

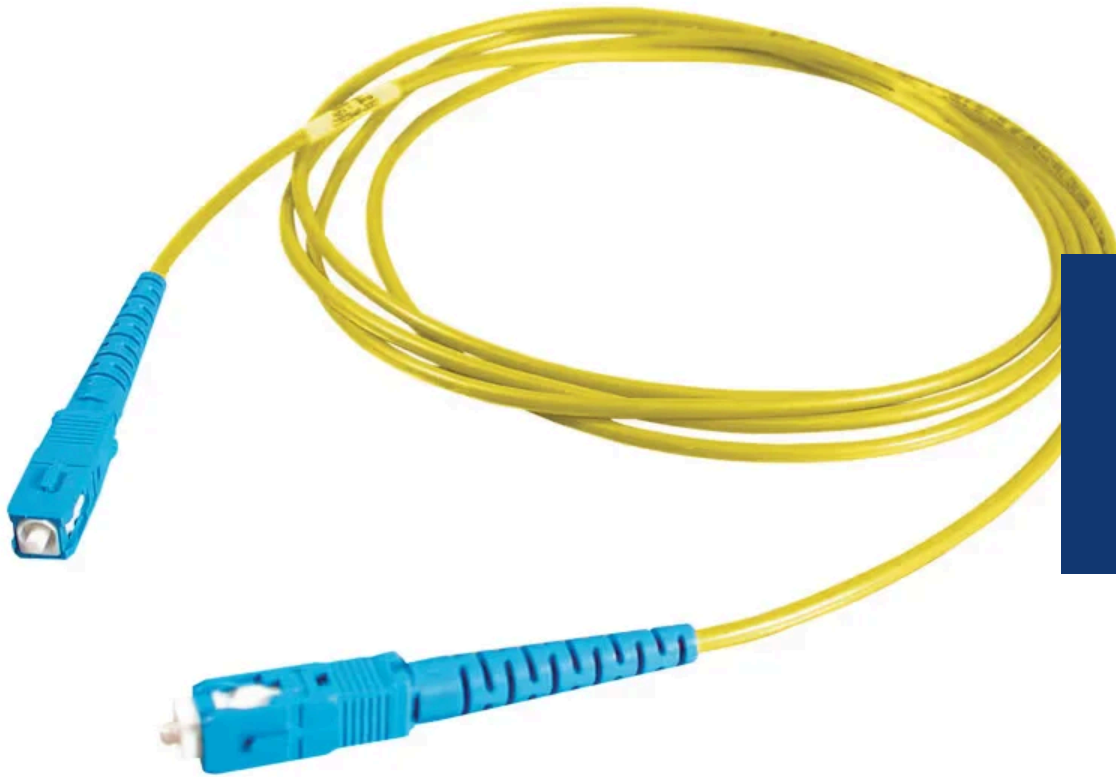


Environmental Product Declaration

IN ACCORDANCE WITH ISO 14025:2006 AND EN 15804:2012+A2:2019/AC:2021

Program Operator: Smart EPD®

www.smartepd.com



SmartEPD-2025-066-0477-01.4

Patch Cord Fiber Optic Cable

Date of Issue

May 14, 2025

Expiration date

May 14, 2030

Last updated

Oct 02, 2026



Refer to the EPD Library at www.smartepd.com for the latest EPD listing information

General Information

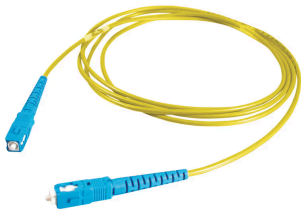
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Product Name:	Patch Cord Fiber Optic Cable
Functional Unit:	1 m installed fiber optic patch cords, including waste treatment at end-of-life
Declaration Number:	SmartEPD-2025-066-0477-01.4
Date of Issue:	May 14, 2025
Expiration:	May 14, 2030
Last updated:	October 02, 2026
EPD Scope:	Cradle to gate with other options A1 - A3, A4, A5, C2, C4, D
Market(s) of Applicability:	Global

General Organization Information

AFL is a global manufacturer providing end-to-end solutions to the energy, broadband, data center, AI and industrial markets. With products in over 130 countries, AFL specializes in fiber optic cable and hardware, transmission/compression and substation accessories, connectivity solutions, fusion splicers, and test and inspection equipment. Guided by Customer-Focused and Community-Centered values and a strong commitment to safety, the company operates manufacturing facilities worldwide and provides a comprehensive portfolio of services and solutions supporting network infrastructure, data centers, service providers, wireless and power grid modernization. For more information, visit www.AFLglobal.com.

Further information can be found at: www.AFLglobal.com

Limitations, Liability and Ownership

This EPD applies only to the specified product system and is not intended for direct comparisons unless conducted per relevant PCR requirements. The manufacturer is responsible for the accuracy of the data, while the program operator and verifier assume no liability for its use or interpretation. This document is the property of the manufacturer and may not be reproduced or modified without permission. It remains valid until its expiration date unless significant product or process changes occur.

This LCA and associated EPD report only on environmental aspects that are based on verified data and reflect actual processes, impacts, and conditions relevant to the product system. No claims are made regarding potential future environmental benefits or speculative outcomes unless such outcomes are supported by documented evidence and are reasonably expected to be realized under normal operating conditions.

This LCA and associated EPD do not include standalone sustainability claims. Where sustainability-related statements are made, they are explicitly linked to established sustainability programs that conform to the requirements of ISO 14020 Clause 6, or are referenced from publicly available documents that have been developed through consensus with the involvement of relevant interested parties. No general or unsubstantiated sustainability claims are included.

A manufacturer shall not make claims based on an industry-average EPD which leads the market to believe the industry-average is representative of manufacturer-specific or product-specific.

Reference Standards

Standard(s):	ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021
Core PCR:	EPD Norge Part A: Construction Products and Services v.2 Date of issue: March 24, 2021
Sub-category PCR:	EPD Norge NPCR 027: Part B for Electrical cables and wires v.2 Date of issue: March 01, 2022 Valid until: June 30, 2026
Sub-category PCR review panel:	 Contact Smart EPD for more information.
General Program Instructions:	 Smart EPD General Program Instructions v.2.0, March 2025

Verification Information

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EPD Program Operator:	 Smart EPD  info@smartepd.com  www.smartepd.com  585 Grove St., Ste. 145, Herndon, VA 20170, USA
Verification:	Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071:  Lucas Pedro Berman  Senda - Consultoria Ambiental & Energetica  info@sendaconsultorias.com Independent external verification of EPD, according to ISO 14025 and reference PCR(s):  Lucas Pedro Berman  Senda - Consultoria Ambiental & Energetica  info@sendaconsultorias.com

External

External

Product Information

Functional Unit:	1 m installed fiber optic patch cords, including waste treatment at end-of-life
Mass:	0.0045 kg
Reference Service Life:	60 Years
Product Specificity:	 Product Average  Product Specific

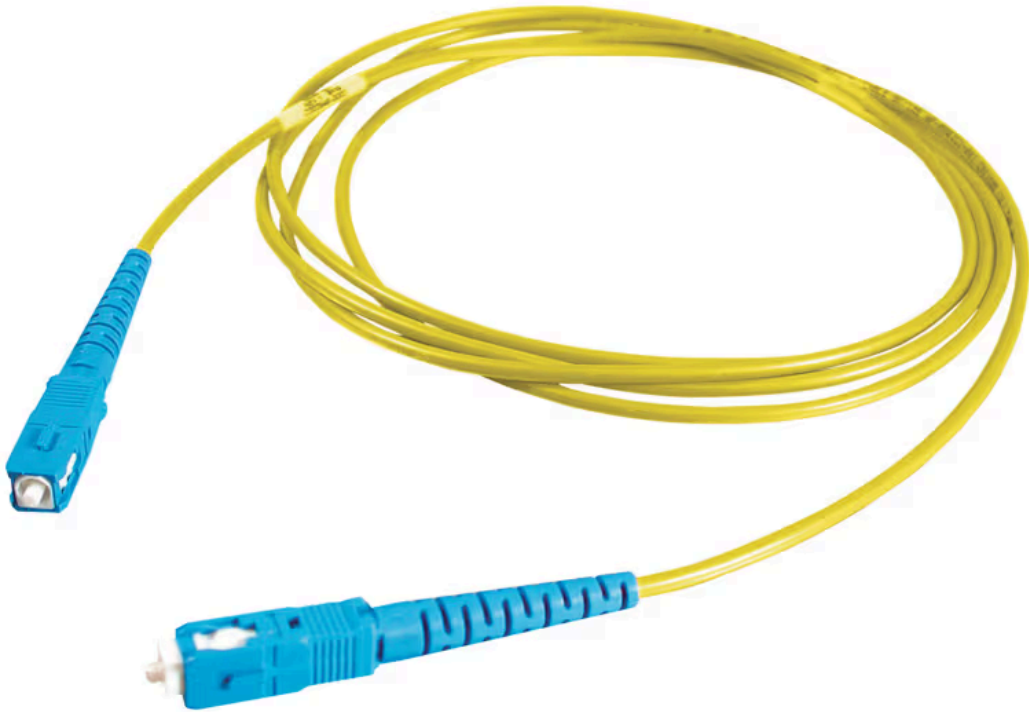
Product Description

Single fiber patch cords are high-performance optical cables used in hyperscale data centers, telecommunications, and high-speed computing. These cables consist of a single optical fiber, typically single-mode or multimode, with precision connectors such as LC, SC, or MPO/MTP to ensure low-loss, high-bandwidth transmission. Designed for durability and flexibility, they feature LSZH, OFNR, or OFNP rated jackets and may include bend-insensitive or armored designs for enhanced performance. Optimized for low latency and high-speed data transfer, they enable scalable, high-density interconnects essential for modern network infrastructure.

