Environmental Product Declaration

Prysmian TransPowr® AAC Bare Overhead Conductor

All-Aluminum 1350 Conductor Concentric-Lay-Stranded

With 150 years of experience in over 50 countries around the globe, Prysmian is the world leader in the energy and telecom cable industry. Prysmian offers the broadest range of services and know-how in the industry. Each year, Prysmian manufactures thousands of miles of underground and submarine cables and systems for power transmission and distribution, as well as medium and low voltage cables for the construction and infrastructure sectors. The company produces a comprehensive range of optical fibers, copper cables, and connectivity systems for voice, video, and data transmission for the telecommunication sector.

At the core of Prysmian's business model lies a commitment to sustainability. Prysmian seeks to achieve an efficient, effective, and sustainable supply of energy and information while integrating sustainable practices throughout the value chain – including initiatives like this EPD for the company's bare overhead product portfolio produced at Prysmian's Williamsport, Pennsylvania plant. These products are manufactured using low-carbon aluminum, produced using hydropower energy, leading to low CO_2 emissions, and recycled steel, with an 85 percent minimum of recycled content.

Prysmian is a leader in the industry and a pioneer in sustainability initiatives. The company has adopted a science-based approach and adheres to EPA standards to achieve net-zero emission targets for Scope 1 and 2 by 2035 and Scope 3 by 2050.

Environmental Product Declaration

Prysmian TransPowr® AAC Bare Overhead Conductor
overhead Cable

According to ISO 14025, EN 15804+A2, ISO 14040, ISO 14044

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025 and EN 15804+A2. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc. Accuracy of Results: EPDs regularly rely on estimations of impacts, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. Comparability: EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.

EPD PROGRAM AND PROGRAM OPERATOR NAME, ADDRESS, LOGO, AND WEBSITE	ASTM International 100 Barr Harbor Drive West Conshohocken, PA 19428
GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER	ASTM GPI
MANUFACTURER NAME AND ADDRESS	Prysmian Group 4 Tesseneer Road Highland Heights, KY 41076
DECLARATION NUMBER	EPD830
DECLARED PRODUCT & FUNCTIONAL UNIT OF DECLARED UNIT	Prysmian TransPowr® AAC Bare Overhead Conductor Functional Unit = To transmit energy expressed for 1A over a distance of 1km during 40 years and a 100% use rate, in accordance with the relevant standards shown in the product technical data sheets. Lifetime and use rate correspond to the application of energy distribution network as defined in the table given in Appendix 6.1. of the specific rules for wire, cables and accessories.
REFERENCE PCR AND VERSION NUMBER	PEP ecopassport Program: Product Category Rules for Electrical, Electronic and HVAC-R Products, v4.0, 2021., PEP ecopassport Program: Product Specific Rules for Wires, Cables and Accessories, v4.0, 2022.
DESCRIPTION OF PRODUCT APPLICATION/USE	Prysmian cable products are primarily used in overhead distribution and transmission lines
PRODUCT RSL DESCRIPTION	40 Years
MARKETS OF APPLICABILITY	North America
DATE OF ISSUE	November 20, 2024
PERIOD OF VALIDITY	5 Years
EPD TYPE	Product Specific
DATASET VARIABILITY	N/A
EPD SCOPE	Cradle-to-Grave
YEAR(S) OF REPORTED PRIMARY DATA	2023
LCA SOFTWARE & VERSION NUMBER	LCA for Experts v10.7.0.183
LCI DATABASE(S) & VERSION NUMBER	Sphera Managed Content & USLCI v2.0
LCIA METHODOLOGY & VERSION NUMBER	TRACI 2.1; CML 4.1

The sub-category PCR review was conducted by:	
This declaration was independently verified in accordance with ISO 14025: 2006. The "PEP ecopassport Program: Product Category Rules for Electrical, Electronic and HVAC-R Products, v4.0, 2021." based on EN 15804:2012+A2:2019, serves as the core PCR. The supporting PSR is the "PEP ecopassport Program: Product Specific Rules for Wires, Cables and Accessories, v4.0, 2022." ☐ INTERNAL ☒ EXTERNAL	Timothy S Brooke ASTM International
This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:	
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	Thomas P Gloria, Ph. D Industrial Ecology Consultants

Environmental declarations from different programs (ISO 14025) may not be comparable.
Comparison of the environmental performance using EPD information shall consider all relevant information modules over the full life cycle of the products within the building.
This PCR allows EPD comparability only when the same functional requirements, technical requirements of products are assessed and the requirements of EN 15804:2012+A2:2019 are

This PCR allows EPD comparability only when the same functional requirements between products are ensured and the requirements of EN 15804:2012+A2:2019 are met. It should be noted that different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared.

