Statement of Verification

BREG EN EPD No.: 000521 Issue 01

This is to verify that the

Environmental Product Declaration

provided by:

Mayflex UK Limited

BRE Global Verified EPD

is in accordance with the requirements of:

EN 15804:2012+A2:2019

and

BRE Global Scheme Document SD207

This declaration is for:

1 metre of Singlemode & Multimode fibre optic pigtails & Patchcords

Company Address

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MAYFLEX
A Sonepar Company

Signed for BRE Global Ltd	Emma Baker Operator	14 August 2023 Date of this Issue
14 August 2023 Date of First Issue		13 August 2028 Expiry Date

BRE Global Verified EPD

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ECO PLATFORM EPD VERIFIED

Environmental Product Declaration

EPD Number: 000521

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE 2021 Product Category Rules (PN 514 Rev 3.0) for Type III environmental product declaration of construction products to EN 15804:2012+A2:2019.
Commissioner of LCA study	**LCA consultant/Tool**
Mayflex UK Limited Unit 15, Junction Six Industrial Park, Electric Avenue Birmingham B6 7JJ	LCA Tool: BRE LINA A2 LCA Consultant: Bala Subramanian
Declared/Functional Unit	**Applicability/Coverage**
1 metre of Singlemode & Multimode fibre optic pigtails & Patchcords	Other (please specify). Product Specific
EPD Type	**Background database**
Cradle to Gate with options	ecoinvent

Demonstration of Verification
CEN standard EN 15804 serves as the core PCR [a]
Independent verification of the declaration and data according to EN ISO 14025:2010 ☐Internal ☒ External
(Where appropriate [b])Third party verifier: Pat Hermon
a: Product category rules b: Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)

Comparability
Environmental product declarations from different programmes may not be comparable if not compliant with EN 15804:2012+A2:2019. Comparability is further dependent on the specific product category rules, system boundaries and allocations, and background data sources. See Clause 5.3 of EN 15804:2012+A2:2019 for further guidance

Information modules covered

Product			Construction		Use stage							End-of-life					Benefits and loads beyond the system boundary
					Related to the building fabric					Related to the building							
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		D
Raw materials supply	Transport	Manufacturing	Transport to site	Construction – Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal		Reuse, Recovery and/or Recycling potential
☑	☑	☑	☑	☑	☐	☐	☐	☐	☐	☐	☐	☑	☑	☑	☑		☑

Note: Ticks indicate the Information Modules declared.

Manufacturing site(s)

Made in PRC

Construction Product:

Product Description

Excel Singlemode & Multimode fibre optic pigtails & Patchcords are manufactured from the highest quality 900-micron optical fibre (pigtails) and 2mm/3mm duplex ruggedised cable (patchcords), terminated with ceramic ferrule (PC) connectors of various types. To assist in fast cable preparation and splicing semi tight buffered, easy strip, cable is used as standard. Cable preparation, termination and testing is carried out to strictly managed procedures in an approved ISO9001 registered manufacturing facility. Each assembly has a strain relief boot to prolong and maintain performance levels of the assembly, preventing stress as the fibre exits the connector.

The pigtails are supplied in packs of 12 colours for easy identification. The colours follow the TIA-598 colour code standard – Blue, Orange, Green, Brown, Grey, White, Red, Black, Yellow, Purple, Pink, Aqua, and are packaged onto a convenient card to easy unpacking.

The patchcords use connectors that are duplexed together using removable duplex clips to enable the fibres to be uncrossed if required. All patchcords are supplied naturally crossed (A-B, B-A). LC patchcords use 2mm ruggedised duplex cables and SC patchcords use 2.8mm ruggedised cables. Singlemode patchcords use yellow cable and OM4 use violet cable.

Pigtail with 1m of 12m Pack with the weight of 0.0185 kg/m has been modelled and Patchcords are available in Singlemode and multimode cables with the varying lengths from 1m to 5m with the different colour, so in this EPD the single mode patchcords with the weight of 0.01441 kg/m has been taken as a representative among their group.

