Environmental Product Declaration

In accordance with ISO 14025 and EN 15804:2012+A2 for:

Optical fibre cables for telecommunication networks through duct installation

from

Cables de Comunicaciones Zaragoza S.L.

Program:	The International EPD® System, www.environdec.com
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General information

Program information

Program:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
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CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): *PCR 2019:14 Construction products, version 1.11 Published on 2021.02.05, valid until: 2024.12.20.*
PCR review was conducted by *the Technical Committee of the International EPD® System. Chair: Claudia A. Peña. Contact via info@environdec.com*
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ EPD process certification ☒ EPD verification
Third party verifier: TECNALIA R&I Certificación S.L. Auditor: Cristina Gazulla Santos Accredited by: ENAC. Accreditation no.125/C-PR283
Procedure for follow-up of data during EPD validity involves third party verifier: ☒ Yes ☐ No

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EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

The verifier and the program operator do not make any claim or have any responsibility of the legality of the product.

Company information

Owner of the EPD: Cables de Comunicaciones Zaragoza S.L., +34976729900, http://www.cablescom.com/

Contact: For more information contact by mail: quality@cablescom.com

Description of the organisation: Cables de Comunicaciones is one of the main European companies dedicated to the design, manufacturing and sales of cooper and fibre-optic telecommunications and signalling cables. Ever since its foundation in 1971, it has contributed to the development and extent of the telecommunications infrastructures. Operator companies in over 50 countries throughout the five continents trust us the manufacturing of their cables.

Cablescom undertakes its activity in Zaragoza, in the Malpica industrial park, over a surface of 77,000 m2, which includes a production plant, offices and warehouses.

The successful activity of Cablescom is based in an efficient organisation, a dynamic and proactive management, and professional human resources, motivated and committed to the objectives and values of the company. All of this is encouraged by the objective of reaching the excellence of products and company services.

Since July 2016 the company belongs to the Chinese group Hengtong optic-electric Co. Ltd, located in the city of Suzhou, China, and listed on Shanghai Stock Exchange. The group is one of the largest cable and optical fibre manufacturing groups in the world. Hengtong is highly dedicated to R+D+i, having 5 major scientific research platforms.

Product-related or management system-related certifications: Cablescom. holds the ISO 9001:2015 (Quality Management System) and ISO 14001:2015 (Environmental Management System)

Name and location of production site: Polígono industrial Malpica C. D, 83, 50016 Zaragoza, SPAIN

Product information

Product name: Optical fibre micromodule cables for telecommunication networks through duct installation

UN CPC code: 88753 (Fibre optic cable)

Product identification: This EPD covers the following product references of optical fibre micromodule cables cablesthrough duct installation (by blowing or pulling): EE85RG10001440GN, EE85RG10000720GN, EE85RG10001080GN, EE86RG10000720GN, EE86RG10001440GN and EE86RG10002880GN.
It must be noted that the EPD has been based on the cable reference EE85RG10001440GN since it is the leading product according to its volume sales.
The intended use is to provide a fast data transmission for telecommunication networks on large-scale infrastructures.

Product description: The assessed product references are outdoor and water-blocking compact optical fibre micromodule cables, which are made from a black polyethylene sheath withfibreglass reinforcements into the sheath
These cables are designed for every type of communications networks with G657A2 fibre. Micro module cables reduce the time needed for deployment, ease of installation and connectorization.

Regarding to the products structure, cables are composed by micromodules (which contain the optical fibres) stranded in a cable core without central element, as well as a water blocking yarns and/or tapes. Furthermore, the optical fibre cables have fibreglass reinforcement elements embedded in the outer sheath, and eventual aramid yarns in the cable code. The outer covering is made from black high density polyethylene UV-resistant sheath.
The expected life span of the product is 25 years. The main technical features can be seen on the next table.

Product references	Fibre count (units)	Modules count (units)	Nominal diameter (mm)	Tensile strength (N)	Impact resistance (J)
EE86RG10000720GN	72	6	9.0	1600	5
EE85RG10000720GN	72	12	10.5	2000	5
EE86RG10001440GN	144	12	11.8	2200	5
EE85RG10001080GN	108	18	11.8	2500	10
EE85RG10001440GN	144	24	13.0	2500	10
EE86RG10002880GN	288	24	13.8	2700	5

Tensile strength features based on IEC 60794-1-2 E1
Impact resistance features based on IEC 60794-1-2 E4

The product references of the optical fibre cables through duct installation covered by this EPD are detailed at the following table, as well as its mass amount per km of cable.