General Information

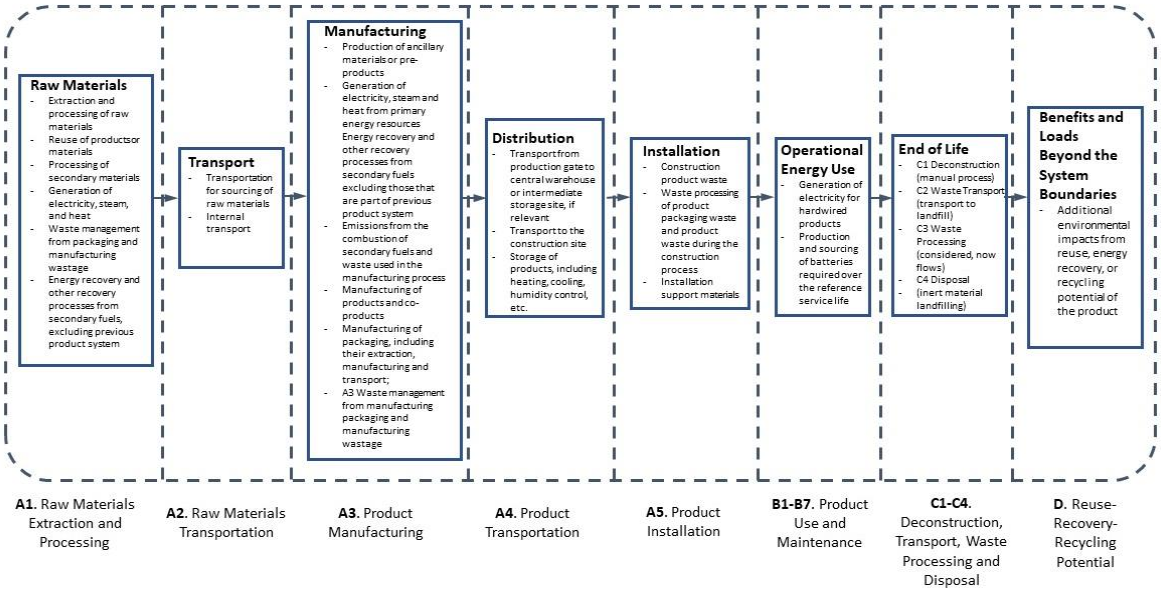
Description of Company/Organization

Prysmian, a global provider of cabling solutions, is leading the charge in the energy transition and digital transformation. With 150 years of experience in over 50 countries around the globe, the company's business strategy is a testament to its understanding of market dynamics, focusing on the development of resilient, high-performing, sustainable, and innovative cable solutions across the Transmission, Power Grid, Electrification, and Digital Solutions segments.

Product Description

Product Name: TransPowr® AAC Bare Overhead Conductor
Product Characteristic: 1350-H19 aluminum wires, concentrically stranded
The TransPowr® AAC Bare Overhead Conductor consists of 1350-H19 aluminum, is lightweight and corrosion-resistant and is commonly used in overhead line installations where higher strength or temperature ratings are not required.
This EPD includes results for the following products: FUCHSIA/AAC/3P.

Flow Diagram



Manufacturer Specific EPD

This product-specific EPD was developed based on the cradle-to-grave (modules A1-D) life cycle assessment. The EPD accounts for raw material extraction and processing, transport, product manufacturing, distribution, installation, use, maintenance, disposal, and potential benefits and loads following the end of life disposal. Manufacturing data were gathered directly from company personnel. For EPDs with product groups, an impact assessment was completed for each product and the highest impacts were reported as representations of the product group. The rest of the products in each group are represented through scaling factor tables and can be independently calculated.

Application

Stranded bare all-aluminum 1350 conductors (AAC) are used in overhead line installations where design parameters do not require the higher strength or temperature ratings provided by ACSR, ACSS or other type conductors.

Material Composition

The primary product components and/or materials must be indicated as a percentage mass to enable the user of the EPD to understand the composition of the product in delivery status.

The average composition of a Prysmian FUCHSIA/AAC/3P cable is as follows:

	Percentage in mass (%)
Material	**Maximum**
EcoAluminum Conductor	100.00%
Total	100.00%

Technical Details

For the declared product, the following technical data in the delivery status must be provided with reference to the test standard:

Technical Data	
General Specifications	
Cable Type	Cable Conductors
Construction Type	Concentric-lay-stranded conductor
Electrical Specifications	
Resistance (ohm/kft)	
DC @ 20°C	0.0216
AC @ 25°C	0.0225
AC @ 75°C	0.0268
Ampacity @ 75°C	
Standard	880
E3X®	1005
Geometric Mean (radius ft)	0.0329
Inductive Reactance (ohm/kft)	0.0785

Placing on the Market / Application Rules

The standards that can be applied for TransPowr® AAC Bare Overhead Conductor are:
- ASTM B231 and all the other ASTM standards being referenced in it

Properties of Declared Product as Shipped

Prysmian FUCHSIA/AAC/3P cables are delivered as a complete unit, inclusive of all installation materials and instructions.

Methodological Framework

The declaration refers to the functional unit of To transmit energy expressed for 1A over a distance of 1km during 40 years and a 100% use rate, in accordance with the relevant standards shown in the product technical data sheets.
Lifetime and use rate correspond to the application of energy distribution network as defined in the table given in Appendix 6.1. of the specific rules for wire, cables and accessories. as specified in the PCR.