Product Specifications

Product SKU(s):	This EPD is representative various Patch Cord SKUs between 1 and 8 optical fibers.
Product Classification Codes:	Masterformat - 27 15 23

Product Composition Diagram



Material Composition

Material/Component Category	Origin	% Mass
Plastic	Global	88.6
Connectors	Global	7.8
Glass	Global	3.7

Packaging Material	Origin	kg Mass
PE	Global	54.2
Plastic Reel	Global	28.9
Label/Sticker	Global	16.9

Biogenic Carbon Content	kg C per m
Biogenic carbon content in product	0
Biogenic carbon content in accompanying packaging	0

Hazardous Materials
No regulated hazardous or dangerous substances are included in this product.

EPD Data Specificity

Primary Data Year:	2023
Manufacturing Specificity:	✗ Industry Average ✗ Manufacturer Average ✓ Facility Specific

Averaging:

This EPD represents a product average EPD covering patch cord products that are highly similar in material composition and manufacturing processes, differing primarily in length. This is a representative product EPD, ensuring that all products within the defined groupings do not vary by more than $\pm 10\%$ of the Global Warming Potential (GWP) indicator in A1–A3.

To account for variations in cable length, a scaling formula along with appropriate scaling factors are provided, allowing users to adjust the results based on the specific length of a given patch cord. More information on the scaling formula can be found in section 6.3 and the underlying data to use in the formula can be found in Appendix A.

To account for product variations, this EPD defines two Product Average Groupings (henceforth, Product Groups) for bulk cable and two Product Groups for cable termination. A patch cord product must consider both steps to represent a complete patch cord.

- **Bulk Cable Groups:** Represent similar products with different material compositions.
- **Cable Termination Groups:** Represent cable assemblies terminated with either two connectors or four connectors.

The most conservative set of results is reported for each group.

Results for complete cable assemblies are determined by scaling the results of the bulk cable and cable termination groups using the equations provided in section 6.3. The results section of this report presents the results of a 21-meter long patch cord covered by this report as this represents the simple average length of patch cords represented in this study.

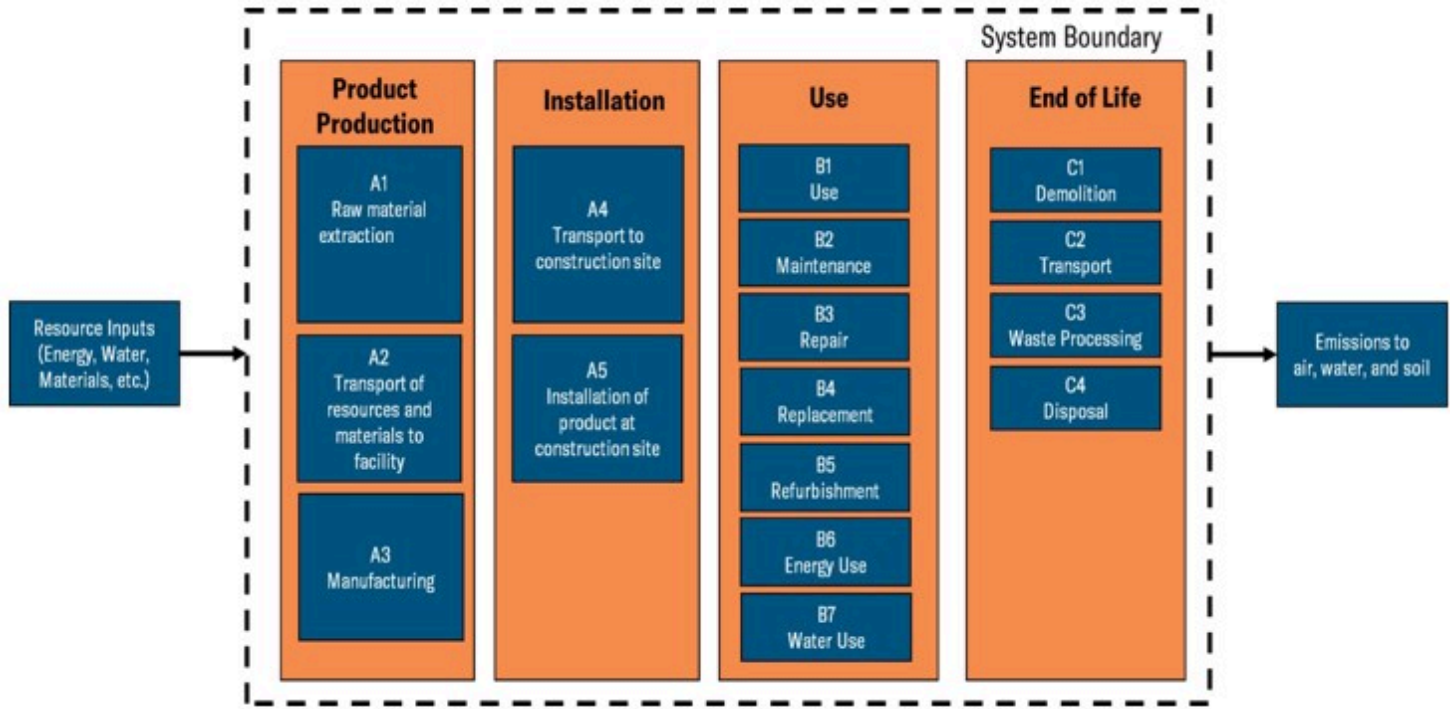
System Boundary

Production	A1	Raw material supply	global	✓
	A2	Transport	global	✓
	A3	Manufacturing	global	✓
Construction	A4	Transport to site	global	✓
	A5	Assembly / Install	global	✓
Use	B1	Use	ND	ND
	B2	Maintenance	ND	ND
	B3	Repair	ND	ND
	B4	Replacement	ND	ND
	B5	Refurbishment	ND	ND
	B6	Operational Energy Use	ND	ND
	B7	Operational Water Use	ND	ND
End of Life	C1	Deconstruction	ND	ND
	C2	Transport	global	✓
	C3	Waste Processing	ND	ND
	C4	Disposal	global	✓
Benefits & Loads Beyond System Boundary	D	Recycling, Reuse Recovery Potential	global	✓

Note:

ND = Module not declared

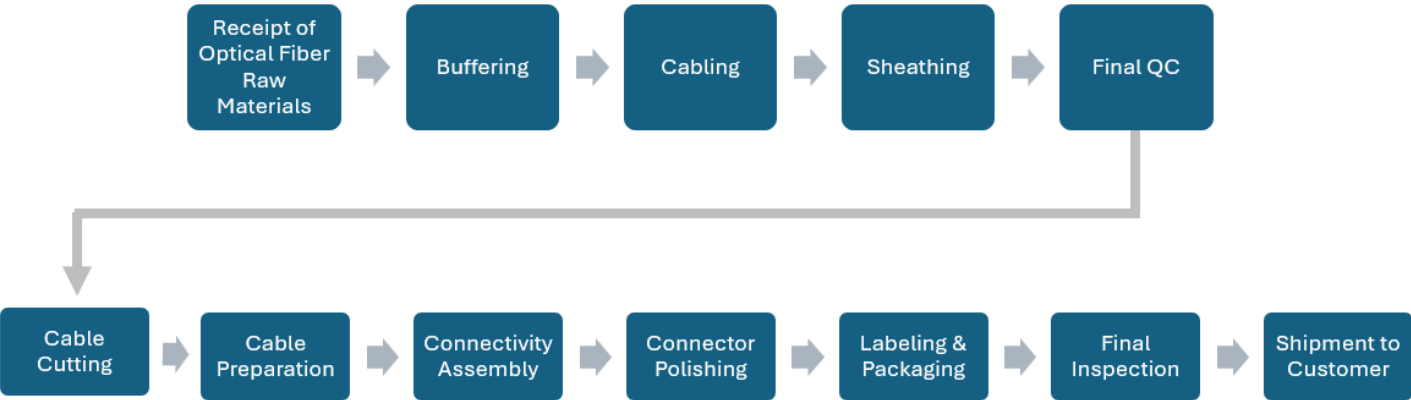
Product Composition Diagram



Plants

 AFL - Duncan, SC 170 Ridgeview Ctr Dr, Duncan, SC 29334, USA

Product Flow Diagram



Software And Database

LCA Software:

☰ SimaPro v. 9.6

LCI Foreground Database(s):

☰ Ecoinvent v. 3.10 | 📍 US, RoW, GLO | ✂ cut-off

LCI Background Database(s):

☰ Ecoinvent v. 3.10 | 📍 US, RoW, GLO | ✂ cut-off

A foreground LCI database is the database used to model the primary, site-specific data collected for this EPD. A background LCI database is the database used to model generic or non-specific data.

