5,24E-10	3,75E-09	ND	ND	ND	ND	ND	4,15E-11	ND	0,00E+00	1,10E-11	4,30E-11	4,29E-11	-2,00E-10
Acidification potential	mol H ⁺ e	3,46E-03	4,85E-04	1,07E-04	4,05E-03	6,09E-04	2,42E-04	ND	ND	ND	ND	ND	1,23E-05	ND	0,00E+00	2,16E-06	2,66E-05	2,01E-05	-2,82E-04
EP-freshwater ²⁾	kg Pe	7,40E-04	1,28E-06	5,37E-06	7,47E-04	1,91E-06	3,79E-05	ND	ND	ND	ND	ND	3,92E-07	ND	0,00E+00	4,85E-08	3,64E-07	2,80E-07	-1,63E-05
EP-marine	kg Ne	9,20E-04	1,23E-04	2,90E-05	1,07E-03	1,51E-04	8,83E-05	ND	ND	ND	ND	ND	1,20E-06	ND	0,00E+00	7,13E-07	1,51E-05	1,08E-04	-4,48E-05
EP-terrestrial	mol Ne	6,86E-03	1,36E-03	2,59E-04	8,48E-03	1,67E-03	5,40E-04	ND	ND	ND	ND	ND	1,29E-05	ND	0,00E+00	7,76E-06	1,29E-04	9,30E-05	-4,62E-04
POCP (“smog”) ³⁾	kg NMVOCe	3,91E-03	3,86E-04	1,02E-04	4,40E-03	4,81E-04	2,57E-04	ND	ND	ND	ND	ND	4,75E-06	ND	0,00E+00	3,19E-06	3,24E-05	2,63E-05	-1,37E-04
ADP-minerals & metals ⁴⁾	kg Sbe	5,52E-06	4,47E-08	2,56E-07	5,82E-06	7,42E-08	2,99E-07	ND	ND	ND	ND	ND	2,43E-08	ND	0,00E+00	2,12E-09	8,37E-09	6,29E-09	-2,86E-08
ADP-fossil resources	MJ	1,72E+01	3,35E-01	3,79E-01	1,79E+01	4,70E-01	9,47E-01	ND	ND	ND	ND	ND	1,78E-02	ND	0,00E+00	9,35E-03	2,27E-02	2,90E-02	-4,84E-01
Water use ⁵⁾	m ³ e depr.	4,06E-01	1,24E-03	6,23E-03	4,14E-01	1,75E-03	2,10E-02	ND	ND	ND	ND	ND	1,90E-03	ND	0,00E+00	4,49E-05	7,68E-03	4,31E-03	-7,09E-03

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	2,51E-08	1,41E-09	1,28E-09	2,78E-08	1,81E-09	1,69E-09	ND	ND	ND	ND	ND	8,67E-11	ND	0,00E+00	5,45E-11	1,37E-10	1,95E-10	-4,08E-09
Ionizing radiation ⁶⁾	kBq 11235e	1,50E-01	2,10E-04	1,23E-03	1,52E-01	2,97E-04	7,65E-03	ND	ND	ND	ND	ND	9,65E-06	ND	0,00E+00	9,43E-06	4,10E-05	3,94E-05	-3,53E-03
Ecotoxicity (freshwater)	CTUe	3,20E+01	3,61E-02	4,22E-01	3,25E+01	5,44E-02	1,66E+00	ND	ND	ND	ND	ND	4,23E-03	ND	0,00E+00	1,35E-03	2,29E-01	2,90E-01	-9,65E-02
Human toxicity, cancer	CTUh	1,67E-10	4,95E-12	1,01E-11	1,82E-10	6,89E-12	9,87E-12	ND	ND	ND	ND	ND	5,57E-13	ND	0,00E+00	1,12E-13	9,95E-12	6,06E-12	-7,22E-12
Human tox. non-cancer	CTUh	7,53E-09	1,40E-10	2,81E-10	7,95E-09	2,04E-10	4,38E-10	ND	ND	ND	ND	ND	2,36E-11	ND	0,00E+00	5,90E-12	3,49E-10	2,99E-10	-2,86E-10
SQP ⁷⁾	-	2,84E+00	1,48E-01	1,21E-01	3,11E+00	1,59E-01	2,06E-01	ND	ND	ND	ND	ND	6,36E-03	ND	0,00E+00	6,19E-03	6,40E-03	4,18E-02	-1,83E-01

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. 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; 7) SQP = Land use related impacts/soil quality.