Product references	Product family	kg per km of cable
EE86RG10000720GN	MS DUCT	65,32
EE85RG10000720GN	MS DUCT	85,94
EE86RG10001440GN	MS DUCT	101,3
EE85RG10001440GN	MS DUCT	115,9
EE85RG10001080GN	MS DUCT	103,37
EE86RG10002880GN	MS DUCT	139,36

Geographical scope: Global
Fabricated in Spain, this product may be used globally.

LCA information

Declared unit: 1000 meters (1 km) of optical fibre cable for telecommunication networks

Time representativeness: The specific on-site data are from the year 2020 (less than two years on antiquity).

Database(s) and LCA software used: Generic data used from the Ecoinvent database V 3.6, updated in December 2019. CleanCO2 software is used.

Primary data regarding the inflows and outflows of the cables manufacturing process has been provided by Cables de Comunicaciones Zaragoza S.L.

Whenever possible, allocation is avoided (e.g. primary materials used). Mass allocation is applied for the rest of inputs used (energy and auxiliary and packaging materials) and outputs generated (wastes) in the production plant.

Description of system boundaries: Cradle to gate with modules C1-C4, module D and optional module A4

Excluded lifecycle stages: A5 module (Installation) and B Stage (Product use)

Hereunder is detailed the description of all modules included at this LCA study:

A1-A3 – Product stage: This stage includes the following modules which are described below: A1 module Extraction and processing of raw materials, A2 module Transportation of raw materials to manufacturing plant and A3 module Manufacturing.
It must be noted that, as the PCR of Construction Products allows, the aggregated environmental results of the entire stage are presented in this EPD.

A1 – Extraction and processing of raw materials: The A1 module considers the extraction and processing of raw materials. For this study, this considers the extraction and processing of the components used to produce the optical fibre cables.
Moreover, at this stage the production of the energy sources consumed on the manufacturing plant is considered. Therefore, the generation of electricity is assessed at this point.
The datasets representing this stage consider the materials processing operations, the bundled energy, the waste treatments, and the emissions arising from these procedures.

A2 – Transportation of raw materials to manufacturing plant: This stage considers the transportation of the raw materials to the point where they are processed and manufactured.
Many suppliers of the raw materials are involved on the system, thus a specific distance for each material provider to Cables de Comunicaciones Zaragoza S.L. production plant according to the quantity of material supplied has been modelled.

A3 – Manufacture: The A3 module includes the manufacturing process of the finished cables at production plant, which is described hereunder as overview:
Optical fibre is flexible and transparent (also can be colored) stretched glass (silica) with a diameter slightly thicker than the average human hair, normally between 200 and 250 microns.
They are commonly used as a means of transmitting light between two points and are widely used in telecommunications, where they allow transmission over greater distances and bandwidth (data speed) than electrical cables.

Micromodules
This process consists of grouping fibres, normally it can be from 1 to 36 optical fibres and inserting them inside a plastic tube to give the fibres protection. The plastic tube is usually made of thermoplastic materials or PBTP. As in the painting process, this plastic is colored to identify the tubes.
The control parameters of this process are: attenuation, outside and inside diameter of the tube, thickness of the tube, mechanical properties of the tube such as tensile strength, elastic modulus or breaking load and excess fibre length (EFL)

Sheathing
This process adds the last protection to the cable. The sheath is usually plastic, generally polyethylene. In addition to this protection, it can include elements to improve the final mechanical properties of the cable, such as Aramid yarn, Fibreglass yarn or FRP (Fibre Reinforce Plastic). Blocking elements are also added to avoid the water penetration inside the cable, such as tapes or threads impregnated with blocking powder.
The control parameters in this process are external and internal diameters and thickness.

A4 – Distribution of finished product to installation site: This module assesses the environmental impacts related to the final product transportation, including its packaging, to the installation site where the fibre cables are distributed. In the lower table are presented the considerations assumed for the module modelization.

It must be noted that the waste arisen from product packaging has not been taken into account for this LCA study, since it belongs to A5 module which is excluded of the system boundaries, and its final destination is unknown.

The scenarios included are currently in use and are representative for one of the most probable alternatives.