Data Quality

The data quality assessment for this EPD follows the framework established by Weidema et al. (2013), using the pedigree matrix approach to evaluate key aspects of data reliability, completeness, and representativeness. The pedigree matrix assesses data quality based on five key criteria: reliability, completeness, temporal correlation, geographical correlation, and technological correlation.

Primary data were collected directly from AFL manufacturing facilities for processes related to bulk cable production and cable termination. These data include direct measurements of energy consumption, manufacturing material inputs, water usage, and waste generation. Product and packaging data was provided by AFL BOMs for Bulk Cable and Cable Termination. Allocation of inputs and outputs follows the principles outlined in EN 15804+A2 and NPCR Part A and Part B. Where primary data were not available, data from ecoinvent v3.10 and a supplier-provided EPD were leveraged to represent upstream material production.

Data quality was assessed using the Weidema et al. (2013) pedigree matrix methodology, considering the following:

- **Temporal Correlation** – Product and packaging bills of material reflect data from 2025. All manufacturing energy and material primary input data reflect production from 2023. Secondary data are from the most recent available LCI sources.
- **Geographical Correlation** – Datasets reflective of sourcing or production geography were used where available; global or regional datasets were selected when country-specific data were not available.
- **Technological Correlation** – Selected datasets align with current manufacturing technologies for fiber optic cable production and termination.
- **Reliability** – All data used are considered reliable, as primary data were sourced directly from manufacturing operations, while secondary data were selected from reputable databases and verified EPDs.
- **Completeness** – This analysis was conducted in alignment with the methodologies prescribed by EN 15804+A2, NPCR Part A, and NPCR Part B. The datasets used represent all major material and energy flows, and no flows were deliberately excluded.

Two pedigree matrices are presented in the accompanying LCA report to represent data quality, one for Bulk Cable Groups and one for Cable Termination Groups. This is possible due to similarities among the data sources used for each set of Groups.

Life Cycle Module Description

A1 - Resource Extraction

The production of single fiber patch cords begins with the extraction and processing of raw materials, including silica for optical fibers, petroleum-based polymers for cable jacketing, and metals for connector components. High-purity silica is refined and drawn into ultra-thin optical fibers, while polymers such as PVC are synthesized for protective sheathing. Metal components are mined and processed to precise tolerances. These materials are sourced globally. Note that electricity is considered within the A3 stage as opposed to the A1 stage.

For the optical fibers (fibers), a supplier-provided EPD is leveraged because it provides a more representative dataset for optical fiber production compared to the generic proxy available in the ecoinvent database. Additionally, the environmental impact results from the selected supplier EPD are more conservative. Note that the EPD represents a Product Environmental Profile (or PEP) EPD, which uses the EF3.1 LCIA method. This method is aligned with EN 15804 + A2 (adapted).

A2 - Resource Transportation

The A2 module includes the transportation of resources and materials used in the production of Patch Cord products. Transport distances are weighted averages based on the quantity of each material type by supplier. Most materials are transported to AFL facilities via truck (road). In some instances, the transport distance and mode from supplier was unknown, and in these instances, it was assumed the material was transported 500km by road.

A3 - Manufacturing

The manufacturing of patch cords takes place in two main steps. Optical fibers are coated, buffered, and reinforced with jacketing materials in the first step, and terminated with single fiber connectors in the second step. The production process includes fiber alignment, epoxy application, curing, polishing, and rigorous quality testing to ensure low-loss optical performance. Final products undergo inspection and are packed in plastic bags with plastic labels before downstream distribution to global markets. Bulk Cable manufacturing inputs and outputs are identical at times as the data is allocated per meter, and the declared unit of the study is on a 1-meter basis. End-of-life treatment of manufacturing waste and the transportation of this waste is considered in A3 and follows the polluter-pays principle for allocation burdens at end-of-life. Landfill datasets selected in ecoinvent consider a 100-year emissions timeline. Note that electricity is considered within the A3 stage of this EPD (not A1). In addition, no market-based instruments, renewable electricity, CO2 certificates, or "green power" are considered in this LCA or associated EPD.

A4 - Downstream Transportation

The A4 module includes transportation of the final product to customers (building site). This LCA averages downstream transportation distances and modes for three key distribution routes to North America, Europe, and Asia. One third of products are assumed to be shipped to each of these geographies. Additionally, as required by Norge Part B, a 300km distance from regional distribution center to installation site is assumed due to unavailability of primary data. Shipments in the US are transported by road and shipments to Europe and Asia are assumed to be split 50-50 between air transport and ocean transport. Transportation distances by truck are 300km + a simple average of the first mile transportation to port or airport for the Europe and Asia entries. For North America, an actual typical transportation route was used as a proxy.

A5 - Downstream Transportation

During installation, 5% of the patch cord material on a mass basis is assumed to be lost as waste, in accordance with Norge Part B (EPD Norge, 2020). This waste primarily consists of excess cable lengths, connector trimmings, and other minor material losses resulting from installation activities. This 5% loss value is applied uniformly to Bulk Cable and Cable Termination BOMs as it is assumed the waste originates from components across both BOMs. Additionally, all packaging materials are considered within this stage in accordance with Norge Part B (EPD Norge, 2020). The transportation of both product and packaging waste to appropriate waste management facilities is included, with an assumed average transport distance of 50 km by truck. The end-of-life pathway for product installation waste and packaging is assumed to be 100% incineration without energy recovery. This end-of-life pathway was selected because it is a likely end-of-life fate for the material globally and it yields the most conservative set of results from a GWP perspective. Fiber optic cable products are not likely to be recycled as it is not economically viable to do so as the raw materials within are low value and processes to recycle these materials are complex. For these reasons, module C4 also assumes incineration of product at end-of-life. The reference service life for the product is 60 years which assumes the same time period as the reference study period; Per Product Category Rule Norge Part A: Construction products and services v2 (EPD Norge, 2021), it is allowed to assume that the construction product will last as long as the building part.

B1 - B7 - Use

The use phase of a product includes seven information modules, B1-B7. Modules B1 through B7 are considered null for this EPD as fiber optic patch cords do not require maintenance, repair, replacement, refurbishment, operational energy, or operational water use during their use phase. Patch cords serve as passive transmission components and do not independently consume energy or other resources. Any electricity consumption associated with the operation of network equipment or other devices connected to the patch cords is beyond the scope of this assessment and is therefore excluded from this EPD.

There are no known releases of dangerous substances to indoor air, soil, or water during the use stage of the product. Fiber optic patch cords are inert in use and do not emit volatile organic compounds (VOCs) or other harmful emissions under normal operating conditions.

C1 - C4 - End-of-Life

The end-of-life of a product consists of four information modules, C1-C4. At end-of-life, fiber optic patch cords are assumed to be 100% incinerated without energy recovery, as recycling infrastructure for fiber optic cables is limited and landfill disposal is discouraged due to material composition. This is

the most conservative end-of-life scenario, which must be reported as per NPCR Part B (EPD Norge, 2020). Module C1 (deconstruction, demolition) is considered null, as no active deconstruction processes are required beyond removal from service. Similarly, Module C3 (waste processing) is also null since no additional processing is needed before incineration. Module C2 accounts for transportation of the waste to an incineration facility, with an assumed transport distance of 50 km by truck. Module C4 includes the impacts associated with all emissions generated during incineration without energy recovery.

Optional Module D

Module D provides optional supplementary information about the potential net benefits from reuse, recycling, and energy recovery beyond the system boundary of the studied product system. Module D in this study reflects a scenario where waste incineration with energy recovery displaces fossil fuel use, contributing to avoided impacts. It is assumed that the energy content (MJ LHV) of incinerated materials displaces an equivalent amount of natural gas combustion, a typical fossil fuel for heat generation. This is considered a conservative assumption, as natural gas generally has lower associated environmental impacts compared to alternatives like coal or fuel oil. The displaced quantity of natural gas is estimated based on the total lower heating value of the incinerated materials. The energy contents used to estimate the total MJ LHV of energy in incinerated materials can be found in Appendix D. It is acknowledged that actual energy recovery efficiencies can vary, and market conditions or regional energy mixes may result in different displaced fuels or lower substitution effects. Therefore, results should be interpreted as an indicative estimate, not a prediction of real-world effects.