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	1,67E+00	3,45E-03	1,08E+00	2,75E+00	5,05E-03	-4,97E-01	ND	ND	ND	ND	ND	2,33E-02	ND	0,00E+00	1,42E-04	9,33E-04	7,78E-04	-4,87E-03
Renew. PER as material	MJ	0,00E+00	0,00E+00	1,23E+00	1,23E+00	0,00E+00	-1,23E+00	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,50E-02
Total use of renew. PER	MJ	1,67E+00	3,45E-03	2,31E+00	3,98E+00	5,05E-03	-1,73E+00	ND	ND	ND	ND	ND	2,33E-02	ND	0,00E+00	1,42E-04	9,33E-04	7,78E-04	7,01E-02
Non-re. PER as energy	MJ	1,28E+01	3,35E-01	-1,79E-02	1,31E+01	4,70E-01	4,08E-01	ND	ND	ND	ND	ND	1,78E-02	ND	0,00E+00	9,36E-03	-1,76E+00	-2,66E+00	-4,84E-01
Non-re. PER as material	MJ	4,22E+00	0,00E+00	-2,09E-01	4,01E+00	0,00E+00	-7,53E-02	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	-1,97E+00	-1,97E+00	1,60E-02
Total use of non-re. PER	MJ	1,70E+01	3,35E-01	-2,27E-01	1,71E+01	4,70E-01	3,33E-01	ND	ND	ND	ND	ND	1,78E-02	ND	0,00E+00	9,36E-03	-3,72E+00	-4,63E+00	-4,68E-01
Secondary materials	kg	2,53E-03	1,53E-04	3,27E-04	3,01E-03	2,19E-04	1,74E-04	ND	ND	ND	ND	ND	7,00E-06	ND	0,00E+00	4,20E-06	2,07E-05	1,73E-05	-4,79E-05
Renew. secondary fuels	MJ	2,04E-05	1,00E-06	1,34E-06	2,27E-05	1,60E-06	1,40E-06	ND	ND	ND	ND	ND	5,17E-08	ND	0,00E+00	5,33E-08	6,79E-07	4,85E-07	-1,44E-05
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m ³	9,13E-03	3,41E-05	9,76E-05	9,26E-03	4,79E-05	3,09E-04	ND	ND	ND	ND	ND	4,50E-05	ND	0,00E+00	1,27E-06	1,32E-04	-1,72E-04	-1,96E-04

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	4,66E-02	5,00E-04	2,02E-03	4,92E-02	7,22E-04	2,55E-03	ND	ND	ND	ND	ND	1,00E-04	ND	0,00E+00	1,51E-05	2,01E-03	1,14E-03	-3,63E-03
Non-hazardous waste	kg	6,30E+00	8,01E-03	8,78E-02	6,39E+00	1,19E-02	5,19E-01	ND	ND	ND	ND	ND	1,91E-03	ND	0,00E+00	2,95E-04	5,42E-02	3,58E-01	-7,90E-02
Radioactive waste	kg	3,89E-05	5,14E-08	5,91E-07	3,96E-05	7,26E-08	1,99E-06	ND	ND	ND	ND	ND	2,35E-09	ND	0,00E+00	2,33E-09	1,04E-08	9,87E-09	-8,62E-07

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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,00E-03	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy rec	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,00E-03	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	0,00E+00	5,74E-01	0,00E+00
Exported energy – Electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,00E-03	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	0,00E+00	2,41E-01	0,00E+00
Exported energy – Heat	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,00E-03	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	0,00E+00	3,33E-01	0,00E+00

