

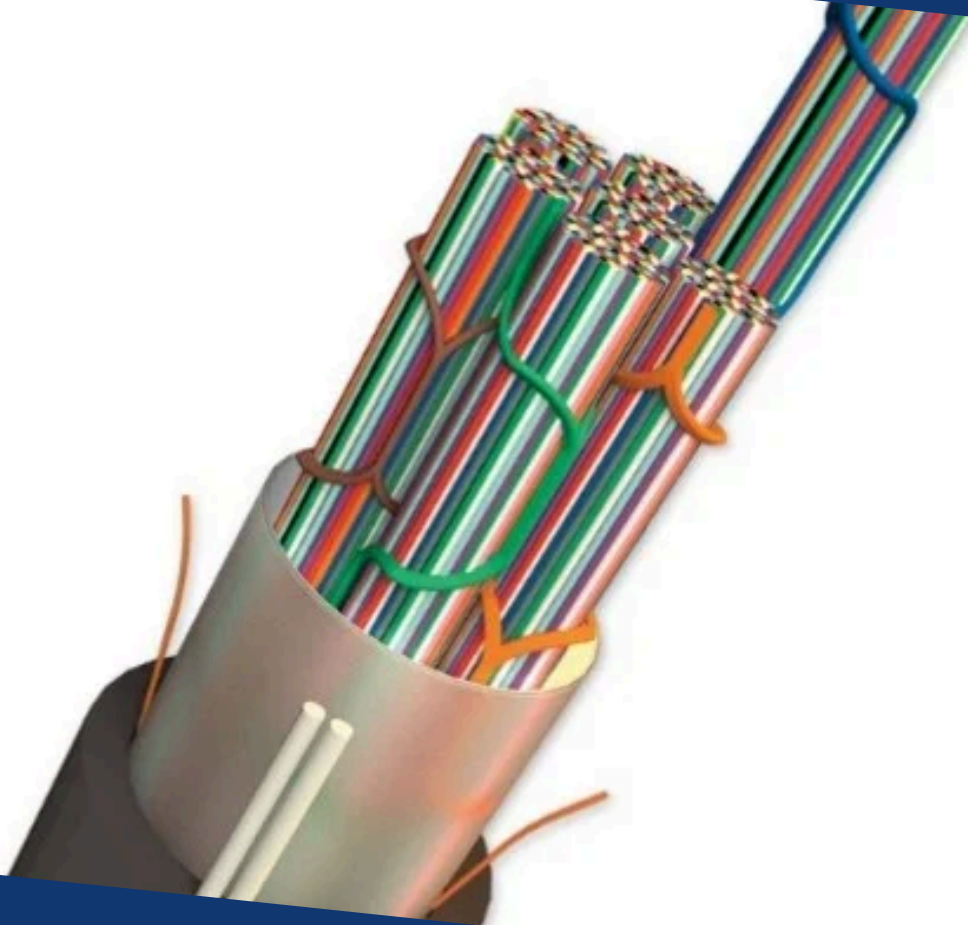


Environmental Product Declaration

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

Program Operator: Smart EPD®

www.smartepd.com



SmartEPD-2026-066-1085-01.1

OSP Blunt Fiber Optic Cable

Date of Issue

Sep 29, 2026

Expiration date

Sep 29, 2031

Last updated

Oct 02, 2026



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

General Information

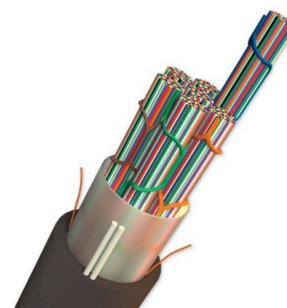
AFL Telecommunications LLC

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Product Name:	OSP Blunt Fiber Optic Cable
Functional Unit:	1 m To transmit one communication signal over 1 m, at a wavelength of 1310 nm and 1550 nm, for 10 years and at a utilization rate of 100% in accordance with the National Electric Code® (NEC®) Standard on the product spec sheet and as defined in PSR-0001-ed4. Lifetime and use rate correspond to Data center applications as defined in the table given in Appendix 6.1. of the specific rules for wire, cables and accessories
Declaration Number:	SmartEPD-2026-066-1085-01.1
Date of Issue:	September 29, 2026
Expiration:	September 29, 2031
Last updated:	October 02, 2026
EPD Scope:	Cradle to gate with other options A1 - A3, A4, A5, B6, C2 - C4, D
Market(s) of Applicability:	Global

General Organization Information

We manufacture, engineer and install the fiber optic products and equipment that communications providers need to provide quad-play solutions to their customers. Our extensive experience in both design and application crosses all markets, from Service Provider and Energy to Industrial, Enterprise and Hyperscale.

Further information can be found at: <https://www.aflglobal.com/>

Limitations, Liability and Ownership

Limitations

This EPD is based on a cradle-to-grave assessment and follows the requirements of aligned with EN 50693 and the PEP-PCR. While the results provide a reliable representation of the environmental performance of the declared products, the following limitations apply:

- **Comparability:** This study is not intended for direct comparison with other LCAs or EPDs as differences in data sources, allocation methods, and background databases may affect comparability.
- **Data Quality:** The LCI data used in this assessment is based on primary data from manufacturing processes and supplier-provided EPDs where available, supplemented with secondary data from the ecoinvent database. While efforts have been made to ensure high data quality, uncertainties may exist in specific datasets, particularly in upstream material extraction and transportation processes.
- **Use Phase Exclusions:** This study does not account for all use phase energy or maintenance requirements of equipment in which the products are used. Modules B1-B5, and B7 are considered zero, as the products require no water, or routine maintenance during use.

- **End-of-Life Assumptions:** The end-of-life modeling assumes EN 50693 defaults in A5 and C4. Other potential disposal routes such as 100% to particular pathways are not considered in this analysis. The actual end-of-life scenario may vary depending on regional waste management practices.
- **Exclusion of Module D:** Potential benefits and loads beyond the system boundary (Module D) are quantified in this EPD. Module D is reported separately and not included in totals.
- **Applicability of Results:** This EPD applies only to the declared product system described herein. The environmental impacts reported are representative of the specified product family and should not be used to characterize products outside the defined scope and specifications.
- **Product-Average and Scaling Approach:** This is a product-average EPD developed using a worst-case representative product configuration. Environmental impacts for specific product variants may be estimated using the applicable scaling equation.

Liability

Responsibility for the accuracy and completeness of background data used in this assessment lies with the respective data providers, and not with the EPD program operator or the authors of PEP-PCR and PSR. AFL, as the EPD owner and declarant, bears full responsibility for the foreground data submitted in support of this EPD, including product composition, manufacturing process data, and all site-specific primary inputs. The EPD program operator is not liable for any damages arising from the use or misuse of the EPD or its underlying LCA results. The third-party verifier's liability is limited to the correctness of the verification statement and does not extend to the underlying data provided by the manufacturer. In case EPD results are applied downstream for whole-building LCA or product comparison tools, liability for misapplication or misinterpretation rests with the user of the EPD data, and not with AFL or the LCA practitioner.

Ownership

This EPD and the underlying LCA study are owned by AFL as the commissioning company and EPD declarant. The EPD is registered with and published by the EPD program operator, who maintains the right to withdraw or suspend the EPD if it is found to be non-conformant with program requirements or PEP-PCR and PSR. The underlying LCA report, life cycle inventory data, and associated documentation remain the intellectual property of AFL unless contractually assigned to a third party.

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

Reference Standards

Standard(s):	ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021
Core PCR:	PEP PCR Electrical, Electronic and HVAC-R Products v.4
	Date of issue: September 06, 2021
Sub-category PCR:	PEP ecopassport® PROGRAM PSR Specific Rules for Wires, Cables and Accessories (PSR-0001-ed4-EN-2022 11 16) v.4
	Date of issue: November 16, 2022
	Valid until: November 01, 2027
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

LCA Author/Creator:	 Brian Bunte
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EPD Program Operator:	 Smart EPD

Verification:	✉ info@smartepd.com	Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071:	External
	🌐 www.smartepd.com		
	📍 585 Grove St., Ste. 145, Herndon, VA 20170, USA		
	🌐 Nathan Ayer	Independent external verification of EPD, according to ISO 14025 and reference PCR(s):	External
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	🏢 EarthShift Global		
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Product Information

Functional Unit:	1 m To transmit one communication signal over 1 m, at a wavelength of 1310 nm and 1550 nm, for 10 years and at a utilization rate of 100% in accordance with the National Electric Code® (NEC®) Standard on the product spec sheet and as defined in PSR-0001-ed4. Lifetime and use rate correspond to Data center applications as defined in the table given in Appendix 6.1. of the specific rules for wire, cables and accessories
Mass:	0.826 kg
Reference Service Life:	10 Years
Product Specificity:	✓ Product Average
	✗ Product Specific

Product Description

The production of AFL cable products involves several key manufacturing steps to ensure high optical performance and durability. The process begins with the precision cutting of a main cable to a specified length. The main cable jacket is cut back to allow for high-precision cleaving and stripping of high-purity single-mode or multimode optical fibers from the main cable body, followed by the application of protective furcations or additional coatings. Fibers are then terminated with connectors such as LC, SC, MPO/MTP, or MMC, using advanced polishing and epoxy curing techniques to achieve low insertion loss. Finally, each AFL Cable undergoes rigorous testing for optical performance, mechanical integrity, and compliance with industry standards before packaging and distribution.

OSP Cable is used to link XSW to SSW Switch. This cable shall be used to make the link in between Building 1 to Building 2 at the Entrance Facility in each building. At the Entrance Facility, the cable shall be spliced at the Optical Splice Enclosure.

Product Specifications

Product Classification Codes:	Masterformat - 27 15 23
Communication and data transmission cables:	Optical fiber cables