Parameter	Value/Description
Fuel type and consumption of vehicle or vehicle type used for transport	16-32 ton EURO5 Lorry
Distance	975 km
Capacity utilisation (including empty returns)	% Assumed in Ecoinvent
Bulk density of transported products	193,82 kg/ km of cable (packaging included)
Volume capacity utilisation factor	1

C1-C4 – End of life stage: This stage includes the following modules related with the end of life of the product: C1 Deconstruction, C2 Transportation to waste manager, C3 Waste processing and C4 Disposal

C1 Deconstruction: This module includes the dismantling operations of the optical fibre cables. In this case, the related environmental impacts are considered as negligible, since the consumption of energy for the building or infrastructure demolition where the product is installed is much higher than the dismantling of the analyzed product. Moreover, most of the activities involving the dismantling of the product are manual operations.

C2 Transport to waste manager: This module considers the transportation of the product as a waste to the waste manager. As the PCR of Construction products allows, a default distance of 50 km between the waste manager and the location where the product wastes are conveyed has been considered.

C3 Waste processing: Waste processing module includes the collection of waste fractions from the deconstruction and waste processing of material flows intended for reuse, recycling, and energy recovery. This module has no environmental impacts for this study since 100% of the product is landfilled.

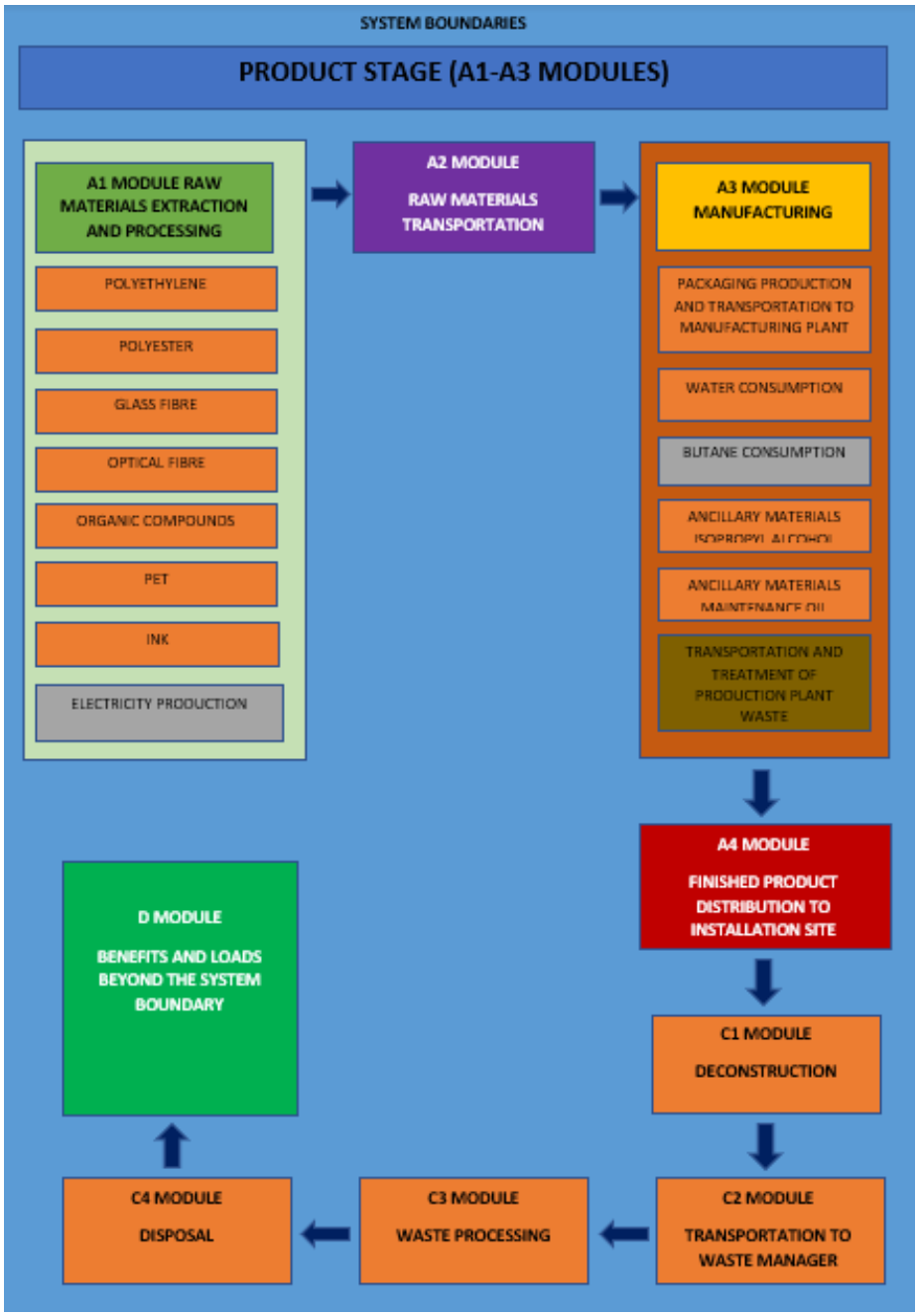
C4 Disposal: This module includes the related environmental impacts of the final disposal of the product wastes. In this case 100% of the product is landfilled