Name	Value	Unit
Functional unit	To transmit energy expressed for 1A over a distance of 1km during 40 years and a 100% use rate, in accordance with the relevant standards shown in the product technical data sheets. Lifetime and use rate correspond to the application of energy distribution network as defined in the table given in Appendix 6.1. of the specific rules for wire, cables and accessories.	
Maximum Mass	3487	kg
Conversion factor to 1 kg	0.0003	-

System Boundary

This is a cradle to grave Environmental Product Declaration. The following life cycle phases were considered:

Product Stage			Construction Process Stage		Use Stage							End of Life Stage*				Benefits and Loads Beyond the System Boundaries
Raw material supply	Transport	Manufacturing	Transport from gate to the site	Construction/ installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction /demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Description of the System Boundary Stages Corresponding to the PCR
(X = Included; MND = Module Not Declared)

*This includes provision of all materials, products and energy, packaging processing and its transport, as well as waste processing up to the end-of waste state or disposal of final residues.

Reference Service Life

The reference service life of a properly installed Prysmian FUCHSIA/AAC/3P cable is 40 years.

Allocation

Allocation of manufacturing was determined by mass, in kilogram per kilometer.

Cut-off Criteria

Processes whose total contribution to the final result, with respect to their mass and in relation to all considered impact categories, is less than 1% can be neglected. The sum of the neglected processes may not exceed 5% by mass of the considered impact categories. For that a documented assumption is admissible.

For Hazardous Substances the following requirements apply:

- The Life Cycle Inventory (LCI) of hazardous substances will be included, if the inventory is available.
- If the LCI for a hazardous substance is not available, the substance will appear as an input in the LCI of the product, if its mass represents more than 0.1% of the product composition.
- If the LCI of a hazardous substance is approximated by modeling another substance, documentation will be provided.

This EPD is in compliance with the cut-off criteria. No processes were neglected or excluded. Capital items for the production processes (machine, buildings, etc.) were not taken into consideration.

Data Sources

Primary data were collected for every process in the product system under the control of Prysmian. Secondary data from the Sphera database were utilized when necessary. These data were evaluated and have temporal, geographic, and technical coverage appropriate to the scope of the product category

Data Quality

The data sources used are complete and representative of global systems in terms of the geographic and technological coverage and are a recent vintage (i.e. less than ten years old). The data used for primary data are based on direct information sources of the manufacturers. Secondary data sets were used for raw materials extraction and processing, end of life, transportation, and energy production flows. Wherever secondary data is used, the study adopts critically reviewed data for consistency, precision, and reproducibility to limit uncertainty.

Period Under Review

The period under review is the full calendar year of 2023.

Treatment of Biogenic Carbon

The uptake and release of biogenic carbon throughout the product life cycle follows EN15805+A2 Section 6.4.4.

Comparability and Benchmarking

A comparison or an evaluation of EPD data is only possible if all data sets to be compared were created according to EN 15804+A2 and the building context, respectively the product-specific characteristics of performance, are taken into account. Environmental declarations from different programs may not be comparable. Full conformance with the PCR allows for EPD comparability only when all stages a product's life cycle have been considered. However, variations and deviations are possible.

Estimates and Assumptions

End of Life

In the End of Life phase, aluminum is assumed to have a 70% recycling rate and steel is assumed to have a 80% recycling rate. The remaining 30% or 20% is assumed to be disposed in landfill. Assumptions are based off of the PSR.

Units

The LCA results within this EPD are reported in SI units.

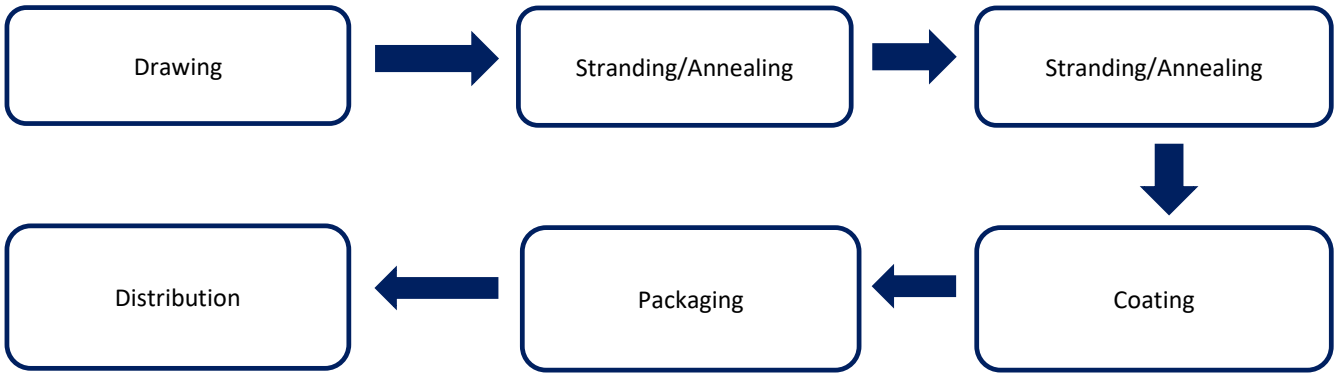
Additional Environmental Information

Background data

For life cycle modeling of the considered products, the LCA for Experts Software System for Life Cycle Engineering, developed by Sphera, is used. The Sphera database contains consistent and documented datasets which are documented online. To ensure comparability of results in the LCA, the basic data of the Sphera database were used for energy, transportation, and auxiliary materials.