Product Composition Diagram

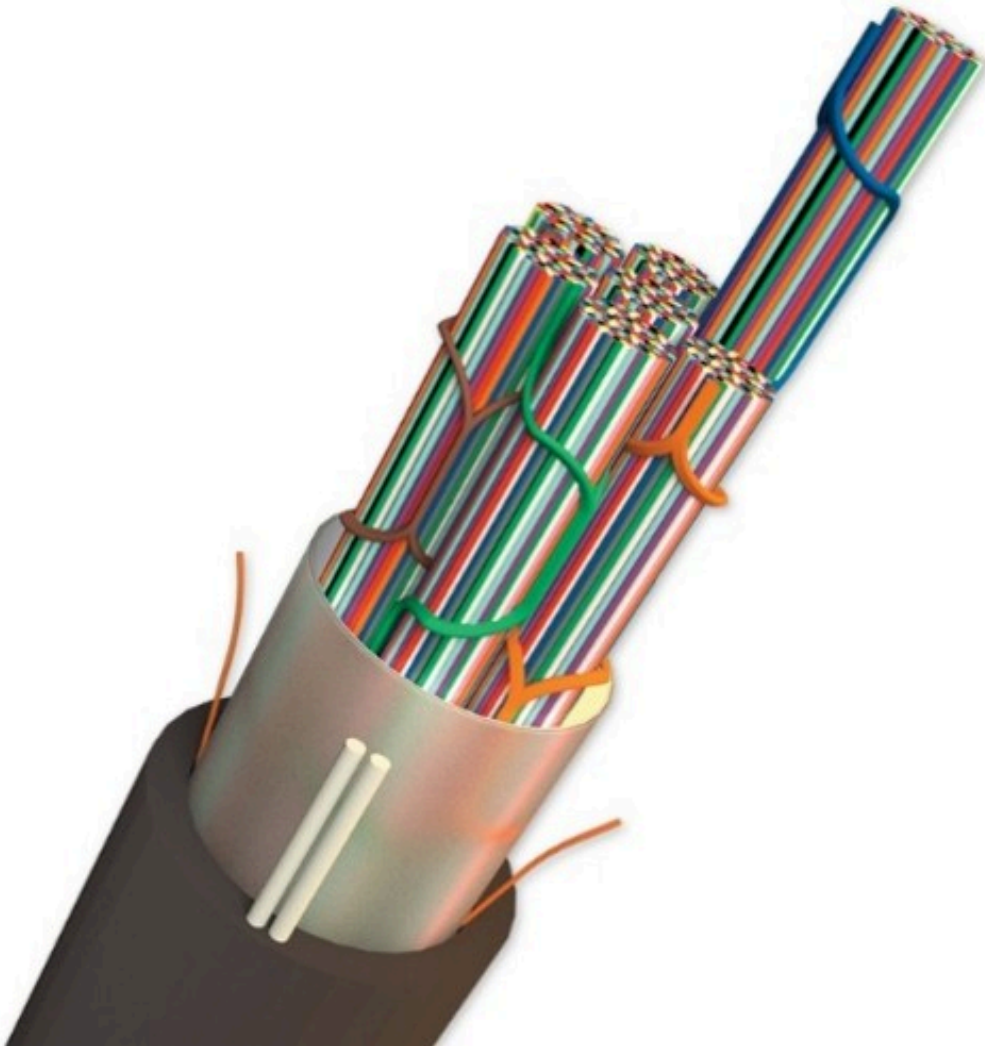


Table 1. Material Composition

Material/Component Category	Origin	% Mass
Plastic	global	67
Glass	global	33

Packaging Material	Origin	kg Mass
Wood	global	0.14

Biogenic Carbon Content	kg C per m
Biogenic carbon content in product	0
Biogenic carbon content in accompanying packaging	0.07

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

EPD Data Specificity

Primary Data Year:	2025
Manufacturing Specificity:	✗ Industry Average ✓ Manufacturer Average ✗ Facility Specific

Averaging:
This EPD represents a Product Average EPD covering cable assembly products that are highly similar in material composition and manufacturing processes, differing primarily in length and connector type and quantity. This is a representative product EPD, where the reported results for each grouping reflect the worst-case results for each grouping with respect to the Global Warming Potential (GWP) indicator in A1–A3.

To account for variations in cable length and connector type and quantity, a scaling formula with scaling factors are provided, allowing users to adjust the results based on the specific attributes of a given cable assembly product. More information on the scaling formula can be found in section 7 and the underlying data to use in the formula can be found in each product's annex at the end of this document. Results from different annexes should not be used together unless otherwise specified. Due to use across product types and groups, connector results are presented separately in Appendix C.

To account for product variations, this EPD defines Product Average Groupings (henceforth referred to as Product Groups) for bulk cable elements, for cable assembly elements, and for connector elements. A cable assembly product must consider all three elements to represent a complete product.

- Bulk Cable Groups: Represent similar cables with small differences in mass and material compositions
- Cable Assembly Groups: Represents all non-cable or connector elements present in the product, such as packaging
- Connector Groups: Represent different connector types which can be applied to cables cable assemblies terminated with either two connectors or four connectors.

The most conservative set of results is reported for each group Product Group for all elements (bulk cable, cable assembly, and connector elements).

Results for complete cable assembly products are determined by applying the scaling equation to results sets from each group using the equations provided in this EPD.

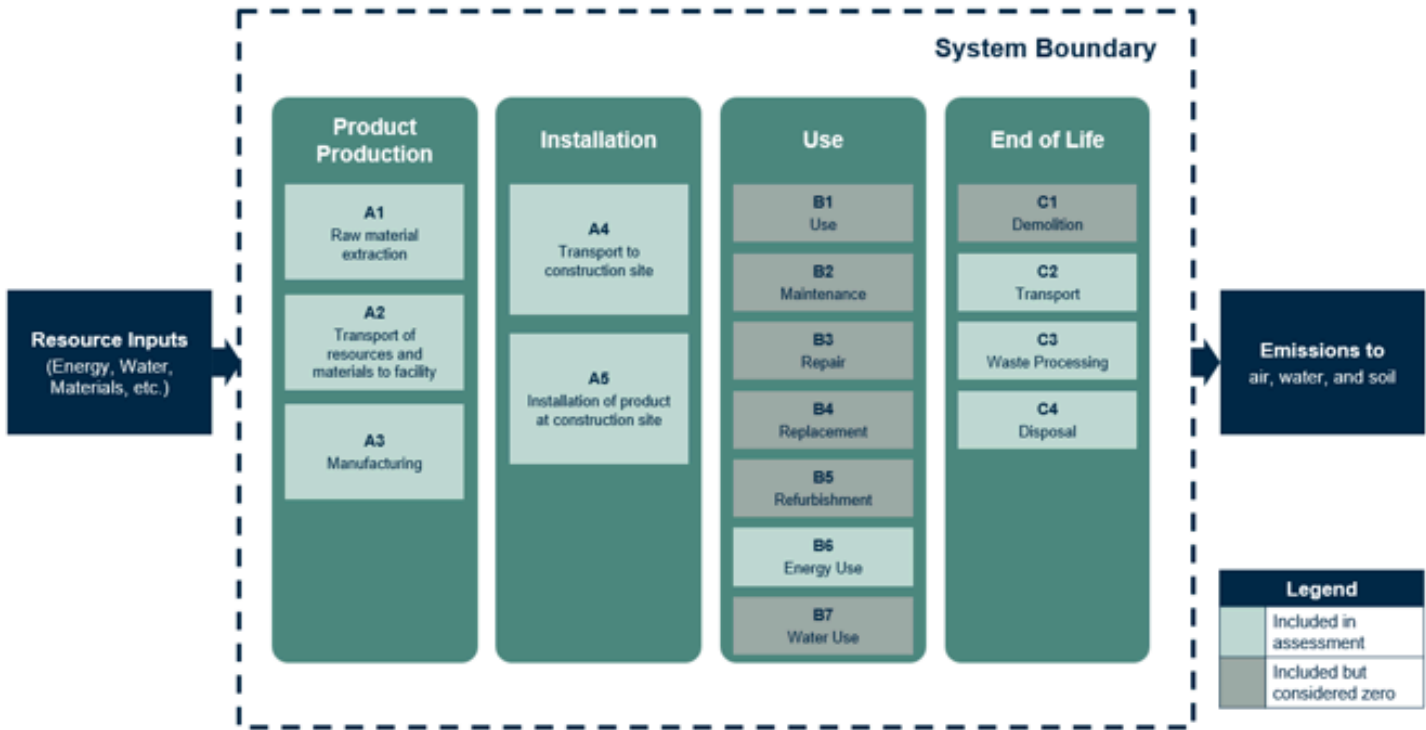
Table 2. System Boundary

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

Note:

ND = Module not declared

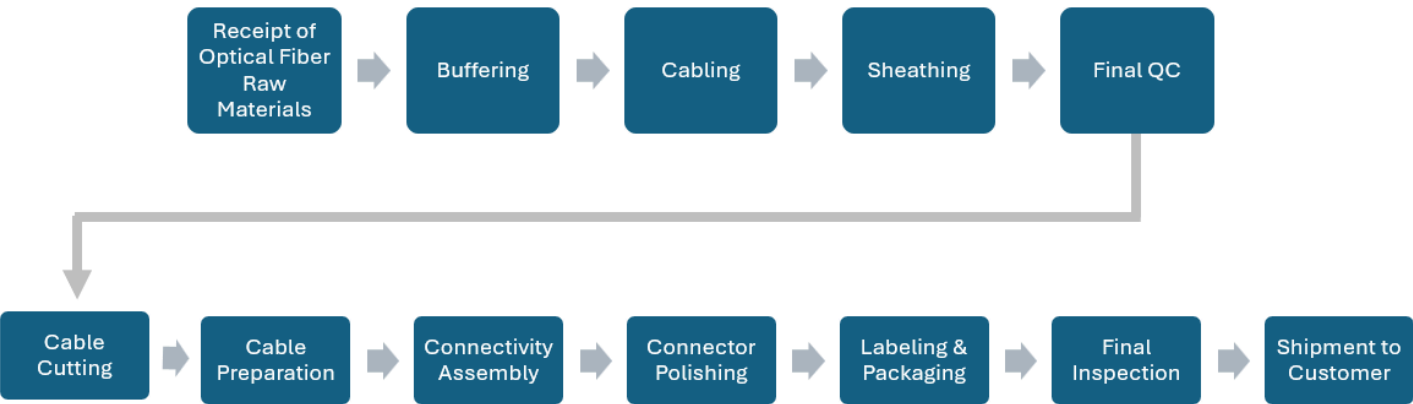
Product Composition Diagram



Plants

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

Product Flow Diagram



Software And Database

LCA Software:

☰ SimaPro v. 10.4

LCI Foreground Database(s):

☰ Ecoinvent v. 3.12 | 📍 GLO, RoW | ✂ cutoff

LCI Background Database(s):

☰ Ecoinvent v. 3.12 | 📍 GLO, RoW | ✂ cutoff

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 connector application. 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. Where primary data were not available, data from ecoinvent 3.12 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 2026. All manufacturing energy and material primary input data reflect production from 2025. 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 connector termination.
- **Reliability** – Primary data were obtained from documented AFL business records, including production, purchasing, utility, and product-specific information. Secondary data were sourced from recognized LCA databases, supplier documentation, and other reputable references and verified EPDs.
- **Accuracy** – Available primary and secondary data are considered reasonably accurate and representative of the modeled products, materials, processes, and life cycle stages. Data were reviewed for technical consistency and plausibility, and no significant issues were identified.
- **Completeness** – This analysis was conducted in alignment with the methodologies prescribed by EN 15804+A2, PEP PCR, and PEP PSR[BB12.1]. The datasets used represent all major material and energy flows, and no flows were deliberately excluded.
- **Consistency** – This analysis was conducted using uniform system boundaries, allocation approaches, modeling assumptions, impact assessment methods, and data quality evaluation procedures across all product systems included within the study.
- **Precision and Uncertainty** – Primary data were derived from measured, calculated, or documented operational records where available. Uncertainty associated with secondary datasets, proxy datasets, and modeling assumptions was evaluated through the data quality assessment and was determined to be acceptable for the intended application of this study.
- **Reproducibility** – Data sources, assumptions, calculation methods, and modeling approaches are documented throughout this report and supporting model documentation, enabling an independent practitioner to understand and reproduce the reported results.

Life Cycle Module Description

A1 - Resource Extraction

The production of cable assembly products 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. Note that electricity is considered within the A3 stage (not in the A1 stage).

For optical fiber, a supplier-provided EPD is leveraged as a proxy dataset. The supplier EPD provides a more representative dataset for optical fiber production compared to the proxy available in the ecoinvent database. Additionally, using this supplier dataset results in more conservative environmental impact results than if ecoinvent data were used. The supplier EPD was reviewed to ensure methodological consistency and this EPD's results were generated using the EF 3.1 LCIA method.

A2 - Resource Transportation

The A2 module includes the transportation of resources and materials used in the production of AFL products. Transport distances are weighted averages based on the quantity of each material type by supplier. All materials are transported to AFL production facilities via truck (road) transport, and some materials which are sourced globally consider oceanic shipments. In some instances, the transport distance and mode from supplier was unknown and a simple average transportation distance derived from the weighted average material transportation distance was applied.