Technical Information

Fibre Pigtails

Property	OS2	OM4
Fibre Type	OS2 9/125µm G657.A2	OM4 50/125
Fibre Coating	Secondary	Secondary
Colour	Yellow	Violet
Diameter	900 microns	900 microns
Lengths	1m & 2m	1m & 2m
Temperature Range	-20 to +70 °C	-20 to +70 °C
Minimum Bending Radius	10x Diameter	10x Diameter
Fibre Attenuation 1	0.35dB/km @ 1310nm	3.5dB/km @ 850nm
Fibre Attenuation 2	0.21dB/km @ 1550nm	1.5dB/km @ 1300nm
Refractive Index 1	1.466 @ 1310nm	1.482 @ 850nm
Refractive Index 2	1.467 @ 1550nm	1.477 @ 1300nm
Core Diameter	NA	50 +/- 2.5um
Mode Field Diameter @1310nm	8.4 – 9.2um	NA
Mode Field Diameter @ 1550nm	9.3 – 10.3um	NA
Cladding Diameter	125 +/- 0.7um	125 +/-1.0um
Primary Coating Diameter (coloured)	245 +/- 7um	245 +/- 7um
Fibre Colour Coating Standard	TIA 598	TIA 598
Connector Insertion Loss (max)	0.3 dB	0.3 dB
Connector Return Loss (min)	-50 dB	- 30dB

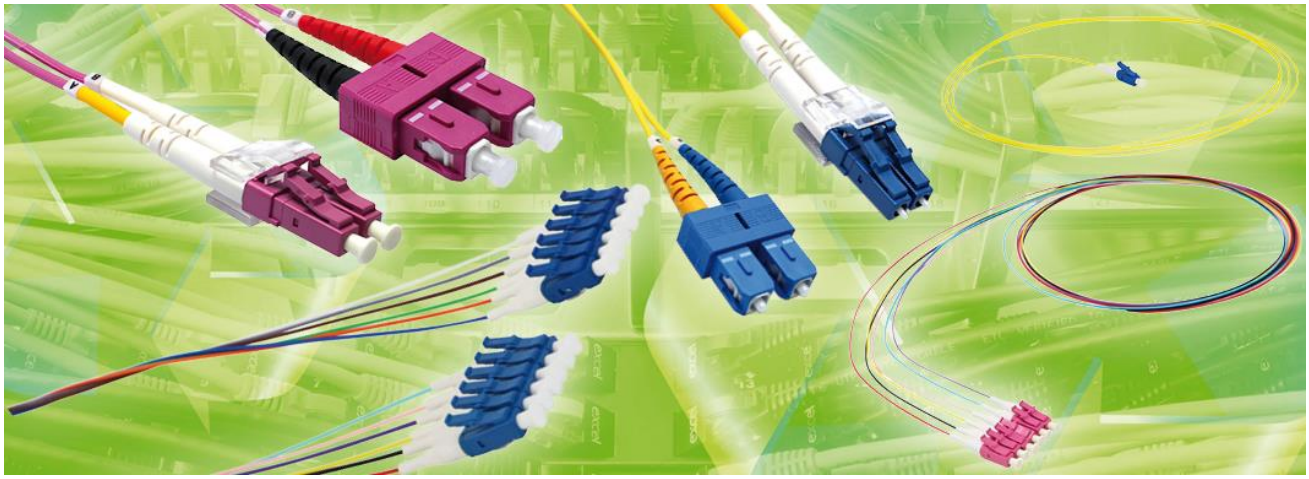
Note: Technical Properties of all products assessed within this EPD

Fibre Patchcords

Property	OS2	OM4
Fibre Type	OS2 9/125µm G657.A2	OM4 50/125
Fibre Coating	Secondary	Secondary
Cable Colour	Yellow	Violet
Cable Diameter (LC)	1.8 mm	1.8 mm
Cable Diameter (SC)	2.8 x 5.7 mm Duplex	2.8 x 5.7 mm Duplex
Cable Type	Zip Cord	Zip Cord
Lengths	1m to 5m	1m to 5m
Temperature Range	-20 to +70 °C	-20 to +70 °C
Minimum Bending Radius	10x Diameter	10x Diameter
Fibre Attenuation 1	0.35dB/km @ 1310nm	2.4dB/km @ 850nm
Fibre Attenuation 2	0.21dB/km @ 1550nm	0.6dB/km @ 1300nm
Refractive Index 1	1.466 @ 1310nm	1.482 @ 850nm
Refractive Index 2	1.467 @ 1550nm	1.477 @ 1300nm
Core Diameter	NA	50 +/- 2.5um
Mode Field Diameter @1310nm	8.4 – 9.2um	NA
Mode Field Diameter @ 1550nm	9.3 – 10.3um	NA
Cladding Diameter	125 +/- 0.7um	125 +/-1.0um
Primary Coating Diameter (coloured)	245 +/- 7um	245 +/- 7um
Fibre Colour Coating Standard	TIA 598	TIA 598
Connector Insertion Loss (max)	0.3 dB	0.3 dB
Connector Return Loss (min)	-50 dB	- 30dB
Flame Retardant EN 60332-1-2	Yes	Yes
Low Smoke EN 61034-2	Yes	Yes