In the lower table the considerations for the End of life stage modelization are presented.

End of life scenario considerations:

Parameter	Unit per declared unit	Value
Collection process, specified by type	kg collected separately	115,9
	kg collected with demolition wastes	0
Recovery system, specified by type	kg to reuse	0
	kg for recycling	0
	kg for energy recovery	0
Disposal	kg landfilled	115,9 (100% of product weight)
Transports considerations	km of distance to the waste manager	50

Module D Benefits and loads beyond the system boundary: The module D counts for the benefits and loads of recycling beyond the limits of the system, representing the quantity of substituted new raw material by recycled material at the market, and thus, having a positive environmental impact, but outside the limits of the system. In this case, this module has no value since 100% of the product is landfilled. Furthermore, the benefits and loads regarding the packaging waste treatment of the product have not been taking into account, since it belongs to A5 module which is excluded of the system boundaries and its final destination is unknown.
On the next page, a generic flow chart as an overview of all modules and the main processes included at the system boundaries of this LCA study is presented.



More information of the LCA practitioner:

Anthesis Lavola
Rambla de Catalunya, 6, planta 2, 08007 Barcelona
+34 938 515 055
www.lavola.com

Cut-off rules applied:

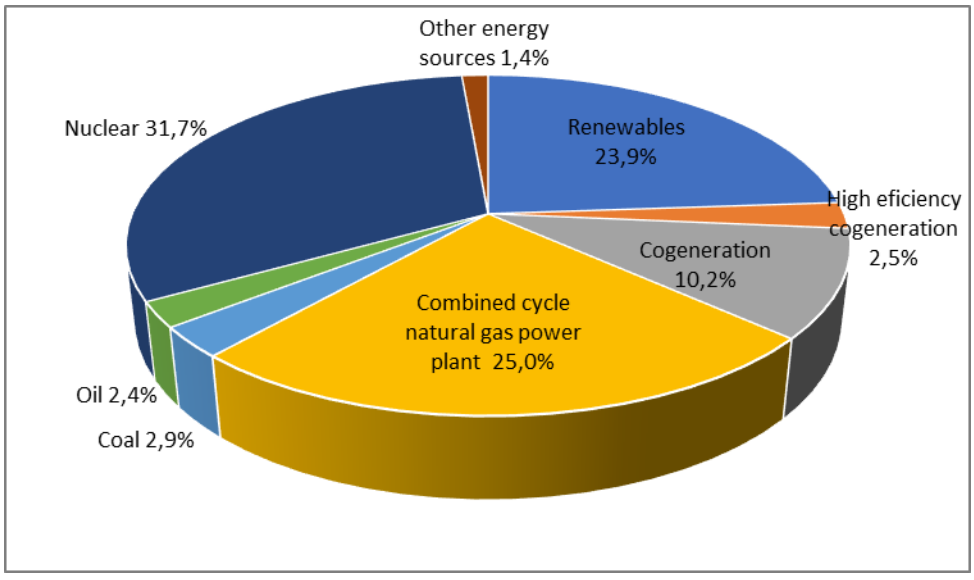
As established in the PCR of construction products and construction services, a minimum of 95% of total inflows (mass and energy) should be included per module. For this study, a 100% of the inflows of the declared product are considered, including packaging materials.

The PPP (Polluter pays principle) has been applied.

Moreover, the processes listed below have not been included:

- Manufacturing of production equipment, buildings and other capital goods.
- Business travel of personnel.
- Travel to and from work by personnel.
- Long term emissions.
- No end of life of packaging has been considered since they belong to the A5 module, which is out of the system boundaries.