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML

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	1,10E+00	2,54E-02	2,26E-02	1,15E+00	3,58E-02	6,36E-02	ND	ND	ND	ND	ND	1,53E-03	ND	0,00E+00	6,59E-04	1,17E-01	6,86E-02	-4,42E-02
Ozone depletion Pot.	kg CFC ₁₁ e	5,11E-08	2,96E-10	8,31E-10	5,22E-08	4,17E-10	2,66E-09	ND	ND	ND	ND	ND	3,34E-11	ND	0,00E+00	8,73E-12	3,83E-11	3,64E-11	-1,68E-10
Acidification	kg SO ₂ e	2,87E-03	3,86E-04	8,31E-05	3,34E-03	4,87E-04	1,98E-04	ND	ND	ND	ND	ND	1,06E-05	ND	0,00E+00	1,65E-06	1,88E-05	1,44E-05	-2,39E-04
Eutrophication	kg PO ₄ ³ e	7,57E-03	4,57E-05	2,28E-04	7,84E-03	5,74E-05	3,98E-04	ND	ND	ND	ND	ND	7,86E-07	ND	0,00E+00	4,09E-07	6,74E-06	9,15E-06	-2,89E-05
POCP ("smog")	kg C ₂ H ₄ e	2,28E-04	2,01E-05	7,06E-06	2,55E-04	2,56E-05	1,51E-05	ND	ND	ND	ND	ND	5,47E-07	ND	0,00E+00	1,51E-07	1,24E-06	1,62E-06	-1,36E-05
ADP-elements	kg Sbe	5,46E-06	4,38E-08	2,53E-07	5,76E-06	7,27E-08	2,96E-07	ND	ND	ND	ND	ND	2,42E-08	ND	0,00E+00	2,07E-09	5,81E-09	4,83E-09	-2,81E-08
ADP-fossil	MJ	1,46E+01	3,32E-01	3,67E-01	1,53E+01	4,66E-01	8,15E-01	ND	ND	ND	ND	ND	1,76E-02	ND	0,00E+00	9,20E-03	2,21E-02	2,84E-02	-4,27E-01

ADDITIONAL INDICATOR – GWP-GHG

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG ⁹⁾	kg CO ₂ e	1,10E+00	2,56E-02	2,29E-02	1,15E+00	3,60E-02	6,20E-02	ND	ND	ND	ND	ND	1,48E-03	ND	0,00E+00	6,63E-04	1,17E-01	6,88E-02	-4,44E-02

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. In addition, the characterisation factors for the flows – CH₄ fossil, CH₄ biogenic and Dinitrogen monoxide – were updated. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterisation factor for biogenic CO₂ is set to zero

ADDITIONAL INFORMATION: ENVIRONMENTAL IMPACTS – TRACI 2.1. / 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	1,09E+00	2,53E-02	2,23E-02	1,14E+00	3,55E-02	6,28E-02	ND	ND	ND	ND	ND	1,52E-03	ND	0,00E+00	6,54E-04	1,17E-01	6,84E-02	-4,38E-02
Ozone Depletion	kg CFC ₁₁ e	6,75E-08	3,92E-10	1,10E-09	6,90E-08	5,53E-10	3,51E-09	ND	ND	ND	ND	ND	4,35E-11	ND	0,00E+00	1,16E-11	4,49E-11	4,49E-11	-2,15E-10
Acidification	kg SO ₂ e	3,08E-03	4,13E-04	9,94E-05	3,59E-03	5,18E-04	2,13E-04	ND	ND	ND	ND	ND	9,84E-06	ND	0,00E+00	1,92E-06	2,48E-05	1,88E-05	-2,40E-04
Eutrophication	kg Ne	3,53E-03	1,76E-05	8,90E-05	3,64E-03	2,25E-05	1,87E-04	ND	ND	ND	ND	ND	6,35E-07	ND	0,00E+00	2,05E-07	6,33E-06	1,32E-05	-2,22E-05
POCP ("smog")	kg O ₃ e	4,62E-02	7,97E-03	1,56E-03	5,57E-02	9,83E-03	3,47E-03	ND	ND	ND	ND	ND	7,36E-05	ND	0,00E+00	4,91E-05	7,47E-04	5,45E-04	-2,68E-03
ADP-fossil	MJ	3,51E-01	3,35E-01	-5,51E-02	6,31E-01	4,71E-01	5,03E-03	ND	ND	ND	ND	ND	1,78E-02	ND	0,00E+00	9,37E-03	-1,76E+00	-2,66E+00	-4,90E-01