Applicable Standard	Subject
IEC 60793-1-1:2017	Optical fibres - Part 1-1: Measurement methods and test procedures - General and guidance
IEC 60793-2:2015	Optical fibres - Part 2: Product specifications - General
IEC 60793-2-10:2017	Sectional specification for A1 multimode fibres
IEC 60793-1-20:2014	Optical fibres - Part 1-20: Measurement methods and test procedures - Fibre geometry
IEC 60793-1-21:2001	Optical fibres - Part 1-21: Measurement methods and test procedures - Coating geometry
IEC 60793-1-22:2001	Optical fibres - Part 1-22: Measurement methods and test procedures - Length measurement
IEC 60793-1-30:2010	Optical fibres - Part 1-30: Measurement methods and test procedures - Fibre proof test
IEC 60793-1-31:2010	Optical fibres - Part 1-31: Measurement methods and test procedures - Tensile Strength
ITU G.651.1:2018	Characteristics of a 50/125 µm multimode graded index optical fibre cable for the optical access network
ITU-T G.652:2016	Characteristics of a single-mode optical fibre and cable
ITU-T G.657:2016	Characteristics of a bending-loss insensitive single-mode optical fibre and cable
EN 50173-1:2018	Information technology. Generic cabling systems - General requirements
EN 50173-2:2007 + A1:2010	Information technology. Generic cabling systems - Office premises
IEC 61754-1:2013	Fibre optic interconnecting devices and passive components - Fibre optic connector interfaces - Part 1: General and guidance
IEC 61754-2:1996	Fibre optic connector interfaces - Part 2: Type BFOC/2,5 connector family
IEC 61754-4:2013	Fibre optic interconnecting devices and passive components - Fibre optic connector interfaces - Part 4: Type SC connector family
IEC 61754-4-100:2015	Fibre optic interconnecting devices and passive components - Fibre optic connector interfaces - Part 4-100: Type SC connector family - Simplified receptacle SC-PC connector interfaces
IEC 61754-4-100:2015	Fibre optic interconnecting devices and passive components - Fibre optic connector interfaces - Part 4-100: Type SC connector family - Simplified receptacle SC-PC connector interfaces
ISO/IEC 11801-1:2017	Information technology - Generic cabling for customer premises: Part 1 General Requirements
ANSI/TIA 568-3.D	Optical Fibre Cabling and Components Standard
RoHS	Restriction of Hazardous Substances - Compliant
WFD	Compliant to Waste Framework Directive
SCIP	Compliant - Does Not Contain Substances of Concern in Products

Note: Technical standards of all products assessed within this EPD



Main Product Contents

Material/Chemical Input	%
PVC	10-15
PET	5-10
Steel	5-10
Rubber	1-5
Co-Polymer	50-55
Others	0-5

Note: Main product contents of all products assessed within this EPD

Manufacturing Process

The processes followed to produce fibre optic pigtails and Patchleads are generally common for all types, whether they are Singlemode or Multimode. The connectors described here also follow common processes.
The process starts with reels of fibre/cable. The fibre/cable is first cut to length according to requirements. The reel in placed onto a pay-off machine and the fibre/cable fed into the cutting machine. The cable is pulled off the reel, cut to length and coiled in coiling pans. The coiled lengths are then removed from the coiling pans by the operator and passed to the termination area in batches.

Once at the termination area, the cable is prepared by fitting the connector boots & crimps (if required) to the ends of the fibre/cable. The connectors are prepared by injecting a precise amount of epoxy resin through the ferrule. An automatic dispensing machine is used for this to ensure the correct amount of epoxy is used.
The fibre/cable is stripped to precise lengths according to the connector being terminated. This is carried out by the operator using special stripping tools such as jacket strippers, Kevlar® scissors and fibre strippers. Great care is necessary to ensure that the strip lengths are correct, and that the fibre is not damaged during the stripping process.