A3 - Manufacturing

The manufacturing of these products takes place in two main steps. Optical fibers are coated, buffered, and reinforced with jacketing materials at the bulk cable production facility before being shipped on wooden reels to cable assembly production facility where bulk cables are terminated with single- or multi-fiber connectors. 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 packaged before downstream distribution from regional production facilities to regional markets. 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. The quantity of bulk cable that fits on a reel is calculated given a reference quantity and cable outer diameter (OD) in relation to the OD of the cable in question. 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 uses a typical downstream transportation distance for North America as this represents the longest downstream transportation distance within production regions. All shipments are assumed to be via road. Datasets used to represent transportation are uniform across the study.

A5 - Installation

During installation, 5% of the product material is assumed lost as waste. In the absence of product-specific data, this assumption is considered conservative and consistent with typical cable installation scenarios. 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 all three elements (bulk cable, connectors, and cable assembly) as it is assumed the waste originates from components across all product materials. Additionally, end-of-life of all packaging materials are considered within this stage. The transportation of both product and packaging waste to appropriate waste management facilities is included, with an assumed average transport distance of 1000 km by truck per EN 50693 guidance. The end-of-life pathways for product installation waste and packaging follow Table G.4 of EN 50693.

B1-B7 - Use

Per the PEP PSR, energy losses due to signal attenuation during use are accounted for in Module B6 (Operational Energy Use). Attenuation losses were modeled using the equations and the default attenuations rates provided within the PSR section 3.4.4. Due to variability in the electricity grid where products operate, impacts of attenuation losses were quantified using the electricity dataset Electricity, low voltage [GLO] market group for electricity, low voltage | Cut-off, U. Attenuation losses associated with the cable itself are included with results sets for bulk cables, and losses associated with connectors are included with connector results sets. Cable assembly elements results sets are 0 for B6 attenuation losses as there are no attenuation losses associated with these packaging and other misc. materials - only with cables and connectors. All AFL products within the scope of this EPD are single mode frequency products.

Modules B1–B5 (use, maintenance, repair, replacement, and refurbishment) and B7 (operational water use) are considered null, as fiber optic cable assemblies are passive transmission components that do not require energy, water, or routine maintenance during use. There are no known releases of dangerous substances to indoor air, soil, or water during the use stage of the product. Fiber optic cables are inert in use and do not emit volatile organic compounds (VOCs) or other harmful emissions under normal operating conditions. In summary, Modules B1–B5 and B7 are included and reported as zero in accordance with the PSR, while B6 represents operational energy losses due to attenuation.

C1-C4 - End-of-Life

The end-of-life of a product consists of four information modules, C1-C4. The end-of-life pathways for products follow Table G.4 of EN 50693. 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 1000 km by truck. Module C3 (waste processing) estimates impacts from shredding/dismantling, cleaning and sorting. Module C4 includes the impacts associated with end-of-life treatment of materials, with consideration for the polluter-pays principle for recycling. Recycling was modeled using a cut-off approach. Therefore, recycled content burdens associated with the production of secondary materials are included within the system boundary and potential benefits associated with the recovery of materials and energy at end of life are included in module D.

Optional Module D - Benefits and loads beyond the system boundary

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. Only incineration with energy recovery was considered in Module 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 the PSR 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 production system. The following allocation approaches were used in this study:

- **Bulk Cable Groups:** Energy, utilities, and other manufacturing inputs and outputs are allocated based on the total length of cable produced, using a per meter (m) basis as the allocation key.
- Bills of Material (BOMs) for bulk cable are also provided per meter, eliminating the need for additional allocation
- **Cable Assembly Groups:** Energy, utilities, and other manufacturing inputs and outputs are allocated on a per cable assembly (#) basis as the allocation key.
- Cable assemblies are the form in which AFL products are typically sold, and these groupings cover all non-connector inputs to the final cable assembly product.
- **Connector Groups:** 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 number of connectors regardless of its length.
- A variable number of connectors across several types can be applied to otherwise identical bulk cables to achieve different complete cable assembly products

No co-products are produced from the same product system and therefore no co-product allocation was conducted. There are no co-product allocation situations within the energy and material supply chains and production processes and allocation was done on plant-level data across production lines. Background datasets obtained from ecoinvent may contain allocation procedures applied by ecoinvent developers for multi-output processes. These allocation approaches are accepted as they are from the ecoinvent 3.12 database. Allocation choices embedded within background datasets are not expected to materially influence the overall results of the study.

Cut-off Procedure

Cut-off rules follow PEP-PCR requirements, ensuring all relevant mass and energy flows are included. 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.
- Cumulative exclusions are less than 5% for any environmental indicator in accordance with EN 15804 and PEP-PCR.
- Infrastructure, capital equipment, and personnel-related impacts are excluded from the system boundaries unless captured in background datasets
- No known precious metals or hazardous substances were intentionally excluded from the study regardless of mass contribution.
- 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

Transport to the building/construction site (A4)

A4 Module

Fuel Type:	Diesel
Liters of Fuel:	33.662 l/100km
Vehicle Type:	Truck
Transport Distance:	3447 km
Capacity Utilization:	50 %
Packaging Mass:	.14 kg
Weight of products transported:	.868 kg
Capacity utilization volume factor:	=1
Assumptions for scenario development:	The finished product and its packaging are transported together from the manufacturing facility to the point of installation by truck, over a distance of 3447 km by road. These distances are derived from AFL data representing transportation distances from manufacturing location to project. This distance is assumed representative of AFL's distribution patterns. Since packaging travels with the finished product, the same distance and mode assumptions apply to both.

Installation in to the building/construction site (A5)

A5 Module

Installation Scrap Rate Assumed:	5 %
Product Lost per Declared/Functional Unit:	0.0413 kg

Mass of Packaging Waste Specified by Type:	.14 kg
Biogenic Carbon Contained in Packaging (kg C):	0.07 kg
Assumptions for scenario development:	A 5% material scrap rate is assumed, with all scrap materials managed as installation waste in module A5. All product packaging is also assumed to be sent to end-of-life treatment at this stage. No energy or additional resources are consumed during installation. No air, water, or soil emissions are generated during installation.

Operational Energy Use (B6) & Operational Water Use (B7)

B6 & B7 Modules

End of Life (C1 - C4)

C1 - C4 Modules

Collection Process

Collected with Mixed Construction Waste:	8.26E-01 kg
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Recovery

Landfill:	4.13E-01 kg
Incineration:	4.13E-01 kg

Disposal

Product or Material for Final Disposal:	8.26E-01 kg
Removals of Biogenic Carbon:	0 kg CO2

Assumptions for scenario development:
The end-of-life pathways for products follow Table G.4 of EN 50693. All product materials are best matched to the following category in Table G.4 of EN 50693: -Other plastics or plastics containing additives/fillers (e.g. glass fibres, BFR, ...)

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

D Module

Results

Table 3. Environmental Impact Assessment Results

EF3.1, EF 3.1

per 1 m of product To transmit one communication signal over 1 m, at a wavelength of 1310 nm and 1550 nm, for 10 years and at a utilization rate of 100% in accordance with the National Electric Code® (NEC®) Standard on the product spec sheet and as defined in PSR-0001-ed4. Lifetime and use rate correspond to Data center applications as defined in the table given in Appendix 6.1. of the specific rules for wire, cables and accessories.

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 Example Product: 3456F 3028m OSP Blunt Cable (Group 6) – EN 50693 Default End-of-Life– Cradle-to-grave Scope

Impact Category	Unit	Method	A1 - A3	A4	A5	B6	C2	C3	C4	D	Total
GWP- total	kg CO2 eq	EF3.1	6.31e+0	5.60e-1	2.12e-1	6.35e-6	1.40e-1	1.03e-1	1.07e+0	-6.54e-1	7.74e+0

Impact Category	Unit	Method	A1 - A3	A4	A5	B6	C2	C3	C4	D	Total
GWP- fossil	kg CO2 eq	EF3.1	6.59e+0	5.60e-1	1.04e-1	6.31e-6	1.40e-1	1.03e-1	1.07e+0	-6.54e-1	7.91e+0
GWP-biogenic	kg CO2 eq	EF3.1	-3.09e-1	1.61e-4	1.08e-1	1.59e-7	4.03e-5	2.11e-4	9.32e-5	-7.48e-5	-2.01e-1
GWP-luluc	kg CO2 eq	EF3.1	2.24e-2	2.57e-4	1.83e-5	1.32e-8	6.41e-5	1.71e-5	1.12e-5	-5.08e-5	2.27e-2
ODP	kg CFC11 eq	EF3.1	1.19e-7	8.01e-9	4.92e-10	4.67e-14	2.00e-9	8.89e-11	4.70e-10	-1.17e-8	1.18e-7
AP	mol H+ eq	EF3.1	1.83e-2	2.56e-3	1.76e-4	3.37e-8	6.39e-4	6.22e-5	2.69e-4	-5.35e-4	2.15e-2
PM	disease incidence	EF3.1	2.27e-7	5.25e-8	3.19e-9	3.02e-13	1.31e-8	4.83e-10	2.02e-9	-3.19e-9	2.95e-7
IRP	kBq U235 eq	EF3.1	1.26e+0	6.45e-3	5.84e-4	8.42e-7	1.61e-3	9.82e-4	4.00e-4	-2.56e-3	1.27e+0
POCP	kg NMVOC eq	EF3.1	1.56e-2	3.60e-3	2.39e-4	1.92e-8	8.99e-4	5.47e-5	3.44e-4	-1.23e-3	1.95e-2
EP-fw	kg P eq	EF3.1	5.12e-4	6.17e-5	5.45e-6	3.13e-9	1.54e-5	4.54e-6	3.90e-6	-1.29e-5	5.90e-4
EP-marine	kg N eq	EF3.1	4.75e-3	9.59e-4	1.35e-4	6.54e-9	2.40e-4	2.40e-5	1.02e-3	-1.78e-4	6.95e-3
EP-terrestrial	mol N eq	EF3.1	4.87e-2	1.04e-2	7.28e-4	6.59e-8	2.60e-3	2.07e-4	1.29e-3	-1.79e-3	6.21e-2
SQI	dimensionless	EF3.1	6.29e+1	5.81e+0	3.66e-1	1.54e-5	1.45e+0	2.27e-2	3.06e-1	-1.58e-1	7.07e+1
WDP	m3 world eq deprived	EF3.1	1.43e+0	3.69e-2	-9.95e-3	9.02e-7	9.22e-3	2.55e-3	-3.58e-2	-9.87e-3	1.42e+0
ADP-fossil	MJ, net calorific value	EF3.1	1.33e+2	7.73e+0	4.65e-1	7.07e-5	1.93e+0	1.04e-1	2.93e-1	-1.05e+1	1.33e+2
ADP-minerals&metals	kg Sb eq	EF3.1	1.94e-5	1.80e-6	1.03e-7	3.90e-11	4.51e-7	1.29e-8	5.93e-8	-1.75e-7	2.17e-5
GWP-IOBC	kg CO2 eq	EF 3.1	6.69e+0	5.63e-1	2.12e-1	6.48e-6	1.41e-1	1.03e-1	1.07e+0	-6.55e-1	8.12e+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:

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.