LCA Discussion

Allocation Procedure

Allocation follows the principles set forth in EN 15804 + A2 and ISO 14040/14044, ensuring a transparent and consistent distribution of inputs and outputs across the life cycle stages of the product's life cycle. The allocation methods used in this study were selected to best align with the physical relationships within the patch cord production system. The following allocation approaches were used in this study:

- **Bulk Cable Production:** Energy, utilities, and other manufacturing inputs and outputs are allocated based on the total length of cable produced, using a **per meter basis** as the allocation key.
- Bills of Material (BOMs) for bulk cable are also provided per meter, eliminating the need for additional allocation
- **Cable Termination:** Energy, utilities, and other manufacturing inputs and outputs associated with termination processes are allocated on a **per connector basis**, as each fiber optic cable requires a fixed number of connectors regardless of its length.
- Because the inputs to this step are fixed in regard to cable length, the inputs and outputs of Cable Termination are scaled by a factor derived from the patch cord's length to allocate the burdens of the Cable Termination step per meter of patch cord. Additional information on Cable Termination allocation and the application of the scaling formula can be found in the scaling section.

Cut-off Procedure

This study applies cut-off criteria in accordance with EN 15804 + A2, ensuring that all relevant mass, energy, and environmental impact contributions are accounted for in the LCA. Specifically:

- Individual flows representing less than 1% of the total mass, energy, or environmental impact may be excluded, provided that their cumulative exclusion does not exceed 5% of the total impact for any environmental indicator.
- All known primary materials, production processes, and energy flow are included.
- Infrastructure, capital equipment, and personnel-related impacts are excluded from the system boundaries unless captured in background datasets
- Excluded flows are documented, and sensitivity analyses confirm that their omission does not significantly affect results.

For this study, no material or energy input or output was deliberately excluded from the system boundary.

Renewable Electricity

Energy Attribute Certificates (EACs) such as ✗ No
Renewable Energy Certificates (RECs) or Power
Purchase Agreements (PPAs) are included in the
baseline reported results:

Scenarios

Reuse, Recovery and / or Recycling Potentials & Relevant Scenario Information (D)

D Module

Results

Environmental Impact Assessment Results

EF3.1

per 1 m of product installed fiber optic patch cords, including waste treatment at end-of-life.

LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

LCIA Results Summary for 1 meter of P7AW2P9PCC-0250 -M0021

Impact Category	Unit	Method	A1 - A3	A4	A5	C2	C4	D
GWP- total	kg CO2 eq	EF3.1	1.58e-1	1.91e-2	5.75e-4	3.52e-5	1.07e-2	-1.44e-2
GWP- fossil	kg CO2 eq	EF3.1	1.49e-1	1.91e-2	5.75e-4	3.51e-5	1.07e-2	-1.44e-2
GWP-biogenic	kg CO2 eq	EF3.1	8.79e-3	2.10e-6	9.89e-8	2.21e-9	7.44e-7	-6.72e-7
GWP-luluc	kg CO2 eq	EF3.1	1.94e-4	1.68e-6	8.52e-9	1.44e-8	6.95e-8	-8.37e-7
ODP	kg CFC11 eq	EF3.1	4.09e-9	2.92e-10	4.09e-13	5.10e-13	3.95e-12	-2.82e-10
AP	mol H+ eq	EF3.1	5.04e-4	8.81e-5	1.81e-7	1.59e-7	2.44e-6	-1.10e-5
PM	disease incidence	EF3.1	3.94e-9	2.91e-10	1.99e-12	3.37e-12	1.26e-11	-6.67e-11
IRP	kBq U235 eq	EF3.1	4.02e-2	7.77e-5	3.87e-7	4.32e-7	3.81e-6	-5.16e-5
POCP	kg NMVOC eq	EF3.1	4.06e-4	1.19e-4	2.44e-7	2.25e-7	2.97e-6	-2.94e-5
EP-fw	kg P eq	EF3.1	5.36e-5	3.36e-7	2.59e-9	2.82e-9	3.36e-8	-2.43e-7
EP-marine	kg N eq	EF3.1	1.28e-4	3.44e-5	1.49e-6	5.98e-8	1.39e-6	-3.47e-6
EP-terrestrial	mol N eq	EF3.1	1.03e-3	3.76e-4	8.23e-7	6.52e-7	1.18e-5	-3.68e-5
SQI	dimensionless	EF3.1	6.06e-1	2.83e-2	4.38e-4	3.74e-4	5.88e-4	-3.37e-3
WDP	m3 world eq deprived	EF3.1	2.67e-2	3.99e-4	-9.09e-5	2.39e-6	3.46e-4	-2.41e-4
ADP-fossil	MJ, net calorific value	EF3.1	2.05e+0	2.52e-1	2.87e-4	4.93e-4	2.03e-3	-2.28e-1
ADP-minerals&metals	kg Sb eq	EF3.1	1.01e-6	7.37e-9	4.76e-11	1.10e-10	5.36e-10	-3.68e-9

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

Comparisons cannot be made between product-specific or industry average EPDs at the design stage of a project, before a building has been specified. Comparisons may be made between product-specific or industry average EPDs at the time of product purchase when product performance and specifications have been established and serve as a functional unit for comparison. Environmental impact results shall be converted to a functional unit basis before any comparison is attempted. Any comparison of EPDs shall be subject to the requirements of ISO 21930 or EN 15804. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries, are based on different product category rules or are missing relevant environmental impacts. Such comparison can be inaccurate, and could lead to erroneous selection of materials or products which are higher-impact, at least in some impact categories.

LCIA Results Summary for 1 meter of Bulk Cable Group 1

Impact Category	Unit	Method	A1 - A3	A4	A5	C2	C4	D
GWP- total	kg CO2 eq	EF3.1	1.20e-1	1.46e-2	5.09e-4	3.22e-5	9.80e-3	-9.98e-3
GWP- fossil	kg CO2 eq	EF3.1	1.14e-1	1.45e-2	5.09e-4	3.22e-5	9.80e-3	-9.97e-3
GWP-biogenic	kg CO2 eq	EF3.1	5.98e-3	1.60e-6	7.26e-8	2.03e-9	6.82e-7	-4.64e-7
GWP-luluc	kg CO2 eq	EF3.1	1.60e-4	1.28e-6	6.52e-9	1.32e-8	6.38e-8	-5.79e-7
ODP	kg CFC11 eq	EF3.1	3.41e-9	2.23e-10	3.19e-13	4.68e-13	3.62e-12	-1.95e-10
AP	mol H+ eq	EF3.1	3.48e-4	6.71e-5	1.50e-7	1.46e-7	2.24e-6	-7.59e-6
PM	disease incidence	EF3.1	2.48e-9	2.22e-10	1.48e-12	3.09e-12	1.15e-11	-4.61e-11
IRP	kBq U235 eq	EF3.1	3.83e-2	5.92e-5	3.02e-7	3.96e-7	3.50e-6	-3.57e-5
POCP	kg NMVOC eq	EF3.1	2.75e-4	9.07e-5	1.97e-7	2.06e-7	2.72e-6	-2.03e-5
EP-fw	kg P eq	EF3.1	4.42e-5	2.56e-7	2.13e-9	2.58e-9	3.08e-8	-1.68e-7
EP-marine	kg N eq	EF3.1	8.29e-5	2.62e-5	9.60e-7	5.48e-8	1.27e-6	-2.40e-6
EP-terrestrial	mol N eq	EF3.1	6.86e-4	2.86e-4	6.89e-7	5.98e-7	1.08e-5	-2.54e-5
SQP	dimensionless	EF3.1	5.06e-1	2.15e-2	2.89e-4	3.42e-4	5.39e-4	-2.33e-3
WDP	m3 world eq deprived	EF3.1	2.46e-2	3.04e-4	-5.27e-5	2.19e-6	3.17e-4	-1.67e-4
ADP-fossil	MJ, net calorific value	EF3.1	1.55e+0	1.92e-1	2.16e-4	4.52e-4	1.86e-3	-1.57e-1
ADP-minerals&metals	kg Sb eq	EF3.1	8.20e-7	5.62e-9	3.88e-11	1.01e-10	4.91e-10	-2.55e-9

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

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product category rules or are missing relevant environmental impacts. Such comparison can be inaccurate, and could lead to erroneous selection of materials or products which are higher-impact, at least in some impact categories.