With the connector and fibre/cable prepared, the fibre is carefully inserted through the connector and the connector is placed into the curing oven to cure the epoxy resin. This generally requires 30 minutes at 90C for a complete cure. Once cured, the connector is removed from the curing oven and the fibre is cleaved (the end of the fibre is cut off using a special ceramic or sapphire blade). The fibre cut-off end is placed into a designated sharps container for safety.

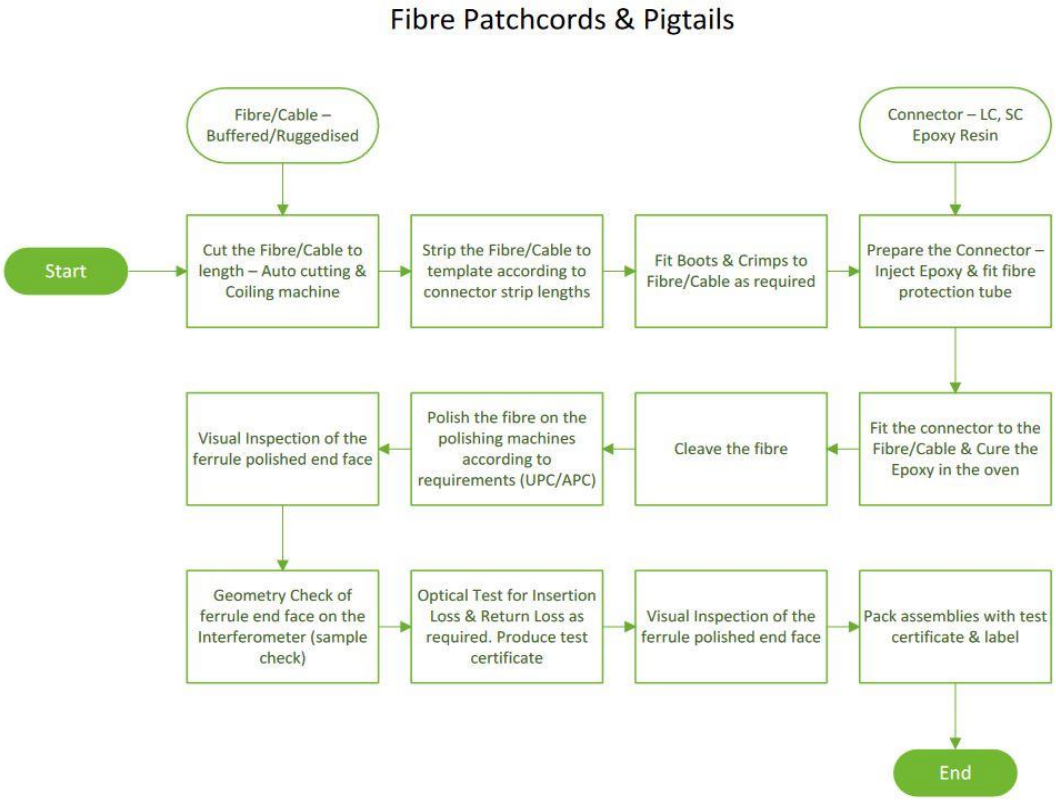
The assembles are then polished. Polishing quality is critical to ensure good performance of the connectors at all temperatures. This is achieved using special polishing machines. The polishing will involve 4 stages (epoxy removal, shape forming, intermediate polish, final polish). Each stage uses a different grade of polishing film. Once the polishing is complete, all connector ferrules are visually inspected using a high-powered microscope

(typically 400x magnification) to ensure that the end faces are clean and free from defects such as scratches and pitting. If any defects are observed, the ferrules will be re-polished and re-inspected.

The ferrules will then be sample checked on the Interferometer. This is an extremely accurate machine that measures the geometry of the ferrule end face. It uses interference of reflected light (hence the name Interferometer) and software to analyse the geometry. The ferrules must conform to certain parameters, such as Radius, Apex Offset, and Fibre Height (undercut/protrusion), to ensure correct Physical Contact (PC) at all temperatures. Once all checks have been passed, the assemblies are moved to Optical Testing.