Manufacturing

This study includes one of Prysmian's manufacturing plants, which accounts for the entirety of the cable category produced in this EPD. These cables consist almost entirely of a single conductor material, which is drawn and stranded on site. The cable may then go through an annealing process and an optional coating which some of the products receive. The products are then packaged on wooden reels and sent to customer distribution.



Packaging

Products packaging is fully recyclable in all its components. Main packaging material consists of wood, cardboard and plastic materials, being used for packaging each product individually. Depending on the final product size, length and weight, packaging may vary.

	Quantity (% By Weight)
Material	**Maximum**
Wood	100.00%
Total	100.00%

Transportation

Transport to Building Site (A4)		
Name	**Max**	**Unit**
Fuel type	Diesel	
Liters of fuel	38	l/100km
Transport distance	800	km
Capacity utilization (including empty runs)	85	%
Linear density of products transported	3487	kg/km
Weight of products transported	-	kg
Volume of products transported	-	m^3
Capacity utilization volume factor	0.85	-

Product Installation

Products are installed manually by trained professionals. There is an installation scrap rate of 5% assumed.

Installation into the building (A5)		
Name	**Max**	**Unit**
Water consumption	-	m^3
Other energy carriers	-	MJ
Product loss per functional unit	1.74E+02	kg
Waste materials at construction site	2.81E+02	kg
Output substance (recycle)	1.22E+02	kg
Output substance (landfill)	5.23E+01	kg
Output substance (incineration)	0.00E+00	kg
Packaging waste (recycle)	0.00E+00	kg
Packaging waste (landfill)	5.36E+01	kg
Packaging waste (incineration)	5.36E+01	kg
Direct emissions to ambient air*, soil, and water	1.54E-03	kg CO_2
VOC emissions	-	kg

*CO2 emissions to air from disposal of packaging

Reference Service Life		
Name	**Value**	**Unit**
Estimated Product Service Life	40	years
Replacements	0	-

Product Use

No cleaning, maintenance, repair, or refurbishment is required.

Operational energy use was modeled as use phase losses determined by the IEC 61156-5 standard. The maximum loss values for each cable category are detailed in the table below and were used in the B6 stage.

The operational energy use is presented under the assumption that the cable experiences a current of 1 Amp, but certain Prysmian products have an E3X coating that results in an energy saving effect at higher amperages. It is assumed that the use of E3X will reduce energy losses by 5%. The equation used to calculate the use phase is:

$$E = Z * l^2 * \Delta t$$

Where:

Z = linear resistivity of the cable in Ω/km, provided by Prysmian
L = current in A, assumption is 1 A
Δt = use time in seconds, assumption is 40 years

Operational Energy Use (B6)		
Name	**Max**	**Unit per RSL**
Water consumption (from tap, to sewer)	-	m^3
Electricity consumption	26.97	kWh
Other energy carriers	-	MJ
Equipment output	-	kW
Direct emissions to ambient air, soil, and water	-	kg

Disposal

The product can be mechanically dissembled to separate the different materials. The majority of components are disposed of through waste incineration with energy recovery or landfilled, in accordance with the PCR.

End of life (C1-C4)		
Name	**Max**	**Unit**
Collected separately	2.44E+03	kg
Collected as mixed construction waste	1.05E+03	kg
Reuse	0.00E+00	kg
Recycling	2.44E+03	kg
Landfilling	1.05E+03	kg
Incineration with energy recovery	0.00E+00	kg
Removals of biogenic carbon	-	kg

Re-use Phase

Re-use of the product is not common, but a large amount of the metals in this material will be recycled.

Re-Use, recovery, And/Or Recycling Potential (D)		
Name	**Max**	**Unit**
Net energy benefit from energy recovery from waste treatment declared as exported energy in C3 (R>0.6)	0.00	MJ
Net energy benefit from thermal energy due to treatment of waste declared as exported energy in C4 (R<0.6)	0.00	MJ
Net energy benefit from material flow declared in C3 for energy recovery	0.00	MJ
Process and conversion efficiencies	-	
Further assumptions for scenario development (e.g. further processing technologies, assumptions on correction factors);	These products are almost entirely metals and the recycling rate from the PCR and the benefit for module D is calculated by the benefit of recycling product at the end of life.	

LCA Results - Maximum Impact

Results shown below were calculated using TRACI 2.1 Methodology.

TRACI 2.1 Impact Assessment

Parameter	Parameter	Unit	A1-A3	A4	A5	B6	C2	C3	C4	D	Total
GWP	Global warming potential	kg CO_2-Eq.	2.18E+04	2.59E+02	1.53E+03	1.13E+01	2.35E-01	1.32E+00	1.66E+01	-1.90E+04	2.36E+04
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	1.55E-07	9.79E-09	2.05E-08	1.35E-12	8.88E-12	1.08E-15	8.69E-13	-2.53E-09	1.85E-07
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	2.77E+02	1.55E+00	1.59E+01	1.58E-02	1.41E-03	3.88E-04	1.04E-01	-6.50E+01	2.94E+02
EP	Eutrophication potential	kg N-Eq.	8.44E+00	8.61E-02	5.82E-01	1.24E-03	7.81E-05	1.09E-05	5.56E-03	-3.37E+00	9.11E+00
SP	Smog formation potential	kg O_3-Eq.	4.53E+03	4.28E+01	2.83E+02	2.22E-01	3.88E-02	2.64E-03	1.88E+00	-1.08E+03	4.9E+03
FFD	Fossil Fuel Depletion	MJ-surplus	2.63E+04	4.58E+02	1.92E+03	1.33E+01	4.15E-01	6.40E-02	2.77E+01	-1.77E+04	2.9E+04

**Stages B1 through B7 and C1 through C4 have been considered and only those with non-zero values have been reported*

Results shown below were calculated using CML 2001 - April 2013 Methodology.