LCIA Results Summary for 1 meter of Bulk Cable Group 2

Impact Category	Unit	Method	A1 - A3	A4	A5	C2	C4	D
GWP- total	kg CO2 eq	EF3.1	1.51e-1	3.00e-2	1.06e-3	7.00e-5	2.13e-2	-2.16e-2
GWP- fossil	kg CO2 eq	EF3.1	1.45e-1	3.00e-2	1.06e-3	7.00e-5	2.13e-2	-2.16e-2
GWP-biogenic	kg CO2 eq	EF3.1	5.54e-3	3.29e-6	1.11e-7	4.40e-9	1.48e-6	-1.01e-6
GWP-luluc	kg CO2 eq	EF3.1	3.31e-4	2.64e-6	1.08e-8	2.86e-8	1.39e-7	-1.26e-6
ODP	kg CFC11 eq	EF3.1	6.58e-9	4.59e-10	5.47e-13	1.02e-12	7.87e-12	-4.23e-10
AP	mol H+ eq	EF3.1	4.50e-4	1.38e-4	2.83e-7	3.17e-7	4.86e-6	-1.65e-5
PM	disease incidence	EF3.1	3.64e-9	4.58e-10	2.29e-12	6.71e-12	2.51e-11	-1.00e-10
IRP	kBq U235 eq	EF3.1	4.26e-2	1.22e-4	5.20e-7	8.61e-7	7.60e-6	-7.74e-5
POCP	kg NMVOC eq	EF3.1	3.66e-4	1.87e-4	3.61e-7	4.48e-7	5.92e-6	-4.41e-5
EP-fw	kg P eq	EF3.1	4.86e-5	5.29e-7	4.00e-9	5.61e-9	6.70e-8	-3.65e-7
EP-marine	kg N eq	EF3.1	1.08e-4	5.40e-5	1.03e-6	1.19e-7	2.76e-6	-5.21e-6
EP-terrestrial	mol N eq	EF3.1	9.38e-4	5.90e-4	1.33e-6	1.30e-6	2.36e-5	-5.51e-5
SQI	dimensionless	EF3.1	6.99e-1	4.44e-2	3.39e-4	7.44e-4	1.17e-3	-5.06e-3
WDP	m3 world eq deprived	EF3.1	3.49e-2	6.27e-4	-3.48e-5	4.75e-6	6.89e-4	-3.61e-4
ADP-fossil	MJ, net calorific value	EF3.1	2.13e+0	3.96e-1	3.45e-4	9.82e-4	4.04e-3	-3.41e-1
ADP-minerals&metals	kg Sb eq	EF3.1	9.92e-7	1.16e-8	7.19e-11	2.19e-10	1.07e-9	-5.53e-9

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particulate Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

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LCIA Results Summary for 1 unit of Cable Termination Group 1

Impact Category	Unit	Method	A1 - A3	A4	A5	C2	C4	D
GWP- total	kg CO2 eq	EF3.1	7.88e-1	9.56e-2	1.39e-3	6.14e-5	1.87e-2	-9.35e-2
GWP- fossil	kg CO2 eq	EF3.1	7.28e-1	9.55e-2	1.39e-3	6.14e-5	1.87e-2	-9.35e-2
GWP-biogenic	kg CO2 eq	EF3.1	5.89e-2	1.05e-5	5.52e-7	3.86e-9	1.30e-6	-4.35e-6
GWP-luluc	kg CO2 eq	EF3.1	7.20e-4	8.40e-6	4.20e-8	2.51e-8	1.21e-7	-5.43e-6
ODP	kg CFC11 eq	EF3.1	1.43e-8	1.46e-9	1.89e-12	8.91e-13	6.89e-12	-1.83e-9
AP	mol H+ eq	EF3.1	3.28e-3	4.41e-4	6.59e-7	2.78e-7	4.26e-6	-7.11e-5
PM	disease incidence	EF3.1	3.07e-8	1.46e-9	1.09e-11	5.88e-12	2.20e-11	-4.32e-10
IRP	kBq U235 eq	EF3.1	4.02e-2	3.89e-4	1.78e-6	7.55e-7	6.66e-6	-3.34e-4
POCP	kg NMVOC eq	EF3.1	2.75e-3	5.96e-4	9.73e-7	3.93e-7	5.19e-6	-1.91e-4
EP-fw	kg P eq	EF3.1	1.99e-4	1.68e-6	9.67e-9	4.92e-9	5.87e-8	-1.58e-6
EP-marine	kg N eq	EF3.1	9.52e-4	1.72e-4	1.11e-5	1.04e-7	2.42e-6	-2.25e-5
EP-terrestrial	mol N eq	EF3.1	7.26e-3	1.88e-3	2.81e-6	1.14e-6	2.06e-5	-2.38e-4
SQI	dimensionless	EF3.1	2.10e+0	1.41e-1	3.11e-3	6.52e-4	1.03e-3	-2.18e-2
WDP	m3 world eq deprived	EF3.1	4.47e-2	1.99e-3	-8.03e-4	4.17e-6	6.04e-4	-1.56e-3
ADP-fossil	MJ, net calorific value	EF3.1	1.04e+1	1.26e+0	1.50e-3	8.61e-4	3.54e-3	-1.48e+0
ADP-minerals&metals	kg Sb eq	EF3.1	4.08e-6	3.69e-8	1.84e-10	1.92e-10	9.35e-10	-2.39e-8

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

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LCIA Results Summary for 1 unit of Cable Termination Group 2

Impact Category	Unit	Method	A1 - A3	A4	A5	C2	C4	D
GWP- total	kg CO2 eq	EF3.1	1.57e+0	1.92e-1	2.83e-3	1.38e-4	4.19e-2	-1.86e-1
GWP- fossil	kg CO2 eq	EF3.1	1.45e+0	1.92e-1	2.83e-3	1.38e-4	4.19e-2	-1.86e-1
GWP-biogenic	kg CO2 eq	EF3.1	1.18e-1	2.10e-5	9.57e-7	8.65e-9	2.91e-6	-8.67e-6
GWP-luluc	kg CO2 eq	EF3.1	1.42e-3	1.68e-5	7.41e-8	5.62e-8	2.72e-7	-1.08e-5
ODP	kg CFC11 eq	EF3.1	3.01e-8	2.93e-9	3.37e-12	2.00e-12	1.55e-11	-3.64e-9
AP	mol H+ eq	EF3.1	6.52e-3	8.84e-4	1.22e-6	6.24e-7	9.55e-6	-1.42e-4
PM	disease incidence	EF3.1	6.10e-8	2.92e-9	1.89e-11	1.32e-11	4.93e-11	-8.61e-10
IRP	kBq U235 eq	EF3.1	8.04e-2	7.79e-4	3.18e-6	1.69e-6	1.49e-5	-6.66e-4
POCP	kg NMVOC eq	EF3.1	5.47e-3	1.19e-3	1.77e-6	8.81e-7	1.16e-5	-3.79e-4
EP-fw	kg P eq	EF3.1	3.97e-4	3.37e-6	1.79e-8	1.10e-8	1.32e-7	-3.14e-6
EP-marine	kg N eq	EF3.1	1.90e-3	3.45e-4	1.86e-5	2.34e-7	5.43e-6	-4.48e-5
EP-terrestrial	mol N eq	EF3.1	1.44e-2	3.77e-3	5.28e-6	2.55e-6	4.63e-5	-4.74e-4
SQI	dimensionless	EF3.1	4.21e+0	2.84e-1	5.23e-3	1.46e-3	2.30e-3	-4.35e-2
WDP	m3 world eq deprived	EF3.1	8.88e-2	4.00e-3	-1.32e-3	9.34e-6	1.35e-3	-3.11e-3
ADP-fossil	MJ, net calorific value	EF3.1	2.08e+1	2.53e+0	2.63e-3	1.93e-3	7.94e-3	-2.94e+0
ADP-minerals&metals	kg Sb eq	EF3.1	8.05e-6	7.40e-8	3.38e-10	4.30e-10	2.10e-9	-4.75e-8

Note:

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Abbreviations:

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Resource Use Indicator

per 1 m of product installed fiber optic patch cords, including waste treatment at end-of-life.

LCIA Results Summary for 1 meter of P7AW2P9PCC-0250 -M0021

Indicator	Unit	A1 - A3	A4	A5	C2	C4	D
PERE	MJ	1.90e-1	9.83e-4	6.68e-6	6.52e-6	7.90e-5	-6.43e-4
PERM	MJ	0	0	0	0	0	0
PERT	MJ	1.90e-1	9.83e-4	6.68e-6	6.52e-6	7.90e-5	0
PENRE	MJ	2.66e+0	2.53e-1	2.93e-4	5.00e-4	2.09e-3	-2.28e-1
PENRM	MJ	2.08e-1	0	0	0	0	0
PENRT	MJ	2.87e+0	2.53e-1	2.93e-4	5.00e-4	2.09e-3	0
RPRE	MJ	ND	ND	ND	ND	ND	ND
RPRM	MJ	ND	ND	ND	ND	ND	ND
RPRT	MJ	ND	ND	ND	ND	ND	ND
NRPRE	MJ	ND	ND	ND	ND	ND	ND
NRPRM	MJ	ND	ND	ND	ND	ND	ND
NRPRT	MJ	ND	ND	ND	ND	ND	ND
ADP-fossil	MJ	2.05e+0	2.52e-1	2.87e-4	4.93e-4	2.03e-3	-2.28e-1
SM	kg	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m3	7.17e-4	1.12e-5	-1.92e-6	6.61e-8	1.21e-5	-6.58e-6

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

RPRE or PERE = Renewable primary resources used as energy carrier (fuel), RPRM or PERM = Renewable primary resources with energy content used as material, RPRT or PERT = Total use of renewable primary resources with energy content, NRPRE or PENRE = Non-renewable primary resources used as an energy carrier (fuel), NRPRM or PENRM = Non-renewable primary resources with energy content used as material, NRPRT or PENRT = Total non-renewable primary resources with energy content, SM = Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, ADPF = Abiotic depletion potential, FW = Use of net freshwater resources, VOCs = Volatile Organic Compounds.