Additional information: As established on the PCR, if the contribution of the electricity production exceeds the threshold of a 30% over the energy consumption in the modules A1-A3, the electricity mix used in the manufacturing process at Cables de Comunicaciones Zaragoza S.L. must be specified. Electricity grid mix as purchased from an electricity supplier, shown below, has an GWP-GHG value of 0,28 kg CO2 eq per kWh generated.



Disaggregated electricity mix supplied to Cables de Comunicaciones Zaragoza S.L. by energy sources corresponding to year 2020

Modules declared, geographical scope, share of specific data (in GWP-GHG indicator) and data variation:

	Product stage			Construction process stage		Use stage							End of life stage					Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal		Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**		**D**
Modules declared	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X		X
Geography	ES	ES	ES	FR	ND	ND	ND	ND	ND	ND	ND	ND	G	G	G	G		G
Specific data used	>95% GWP-GHG result in A1-A3 based on product-specific LCI					-	-	-	-	-	-	-	-	-	-	-		-
Variation – products	GWP-GHG result varies from 19,8% to 39,6% in relation to EE85RG10001440GN DUCT					-	-	-	-	-	-	-	-	-	-	-		-
Variation – sites	The product is manufactured in a single manufacturing site					-	-	-	-	-	-	-	-	-	-	-		-

X = Declared module **ND** = Non-Declared **G** = Global

Content information

MATERIAL SPECIFICATIONS EE85RG10001440GN DUCT CABLE			
Product components	**Weight (%)**	**Post-consumer material, weight-%**	**Renewable material, weight-%**
Polyethylene	50-60%	0%	0%
Glass fibre	10-20%	0%	0%
Polyester	10-20%	0%	0%
Optical fibre	5-10%	0%	0%
Chemical organic compounds	5-10%	0%	0%
PET	1-2%	0%	0%
Ink	0-1%	0%	0%
TOTAL (kg/DU)	**115,9**	0%	0%

Packaging materials	Weight, (kg per DU)	Weight-% (versus the product)
Wood (coil and protection staves)	68,97	59,50%
Steel (straps)	8,12	7,00%
Plastic-cardboard compound (protector film)	0,83	0,72%
TOTAL	**77,92**	67,23%

None of the final product components are included in the "Candidate list of substances of very high concern for authorisation" of the REACH regulation.

Packaging

Distribution packaging: The optical fibre cables are winding in wooden drums and protected by a plastic-cardboard film. The biogenic carbon content of the wood and cardboard elements of packaging is assumed to be a 50%.

Even though the packaging production is included, its end of life has not been considered since it belongs to the module A5 and the final destination is unknown.

Recycled material

Provenience of recycled materials (pre-consumer or post-consumer) in the product:
The products under study are not composed by any recycled material.

Environmental Information

Environmental performance has been calculated with CleanCO2 software. Characterization factors from Annex C of EN 15804:2012+A2 (EF 3.0 method adapted, in SimaPro) have been used for estimating the potential environmental impacts, as required by PCR 2019:14 Construction products, version 1.11. Results for the other parameters have been calculated using EDIP, CED (Cumulative energy Demand) and ReCiPe methodologies.

The following environmental results presented on the next page corresponds to the cable reference for duct family EE85RG10001440GN. Regarding the results belonging to the rest of duct family product references can be subsequently found at section Additional Information

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

Potential environmental impact – mandatory and voluntary indicators according to EN 15804