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 OSP Blunt Bulk Cable Group 1 – EN 50693 Default End-of-Life– Cradle-to-grave Scope

Impact Category	Unit	Method	A1 - A3	A4	A5	B6	C2	C3	C4	D	Total
GWP- total	kg CO2 eq	EF3.1	7.14e-1	8.28e-2	5.32e-2	5.44e-6	1.71e-2	1.26e-2	1.31e-1	-2.24e-1	7.87e-1
GWP- fossil	kg CO2 eq	EF3.1	7.75e-1	8.27e-2	2.02e-2	5.41e-6	1.71e-2	1.26e-2	1.31e-1	-2.24e-1	8.15e-1
GWP-biogenic	kg CO2 eq	EF3.1	-6.37e-2	2.38e-5	3.30e-2	1.36e-7	4.93e-6	2.58e-5	1.14e-5	-2.56e-5	-3.07e-2
GWP-luluc	kg CO2 eq	EF3.1	1.64e-3	3.79e-5	4.77e-6	1.13e-8	7.84e-6	2.09e-6	1.37e-6	-1.74e-5	1.68e-3
ODP	kg CFC11 eq	EF3.1	1.52e-8	1.18e-9	1.28e-10	4.00e-14	2.45e-10	1.09e-11	5.75e-11	-4.02e-9	1.28e-8
AP	mol H+ eq	EF3.1	3.36e-3	3.78e-4	4.52e-5	2.89e-8	7.81e-5	7.60e-6	3.29e-5	-1.83e-4	3.72e-3
PM	disease incidence	EF3.1	4.58e-8	7.75e-9	8.38e-10	2.58e-13	1.60e-9	5.91e-11	2.47e-10	-1.09e-9	5.52e-8
IRP	kBq U235 eq	EF3.1	7.64e-2	9.52e-4	1.52e-4	7.21e-7	1.97e-4	1.20e-4	4.89e-5	-8.76e-4	7.70e-2
POCP	kg NMVOC eq	EF3.1	2.75e-3	5.32e-4	6.18e-5	1.64e-8	1.10e-4	6.68e-6	4.20e-5	-4.23e-4	3.08e-3
EP-fw	kg P eq	EF3.1	1.47e-4	9.12e-6	1.46e-6	2.68e-9	1.89e-6	5.55e-7	4.77e-7	-4.43e-6	1.56e-4
EP-marine	kg N eq	EF3.1	7.79e-4	1.42e-4	2.99e-5	5.60e-9	2.93e-5	2.93e-6	1.25e-4	-6.11e-5	1.05e-3
EP-terrestrial	mol N eq	EF3.1	7.75e-3	1.54e-3	1.87e-4	5.64e-8	3.18e-4	2.53e-5	1.57e-4	-6.12e-4	9.37e-3
SQI	dimensionless	EF3.1	9.44e+0	8.59e-1	9.62e-2	1.32e-5	1.78e-1	2.77e-3	3.74e-2	-5.41e-2	1.06e+1
WDP	m3 world eq deprived	EF3.1	1.93e-1	5.45e-3	-2.83e-3	7.72e-7	1.13e-3	3.12e-4	-4.37e-3	-3.38e-3	1.89e-1
ADP-fossil	MJ, net calorific value	EF3.1	1.34e+1	1.14e+0	1.22e-1	6.06e-5	2.36e-1	1.27e-2	3.58e-2	-3.58e+0	1.14e+1
ADP-minerals&metals	kg Sb eq	EF3.1	3.50e-6	2.67e-7	2.69e-8	3.34e-11	5.51e-8	1.57e-9	7.25e-9	-6.00e-8	3.80e-6
GWP-IOBC	kg CO2 eq	EF 3.1	8.11e-1	8.32e-2	5.32e-2	5.55e-6	1.72e-2	1.26e-2	1.31e-1	-2.24e-1	8.84e-1

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 OSP Blunt Bulk Cable Group 2 – EN 50693 Default End-of-Life– Cradle-to-grave Scope

Impact Category	Unit	Method	A1 - A3	A4	A5	B6	C2	C3	C4	D	Total
GWP- total	kg CO2 eq	EF3.1	1.36e+0	1.15e-1	7.35e-2	5.44e-6	2.37e-2	1.75e-2	1.82e-1	-3.13e-1	1.46e+0
GWP- fossil	kg CO2 eq	EF3.1	1.46e+0	1.15e-1	2.79e-2	5.41e-6	2.37e-2	1.75e-2	1.82e-1	-3.13e-1	1.51e+0
GWP-biogenic	kg CO2 eq	EF3.1	-1.01e-1	3.30e-5	4.56e-2	1.36e-7	6.83e-6	3.57e-5	1.58e-5	-3.58e-5	-5.53e-2
GWP-luluc	kg CO2 eq	EF3.1	8.82e-4	5.25e-5	6.60e-6	1.13e-8	1.09e-5	2.90e-6	1.90e-6	-2.43e-5	9.33e-4
ODP	kg CFC11 eq	EF3.1	8.00e-8	1.64e-9	1.77e-10	4.00e-14	3.39e-10	1.51e-11	7.97e-11	-5.62e-9	7.66e-8
AP	mol H+ eq	EF3.1	5.13e-3	5.23e-4	6.26e-5	2.89e-8	1.08e-4	1.05e-5	4.56e-5	-2.56e-4	5.62e-3
PM	disease incidence	EF3.1	6.54e-8	1.07e-8	1.16e-9	2.58e-13	2.22e-9	8.19e-11	3.42e-10	-1.53e-9	7.84e-8
IRP	kBq U235 eq	EF3.1	1.94e-1	1.32e-3	2.11e-4	7.21e-7	2.73e-4	1.66e-4	6.77e-5	-1.22e-3	1.95e-1
POCP	kg NMVOC eq	EF3.1	4.19e-3	7.37e-4	8.55e-5	1.64e-8	1.52e-4	9.27e-6	5.83e-5	-5.91e-4	4.64e-3
EP-fw	kg P eq	EF3.1	1.61e-4	1.26e-5	2.01e-6	2.68e-9	2.61e-6	7.70e-7	6.62e-7	-6.19e-6	1.73e-4
EP-marine	kg N eq	EF3.1	1.32e-3	1.96e-4	4.14e-5	5.60e-9	4.06e-5	4.06e-6	1.74e-4	-8.54e-5	1.69e-3
EP-terrestrial	mol N eq	EF3.1	1.21e-2	2.13e-3	2.58e-4	5.64e-8	4.41e-4	3.51e-5	2.18e-4	-8.56e-4	1.43e-2
SQI	dimensionless	EF3.1	1.49e+1	1.19e+0	1.33e-1	1.32e-5	2.46e-1	3.85e-3	5.19e-2	-7.56e-2	1.64e+1
WDP	m3 world eq deprived	EF3.1	4.60e-1	7.55e-3	-3.92e-3	7.72e-7	1.56e-3	4.33e-4	-6.06e-3	-4.72e-3	4.55e-1
ADP-fossil	MJ, net calorific value	EF3.1	2.68e+1	1.58e+0	1.69e-1	6.06e-5	3.27e-1	1.76e-2	4.96e-2	-5.00e+0	2.39e+1
ADP-minerals&metals	kg Sb eq	EF3.1	4.78e-6	3.69e-7	3.72e-8	3.34e-11	7.64e-8	2.18e-9	1.00e-8	-8.39e-8	5.19e-6
GWP-IOBC	kg CO2 eq	EF 3.1	1.49e+0	1.15e-1	7.36e-2	5.55e-6	2.38e-2	1.75e-2	1.82e-1	-3.13e-1	1.59e+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:

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 OSP Blunt Bulk Cable Group 3 – EN 50693 Default End-of-Life– Cradle-to-grave Scope

Impact Category	Unit	Method	A1 - A3	A4	A5	B6	C2	C3	C4	D	Total
GWP- total	kg CO2 eq	EF3.1	2.42e+0	2.47e-1	1.21e-1	5.44e-6	5.71e-2	4.20e-2	4.37e-1	-6.87e-1	2.64e+0
GWP- fossil	kg CO2 eq	EF3.1	2.58e+0	2.46e-1	5.18e-2	5.41e-6	5.70e-2	4.20e-2	4.37e-1	-6.87e-1	2.73e+0
GWP-biogenic	kg CO2 eq	EF3.1	-1.70e-1	7.11e-5	6.92e-2	1.36e-7	1.64e-5	8.59e-5	3.80e-5	-7.86e-5	-1.01e-1
GWP-luluc	kg CO2 eq	EF3.1	1.64e-3	1.13e-4	1.07e-5	1.13e-8	2.61e-5	6.97e-6	4.56e-6	-5.34e-5	1.75e-3
ODP	kg CFC11 eq	EF3.1	6.28e-8	3.53e-9	2.87e-10	4.00e-14	8.16e-10	3.62e-11	1.92e-10	-1.23e-8	5.54e-8
AP	mol H+ eq	EF3.1	8.06e-3	1.13e-3	1.02e-4	2.89e-8	2.60e-4	2.53e-5	1.10e-4	-5.62e-4	9.13e-3
PM	disease incidence	EF3.1	1.04e-7	2.31e-8	1.87e-9	2.58e-13	5.35e-9	1.97e-10	8.22e-10	-3.35e-9	1.32e-7
IRP	kBq U235 eq	EF3.1	3.57e-1	2.84e-3	3.42e-4	7.21e-7	6.57e-4	4.00e-4	1.63e-4	-2.69e-3	3.59e-1
POCP	kg NMVOC eq	EF3.1	7.80e-3	1.58e-3	1.39e-4	1.64e-8	3.67e-4	2.23e-5	1.40e-4	-1.30e-3	8.75e-3
EP-fw	kg P eq	EF3.1	3.11e-4	2.72e-5	3.23e-6	2.68e-9	6.29e-6	1.85e-6	1.59e-6	-1.36e-5	3.38e-4
EP-marine	kg N eq	EF3.1	1.98e-3	4.22e-4	7.21e-5	5.60e-9	9.76e-5	9.78e-6	4.18e-4	-1.87e-4	2.81e-3
EP-terrestrial	mol N eq	EF3.1	2.04e-2	4.58e-3	4.21e-4	5.64e-8	1.06e-3	8.43e-5	5.24e-4	-1.88e-3	2.52e-2
SQI	dimensionless	EF3.1	2.64e+1	2.56e+0	2.15e-1	1.32e-5	5.92e-1	9.25e-3	1.25e-1	-1.66e-1	2.97e+1
WDP	m3 world eq deprived	EF3.1	6.13e-1	1.62e-2	-6.11e-3	7.72e-7	3.76e-3	1.04e-3	-1.46e-2	-1.04e-2	6.03e-1
ADP-fossil	MJ, net calorific value	EF3.1	5.42e+1	3.40e+0	2.73e-1	6.06e-5	7.87e-1	4.24e-2	1.19e-1	-1.10e+1	4.78e+1
ADP-minerals&metals	kg Sb eq	EF3.1	9.12e-6	7.94e-7	6.03e-8	3.34e-11	1.84e-7	5.25e-9	2.42e-8	-1.84e-7	1.00e-5
GWP-IOBC	kg CO2 eq	EF 3.1	2.63e+0	2.48e-1	1.21e-1	5.55e-6	5.74e-2	4.21e-2	4.37e-1	-6.88e-1	2.85e+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:

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 OSP Blunt Bulk Cable Group 4 – EN 50693 Default End-of-Life– Cradle-to-grave Scope