LCIA Results Summary for 1 meter of Bulk Cable Group 1

Indicator	Unit	A1 - A3	A4	A5	C2	C4	D
PERE	MJ	1.34e-1	7.49e-4	5.38e-6	5.98e-6	7.25e-5	-4.44e-4
PERM	MJ	0	0	0	0	0	0
PERT	MJ	1.34e-1	7.49e-4	5.38e-6	5.98e-6	7.25e-5	0
PENRE	MJ	2.14e+0	1.93e-1	2.20e-4	4.58e-4	1.92e-3	-1.58e-1
PENRM	MJ	1.49e-1	0	0	0	0	0
PENRT	MJ	2.29e+0	1.93e-1	2.20e-4	4.58e-4	1.92e-3	0
RPRE	MJ	ND	ND	ND	ND	ND	ND
RPRM	MJ	ND	ND	ND	ND	ND	ND
RPRT	MJ	ND	ND	ND	ND	ND	ND
NRPRE	MJ	ND	ND	ND	ND	ND	ND
NRPRM	MJ	ND	ND	ND	ND	ND	ND
NRPRT	MJ	ND	ND	ND	ND	ND	ND
ADP-fossil	MJ	1.55e+0	1.92e-1	2.16e-4	4.52e-4	1.86e-3	-1.57e-1
SM	kg	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m3	6.47e-4	8.50e-6	-1.05e-6	6.06e-8	1.11e-5	-4.55e-6

Note:

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LCIA Results Summary for 1 meter of Bulk Cable Group 2

Indicator	Unit	A1 - A3	A4	A5	C2	C4	D
PERE	MJ	2.05e-1	1.55e-3	9.76e-6	1.30e-5	1.57e-4	-9.63e-4
PERM	MJ	0	0	0	0	0	0
PERT	MJ	2.05e-1	1.55e-3	9.76e-6	1.30e-5	1.57e-4	0
PENRE	MJ	2.74e+0	3.98e-1	3.53e-4	9.95e-4	4.16e-3	-3.43e-1
PENRM	MJ	3.03e-1	0	0	0	0	0
PENRT	MJ	3.04e+0	3.98e-1	3.53e-4	9.95e-4	4.16e-3	0
RPRE	MJ	ND	ND	ND	ND	ND	ND
RPRM	MJ	ND	ND	ND	ND	ND	ND
RPRT	MJ	ND	ND	ND	ND	ND	ND
NRPRE	MJ	ND	ND	ND	ND	ND	ND
NRPRM	MJ	ND	ND	ND	ND	ND	ND
NRPRT	MJ	ND	ND	ND	ND	ND	ND
ADP-fossil	MJ	2.13e+0	3.96e-1	3.45e-4	9.82e-4	4.04e-3	-3.41e-1
SM	kg	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m3	8.77e-4	1.75e-5	-4.27e-7	1.32e-7	2.40e-5	-9.87e-6

Note:

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LCIA Results Summary for 1 unit of Cable Termination Group 1

Indicator	Unit	A1 - A3	A4	A5	C2	C4	D
PERE	MJ	1.19e+0	4.92e-3	2.72e-5	1.14e-5	1.38e-4	-4.16e-3
PERM	MJ	0	0	0	0	0	0
PERT	MJ	1.19e+0	4.92e-3	2.72e-5	1.14e-5	1.38e-4	0
PENRE	MJ	1.10e+1	1.27e+0	1.53e-3	8.72e-4	3.65e-3	-1.48e+0
PENRM	MJ	1.24e+0	0	0	0	0	0
PENRT	MJ	1.22e+1	1.27e+0	1.53e-3	8.72e-4	3.65e-3	0
RPRE	MJ	ND	ND	ND	ND	ND	ND
RPRM	MJ	ND	ND	ND	ND	ND	ND
RPRT	MJ	ND	ND	ND	ND	ND	ND
NRPRE	MJ	ND	ND	ND	ND	ND	ND
NRPRM	MJ	ND	ND	ND	ND	ND	ND
NRPRT	MJ	ND	ND	ND	ND	ND	ND
ADP-fossil	MJ	1.04e+1	1.26e+0	1.50e-3	8.61e-4	3.54e-3	-1.48e+0
SM	kg	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m3	1.49e-3	5.58e-5	-1.83e-5	1.15e-7	2.11e-5	-4.26e-5

Note:

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LCIA Results Summary for 1 unit of Cable Termination Group 2

Indicator	Unit	A1 - A3	A4	A5	C2	C4	D
PERE	MJ	2.38e+0	9.87e-3	4.95e-5	2.55e-5	3.09e-4	-8.29e-3
PERM	MJ	0	0	0	0	0	0
PERT	MJ	2.38e+0	9.87e-3	4.95e-5	2.55e-5	3.09e-4	0
PENRE	MJ	2.19e+1	2.54e+0	2.68e-3	1.96e-3	8.18e-3	-2.95e+0
PENRM	MJ	2.46e+0	0	0	0	0	0
PENRT	MJ	2.44e+1	2.54e+0	2.68e-3	1.96e-3	8.18e-3	0
RPRE	MJ	ND	ND	ND	ND	ND	ND
RPRM	MJ	ND	ND	ND	ND	ND	ND
RPRT	MJ	ND	ND	ND	ND	ND	ND
NRPRE	MJ	ND	ND	ND	ND	ND	ND
NRPRM	MJ	ND	ND	ND	ND	ND	ND
NRPRT	MJ	ND	ND	ND	ND	ND	ND
ADP-fossil	MJ	2.08e+1	2.53e+0	2.63e-3	1.93e-3	7.94e-3	-2.94e+0
SM	kg	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m3	2.93e-3	1.12e-4	-3.00e-5	2.59e-7	4.72e-5	-8.49e-5

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

RPRE or PERE = Renewable primary resources used as energy carrier (fuel), RPRM or PERM = Renewable primary resources with energy content used as material, RPRT or PERT = Total use of renewable primary resources with energy content, NRPRE or PENRE = Non-renewable primary resources used as an energy carrier (fuel), NRPRM or PENRM = Non-renewable primary resources with energy content used as material, NRPRT or PENRT = Total non-renewable primary resources with energy content, SM = Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, ADPF = Abiotic depletion potential, FW = Use of net freshwater resources, VOCs = Volatile Organic Compounds.

Waste and Output Flow Indicators

per 1 m of product installed fiber optic patch cords, including waste treatment at end-of-life.

LCIA Results Summary for 1 meter of P7AW2P9PCC-0250 -M0021

Indicator	Unit	A1 - A3	A4	A5	C2	C4	D
HWD	kg	1.69e-5	0	0	0	0	0
NHWD	kg	1.01e-2	0	0	0	0	0
RWD	kg	0	0	0	0	0	0
CRU	kg	0	0	0	0	0	0
MFR	kg	1.06e-2	0	0	0	0	0
MER	kg	1.50e-3	0	5.70e-4	0	1.20e-2	0
EEE	MJ	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

LCIA Results Summary for 1 meter of Bulk Cable Group 1

Indicator	Unit	A1 - A3	A4	A5	C2	C4	D
HWD	kg	1.36e-5	0	0	0	0	0
NHWD	kg	6.81e-3	0	0	0	0	0
RWD	kg	0	0	0	0	0	0
CRU	kg	0	0	0	0	0	0
MFR	kg	2.88e-3	0	0	0	0	0
MER	kg	1.50e-3	0	1.96e-4	0	4.12e-3	0
EEE	MJ	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

LCIA Results Summary for 1 meter of Bulk Cable Group 2

Indicator	Unit	A1 - A3	A4	A5	C2	C4	D
HWD	kg	1.36e-5	0	0	0	0	0
NHWD	kg	6.81e-3	0	0	0	0	0
RWD	kg	0	0	0	0	0	0
CRU	kg	0	0	0	0	0	0
MFR	kg	2.88e-3	0	0	0	0	0
MER	kg	1.50e-3	0	4.26e-4	0	8.95e-3	0
EEE	MJ	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