Environmental impact results per declared unit (1 km) for EE85RG10001440GN DUCT CABLE								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D Module**
GWP-fossil	kg CO_2 eq.	3,72E+02	2,61E+01	0	8,01E-01	0	6,13E-01	0
GWP-biogenic	kg CO_2 eq.	-1,18E+02	1,07E-02	0	3,28E-04	0	1,03E-02	0
GWP-luluc	kg CO_2 eq.	6,12E-01	2,07E-04	0	6,34E-06	0	2,21E-04	0
GWP-Total	kg CO_2 eq.	2,54E+02	2,61E+01	0	8,01E-01	0	6,24E-01	0
ODP	kg CFC 11 eq.	3,35E-05	6,06E-06	0	1,86E-07	0	1,10E-07	0
AP	mol H+ eq.	2,45E+00	9,04E-02	0	2,77E-03	0	5,72E-03	0
EP-freshwater	kg PO_4^{3-} eq.	2,93E-02	4,78E-05	0	1,47E-06	0	2,42E-05	0
EP-freshwater	kg P eq.	9,52E-03	1,55E-05	0	4,76E-07	0	7,86E-06	0
EP-marine	kg N eq.	4,89E-01	2,90E-02	0	8,89E-04	0	2,36E-03	0
EP-terrestrial	mol N eq.	5,66E+00	3,19E-01	0	9,79E-03	0	2,59E-02	0
POCP	kg NMVOC eq.	1,85E+00	8,71E-02	0	2,67E-03	0	7,15E-03	0
ADP-minerals and metals[1]	kg Sb eq.	5,04E-03	1,54E-06	0	4,72E-08	0	2,85E-07	0
ADP-fossil[1]	MJ	1,04E+04	3,70E+02	0	1,13E+01	0	8,16E+00	0
WDP[1]	m^3	2,34E+02	-8,14E-02	0	-2,50E-03	0	2,01E-02	0
PM	disease inc.	1,29E-05	1,70E-06	0	5,21E-08	0	1,41E-07	0
IRP[2]	kBq U-235 eq	3,68E+01	1,63E+00	0	4,99E-02	0	3,55E-02	0
ETP-fw[1]	CTUe	7,51E+03	1,48E+02	0	4,55E+00	0	4,85E+00	0
HTP-c[1]	CTUh	3,50E-07	2,08E-09	0	6,37E-11	0	5,96E-11	0
HTP-nc[1]	CTUh	1,30E-05	2,45E-07	0	7,53E-09	0	5,07E-09	0
SQP[1]	Pt	1,09E+04	9,18E-01	0	2,82E-02	0	2,03E+01	0
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption; PM = Particulate matter; IRP = Ionising radiation, human health; ETP-fw = Ecotoxicity, freshwater - organics ; HTP-c = Cancer human health effects; HTP-nc = Non-cancer human health effects; SQP = Land use - Soil quality index							
[1]Environmental impact results shall be managed with caution since the uncertainty of the results are high and the experience with this parameter is limited.								
[2]This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear full cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.								

As required on the PCR 2019:14 of construction products, a supplementary indicator for climate change impact (GWP-GHG) with characterization factors based on IPCC (2013) is reported.

Environmental impact results per declared unit (1 km) for EE85RG10001440GN DUCT CABLE								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D Module**
GWP-GHG*	kg CO_2 eq.	3,62E+02	2,59E+01	0	7,96E-01	0	6,07E-01	0
*The indicator includes all greenhouse gases included in GWP-TOTAL but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus almost equal to the GWP originally								

ENVIRONMENTAL RESULTS INTERPRETATION

The table above shows that the Product stage A1-A3 (Extraction and processing of raw materials, transport of raw materials to production plant and product manufacturing) is the life cycle stage with the highest contribution to the whole life cycle ranging from 84% for ODP indicator (Depletion potential of the stratospheric ozone layer) to 100% for GWP-biogenic (Global Warming Potential Biogenic) and WDP (Water deprivation potential).

A4 module (Distribution of the finished product to installation site) presents a low contribution on the product life cycle, except for ODP indicator (15%).

Regarding the End-of-life stage environmental impacts, (Deconstruction, transport to waste manager, waste processing and disposal) they can be considered as negligible since all indicator values are below 1%

Use of resources

Use of resources per declared unit (1 km) for EE85RG10001440GN DUCT CABLE								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D Module**
PERE	MJ	1,08E+03	5,17E-01	0	1,59E-02	0	1,87E-01	0
PERM	MJ	1,29E+03	0	0	0	0	0	0
PERT	MJ	2,36E+03	5,17E-01	0	1,59E-02	0	1,87E-01	0
PENRE	MJ	1,10E+04	3,93E+02	0	1,20E+01	0	8,67E+00	0
PENRM	MJ	1,10E+00	0	0	0	0	0	0
PENRT	MJ	1,10E+04	3,93E+02	0	1,20E+01	0	8,67E+00	0
SM	kg	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0
FW	m^3	3,95E+00	5,54E-04	0	1,70E-05	0	9,85E-04	0
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water							

Waste production and output flows

Waste production

Waste production per declared unit (1 km) for EE85RG10001440GN DUCT CABLE								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D Module**
Hazardous waste disposed	kg	1,24E-01	9,79E-04	0	3,00E-05	0	1,74E-05	0
Non-hazardous waste disposed	kg	1,92E+01	1,97E-02	0	6,05E-04	0	1,16E+02	0
Radioactive waste disposed	kg	2,83E-02	2,68E-03	0	8,22E-05	0	5,16E-05	0