Impact Category	Unit	Method	A1 - A3	A4	A5	B6	C2	C3	C4	D	Total
GWP- total	kg CO2 eq	EF3.1	3.33e+0	3.32e-1	1.82e-1	5.44e-6	7.37e-2	5.43e-2	5.64e-1	-9.13e-1	3.62e+0
GWP- fossil	kg CO2 eq	EF3.1	3.59e+0	3.32e-1	7.40e-2	5.41e-6	7.36e-2	5.43e-2	5.64e-1	-9.13e-1	3.77e+0
GWP-biogenic	kg CO2 eq	EF3.1	-2.57e-1	9.56e-5	1.08e-1	1.36e-7	2.12e-5	1.11e-4	4.91e-5	-1.04e-4	-1.49e-1
GWP-luluc	kg CO2 eq	EF3.1	2.05e-3	1.52e-4	1.62e-5	1.13e-8	3.37e-5	9.01e-6	5.89e-6	-7.09e-5	2.20e-3
ODP	kg CFC11 eq	EF3.1	1.49e-7	4.75e-9	4.35e-10	4.00e-14	1.05e-9	4.68e-11	2.48e-10	-1.64e-8	1.39e-7
AP	mol H+ eq	EF3.1	1.17e-2	1.51e-3	1.54e-4	2.89e-8	3.36e-4	3.27e-5	1.42e-4	-7.48e-4	1.31e-2
PM	disease incidence	EF3.1	1.51e-7	3.11e-8	2.84e-9	2.58e-13	6.90e-9	2.54e-10	1.06e-9	-4.45e-9	1.89e-7
IRP	kBq U235 eq	EF3.1	4.52e-1	3.82e-3	5.17e-4	7.21e-7	8.48e-4	5.17e-4	2.10e-4	-3.57e-3	4.54e-1
POCP	kg NMVOC eq	EF3.1	1.05e-2	2.13e-3	2.10e-4	1.64e-8	4.74e-4	2.88e-5	1.81e-4	-1.72e-3	1.18e-2
EP-fw	kg P eq	EF3.1	3.80e-4	3.66e-5	4.91e-6	2.68e-9	8.12e-6	2.39e-6	2.06e-6	-1.81e-5	4.16e-4
EP-marine	kg N eq	EF3.1	3.09e-3	5.68e-4	1.06e-4	5.60e-9	1.26e-4	1.26e-5	5.39e-4	-2.49e-4	4.19e-3
EP-terrestrial	mol N eq	EF3.1	2.84e-2	6.17e-3	6.36e-4	5.64e-8	1.37e-3	1.09e-4	6.77e-4	-2.50e-3	3.49e-2
SQI	dimensionless	EF3.1	3.66e+1	3.44e+0	3.26e-1	1.32e-5	7.65e-1	1.19e-2	1.61e-1	-2.21e-1	4.11e+1
WDP	m3 world eq deprived	EF3.1	1.22e+0	2.19e-2	-9.41e-3	7.72e-7	4.85e-3	1.34e-3	-1.88e-2	-1.38e-2	1.21e+0
ADP-fossil	MJ, net calorific value	EF3.1	7.08e+1	4.58e+0	4.13e-1	6.06e-5	1.02e+0	5.47e-2	1.54e-1	-1.46e+1	6.24e+1
ADP-minerals&metals	kg Sb eq	EF3.1	1.10e-5	1.07e-6	9.13e-8	3.34e-11	2.37e-7	6.78e-9	3.12e-8	-2.45e-7	1.22e-5
GWP-IOBC	kg CO2 eq	EF 3.1	3.65e+0	3.34e-1	1.82e-1	5.55e-6	7.41e-2	5.44e-2	5.65e-1	-9.14e-1	3.95e+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:

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 OSP Blunt Bulk Cable Group 5 – EN 50693 Default End-of-Life– Cradle-to-grave Scope

Impact Category	Unit	Method	A1 - A3	A4	A5	B6	C2	C3	C4	D	Total
GWP- total	kg CO2 eq	EF3.1	5.28e+0	4.75e-1	1.93e-1	5.44e-6	1.17e-1	8.59e-2	8.93e-1	-5.67e-1	6.48e+0
GWP- fossil	kg CO2 eq	EF3.1	5.54e+0	4.75e-1	9.08e-2	5.41e-6	1.16e-1	8.58e-2	8.93e-1	-5.67e-1	6.63e+0
GWP-biogenic	kg CO2 eq	EF3.1	-2.82e-1	1.37e-4	1.02e-1	1.36e-7	3.36e-5	1.76e-4	7.76e-5	-6.49e-5	-1.80e-1
GWP-luluc	kg CO2 eq	EF3.1	1.88e-2	2.18e-4	1.67e-5	1.13e-8	5.34e-5	1.42e-5	9.32e-6	-4.40e-5	1.91e-2
ODP	kg CFC11 eq	EF3.1	9.97e-8	6.80e-9	4.51e-10	4.00e-14	1.67e-9	7.40e-11	3.92e-10	-1.02e-8	9.89e-8
AP	mol H+ eq	EF3.1	1.55e-2	2.17e-3	1.61e-4	2.89e-8	5.32e-4	5.18e-5	2.24e-4	-4.64e-4	1.82e-2
PM	disease incidence	EF3.1	1.93e-7	4.45e-8	2.93e-9	2.58e-13	1.09e-8	4.02e-10	1.68e-9	-2.76e-9	2.51e-7
IRP	kBq U235 eq	EF3.1	1.05e+0	5.47e-3	5.35e-4	7.21e-7	1.34e-3	8.17e-4	3.33e-4	-2.22e-3	1.06e+0
POCP	kg NMVOC eq	EF3.1	1.32e-2	3.05e-3	2.19e-4	1.64e-8	7.49e-4	4.55e-5	2.86e-4	-1.07e-3	1.65e-2
EP-fw	kg P eq	EF3.1	4.38e-4	5.24e-5	5.01e-6	2.68e-9	1.28e-5	3.78e-6	3.25e-6	-1.12e-5	5.04e-4
EP-marine	kg N eq	EF3.1	4.02e-3	8.13e-4	1.20e-4	5.60e-9	1.99e-4	2.00e-5	8.53e-4	-1.55e-4	5.87e-3
EP-terrestrial	mol N eq	EF3.1	4.12e-2	8.83e-3	6.65e-4	5.64e-8	2.17e-3	1.72e-4	1.07e-3	-1.55e-3	5.26e-2
SQI	dimensionless	EF3.1	5.47e+1	4.93e+0	3.36e-1	1.32e-5	1.21e+0	1.89e-2	2.55e-1	-1.37e-1	6.13e+1
WDP	m3 world eq deprived	EF3.1	1.19e+0	3.13e-2	-9.26e-3	7.72e-7	7.68e-3	2.13e-3	-2.98e-2	-8.56e-3	1.18e+0
ADP-fossil	MJ, net calorific value	EF3.1	1.12e+2	6.56e+0	4.27e-1	6.06e-5	1.61e+0	8.66e-2	2.44e-1	-9.07e+0	1.12e+2
ADP-minerals&metals	kg Sb eq	EF3.1	1.64e-5	1.53e-6	9.45e-8	3.34e-11	3.75e-7	1.07e-8	4.94e-8	-1.52e-7	1.83e-5
GWP-IOBC	kg CO2 eq	EF 3.1	5.63e+0	4.78e-1	1.93e-1	5.55e-6	1.17e-1	8.60e-2	8.93e-1	-5.67e-1	6.83e+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:

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 OSP Blunt Bulk Cable Group 6 – EN 50693 Default End-of-Life– Cradle-to-grave Scope

Impact Category	Unit	Method	A1 - A3	A4	A5	B6	C2	C3	C4	D	Total
GWP- total	kg CO2 eq	EF3.1	6.31e+0	5.60e-1	2.12e-1	5.44e-6	1.40e-1	1.03e-1	1.07e+0	-6.54e-1	7.74e+0
GWP- fossil	kg CO2 eq	EF3.1	6.59e+0	5.60e-1	1.04e-1	5.41e-6	1.40e-1	1.03e-1	1.07e+0	-6.54e-1	7.91e+0
GWP-biogenic	kg CO2 eq	EF3.1	-3.09e-1	1.61e-4	1.08e-1	1.36e-7	4.03e-5	2.11e-4	9.32e-5	-7.48e-5	-2.01e-1
GWP-luluc	kg CO2 eq	EF3.1	2.24e-2	2.57e-4	1.83e-5	1.13e-8	6.41e-5	1.71e-5	1.12e-5	-5.08e-5	2.27e-2
ODP	kg CFC11 eq	EF3.1	1.19e-7	8.01e-9	4.92e-10	4.00e-14	2.00e-9	8.89e-11	4.70e-10	-1.17e-8	1.18e-7
AP	mol H+ eq	EF3.1	1.83e-2	2.56e-3	1.76e-4	2.89e-8	6.39e-4	6.22e-5	2.69e-4	-5.35e-4	2.15e-2
PM	disease incidence	EF3.1	2.27e-7	5.25e-8	3.19e-9	2.58e-13	1.31e-8	4.83e-10	2.02e-9	-3.19e-9	2.95e-7
IRP	kBq U235 eq	EF3.1	1.26e+0	6.45e-3	5.84e-4	7.21e-7	1.61e-3	9.82e-4	4.00e-4	-2.56e-3	1.27e+0
POCP	kg NMVOC eq	EF3.1	1.56e-2	3.60e-3	2.39e-4	1.64e-8	8.99e-4	5.47e-5	3.44e-4	-1.23e-3	1.95e-2
EP-fw	kg P eq	EF3.1	5.12e-4	6.17e-5	5.45e-6	2.68e-9	1.54e-5	4.54e-6	3.90e-6	-1.29e-5	5.90e-4
EP-marine	kg N eq	EF3.1	4.75e-3	9.59e-4	1.35e-4	5.60e-9	2.40e-4	2.40e-5	1.02e-3	-1.78e-4	6.95e-3
EP-terrestrial	mol N eq	EF3.1	4.87e-2	1.04e-2	7.28e-4	5.64e-8	2.60e-3	2.07e-4	1.29e-3	-1.79e-3	6.21e-2
SQI	dimensionless	EF3.1	6.29e+1	5.81e+0	3.66e-1	1.32e-5	1.45e+0	2.27e-2	3.06e-1	-1.58e-1	7.07e+1
WDP	m3 world eq deprived	EF3.1	1.43e+0	3.69e-2	-9.95e-3	7.72e-7	9.22e-3	2.55e-3	-3.58e-2	-9.87e-3	1.42e+0
ADP-fossil	MJ, net calorific value	EF3.1	1.33e+2	7.73e+0	4.65e-1	6.06e-5	1.93e+0	1.04e-1	2.93e-1	-1.05e+1	1.33e+2
ADP-minerals&metals	kg Sb eq	EF3.1	1.94e-5	1.80e-6	1.03e-7	3.34e-11	4.51e-7	1.29e-8	5.93e-8	-1.75e-7	2.17e-5
GWP-IOBC	kg CO2 eq	EF 3.1	6.69e+0	5.63e-1	2.12e-1	5.55e-6	1.41e-1	1.03e-1	1.07e+0	-6.55e-1	8.12e+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:

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 unit of attenuation losses via fusion splicing – EN 50693 Default End-of-Life– Cradle-to-grave Scope

Impact Category	Unit	Method	A1 - A3	A4	A5	B6	C2	C3	C4	D	Total
GWP- total	kg CO2 eq	EF3.1	0	0	0	1.39e-3	0	0	0	0	1.39e-3
GWP- fossil	kg CO2 eq	EF3.1	0	0	0	1.38e-3	0	0	0	0	1.38e-3
GWP-biogenic	kg CO2 eq	EF3.1	0	0	0	3.49e-5	0	0	0	0	3.49e-5
GWP-luluc	kg CO2 eq	EF3.1	0	0	0	2.89e-6	0	0	0	0	2.89e-6
ODP	kg CFC11 eq	EF3.1	0	0	0	1.02e-11	0	0	0	0	1.02e-11
AP	mol H+ eq	EF3.1	0	0	0	7.38e-6	0	0	0	0	7.38e-6
PM	disease incidence	EF3.1	0	0	0	6.60e-11	0	0	0	0	6.60e-11
IRP	kBq U235 eq	EF3.1	0	0	0	1.84e-4	0	0	0	0	1.84e-4
POCP	kg NMVOC eq	EF3.1	0	0	0	4.19e-6	0	0	0	0	4.19e-6
EP-fw	kg P eq	EF3.1	0	0	0	6.85e-7	0	0	0	0	6.85e-7
EP-marine	kg N eq	EF3.1	0	0	0	1.43e-6	0	0	0	0	1.43e-6
EP-terrestrial	mol N eq	EF3.1	0	0	0	1.44e-5	0	0	0	0	1.44e-5
SQI	dimensionless	EF3.1	0	0	0	3.37e-3	0	0	0	0	3.37e-3
WDP	m3 world eq deprived	EF3.1	0	0	0	1.97e-4	0	0	0	0	1.97e-4
ADP-fossil	MJ, net calorific value	EF3.1	0	0	0	1.55e-2	0	0	0	0	1.55e-2
ADP-minerals&metals	kg Sb eq	EF3.1	0	0	0	8.53e-9	0	0	0	0	8.53e-9
GWP-IOBC	kg CO2 eq	EF 3.1	0	0	0	1.42e-3	0	0	0	0	1.42e-3

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.