SCENARIO DOCUMENTATION

DATA SOURCES

Manufacturing energy scenario documentation

1. Electricity production, wind, 1-3MW turbine, onshore, brazilSouthernGrid, Ecoinvent, 0.0171 kgCO₂e/kWh
2. Propane, burned in building machine, World, Ecoinvent, 0.0945 kgCO₂e/MJ

Transport scenario documentation - A4 (Transport resources)

Transport to the building site (A4) - Scenario documentation

Scenario parameter	Value
Capacity utilization (including empty return) %	85
Bulk density of transported products	0
Volume capacity utilization factor	1

THIRD-PARTY VERIFICATION STATEMENT

EPD Hub declares that this EPD is verified in accordance with ISO 14025 by an independent, third-party verifier. The project report on the Life Cycle Assessment and the report(s) on features of environmental relevance are filed at EPD Hub. EPD Hub PCR and ECO Platform verification checklist are used.

EPD Hub is not able to identify any unjustified deviations from the PCR and EN 15804+A2 in the Environmental Product Declaration and its project report.

EPD Hub maintains its independence as a third-party body; it was not involved in the execution of the LCA or in the development of the declaration and has no conflicts of interest regarding this verification.

The company-specific data and upstream and downstream data have been examined as regards plausibility and consistency. The publisher is responsible for ensuring the factual integrity and legal compliance of this declaration.

The software used in creation of this LCA and EPD is verified by EPD Hub to conform to the procedural and methodological requirements outlined in ISO 14025:2010, ISO 14040/14044, EN 15804+A2, and EPD Hub Core Product Category Rules and General Program Instructions.