Output flows

Other output flows per declared unit (1 km) for EE85RG10001440GN DUCT CABLE								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D Module**
Components for re-use	kg	0	0	0	0	0	0	0
Material for recycling	kg	1,49E+01	0	0	0	0	0	0
Materials for energy recovery	kg	1,08E+00	0	0	0	0	0	0
Exported energy, electricity	MJ	0	0	0	0	0	0	0
Exported energy, thermal	MJ	0	0	0	0	0	0	0

Information on biogenic carbon content

Biogenic carbon per declared unit (1 km) for EE85RG10001440GN DUCT CABLE		
Biogenic carbon content	**Unit**	**Amount**
Biogenic carbon content in the product	kg C	0
Biogenic carbon content in packaging	kg C	3,49E+01

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

Additional information

As additional information, on the next page it is presented the life cycle environmental impacts for the rest of references included on the family of optical fibre cables for telecommunication networks through duct installation. The results below are expressed per km of cable and cover the Product Stage (A1, A2 and A3 modules).

Environmental performance of duct family per km of cable

Environmental impact results per declared unit (1 km) for DUCT CABLE FAMILY REFERENCES Product stage (A1-A3 modules)						
Indicator	**Unit**	**EE85RG10000720GN**	**EE85RG10001080GN**	**EE86RG10000720GN**	**EE86RG10001440GN**	**EE86RG10002880GN**
GWP-fossil	kg CO_2 eq.	2,90E+02	3,36E+02	2,25E+02	3,24E+02	4,45E+02
GWP-biogenic	kg CO_2 eq.	-8,26E+01	-8,17E+01	-5,67E+01	-8,21E+01	-1,17E+02
GWP-luluc	kg CO_2 eq.	4,42E-01	5,20E-01	3,41E-01	4,52E-01	9,60E-01
GWP-Total	kg CO_2 eq.	2,08E+02	2,55E+02	1,68E+02	2,43E+02	3,29E+02
ODP	kg CFC 11 eq.	2,62E-05	3,02E-05	2,11E-05	2,94E-05	4,31E-05
AP	mol H+ eq.	1,75E+00	2,10E+00	1,45E+00	2,21E+00	3,45E+00
EP-freshwater	kg PO_4^{3-} eq.	2,32E-02	2,55E-02	1,80E-02	2,44E-02	3,29E-02
EP-freshwater	kg P eq.	7,54E-03	8,28E-03	5,86E-03	7,92E-03	1,07E-02
EP-marine	kg N eq.	3,38E-01	4,15E-01	2,83E-01	4,46E-01	7,20E-01
EP-terrestrial	mol N eq.	3,94E+00	4,82E+00	3,30E+00	5,15E+00	8,27E+00
POCP	kg NMVOC eq.	1,30E+00	1,58E+00	1,06E+00	1,65E+00	2,55E+00
ADP-minerals and metals[1]	kg Sb eq.	4,41E-03	4,54E-03	3,79E-03	4,52E-03	5,68E-03
ADP-fossil[1]	MJ	7,83E+03	9,25E+03	5,95E+03	8,77E+03	1,21E+04
WDP[1]	m^3	1,80E+02	2,11E+02	1,36E+02	1,98E+02	2,68E+02
PM	disease inc.	1,05E-05	1,17E-05	8,20E-06	1,15E-05	1,52E-05
IRP[2]	kBq U-235 eq	2,89E+01	3,31E+01	2,32E+01	3,04E+01	4,53E+01
ETP-fw[1]	CTUe	6,14E+03	6,51E+03	5,12E+03	6,37E+03	8,54E+03
HTP-c[1]	CTUh	2,66E-07	2,80E-07	1,99E-07	2,73E-07	3,76E-07
HTP-nc[1]	CTUh	1,04E-05	1,08E-05	8,42E-06	1,07E-05	1,43E-05
SQP[1]	Pt	7,97E+03	8,29E+03	5,82E+03	8,02E+03	1,15E+04
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption; PM = Particulate matter; IRP = Ionising radiation, human health; ETP-fw = Ecotoxicity, freshwater - organics ; HTP-c = Cancer human health effects; HTP-nc = Non-cancer human health effects; SQP = Land use - Soil quality index					
[1]Environmental impact results shall be managed with caution since the uncertainty of the results are high and the experience with this parameter is limited.						
[2]This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear full cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.						