CML 4.1 Impact Assessment

Parameter	Parameter	Unit	A1-A3	A4	A5	B6	C2	C3	C4	D	Total
GWP	Global warming potential	kg CO_2-Eq.	2.20E+04	2.59E+02	1.56E+03	1.14E+01	2.35E-01	1.32E+00	1.68E+01	-1.91E+04	2.39E+04
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	1.33E-07	9.77E-09	1.93E-08	7.45E-11	8.86E-12	6.37E-14	4.87E-11	-1.49E-07	1.62E-07
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	2.69E+02	1.28E+00	1.51E+01	1.48E-02	1.16E-03	3.23E-04	9.42E-02	-6.21E+01	2.86E+02
EP	Eutrophication potential	kg$(PO_4)^3$-Eq.	2.35E+01	2.27E-01	1.61E+00	1.63E-03	2.06E-04	2.82E-05	1.22E-02	-6.49E+00	2.54E+01
POCP	Formation potential of tropospheric ozone photochemical oxidants	kg ethane-Eq.	2.17E+01	1.49E-01	1.31E+00	1.10E-03	1.35E-04	1.09E-05	7.50E-03	-4.95E+00	2.32E+01
ADPE	Abiotic depletion potential for non-fossil resources	kg Sb-Eq.	2.09E-04	1.08E-07	1.09E-05	1.14E-06	9.75E-11	1.04E-08	4.98E-06	-7.48E-03	2.26E-04
ADPF	Abiotic depletion potential for fossil resources	MJ	3.49E+05	3.30E+03	2.18E+04	1.43E+02	2.99E+00	6.06E-01	2.11E+02	-1.90E+05	3.75E+05

**Stages B1 through B7 and C1 through C4 have been considered and only those with non-zero values have been reported*

Results below contain the resource use throughout the life cycle of the product.

EN15804+A2

Parameter	Parameter	Unit	A1-A3	A4	A5	B6	C2	C3	C4	D	Total
GWP-total	Climate change - total	kg CO_2-Eq.	2.11E+04	2.60E+02	1.55E+03	1.14E+01	2.40E-01	1.32E+00	1.66E+01	-1.92E+04	2.29E+04
GWP-fossil	Climate change - fossil	kg CO_2-Eq.	2.21E+04	2.60E+02	1.46E+03	1.14E+01	2.40E-01	1.32E+00	1.61E+01	-1.92E+04	2.39E+04
GWP-biogenic	Climate change - biogenic	kg CO_2-Eq.	-1.04E+03	1.04E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-luluc	Climate change - land use and land use change	kg CO_2-Eq.	3.00E-02	0.00E+00	9.00E-02	0.00E+00	0.00E+00	0.00E+00	5.00E-02	-3.46E+00	1.70E-01
ODP	Ozone depletion	kg CFC-11 Eq.	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
AP	Acidification	mol H^+ Eq.	3.25E+02	1.72E+00	1.86E+01	2.00E-02	0.00E+00	0.00E+00	1.20E-01	-7.42E+01	3.46E+02
EP-freshwater	Eutrophication aquatic freshwater	kg P Eq.	1.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-3.00E-02	1.00E-02
EP-marine	Eutrophication aquatic marine	kg N Eq.	6.95E+01	6.60E-01	4.39E+00	0.00E+00	0.00E+00	0.00E+00	3.00E-02	-1.73E+01	7.46E+01
EP-terrestrial	Eutrophication terrestrial	mol N Eq.	7.60E+02	7.23E+00	4.77E+01	4.00E-02	1.00E-02	0.00E+00	3.40E-01	-1.88E+02	8.15E+02
POCP	Photochemical ozone formation	NMVOC Eq.	2.12E+02	1.95E+00	1.33E+01	1.00E-02	0.00E+00	0.00E+00	9.00E-02	-4.93E+01	2.27E+02
ADP-minerals&metals	Depletion of abiotic resources - minerals and metals	kg Sb Eq.	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADP-fossil	Depletion of abiotic resources - fossil fuels	mol N Eq.	3.96E+05	3.33E+03	2.42E+04	2.01E+02	3.02E+00	6.40E-01	2.18E+02	-2.28E+05	4.24E+05
WDP	Water use	m^3 world Eq. deprived	8.80E+01	0.00E+00	3.94E+00	2.78E+00	0.00E+00	1.00E-01	1.76E+00	-2.99E+03	9.66E+01
PM	Particulate matter emissions	Disease incidence	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
IRP	Ionizing radiation, human health	kBq U235 Eq.	1.21E+02	0.00E+00	3.95E+00	1.71E+00	0.00E+00	0.00E+00	2.80E-01	-1.38E+03	1.27E+02
ETP-fw	Ecotoxicity (freshwater)	CTUe	2.17E+05	4.82E+03	1.73E+04	4.66E+01	4.37E+00	6.30E-01	1.45E+02	-6.95E+04	2.39E+05
HTP-c	Human toxicity, cancer effects	CTUh	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HTP-nc	Human toxicity, non-cancer effects	CTUh	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SQP	Land use related impacts/Soil quality	dimensionless	4.03E+02	0.00E+00	2.51E+01	2.39E+01	0.00E+00	6.00E-02	5.16E+01	-4.26E+04	5.03E+02