Table 4. Resource Use Indicator

per 1 m of product To transmit one communication signal over 1 m, at a wavelength of 1310 nm and 1550 nm, for 10 years and at a utilization rate of 100% in accordance with the National Electric Code® (NEC®) Standard on the product spec sheet and as defined in PSR-0001-ed4. Lifetime and use rate correspond to Data center applications as defined in the table given in Appendix 6.1. of the specific rules for wire, cables and accessories.

Resource Use Results Summary for 1 meter of Example Product: 3456F 3028m OSP Blunt Cable (Group 6) – EN 50693 Default End-of-Life– Cradle-to-grave Scope

Indicator	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D	Total
PERE	MJ	2.42e+1	1.09e-1	9.28e-3	1.34e-5	2.71e-2	1.30e-2	9.08e-3	-3.46e-2	2.43e+1
PERM	MJ	2.03e+0	0	0	0	0	0	0	0	2.03e+0
PERT	MJ	2.62e+1	1.09e-1	9.28e-3	0	2.71e-2	1.30e-2	9.08e-3	0	2.64e+1
PENRE	MJ	1.35e+2	7.83e+0	4.74e-1	8.41e-5	1.96e+0	1.20e-1	2.99e-1	-1.05e+1	1.35e+2
PENRM	MJ	1.21e+1	0	0	0	0	0	0	0	1.21e+1
PENRT	MJ	1.47e+2	7.83e+0	4.74e-1	0	1.96e+0	1.20e-1	2.99e-1	0	1.58e+2
ADP-fossil	MJ	1.33e+2	7.73e+0	4.65e-1	7.07e-5	1.93e+0	1.04e-1	2.93e-1	-1.05e+1	1.33e+2
SM	kg	0	0	0	0	0	0	0	0	0.00e+0
RSF	MJ	0	0	0	0	0	0	0	0	0.00e+0
NRSF	MJ	0	0	0	0	0	0	0	0	0.00e+0
FW	m3	4.07e-2	1.02e-3	-1.93e-4	3.82e-8	2.55e-4	9.44e-5	-4.46e-4	-2.75e-4	4.12e-2

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, NRPRM 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.

Resource Use Results Summary for 1 meter of OSP Blunt Bulk Cable Group 1 – EN 50693 Default End-of-Life– Cradle-to-grave Scope

Indicator	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D	Total
PERE	MJ	2.55e+0	1.60e-2	2.41e-3	1.14e-5	3.32e-3	1.59e-3	1.11e-3	-1.18e-2	2.56e+0
PERM	MJ	6.19e-1	0	0	0	0	0	0	0	6.19e-1
PERT	MJ	3.17e+0	1.60e-2	2.41e-3	0	3.32e-3	1.59e-3	1.11e-3	0	3.19e+0
PENRE	MJ	1.41e+1	1.16e+0	1.24e-1	7.20e-5	2.39e-1	1.46e-2	3.66e-2	-3.59e+0	1.21e+1
PENRM	MJ	4.33e+0	0	0	0	0	0	0	0	4.33e+0
PENRT	MJ	1.84e+1	1.16e+0	1.24e-1	0	2.39e-1	1.46e-2	3.66e-2	0	2.00e+1
ADP-fossil	MJ	1.34e+1	1.14e+0	1.22e-1	6.06e-5	2.36e-1	1.27e-2	3.58e-2	-3.58e+0	1.14e+1
SM	kg	0	0	0	0	0	0	0	0	0.00e+0
RSF	MJ	0	0	0	0	0	0	0	0	0.00e+0
NRSF	MJ	0	0	0	0	0	0	0	0	0.00e+0
FW	m3	5.12e-3	1.51e-4	-5.83e-5	3.27e-8	3.12e-5	1.15e-5	-5.45e-5	-9.41e-5	5.11e-3

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, NRPRRT 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.

Resource Use Results Summary for 1 meter of OSP Blunt Bulk Cable Group 2 – EN 50693 Default End-of-Life– Cradle-to-grave Scope

Indicator	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D	Total
PERE	MJ	4.80e+0	2.22e-2	3.33e-3	1.14e-5	4.60e-3	2.21e-3	1.54e-3	-1.65e-2	4.82e+0
PERM	MJ	8.56e-1	0	0	0	0	0	0	0	8.56e-1
PERT	MJ	5.65e+0	2.22e-2	3.33e-3	0	4.60e-3	2.21e-3	1.54e-3	0	5.68e+0
PENRE	MJ	2.79e+1	1.60e+0	1.72e-1	7.20e-5	3.31e-1	2.03e-2	5.07e-2	-5.02e+0	2.51e+1
PENRM	MJ	6.08e+0	0	0	0	0	0	0	0	6.08e+0
PENRT	MJ	3.40e+1	1.60e+0	1.72e-1	0	3.31e-1	2.03e-2	5.07e-2	0	3.62e+1
ADP-fossil	MJ	2.68e+1	1.58e+0	1.69e-1	6.06e-5	3.27e-1	1.76e-2	4.96e-2	-5.00e+0	2.39e+1
SM	kg	0	0	0	0	0	0	0	0	0.00e+0
RSF	MJ	0	0	0	0	0	0	0	0	0.00e+0
NRSF	MJ	0	0	0	0	0	0	0	0	0.00e+0
FW	m3	1.20e-2	2.09e-4	-8.06e-5	3.27e-8	4.33e-5	1.60e-5	-7.56e-5	-1.32e-4	1.20e-2

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, NRPRRT 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.

Resource Use Results Summary for 1 meter of OSP Blunt Bulk Cable Group 3 – EN 50693 Default End-of-Life– Cradle-to-grave Scope

Indicator	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D	Total
PERE	MJ	8.39e+0	4.78e-2	5.41e-3	1.14e-5	1.11e-2	5.31e-3	3.70e-3	-3.63e-2	8.43e+0
PERM	MJ	1.30e+0	0	0	0	0	0	0	0	1.30e+0
PERT	MJ	9.69e+0	4.78e-2	5.41e-3	0	1.11e-2	5.31e-3	3.70e-3	0	9.76e+0
PENRE	MJ	5.53e+1	3.45e+0	2.78e-1	7.20e-5	7.97e-1	4.87e-2	1.22e-1	-1.10e+1	4.90e+1
PENRM	MJ	1.49e+1	0	0	0	0	0	0	0	1.49e+1
PENRT	MJ	7.02e+1	3.45e+0	2.78e-1	0	7.97e-1	4.87e-2	1.22e-1	0	7.49e+1
ADP-fossil	MJ	5.42e+1	3.40e+0	2.73e-1	6.06e-5	7.87e-1	4.24e-2	1.19e-1	-1.10e+1	4.78e+1
SM	kg	0	0	0	0	0	0	0	0	0.00e+0
RSF	MJ	0	0	0	0	0	0	0	0	0.00e+0
NRSF	MJ	0	0	0	0	0	0	0	0	0.00e+0
FW	m3	1.68e-2	4.50e-4	-1.23e-4	3.27e-8	1.04e-4	3.85e-5	-1.82e-4	-2.89e-4	1.68e-2

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, NRPRRT 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.

Resource Use Results Summary for 1 meter of OSP Blunt Bulk Cable Group 4 – EN 50693 Default End-of-Life– Cradle-to-grave Scope

Indicator	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D	Total
PERE	MJ	1.13e+1	6.43e-2	8.17e-3	1.14e-5	1.43e-2	6.86e-3	4.78e-3	-4.83e-2	1.14e+1
PERM	MJ	2.03e+0	0	0	0	0	0	0	0	2.03e+0
PERT	MJ	1.33e+1	6.43e-2	8.17e-3	0	1.43e-2	6.86e-3	4.78e-3	0	1.34e+1
PENRE	MJ	7.29e+1	4.64e+0	4.21e-1	7.20e-5	1.03e+0	6.30e-2	1.57e-1	-1.47e+1	6.45e+1
PENRM	MJ	1.91e+1	0	0	0	0	0	0	0	1.91e+1
PENRT	MJ	9.19e+1	4.64e+0	4.21e-1	0	1.03e+0	6.30e-2	1.57e-1	0	9.82e+1
ADP-fossil	MJ	7.08e+1	4.58e+0	4.13e-1	6.06e-5	1.02e+0	5.47e-2	1.54e-1	-1.46e+1	6.24e+1
SM	kg	0	0	0	0	0	0	0	0	0.00e+0
RSF	MJ	0	0	0	0	0	0	0	0	0.00e+0
NRSF	MJ	0	0	0	0	0	0	0	0	0.00e+0
FW	m3	3.18e-2	6.05e-4	-1.91e-4	3.27e-8	1.34e-4	4.97e-5	-2.35e-4	-3.84e-4	3.18e-2

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, NRPRRT 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.

Resource Use Results Summary for 1 meter of OSP Blunt Bulk Cable Group 5 – EN 50693 Default End-of-Life– Cradle-to-grave Scope

Indicator	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D	Total
PERE	MJ	2.06e+1	9.21e-2	8.50e-3	1.14e-5	2.26e-2	1.09e-2	7.56e-3	-3.00e-2	2.07e+1
PERM	MJ	1.91e+0	0	0	0	0	0	0	0	1.91e+0
PERT	MJ	2.25e+1	9.21e-2	8.50e-3	0	2.26e-2	1.09e-2	7.56e-3	0	2.26e+1
PENRE	MJ	1.13e+2	6.64e+0	4.35e-1	7.20e-5	1.63e+0	9.96e-2	2.49e-1	-9.10e+0	1.13e+2
PENRM	MJ	1.00e+1	0	0	0	0	0	0	0	1.00e+1
PENRT	MJ	1.23e+2	6.64e+0	4.35e-1	0	1.63e+0	9.96e-2	2.49e-1	0	1.32e+2
ADP-fossil	MJ	1.12e+2	6.56e+0	4.27e-1	6.06e-5	1.61e+0	8.66e-2	2.44e-1	-9.07e+0	1.12e+2
SM	kg	0	0	0	0	0	0	0	0	0.00e+0
RSF	MJ	0	0	0	0	0	0	0	0	0.00e+0
NRSF	MJ	0	0	0	0	0	0	0	0	0.00e+0
FW	m3	3.41e-2	8.67e-4	-1.82e-4	3.27e-8	2.13e-4	7.86e-5	-3.71e-4	-2.38e-4	3.45e-2

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, NRPRRT 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.