Use of resources per declared unit (1 km) for DUCT CABLE FAMILY REFERENCES Product stage (A1-A3 modules)						
Indicator	Unit	EE85RG10000720GN	EE85RG10001080GN	EE86RG10000720GN	EE86RG10001440GN	EE86RG10002880GN
PERE	MJ	8,42E+02	9,45E+02	6,64E+02	8,63E+02	1,27E+03
PERM	MJ	9,07E+02	9,07E+02	6,32E+02	9,07E+02	1,29E+03
PERT	MJ	1,75E+03	1,85E+03	1,30E+03	1,77E+03	2,56E+03
PENRE	MJ	8,34E+03	9,85E+03	6,33E+03	9,35E+03	1,29E+04
PENRM	MJ	9,50E-01	9,50E-01	6,60E-01	9,50E-01	1,10E+00
PENRT	MJ	8,34E+03	9,85E+03	6,33E+03	9,35E+03	1,29E+04
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m^3	3,14E+00	3,62E+00	2,39E+00	3,41E+00	4,53E+00
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water					

Waste production per declared unit (1 km) for DUCT CABLE FAMILY REFERENCES Product stage (A1-A3 modules)						
Indicator	Unit	EE85RG10000720GN	EE85RG10001080GN	EE86RG10000720GN	EE86RG10001440GN	EE86RG10002880GN
Hazardous waste disposed	kg	1,11E-01	1,15E-01	1,04E-01	1,13E-01	1,31E-01
Non-hazardous waste disposed	kg	1,63E+01	1,79E+01	1,51E+01	1,76E+01	2,07E+01
Radioactive waste disposed	kg	2,18E-02	2,52E-02	1,74E-02	2,35E-02	3,54E-02

Differences versus previous versions

This version, reviewed on 8th April 2022, has applied changes on the table on page 4 regarding technical features from the product references: fiber count, modules count and nominal diameter for EE86RG10001440GN; nominal diameter and tensile strength for EE86RG10002880GN; and tensile strength for EE86RG10000720GN, EE85RG10000720GN, EE85RG10001080GN. This has been an editorial correction and does not alter the results of the EPD.

References

General Program Instructions of the International EPD® System. Version 3.01

PCR 2019:14. Construction products. 1.11

Life cycle assessment of optical fibre cables for telecommunication networks produced by Cables de Comunicaciones Zaragoza S.L. March 2022. Version 1

ISO 14025:2006 Environmental labels and declarations - Type III environmental declarations - Principles and procedures.

UNE-EN ISO 14044:2006 – Environmental management – Life Cycle Assessment – Requirements

UNE-EN 15804:2012+A2 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.

https://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml

Ecoinvent database 3.6 (Released on December 2019).

http://www.cablescom.com/

VERIFICATION STATEMENT CERTIFICATE

CERTIFICADO DE DECLARACIÓN DE VERIFICACIÓN

Certificate No. / Certificado nº: EPD06502

TECNALIA R&I CERTIFICACION S.L., confirms that independent third-party verification has been conducted of the Environmental Product Declaration (EPD) on behalf of:
TECNALIA *R&I CERTIFICACION S.L., confirma que se ha realizado verificación de tercera parte independiente de la Declaración Ambiental de Producto (DAP) en nombre de:*

CABLES DE COMUNICACIONES ZARAGOZA, S.L.
Polígono Malpica C/D Nº 83
50016 ZARAGOZA - SPAIN

for the following product(s):
para el siguiente(s) producto(s):

OPTICAL FIBRE CABLES FOR TELECOMMUNICATION NETWORKS THROUGH DUCT INSTALLATION.
CABLES DE FIBRA ÓPTICA PARA REDES DE TELECOMUNICACIONES MEDIANTE INSTALACIÓN DE CONDUCTOS.

with registration number **S-P-05723** in the International EPD® System *(www.environdec.com)*
*con número de registro **S-P-05723** en el Sistema International EPD® (www.environdec.com)*

it´s in conformity with:
es conforme con:

- **ISO 14025:2010 Environmental labels and declarations. Type III environmental declarations.**
- **General Programme Instructions for the International EPD® System v.3.01.**
- **PCR 2019:14 Construction products (EN 15804:A2) version 1.11.**
- **UN CPC 88753 Fibre optic cable.**

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Carlos Nazabal Alsua
Manager

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