Results below contain the resource use throughout the life cycle of the product.

Resource Use

Parameter	Parameter	Unit	A1-A3	A4	A5	B6	C2	C3	C4	D	Total
RPR_E	Renewable primary energy as energy carrier	MJ	6.95E+03	3.99E+01	3.00E+02	3.52E+02	3.52E+02	5.50E+01	3.52E+01	-1.35E+05	8.08E+03
RPR_M	Renewable primary energy resources as material utilization	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
$NRPR_E$	Nonrenewable primary energy as energy carrier	MJ	3.95E+05	3.42E+03	2.76E+04	2.77E+04	2.44E+04	2.05E+02	2.22E+02	-2.28E+05	4.79E+05
$NRPR_M$	Nonrenewable primary energy as material utilization	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM	Use of secondary material	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	Use of nonrenewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	Energy recovered from disposed waste	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	Use of net fresh water	m^3	2.52E+00	0.00E+00	9.68E-02	8.41E-02	0.00E+00	2.42E-03	5.41E-02	-9.14E+01	2.76E+00

**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

Results below contain the output flows and wastes throughout the life cycle of the product.

Output Flows and Waste Categories

Parameter	Parameter	Unit	A1-A3	A4	A5	B6	C2	C3	C4	D	Total
HWD	Hazardous waste disposed	kg	1.40E-06	0.00E+00	3.46E-08	6.35E-09	0.00E+00	1.09E-10	6.73E-09	-1.46E-04	1.45E-06
NHWD	Non-hazardous waste disposed	kg	2.67E+00	0.00E+00	1.41E+02	6.47E-02	0.00E+00	1.16E-01	1.07E+03	-8.09E+03	1.21E+03
HLRW	High-level radioactive waste	kg	1.44E+00	0.00E+00	5.92E-02	2.07E-02	0.00E+00	1.12E-05	2.48E-03	-1.36E+01	1.52E+00
ILLRW	Intermediate- and low-level radioactive waste	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU	Components for re-use	kg	0.00E+00	0.00E+00	5.36E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.36E+02
MR	Materials for recycling	kg	0.00E+00	0.00E+00	1.22E+02	0.00E+00	0.00E+00	0.00E+00	2.44E+03	0.00E+00	2.56E+03
MER	Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	Recovered energy exported from system	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

Results below contain direct greenhouse gas emissions and removals throughout the life cycle of the product.