Optical Testing is the final check. All assemblies are tested for optical performance (insertion loss as a minimum). This involves connecting a stabilised light source of known power to one end of the assembly and measuring the output power emitted from the other end. This provides the loss through the assembly in one direction. The assembly is then reversed and measured again in the opposite direction. A test certificate is produced and packed with the assembly.

Process flow diagram



Construction Installation

Installation of pigtails & patchcords is generally carried out by manual labour, and in the case of pigtails, a splicing machine is used to fuse the pigtails to the cable.

End of Life

Fibre optic Pigtails & patchcords cables are not economically recyclable therefore they will be taken to landfill via a WEEE registered commercial waste disposal company.

Life Cycle Assessment Calculation Rules

Declared / Functional unit description

1 metre of Singlemode & Multimode fibre optic pigtails & Patchcords

System boundary

This is a cradle-to-gate LCA, reporting all production life cycle stages of modules A1 to A3 and A4 and A5 (transportation and installation) and end of life stages C1-C4, and D in accordance with EN 15804:2012+A2:2019 and BRE 2021 Product Category Rules (PN 514 Rev 3.0).

Data sources, quality and allocation

The quantity used in the data collection for this EPD is the total quantity of Singlemode & Multimode fibre optic pigtails & Patchcords of 1m manufactured as a proportion of the total manufactured during the data collection period (01/01/21-31/12/21). Generally, Mayflex receives the data cables from their PRC manufacturing partners, therefore the transportation used to transfer the products from PRC to the UK is included in the LCA analysis. Other cables and products are manufactured in addition to the pigtail and patchcords; therefore, the allocation of electricity and water consumption and discharge are required, and this has been done according to the provisions of the BRE PCR PN514 and EN 15804.

In this EPD, 1m of Singlemode & Multimode fibre optic pigtails with 0.0185 weight per metre and Patchcords with 0.01441 weight per metre has been taken as a representative among their group and the LCA analysis has been performed. Secondary data has been obtained for all other upstream and downstream processes that are beyond the control of the manufacturer (i.e., raw material production) from the ecoinvent 3.8 database. All ecoinvent datasets are complete within the context used and conform to the system boundary and the criteria for the exclusion of inputs and outputs, according to the requirements specified in EN15804 A2.

ISO14044 guidance. **Quality Level**	**Geographical representativeness**	**Technical representativeness**	**Time representativeness**
Very Good	Data from area under study.	Data from processes and products under study. Same state of technology applied as defined in goal and scope (i.e., identical technology).	n/a
Very Good	n/a	n/a	There is approximately 1-2 years between the Ecoinvent LCI reference year, and the time period for which the LCA was undertaken.

Specific European datasets have been selected from the ecoinvent LCI for this LCA. Manufacturer uses the national grid electricity for production, so therefore the national grid electricity dataset has been used for the LCA modelling (Ecoinvent 3.8). The quality level of time representativeness is also Very Good as the background LCI datasets are based on ecoinvent v3.8 which was compiled in 2021. Therefore, there is less than 5 years between the ecoinvent LCI reference year and the time period for which the LCA was undertaken.

Cut-off criteria

All raw materials and energy input to the manufacturing process have been included, except for direct emissions to air, water, and soil, which are not measured.

LCA Results - Singlemode & Multimode fibre optic pigtails with 0.0185 kg/m

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts									
			GWP-total	GWP-fossil	GWP-biogenic	GWP-luluc	ODP	AP	EP-freshwater
			kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CFC11 eq	mol H^+ eq	kg $(PO_4)^{3-}$ eq
Product stage	Raw material supply	A1	3.92E-02	3.90E-02	1.52E-04	3.04E-05	5.85E-08	2.04E-04	1.30E-05
	Transport	A2	1.14E-02	1.14E-02	1.60E-05	7.28E-06	2.37E-09	1.56E-04	1.19E-06
	Manufacturing	A3	1.11E-01	1.28E-01	-1.71E-02	2.87E-04	7.78E-09	7.93E-04	3.84E-05
	Total (Consumption grid)	A1-3	1.62E-01	1.78E-01	-1.70E-02	3.25E-04	6.87E-08	1.15E-03	5.26E-05
Construction process stage	Transport	A4	5.30E-04	5.29E-04	4.51E-07	2.08E-07	1.22E-10	2.15E-06	3.41E-08
	Construction	A5	1.97E-02	5.54E-03	1.41E-02	9.80E-06	2.07E-09	3.63E-05	1.65E-06
Use stage	Use	B1	MND	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND	MND
100% - Landfill									
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	3.85E-05	3.84E-05	3.28E-08	1.51E-08	8.89E-12	1.56E-07	2.48E-09
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	4.49E-02	4.48E-02	5.50E-05	1.03E-05	5.31E-09	6.71E-05	1.27E-05
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