Verified tools

Tool verifier: Magaly Gonzalez Vazquez

Tool verification validity: 27 March 2025 - 26 March 2028

Vera Durão, as an authorised verifier acting for EPD Hub Limited

07.06.2026

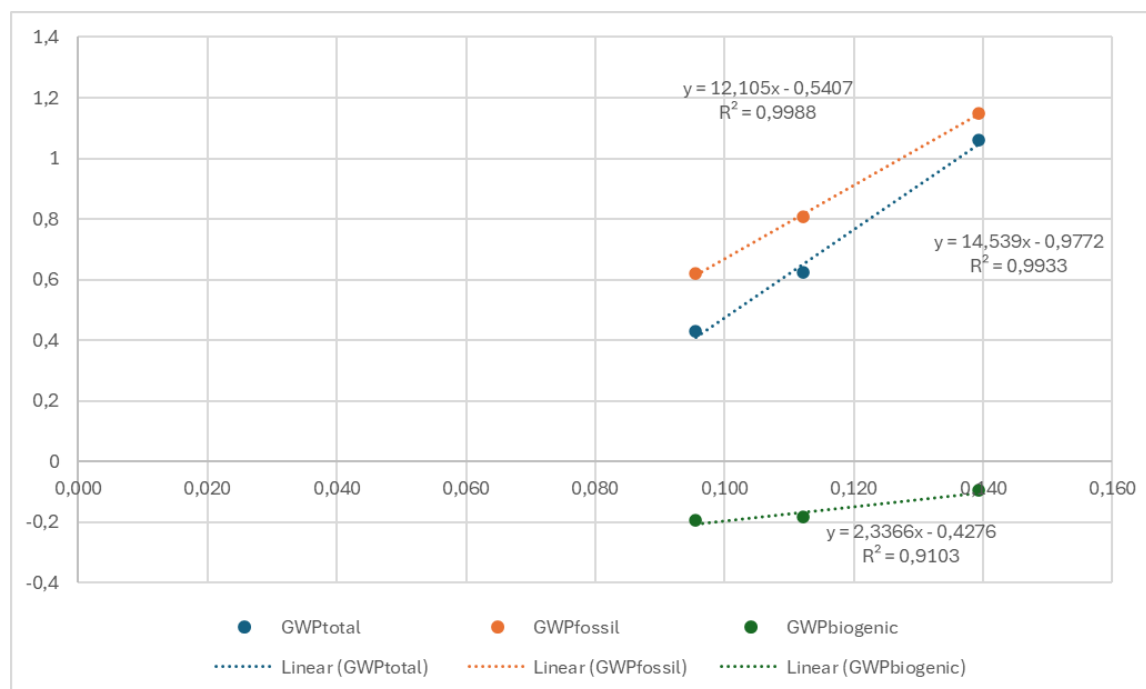


ANNEX I

SCALING TABLE FOR DIFFERENT TYPES OF ACCUROLL DIELECTRIC ROLLABLE RIBBON:

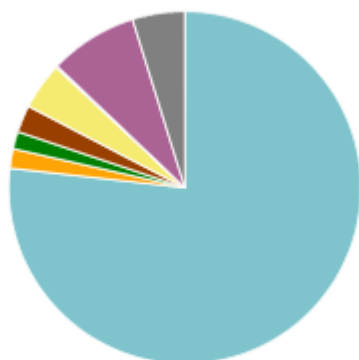
The results bellow were used to calculate a trend line in which the x represents the cable mass, and it could be extrapolated for others cables with different amount of fiber.

Code_PA	Description_PA	Fibers	Thickness(mm)	Mass(kg)	A1-A3	A1-A3	A1-A3
					GWPtotal	GWPfossil	GWPbiogenic
19720014	Optic Cable ROLLABLE RIBBON ACCUROLL CFOAR-F-SM-DDU-TS 72F NR	72	11,3	0,096	0,43	0,622	-0,193
19727061	Optic Cable ROLLABLE RIBBON ACCUROLL CFOAR-F-SM-DDU-TS 144F NR	144	12,6	0,112	0,624	0,807	-0,184
19727068	Optic Cable ROLLABLE RIBBON ACCUROLL CFOAR-F-SM-DDU-TS 288F NR	288	12,9	0,139	1,06	1,15	-0,095



ANNEX II LIFE-CYCLE OVERVIEW OF GLOBAL WARMING POTENTIAL FOSSIL

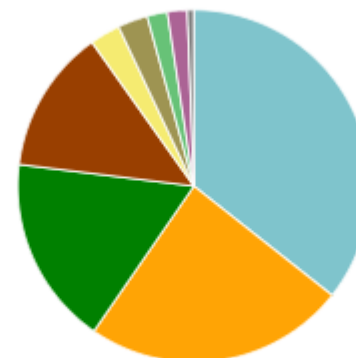
Global Warming Potential fossil kg CO₂e - Life-cycle stages



- A1 Raw material extraction and processing - 81.1%
- A2 Transport to the manufacturer - 1.6%
- A3 Manufacturing - 1.6%
- A4 Transport to the building site - 2.5%
- A5 Installation into the building - 4.3%
- B6 Operational energy use - 0.1%
- C2 Waste transport - 0.0%
- C3 Waste processing - 8.1%
- C4 Waste disposal - 4.8%

Global Warming Potential fossil kg CO₂e - Resource types

This is a drilldown chart. Click on the chart to view details



- Energy supply, electricity transformation - 31.1%
- Manufacturing, chemicals and chemical products - 28.1%
- Water supply, sewerage, waste management - 2.8%
- Transport of goods, Road - 2.8%
- Manufacturing, other non-metallic mineral products - 2.8%
- Manufacturing, textiles, spinning, weaving - 2.8%
- Water supply, sewerage, waste management - 2.8%