Resource Use Results Summary for 1 meter of OSP Blunt Bulk Cable Group 6 – EN 50693 Default End-of-Life– Cradle-to-grave Scope

Indicator	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D	Total
PERE	MJ	2.42e+1	1.09e-1	9.28e-3	1.14e-5	2.71e-2	1.30e-2	9.08e-3	-3.46e-2	2.43e+1
PERM	MJ	2.03e+0	0	0	0	0	0	0	0	2.03e+0
PERT	MJ	2.62e+1	1.09e-1	9.28e-3	0	2.71e-2	1.30e-2	9.08e-3	0	2.64e+1
PENRE	MJ	1.35e+2	7.83e+0	4.74e-1	7.20e-5	1.96e+0	1.20e-1	2.99e-1	-1.05e+1	1.35e+2
PENRM	MJ	1.21e+1	0	0	0	0	0	0	0	1.21e+1
PENRT	MJ	1.47e+2	7.83e+0	4.74e-1	0	1.96e+0	1.20e-1	2.99e-1	0	1.58e+2
ADP-fossil	MJ	1.33e+2	7.73e+0	4.65e-1	6.06e-5	1.93e+0	1.04e-1	2.93e-1	-1.05e+1	1.33e+2
SM	kg	0	0	0	0	0	0	0	0	0.00e+0
RSF	MJ	0	0	0	0	0	0	0	0	0.00e+0
NRSF	MJ	0	0	0	0	0	0	0	0	0.00e+0
FW	m3	4.07e-2	1.02e-3	-1.93e-4	3.27e-8	2.55e-4	9.44e-5	-4.46e-4	-2.75e-4	4.12e-2

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, NRPRRT 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.

Resource Use Results Summary for 1 unit of attenuation losses via fusion splicing – EN 50693 Default End-of-Life– Cradle-to-grave Scope

Indicator	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D	Total
PERE	MJ	0	0	0	2.93e-3	0	0	0	0	2.93e-3
PERM	MJ	0	0	0	0	0	0	0	0	0.00e+0
PERT	MJ	0	0	0	0	0	0	0	0	0.00e+0
PENRE	MJ	0	0	0	1.84e-2	0	0	0	0	1.84e-2
PENRM	MJ	0	0	0	0	0	0	0	0	0.00e+0
PENRT	MJ	0	0	0	0	0	0	0	0	0.00e+0
ADP-fossil	MJ	0	0	0	1.55e-2	0	0	0	0	1.55e-2
SM	kg	0	0	0	0	0	0	0	0	0.00e+0
RSF	MJ	0	0	0	0	0	0	0	0	0.00e+0
NRSF	MJ	0	0	0	0	0	0	0	0	0.00e+0
FW	m3	0	0	0	8.36e-6	0	0	0	0	8.36e-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,

NRPR 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.

Table 5. Waste and Output Flow Indicators

per 1 m of product To transmit one communication signal over 1 m, at a wavelength of 1310 nm and 1550 nm, for 10 years and at a utilization rate of 100% in accordance with the National Electric Code® (NEC®) Standard on the product spec sheet and as defined in PSR-0001-ed4. Lifetime and use rate correspond to Data center applications as defined in the table given in Appendix 6.1. of the specific rules for wire, cables and accessories.

Output Flows and Waste Results Summary for 1 meter of Example Product: 3456F 3028m OSP Blunt Cable (Group 6) – EN 50693 Default End-of-Life– Cradle-to-grave Scope

Indicator	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D	Total
HWD	kg	1.71e-4	0	0	0	0	0	0	0	1.71e-4
NHWD	kg	7.50e-3	0	2.07e-2	0	0	0	4.34e-1	0	4.62e-1
RWD	kg	0	0	0	0	0	0	0	0	0.00e+0
CRU	kg	0	0	0	0	0	0	0	0	0.00e+0
MFR	kg	1.96e-2	0	0	0	0	0	0	0	1.96e-2
MER	kg	2.30e-3	0	2.07e-2	0	0	0	4.34e-1	0	4.57e-1
EEE	MJ	0	0	0	0	0	0	0	0	0.00e+0
EET	MJ	0	0	0	0	0	0	0	0	0.00e+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.

Output Flows and Waste Results Summary for 1 meter of OSP Blunt Bulk Cable Group 1 – EN 50693 Default End-of-Life– Cradle-to-grave Scope

Indicator	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D	Total
HWD	kg	1.71e-4	0	0	0	0	0	0	0	1.71e-4
NHWD	kg	7.50e-3	0	2.52e-3	0	0	0	5.30e-2	0	6.30e-2
RWD	kg	0	0	0	0	0	0	0	0	0.00e+0
CRU	kg	0	0	0	0	0	0	0	0	0.00e+0
MFR	kg	1.96e-2	0	0	0	0	0	0	0	1.96e-2
MER	kg	2.30e-3	0	2.52e-3	0	0	0	5.30e-2	0	5.78e-2
EEE	MJ	0	0	0	0	0	0	0	0	0.00e+0
EET	MJ	0	0	0	0	0	0	0	0	0.00e+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.

Output Flows and Waste Results Summary for 1 meter of OSP Blunt Bulk Cable Group 2 – EN 50693 Default End-of-Life– Cradle-to-grave Scope

Indicator	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D	Total
HWD	kg	1.71e-4	0	0	0	0	0	0	0	1.71e-4
NHWD	kg	7.50e-3	0	3.50e-3	0	0	0	7.35e-2	0	8.45e-2
RWD	kg	0	0	0	0	0	0	0	0	0.00e+0
CRU	kg	0	0	0	0	0	0	0	0	0.00e+0
MFR	kg	1.96e-2	0	0	0	0	0	0	0	1.96e-2
MER	kg	2.30e-3	0	3.50e-3	0	0	0	7.35e-2	0	7.93e-2
EEE	MJ	0	0	0	0	0	0	0	0	0.00e+0
EET	MJ	0	0	0	0	0	0	0	0	0.00e+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.

Output Flows and Waste Results Summary for 1 meter of OSP Blunt Bulk Cable Group 3 – EN 50693 Default End-of-Life– Cradle-to-grave Scope

Indicator	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D	Total
HWD	kg	1.71e-4	0	0	0	0	0	0	0	1.71e-4
NHWD	kg	7.50e-3	0	8.42e-3	0	0	0	1.77e-1	0	1.93e-1
RWD	kg	0	0	0	0	0	0	0	0	0.00e+0
CRU	kg	0	0	0	0	0	0	0	0	0.00e+0
MFR	kg	1.96e-2	0	0	0	0	0	0	0	1.96e-2
MER	kg	2.30e-3	0	8.42e-3	0	0	0	1.77e-1	0	1.88e-1
EEE	MJ	0	0	0	0	0	0	0	0	0.00e+0
EET	MJ	0	0	0	0	0	0	0	0	0.00e+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.

Output Flows and Waste Results Summary for 1 meter of OSP Blunt Bulk Cable Group 4 – EN 50693 Default End-of-Life– Cradle-to-grave Scope

Indicator	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D	Total
HWD	kg	1.71e-4	0	0	0	0	0	0	0	1.71e-4
NHWD	kg	7.50e-3	0	1.09e-2	0	0	0	2.28e-1	0	2.46e-1
RWD	kg	0	0	0	0	0	0	0	0	0.00e+0
CRU	kg	0	0	0	0	0	0	0	0	0.00e+0
MFR	kg	1.96e-2	0	0	0	0	0	0	0	1.96e-2
MER	kg	2.30e-3	0	1.09e-2	0	0	0	2.28e-1	0	2.41e-1
EEE	MJ	0	0	0	0	0	0	0	0	0.00e+0
EET	MJ	0	0	0	0	0	0	0	0	0.00e+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.

Output Flows and Waste Results Summary for 1 meter of OSP Blunt Bulk Cable Group 5 – EN 50693 Default End-of-Life– Cradle-to-grave Scope

Indicator	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D	Total
HWD	kg	1.71e-4	0	0	0	0	0	0	0	1.71e-4
NHWD	kg	7.50e-3	0	1.72e-2	0	0	0	3.61e-1	0	3.86e-1
RWD	kg	0	0	0	0	0	0	0	0	0.00e+0
CRU	kg	0	0	0	0	0	0	0	0	0.00e+0
MFR	kg	1.96e-2	0	0	0	0	0	0	0	1.96e-2
MER	kg	2.30e-3	0	1.72e-2	0	0	0	3.61e-1	0	3.81e-1
EEE	MJ	0	0	0	0	0	0	0	0	0.00e+0
EET	MJ	0	0	0	0	0	0	0	0	0.00e+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.

Output Flows and Waste Results Summary for 1 meter of OSP Blunt Bulk Cable Group 6 – EN 50693 Default End-of-Life– Cradle-to-grave Scope

Indicator	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D	Total
HWD	kg	1.71e-4	0	0	0	0	0	0	0	1.71e-4
NHWD	kg	7.50e-3	0	2.07e-2	0	0	0	4.34e-1	0	4.62e-1
RWD	kg	0	0	0	0	0	0	0	0	0.00e+0
CRU	kg	0	0	0	0	0	0	0	0	0.00e+0
MFR	kg	1.96e-2	0	0	0	0	0	0	0	1.96e-2
MER	kg	2.30e-3	0	2.07e-2	0	0	0	4.34e-1	0	4.57e-1
EEE	MJ	0	0	0	0	0	0	0	0	0.00e+0
EET	MJ	0	0	0	0	0	0	0	0	0.00e+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.

Output Flows and Waste Results Summary for 1 unit of attenuation losses via fusion splicing – EN 50693 Default End-of-Life– Cradle-to-grave Scope

Indicator	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D	Total
HWD	kg	0	0	0	0	0	0	0	0	0.00e+0
NHWD	kg	0	0	0	0	0	0	0	0	0.00e+0
RWD	kg	0	0	0	0	0	0	0	0	0.00e+0
CRU	kg	0	0	0	0	0	0	0	0	0.00e+0
MFR	kg	0	0	0	0	0	0	0	0	0.00e+0
MER	kg	0	0	0	0	0	0	0	0	0.00e+0
EEE	MJ	0	0	0	0	0	0	0	0	0.00e+0
EET	MJ	0	0	0	0	0	0	0	0	0.00e+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

The environmental impacts reported in this EPD are a combination of bulk cable, connector, and cable assembly inputs and processes. To determine the environmental impact of a specific cable assembly product, the results of a bulk cable, a connector group, and a cable assembly group must be combined using the calculation formula outlined in this section. Complete results for bulk cable, connector, and cable assembly, inclusive of all required LCIA and LCI indicators, can be found in the Appendix. Additionally, an alternative set of cable assembly elements results have been provided for each group to represent the significantly smaller packaging requirements of trunk and pigtail cables shorter than 20 meters. These results are only appropriate to be used when the total cable assembly length is 20 meters or less. Any single results set alone do not represent a complete cable assembly product and should not be used in isolation. This equation is applied independently per indicator and per life cycle module.