LCIA Results Summary for 1 unit of Cable Termination Group 1

Indicator	Unit	A1 - A3	A4	A5	C2	C4	D
HWD	kg	6.94e-5	0	0	0	0	0
NHWD	kg	6.96e-2	0	0	0	0	0
RWD	kg	0	0	0	0	0	0
CRU	kg	0	0	0	0	0	0
MFR	kg	1.61e-1	0	0	0	0	0
MER	kg	0	0	3.74e-4	0	7.85e-3	0
MNER	kg	ND	ND	ND	ND	ND	ND
EEE	MJ	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

LCIA Results Summary for 1 unit of Cable Termination Group 2

Indicator	Unit	A1 - A3	A4	A5	C2	C4	D
HWD	kg	1.39e-4	0	0	0	0	0
NHWD	kg	1.39e-1	0	0	0	0	0
RWD	kg	0	0	0	0	0	0
CRU	kg	0	0	0	0	0	0
MFR	kg	3.22e-1	0	0	0	0	0
MER	kg	0	0	8.38e-4	0	1.76e-2	0
MNER	kg	ND	ND	ND	ND	ND	ND
EEE	MJ	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

Scaling Factors

Product Name	Bulk Cable Group	Cable Termination Group	Cable Length (m)	Cable Termination Allocation Factor (Scaling Factor)
P7AW2P9PCC-0250 -M002	Bulk Cable Group 1	Cable Termination Group 1	2	0.5000

Product Name	Bulk Cable Group	Cable Termination Group	Cable Length (m)	Cable Termination Allocation Factor (Scaling Factor)
P7AW2P9PCC-0250 -M003	Bulk Cable Group 1	Cable Termination Group 1	3	0.3333
P7AW2P9PCC-0250 -M004	Bulk Cable Group 1	Cable Termination Group 1	4	0.2500
P7AW2P9PCC-0250 -M005	Bulk Cable Group 1	Cable Termination Group 1	5	0.2000
P7AW2P9PCC-0250 -M006	Bulk Cable Group 1	Cable Termination Group 1	6	0.1667
P7AW2P9PCC-0250 -M007	Bulk Cable Group 1	Cable Termination Group 1	7	0.1429
P7AW2P9PCC-0250 -M008	Bulk Cable Group 1	Cable Termination Group 1	8	0.1250
P7AW2P9PCC-0250 -M009	Bulk Cable Group 1	Cable Termination Group 1	9	0.1111
P7AW2P9PCC-0250 -M010	Bulk Cable Group 1	Cable Termination Group 1	10	0.1000
P7AW2P9PCC-0250 -M011	Bulk Cable Group 1	Cable Termination Group 1	11	0.0909
P7AW2P9PCC-0250 -M012	Bulk Cable Group 1	Cable Termination Group 1	12	0.0833
P7AW2P9PCC-0250 -M013	Bulk Cable Group 1	Cable Termination Group 1	13	0.0769
P7AW2P9PCC-0250 -M014	Bulk Cable Group 1	Cable Termination Group 1	14	0.0714
P7AW2P9PCC-0250 -M015	Bulk Cable Group 1	Cable Termination Group 1	15	0.0667
P7AW2P9PCC-0250 -M016	Bulk Cable Group 1	Cable Termination Group 1	16	0.0625
P7AW2P9PCC-0250 -M017	Bulk Cable Group 1	Cable Termination Group 1	17	0.0588
P7AW2P9PCC-0250 -M018	Bulk Cable Group 1	Cable Termination Group 1	18	0.0556
P7AW2P9PCC-0250 -M019	Bulk Cable Group 1	Cable Termination Group 1	19	0.0526
P7AW2P9PCC-0250 -M020	Bulk Cable Group 1	Cable Termination Group 1	20	0.0500
P7AW2P9PCC-0250 -M021	Bulk Cable Group 1	Cable Termination Group 1	21	0.0476
P7AW2P9PCC-0250 -M022	Bulk Cable Group 1	Cable Termination Group 1	22	0.0455
P7AW2P9PCC-0250 -M023	Bulk Cable Group 1	Cable Termination Group 1	23	0.0435
P7AW2P9PCC-0250 -M024	Bulk Cable Group 1	Cable Termination Group 1	24	0.0417
P7AW2P9PCC-0250 -M025	Bulk Cable Group 1	Cable Termination Group 1	25	0.0400
P7AW2P9PCC-0250 -M026	Bulk Cable Group 1	Cable Termination Group 1	26	0.0385
P7AW2P9PCC-0250 -M027	Bulk Cable Group 1	Cable Termination Group 1	27	0.0370
P7AW2P9PCC-0250 -M028	Bulk Cable Group 1	Cable Termination Group 1	28	0.0357
P7AW2P9PCC-0250 -M029	Bulk Cable Group 1	Cable Termination Group 1	29	0.0345
P7AW2P9PCC-0250 -M030	Bulk Cable Group 1	Cable Termination Group 1	30	0.0333
P7AW2P9PCC-0250 -M032	Bulk Cable Group 1	Cable Termination Group 1	32	0.0313
P7AW2P9PCC-0250 -M033	Bulk Cable Group 1	Cable Termination Group 1	33	0.0303
P7AW2P9PCC-0250 -M034	Bulk Cable Group 1	Cable Termination Group 1	34	0.0294
P7AW2P9PCC-0250 -M035	Bulk Cable Group 1	Cable Termination Group 1	35	0.0286
P7AW2P9PCC-0250 -M036	Bulk Cable Group 1	Cable Termination Group 1	36	0.0278
P7AW2P9PCC-0250 -M037	Bulk Cable Group 1	Cable Termination Group 1	37	0.0270
P7AW2P9PCC-0250 -M038	Bulk Cable Group 1	Cable Termination Group 1	38	0.0263
P7AW2P9PCC-0250 -M039	Bulk Cable Group 1	Cable Termination Group 1	39	0.0256
P7AW2P9PCC-0250 -M040	Bulk Cable Group 1	Cable Termination Group 1	40	0.0250
P7AW2P9PCC-0250 -M051	Bulk Cable Group 1	Cable Termination Group 1	51	0.0196

Product Name	Bulk Cable Group	Cable Termination Group	Cable Length (m)	Cable Termination Allocation Factor (Scaling Factor)
P7AW2P9PCC-0250 -M104	Bulk Cable Group 1	Cable Termination Group 1	104	0.0096
CS019449-002M	Bulk Cable Group 1	Cable Termination Group 1	2	0.5000
CS019449-004M	Bulk Cable Group 1	Cable Termination Group 1	4	0.2500
CS019449-005M	Bulk Cable Group 1	Cable Termination Group 1	5	0.2000
CS019606-M008	Bulk Cable Group 2	Cable Termination Group 2	8	0.1250
CS019606-M0.5	Bulk Cable Group 2	Cable Termination Group 2	1	1.0000

The environmental impacts reported in this EPD are a combination of Bulk Cable and Cable Termination inputs and processes. To determine the environmental impact of a specific patch cord SKU, the results of a Bulk Cable Group and a Cable Termination Group must be combined using the calculation formula outlined in this section. Complete results for Bulk Cable and Cable Termination, inclusive of all required LCIA and LCI indicators, can be found in Appendix B along with a list of product SKUs covered by this EPD and the information necessary to use the following scaling formula. The results of Bulk Cable or Cable Termination alone do not represent a complete patch cord product and should not be used in isolation.

$$Results_{SKU,IND,M} = T_{GRP,IND,M} \times AF_{SKU} + B_{GRP,IND,M}$$

Where:

- **SKU** = a patch cord SKU represented by this EPD
- **IND** = an indicator reported within this EPD
- **GRP** = references a Product Group number
 - Group numbers will always match across Bulk Cable and Cable Termination
- **M** = references the EPD assessment module or LCI data (e.g., A3, or an A3 LCI input)
- **T** = value from Cable Termination Product Group Results
 - With respect to IND, GRP, M
- **B** = value from Bulk Cable Product Group Results
 - With respect to IND, GRP, M
- **AF** = the Cable Termination allocation factor (provided in the Appendix, but quantified as 1 divided by the cable length in meters)

This formula recognizes that Bulk Cable impacts are already normalized per 1 meter and allocates Cable Termination impacts based on the total length of the cable. Since cable termination occurs only once per patch cord, regardless of length, the scaling factor is necessary to accurately distribute the burdens of this production step to the declared unit of this study. Note that the results derived from this scaling formula are only relevant for patch cord SKUs at the lengths specified in the Appendix. The application of this equation beyond the declared product range may not accurately reflect environmental impacts and is not covered by this LCA or associated EPD.

Example Calculation

Example application of the scaling formula is shown below. Note that Appendix B contains a table which matches patch cord SKUs to their representative Bulk Cable and Cable Termination Groups as well as the appropriate Cable Termination allocation factor.