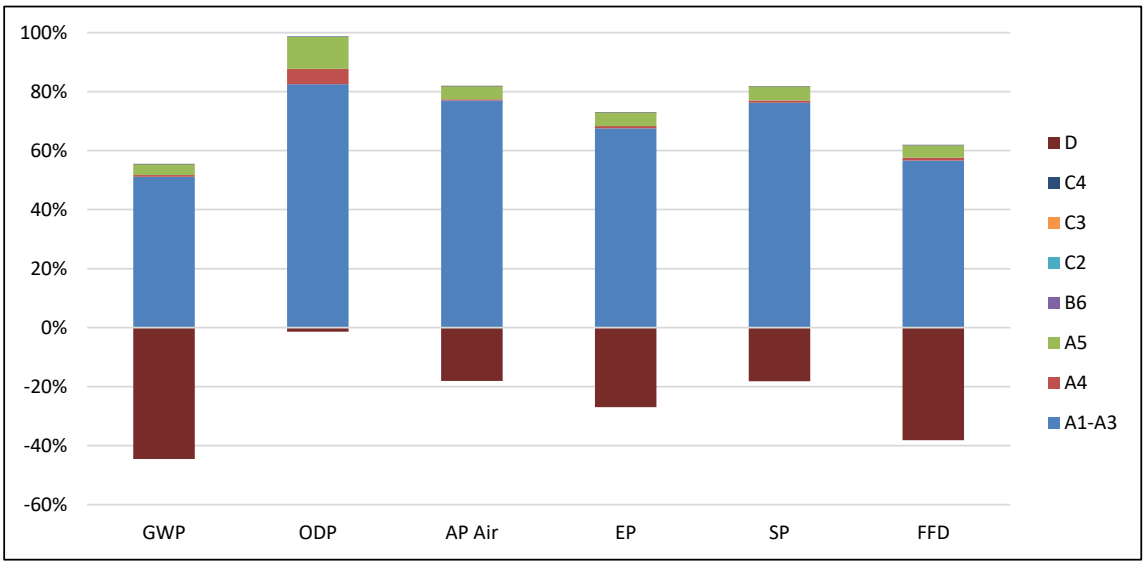
Resource Use

Parameter	Parameter	Unit	A1-A3	A4	A5	B6	C2	C3	C4	D	Total
DGHGER	Direct GHG Emissions and Removal	kg CO_2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEP	Biogenic Carbon Emissions from Product	kg CO_2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCRK	Biogenic Carbon Removal from Packaging	kg CO_2	1.54E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E-03
BCEK	Biogenic Carbon Emissions from Packaging	kg CO_2	0.00E+00	0.00E+00	1.54E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E-03
BCEW	Biogenic Carbon Emissions from Combustion of Waste from Renewable Sources Used in Production Process	kg CO_2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCE	Calcination Carbon Emissions	kg CO_2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCR	Carbonation Carbon Removal	kg CO_2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CWNR	Carbon Emissions from Combustion of Waste from Non-renewable Sources Used in Production Process	kg CO_2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

LCA Interpretation - Maximum Impact

The production life cycle stage (A1-A3) dominates the impacts across all impact categories. This is due to the upstream production of raw materials used in the product, along with energy use in the manufacturing of the product. The D reuse, recovery, and recycling potential stage shows as a negative value and accounts for the benefit of energy recovery during incineration, and the benefit from recycling material at the end-of-life for a product. Though the energy use (B6) phase does not have a large impact, this is due to the functional unit of 1 AMP, lifetime use may be larger than 1 AMP.



Scaling Factor Tables

For EPDs with product groups, an impact assessment was completed for each product and the highest impacts were reported as representations of the product group. The rest of the products in each group are represented through scaling factor tables and can be independently calculated.

	A1 - A3							A4	A5	B6	C2 - D
	GWP	ODP	AP	EP	PCOP	FFD/ADP	Resources				
#2/TE/AAC	2.52E-02	1.14E-01	1.15E-01	1.15E-01	1.18E-01	2.45E-02	2.61E-02	2.61E-02	2.61E-02	1.19E+01	2.61E-02
#4 1W AAC TE	1.64E-02	7.40E-02	7.50E-02	7.51E-02	7.78E-02	1.60E-02	1.70E-02	1.70E-02	1.70E-02	1.95E+01	1.70E-02
#4/TE/AAC	1.64E-02	7.40E-02	7.50E-02	7.51E-02	8.54E-02	1.60E-02	1.70E-02	1.70E-02	1.70E-02	1.95E+01	1.70E-02
#4 TE AAC 1	1.64E-02	7.40E-02	7.50E-02	7.51E-02	7.51E-02	1.60E-02	1.70E-02	1.70E-02	1.70E-02	1.95E+01	1.70E-02
#6/TE/AAC	9.96E-03	4.49E-02	4.55E-02	4.56E-02	4.82E-02	9.69E-03	1.03E-02	1.03E-02	1.03E-02	3.17E+01	1.03E-02
2 1W TE AAC	2.52E-02	1.14E-01	1.15E-01	1.15E-01	1.15E-01	2.45E-02	2.61E-02	2.61E-02	2.61E-02	1.19E+01	2.61E-02
ARBUTUS/AAC/NS	3.19E-01	1.41E+00	1.43E+00	1.44E+00	1.44E+00	3.16E-01	3.36E-01	3.24E-01	3.24E-01	1.01E+00	3.24E-01
ARBUTUS/AAC	3.24E-01	1.43E+00	1.44E+00	1.45E+00	1.44E+00	3.54E-01	3.74E-01	3.24E-01	3.24E-01	1.01E+00	3.24E-01
CANNA/AAC	1.57E-01	9.04E+01	1.35E+00	-4.34E-01	1.47E+00	1.75E-01	2.00E-01	1.62E-01	1.62E-01	1.98E+00	1.62E-01
CANNA/AAC/3P	4.78E-01	9.71E+01	7.93E-01	-1.14E+00	9.21E-01	5.07E-01	5.16E-01	4.93E-01	4.93E-01	1.98E+00	4.93E-01
COLUMBINE/AAC	4.88E-01	2.03E+01	1.43E+00	1.05E+00	1.45E+00	4.86E-01	5.03E-01	4.90E-01	4.90E-01	5.67E-01	4.90E-01
COREOPSIS/AAC	6.04E-01	7.23E+01	1.08E+00	-3.53E-01	1.17E+00	7.27E-01	7.38E-01	5.77E-01	5.77E-01	4.75E-01	5.77E-01
COSMOS/AAC	1.86E-01	2.01E+00	2.07E+00	2.10E+00	2.06E+00	2.02E-01	2.36E-01	1.92E-01	1.92E-01	1.62E+00	1.92E-01
COSMOS/AAC/NS	1.86E-01	1.58E+02	1.32E+00	-1.84E+00	1.53E+00	2.02E-01	2.27E-01	1.92E-01	1.92E-01	1.62E+00	1.92E-01
DAHLIA/AAC	2.32E-01	6.89E+01	1.05E+00	-3.13E-01	1.14E+00	2.71E-01	2.88E-01	2.25E-01	2.25E-01	1.40E+00	2.25E-01
FUCHSIA/AAC/3P	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
HAWTHORN/AAC	4.25E-01	1.50E+01	1.71E-01	-1.27E-01	1.90E-01	5.47E-01	5.42E-01	4.33E-01	4.33E-01	6.45E-01	4.33E-01
LUPINE/AAC	6.83E-01	9.44E+00	1.09E-01	-7.92E-02	1.21E-01	7.21E-01	7.11E-01	6.29E-01	6.29E-01	3.78E-01	6.29E-01
MAGNOLIA/AAC	3.88E-01	1.67E+01	5.89E-01	2.66E-01	6.11E-01	3.88E-01	3.92E-01	3.87E-01	3.87E-01	8.24E-01	3.87E-01
MISTLETOE/AAC	2.21E-01	9.01E+00	6.56E-02	-1.14E-01	7.75E-02	2.38E-01	2.36E-01	2.28E-01	2.28E-01	1.40E+00	2.28E-01
NARCISSUS/AAC	4.56E-01	3.00E+01	3.41E-01	-2.55E-01	3.80E-01	4.51E-01	4.50E-01	4.62E-01	4.62E-01	5.99E-01	4.62E-01
OXLIP/AAC	8.22E-02	1.43E+01	1.05E-01	-1.82E-01	1.24E-01	8.97E-02	9.05E-02	8.47E-02	8.47E-02	3.73E+00	8.47E-02
OXLIP/AAC/NS	8.22E-02	5.93E+00	6.90E-02	-4.89E-02	7.67E-02	8.97E-02	8.96E-02	8.47E-02	8.47E-02	3.73E+00	8.47E-02
PHLOX/AAC	6.51E-02	4.80E+01	5.71E-01	-3.80E-01	6.34E-01	7.04E-02	8.13E-02	6.71E-02	6.71E-02	4.80E+00	6.71E-02
PHLOX/AAC/NS	6.51E-02	4.80E+01	5.71E-01	-3.80E-01	6.34E-01	7.04E-02	8.13E-02	6.71E-02	6.71E-02	4.80E+00	6.71E-02
POPPY/AAC	4.11E-02	2.35E-01	2.39E-01	2.42E-01	2.38E-01	4.44E-02	4.80E-02	4.24E-02	4.24E-02	7.89E+00	4.24E-02
SAGEBRUSH/AAC/NS	5.52E-01	2.38E+01	2.76E-01	-1.96E-01	3.07E-01	6.43E-01	6.38E-01	5.66E-01	5.66E-01	3.78E-01	5.66E-01
TULIP/AAC	1.32E-01	5.93E+00	6.90E-02	-4.89E-02	7.67E-02	1.50E-01	1.49E-01	1.36E-01	1.36E-01	2.36E+00	1.36E-01