To calculate the environmental indicator results for a specific cable assembly length, the following equation shall be applied:

Equation/ Formula for calculating results for a 1m of cable assembly considering bulk cable, connector sides A and B, and cable assembly elements

$$\begin{aligned} & \text{Results}_{SKU,IND,M} \\ &= \left((\text{ConnectA}_{GRP,IND,M} \times \text{ConCountA}_{ASKU}) \right. \\ & \quad \left. + (\text{ConnectB}_{GRP,IND,M} \times \text{ConCountB}_{ASKU}) + \text{Assembly}_{GRP,IND,M} \right) \times \text{AF}_{SKU} \\ & \quad + \text{Cable}_{GRP,IND,M} \end{aligned}$$

Where:

- **SKU** = a product represented by this EPD
- **IND** = an indicator reported within this EPD
- **M** = references the EPD assessment module or LCI data (e.g., A3, or an A3 LCI input)
- **GRP** = references a Group of Worst-Case Results
- **ConnectA** = Results per connector applied to product on cable side A
 - With respect to IND, GRP, M
- **ConCountA** = Quantity of connectors applied to cable assembly product on cable side A
 - With respect to SKU
- **ConnectB** = Results per connector applied to product on cable side B
 - With respect to IND, GRP, M
- **ConCountB** = Quantity of connectors applied to cable assembly product on cable side B
 - With respect to SKU
- **Assembly** = Results per unit of cable assembly elements
 - With respect to IND, GRP, M
- **Cable** = Results per meter of bulk cable
 - With respect to IND, GRP, M
- **AF** = the allocation factor to normalize results to functional unit of per meter (given connector application process occurs 1 time on every cable, regardless of length)
 - With respect to SKU

Where:

- SKU = a product represented by this EPD
- IND = an indicator reported within this EPD
- M = references the EPD assessment module or LCI data (e.g., A3, or an A3 LCI input)
- GRP = references a Group of Worst-Case Results
- ConnectA = Results per connector applied to product on cable side A
 - With respect to IND, GRP, M
- ConCountA = Quantity of connectors applied to cable assembly product on cable side A
 - With respect to SKU
- ConnectB = Results per connector applied to product on cable side B
 - With respect to IND, GRP, M
- ConCountB = Quantity of connectors applied to cable assembly product on cable side B
 - With respect to SKU
- Assembly = Results per unit of cable assembly elements
 - With respect to IND, GRP, M
- Cable = Results per meter of bulk cable
 - With respect to IND, GRP, M

- AF = the allocation factor to normalize results to functional unit of per meter (given connector application process occurs 1 time on every cable, regardless of length)
- With respect to SKU

This formula recognizes that impacts for connectors scale with the quantity of connectors on each side, and connector and cable assembly elements are allocated by the total length of the cable to arrive in the declared unit. Impacts of bulk cable are already normalized per 1 meter and therefore can simply be added to the length-allocated connector and cable assembly impacts. Because the connector and cable assembly elements occur only once per product, regardless of length, the scaling factor is necessary to accurately distribute the burdens of these inputs to the declared unit. Note that the results derived from this scaling formula are only relevant for products represented in this EPD. 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. The product is a 3456F 3028m OSP Blunt Cable represented by Bulk Cable Group 6 and using the fusion splicing results sets instead of connector results.

For the product described above, assume:

- **SKU** = Example Product: 3456F 3028m OSP Blunt Cable
- A real AFL SKU covered by this EPD
- **IND** = The GWP_{total} indicator, expressed in kg CO_{2e}
- **GRP** = 6, applies to Bulk Cable Grouping (there are no Cable Assembly Elements for OSP blunt products), and Fusion Splicing results (all OSP blunts are fusion spliced once at each end)
- **M** = A1 – C4
- **ConnectA** = 1.39E-03, the Fusion Splicing value with respect to the specified indicator (IND), group (GRP), and EPD module (M)
- **ConnectB** = 1.39E-03, the Fusion Splicing value with respect to the specified indicator (IND), group (GRP), and EPD module (M)
- **ConCountA** = 1 (constant quantity of Fusion Splices on each end)
- **ConCountB** = 1 (constant quantity of Fusion Splices on each end)
- **Assembly** = 0.00+00, OSP blunt products do not have cable assembly elements
- **Cable** = 8.40E+00, the Bulk Cable Group value with respect to the specified indicator (IND), group (GRP), and EPD module (M)
- **AF** = 3.28E-04, representing 1 divided by the length of the final cable assembly product in meters for product SKU (Example product is 3048 m, therefore 1 / 3048)

Applying the formula:

A1-C4 GWP_{total} for Example 3456F 3028m OSP Blunt Cable (**8.41E+00**) =

((ConnectA A1-C4 GWP_{total} (1.39E-03) * ConCountA (1)) + (ConnectB A1-C4 GWP_{total} (1.39E-03) * ConCountB (1)) + Cable Assembly Elements A1-C4 GWP_{total} (0.00E+00)) × Cable Assembly Allocation Factor (3.28E-04) + Bulk Cable A1-C4 GWP_{total} (8.40E+00)

Interpretation

A1-A3 Cradle-to-gate

This section discusses the cradle-to-gate results for the functional unit. The results presented below are for the example product 3456F 3028m OSP Blunt Cable (Group 6) which represents aggregate results for the product considering the bulk cable and fusion splicing elements and the scaling equation provided in the Impact Scaling Factors section. Results for other products can be calculated by leveraging the scaling equation and the results presented in this EPD.

Although this discussion is focused on the LCIA results, calculated using the EF 3.1 LCIA method, the section also includes A1-A3 results for Primary Resource Use, Indicators Describing Waste and Output Flows.

As illustrated in the figure below, stage A1 is the dominant contributor to nearly all reported indicators, with contributions ranging from approximately 74% to 98% of the total A1-A3 impacts (88% on average). The contributions of A2 range from 1% to 19% (7% on average). A3 has similar contributions to

impacts as A2, with impacts ranging from 1% to 12% (6% on average). These results highlight the significance of the raw material production stage in cradle-to-gate environmental performance of AFL products while also highlighting that other stages are not insignificant.

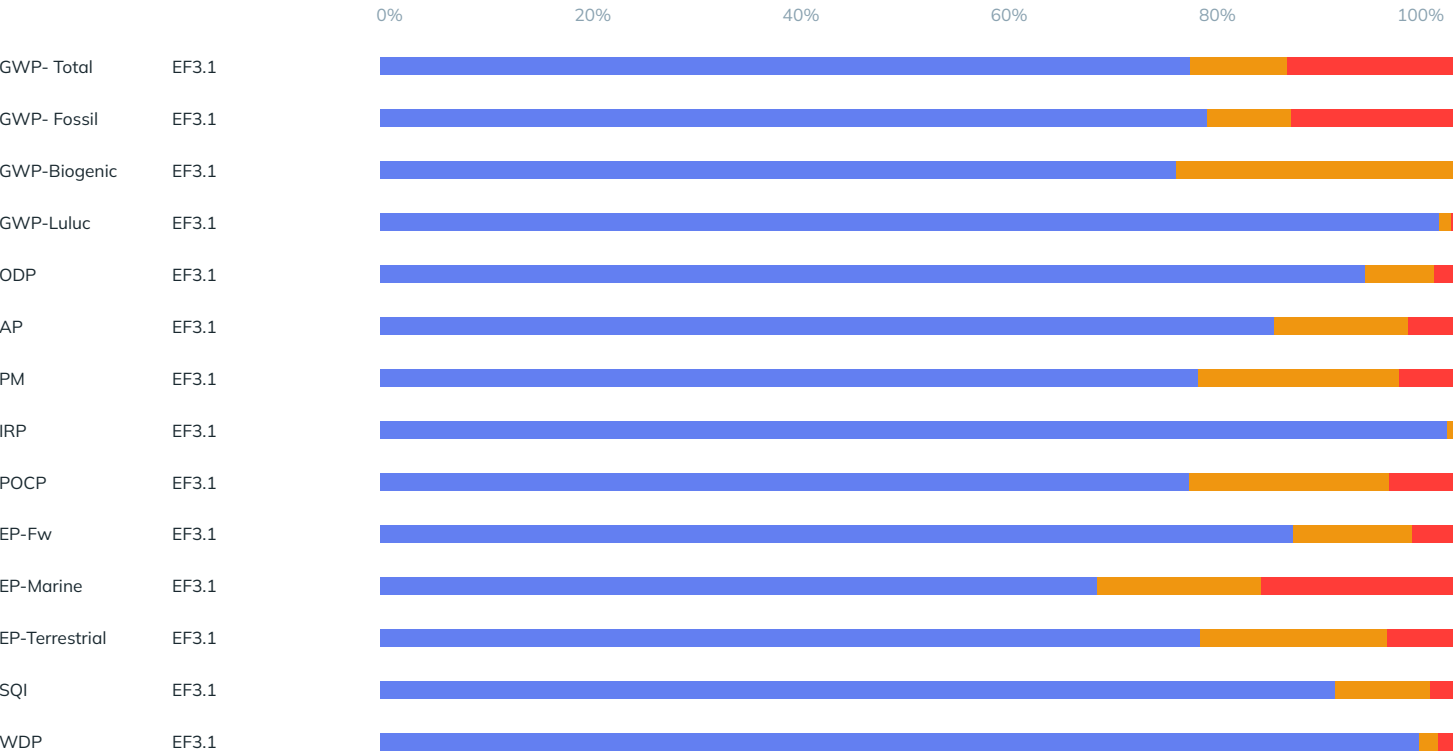
The bulk cable contributes 100% to A1, A2, and A3 impacts across all categories because OSP blunt products do not have cable assembly elements, and the impact of connection of this cable is fusion splicing which is outside of the A1-A3 boundary (in B6). Within the bulk cable, optical fiber and the LSZH compound dominate GWP-fossil impacts contributing 76% and 22%.

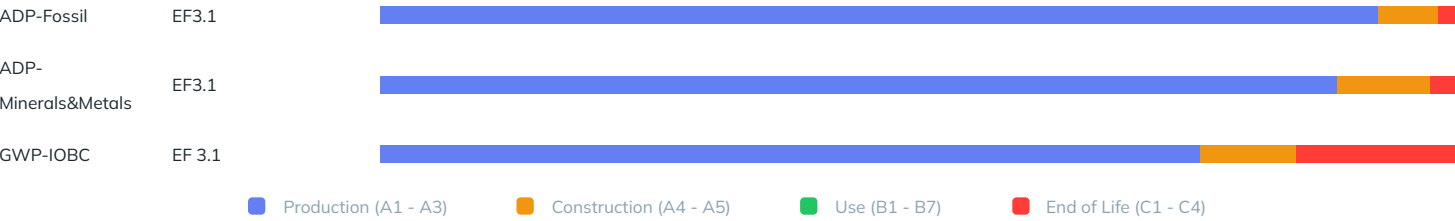
These results highlight the significance of the raw material production stage in cradle-to-gate environmental performance of AFL products while also highlighting that other stages are not insignificant.

A-C Cradle-to-grave

The LCIA results for A1-C4 demonstrate that the A1-A3 stages dominate impact contributions across all indicators, ranging from 67% to 99% 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, ranging from 3% to 17% across indicators. A5 contributes less than 2% across indicators. B modules other than B6 are considered 0 as they are not relevant in this product system. B6 energy use associated with attenuations losses contributes less than 1% across all indicators. Modules C1 is not relevant in this assessment as products do not need to be deconstructed, they can be simply unplugged and removed. Modules C2 contributes less than 4% across all impact categories. Module C3 contributes less than 1% across all impact categories. The contribution of C4 ranges from less than 1% to 13% in some categories.

The GWP-fossil impact is influenced almost entirely by the bulk cable given there are no cable assembly elements and only 2 instances of connection-related impacts. Impacts from attenuation losses associated with fusion splicing of each end of the cable are included and only influence module B6. Module B6 is impacted primarily by attenuation associated with bulk cable (86% of GWP-fossil) and attenuation associated with fusion spliced connections (14% of GWP-fossil). End of life modules C2 – C4 are dominated 100% by the bulk cable as the bulk cable makes up 100% of product mass and packaging material end of life is considered in A5. C2 and C3 are modeled via the same transportation and waste processing & sorting pathways for all materials in the study and are therefore driven by differences in mass input only. C4, however, considers material specific end-of-life pathways sourced from EN50693. The majority of materials in this study are assumed to be incinerated or landfilled at end of life, with only some materials recycled at relatively low rates. Module D results reflect potential avoided impacts beyond the system boundary associated with end-of-life energy recovery and material recycling. These impacts are reported separately and are not included in cradle-to-grave totals.





Further Information

Pre-Verified Calculation Tool

This EPD was generated using AFL's pre-verified LCA calculation tool. This tool was developed and reviewed in alignment with the standards and rules referenced in this EPD. The tool was last verified on September 22, 2026 by the verifier of this EPD.

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