For a **21-meter** patch cord, assume:

- **SKU** = PATCH.2F.(LC/DX).(LC/DX).OFNR.M021
- A real AFL SKU covered by this EPD, of approximately average length (21m) of other products in EPD (simple avg.)
- **IND** = The GWPtotal indicator, expressed in kg CO₂e
- **GRP** = 1, applies to both Bulk Cable Grouping and Cable Termination Grouping

- $M = A1 - A3$
- $T = 7.88E-01$, the Cable Termination value with respect to the specified indicator (IND), group (GRP), and EPD module (M)
- $B = 1.20E-01$, the Bulk Cable value with respect to the specified indicator (IND), group (GRP), and EPD module (M)
- $AF = 0.048$, the Cable Termination allocation factor with respect to product SKU (SKU)

Applying the formula:

GWPtotal for *PATCH.2F.(LC/DX).(LC/DX).OFNR.M021 (1.58E-01)* =

Cable Termination A1-A3 GWPtotal ($7.88E-01$) × Cable Termination Allocation Factor (0.048) + Bulk Cable A1-A3 GWPtotal ($1.20E-01$)

This result provides the A1-A3 GWPtotal for the *PATCH.2F.(LC/DX).(LC/DX).OFNR.M021* 21-meter patch cord. Similar calculations should be used for other environmental indicators using the corresponding Bulk Cable and Cable Termination indicator values for the appropriate Product Groups.

Equation I Formula for calculating results for a patch cord considering Bulk Cable and Cable Termination components and SKU length allocation

$$Results_{SKU,IND,M} = T_{GRP,IND,M} \times AF_{SKU} + B_{GRP,IND,M}$$

Where:

- **SKU** = a patch cord SKU represented by this EPD
- **IND** = an indicator reported within this EPD
- **GRP** = references a Product Group number
 - Group numbers will always match across Bulk Cable and Cable Termination
- **M** = references the EPD assessment module or LCI data (e.g., A3, or an A3 LCI input)
- **T** = value from Cable Termination Product Group Results
 - With respect to IND, GRP, M
- **B** = value from Bulk Cable Product Group Results
 - With respect to IND, GRP, M
- **AF** = the Cable Termination allocation factor (provided in the Appendix, but quantified as 1 divided by the cable length in meters)

Interpretation

A1 - A3 Cradle-to-Gate

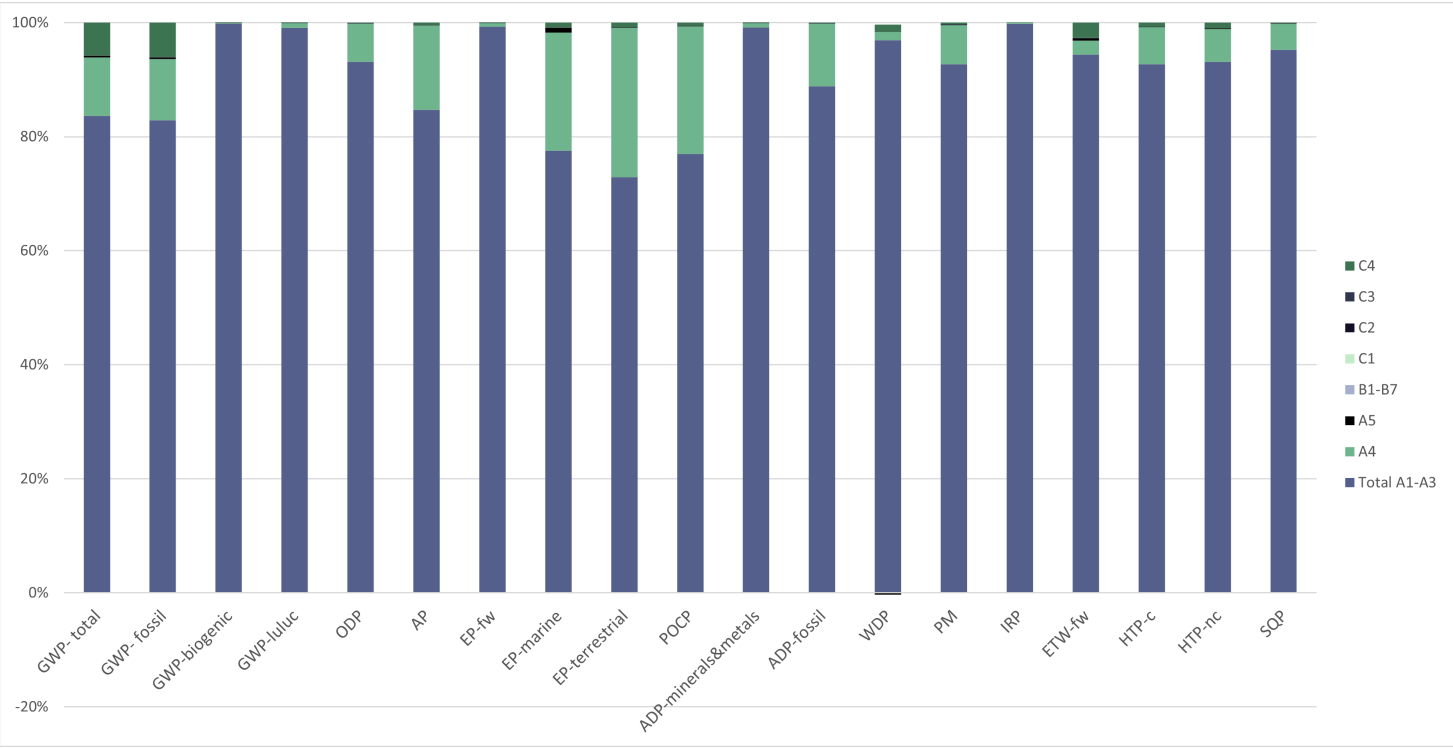
This section discusses the cradle-to-gate results for the declared unit, 1 meter of installed fiber optic patch cords, including waste treatment at end-of-life. Although this discussion is focused on the LCIA results, calculated using the EN 15804 + A2 (adapted) LCIA method, the section also includes A1-A3 results for Primary Resource Use, Indicators Describing Waste and Output Flows, and Additional Environmental Information, inclusive of the GWP-IOBC indicator as required by NPCR Part A (EPD Norge, 2022).

Stage A3 is the dominant contributor to 17 of the 19 reported indicators, with contributions ranging from approximately 55% to 95% of the total A1-A3 impacts. The two indicators which deviate from this trend are GWP-luluc and ODP. For these indicators, the A1 stage is the primary contributor. Across all indicators, A1 is generally the second most impactful stage, with contributions ranging from 5% up to 75% depending on the indicator. The A2 stage represents the least significant contribution across indicators, contributing less than 10% to the total A1-A3 impacts of each indicator. These results highlight the significance of the manufacturing stage in cradle-to-gate environmental performance of patch cord production.

Cradle-to-Gate, with options

The LCIA results for A1-C4 demonstrate that the A1-A3 stages dominate impact contributions across all indicators, ranging from 70% to well over 95% of the total life cycle impacts. This reinforces the significance of raw material extraction, transportation, and manufacturing processes in determining the overall environmental performance of the product. Beyond A1-A3, the A4 stage has moderate contributions, reaching up to 25% in select indicators. A5 contributes less than 5% across all impact categories. B1-B7 (Use Stage) are considered null in this assessment, as patch cords do not require energy,

water, or routine maintenance throughout their use phase. End-of-life impacts (C1-C4) are also relatively low in comparison with A1-A3. Stages C1 and C3 are considered null due to the assumption that all patch cords are directly incinerated at end of life, requiring no deconstruction or additional waste processing. C2 (Transport to Waste Treatment) has an immaterial contribution in most impact categories, while C4 (Disposal) contributes nearly 10% in some categories due to emissions from incineration. Appendix A contains 4 tables containing LCIA for Bulk Cable Groups and Cable Termination Groups. These results are to be used in conjunction with the scaling equation and scaling factors to calculate results for the SKUs represented in this EPD only. Results for the Bulk Cable or Cable Termination groups should not be used independent of the scaling formula as these LCIA results do not represent finished products.



Other Environmental Impacts

Impact Category	Unit	Method	A1 - A3	A4	A5	C2	C4	D
GWP-GHG	kg CO2 eq	IPCC AR5 GWP 100	1.65e-1	1.91e-2	5.75e-4	3.54e-5	1.07e-2	0

Note:

Abbreviations:

GWP-IOBC/GWP-GHG = Climate change indicator with instantaneous oxidation of biogenic carbon. The GWP-IOBC indicator has zero contribution to GWP from biogenic carbon temporary stored in products and packaging. The GWP-IOBC indicator, also called GWP-GHG, is identical to GWP-total except that the characterization factor (CF) for biogenic CO2 is set to zero.

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