To use these scaling factors, you will need the result from the tables in section 'LCA Results - Maximum Impact' and the chosen cable you are investigating. The scaling factors multiplied by the results above will be the results for that particular cable. For example, if you wanted to know how much GWP impact came from A1-A3 for #2/TE/AAC, you would follow the equation below:

	Scaling Factor	*	Results	=	Final GWP
#2/TE/AAC	2.52E-02	*	2.18E+04	=	5.49E+02

To adjust for more operational energy use than one amp, you will need the result from the tables in section 'LCA Results - Maximum Impact', the chosen cable you are investigating, and your expected amperage over 40 years. The scaling factors multiplied by the results above will be the operational use results for that particular cable, multiplied by the squared amperage. For this example, we will be using 30% of the max loading amperage over the lifetime, 303 Amps. For example, if you wanted to know how much 303 Amps would increase the #2/TE/AAC B6 GWP, you would follow the equation below:

	Scaling Factor	*	Results	*	Amperage-squared	=	Final GWP
#2/TE/AAC	1.19E+01	*	1.13E+01	*	303^2	=	1.23E+07

Environmental and Health During Manufacturing

Prysmian has an established HSE Management System in place at its manufacturing sites. Site programs ensure that OSHA and environmental requirements are met or exceeded to help ensure the safety and health of all employees, contractors, and guests.

Environmental and Health During Installation

Prysmian has established guidelines in HSE for installation processes, beginning with the development of a HSE plan. The HSE plan will be developed with specific site Environmental and Health concerns that might arise during installation process. Management and installation team will all be trained on the HSE plan prior to installation.

Extraordinary Effects

Fire
None
Water
None

Mechanical Destruction
None

Delayed Emissions

Global warming potential is calculated using the TRACI 2.1 and CML 4.1 impact assessment methodologies. Delayed emissions are not considered.

Environmental Activities and Certifications

Prysmian North America manufacturing sites strive to meet or exceed all applicable federal, state, and local environmental regulations. All manufacturing sites are ISO 14001:2015 Certified.

Prysmian maintains a variety of certifications based on the widely accepted industry standards:
- Quality Management System certifications (ISO9001/TL9000)
- Environmental Management System certifications (ISO14001)
- Health and Safety Management System certifications (ISO45001)

These certificates can be downloaded from our company website here:

Further Information

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References

- PCR — PEP ecopassport Program: Product Category Rules for Electrical, Electronic and HVAC-R Products, v4.0, 2021.
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Contact Information

Study Commissioner

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