GWP-total = Global warming potential, total;
GWP-fossil = Global warming potential, fossil;
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; and
EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts									
			EP-marine	EP-terrestrial	POCP	ADP-mineral &metal	ADP-fossil	WDP	PM
			kg N eq	mol N eq	kg NMVOC eq	kg Sb eq	MJ, net calorific value	m^3 world eq deprived	disease incidence
Product stage	Raw material supply	A1	3.93E-05	3.86E-04	1.43E-04	3.74E-07	7.71E-01	2.20E-02	2.49E-09
	Transport	A2	4.08E-05	4.52E-04	1.26E-04	1.11E-07	1.62E-01	9.19E-04	9.37E-10
	Manufacturing	A3	2.27E-04	2.30E-03	5.73E-04	3.47E-07	1.60E+00	2.99E-02	1.16E-08
	Total (Consumption grid)	A1-3	3.07E-04	3.14E-03	8.42E-04	8.32E-07	2.53E+00	5.28E-02	1.51E-08
Construction process stage	Transport	A4	6.47E-07	7.06E-06	2.16E-06	1.84E-09	8.00E-03	3.60E-05	4.56E-11
	Construction	A5	1.09E-05	1.02E-04	2.73E-05	2.54E-08	7.73E-02	1.50E-03	4.70E-10
Use stage	Use	B1	MND	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND	MND
100% - Landfill									
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	4.70E-08	5.13E-07	1.57E-07	1.34E-10	5.81E-04	2.61E-06	3.32E-12
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	1.58E-05	1.56E-04	4.26E-05	9.66E-08	2.28E-01	7.09E-03	6.83E-10
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment;
EP-terrestrial = Eutrophication potential, accumulated exceedance;
POCP = Formation potential of tropospheric ozone;
ADP-mineral&metals = Abiotic depletion potential for non-fossil resources;
ADP-fossil = Depletion potential of the stratospheric ozone layer;
WDP = Water (user) deprivation potential, deprivation-weighted water consumption; and
PM = Particulate matter.

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts							
			IRP	ETP-fw	HTP-c	HTP-nc	SQP
			kBq U^{235} eq	CTUe	CTUh	CTUh	dimensionless
Product stage	Raw material supply	A1	2.79E-03	1.40E+00	8.85E-11	1.06E-09	1.12E-01
	Transport	A2	9.24E-04	1.41E-01	1.36E-11	1.61E-10	6.51E-02
	Manufacturing	A3	1.38E-02	4.29E+00	6.44E-11	1.73E-09	2.92E+00
	Total (Consumption grid)	A1-3	1.76E-02	5.84E+00	1.66E-10	2.94E-09	3.10E+00
Construction process stage	Transport	A4	4.11E-05	6.24E-03	2.02E-13	6.54E-12	5.49E-03
	Construction	A5	5.30E-04	1.78E-01	5.44E-12	1.09E-10	9.36E-02
Use stage	Use	B1	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND
100% - Landfill							
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	2.99E-06	4.53E-04	1.47E-14	4.76E-13	3.99E-04
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	1.49E-03	9.40E-01	3.02E-11	3.51E-10	4.87E-02
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

IRP = Potential human exposure efficiency relative to U235;
ETP-fw = Potential comparative toxic unit for ecosystems;
HTP-c = Potential comparative toxic unit for humans;
HTP-nc = Potential comparative toxic unit for humans; and
SQP = Potential soil quality index.

LCA Results (continued)

Parameters describing resource use, primary energy								
			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	2.94E-02	0.00E+00	2.94E-02	5.45E-01	2.97E-01	8.41E-01
	Transport	A2	3.29E-03	0.00E+00	3.29E-03	1.59E-01	0.00E+00	1.59E-01
	Manufacturing	A3	-1.24E-01	1.34E+00	1.22E+00	4.10E+00	5.53E-02	4.15E+00
	Total (Consumption grid)	A1-3	-9.09E-02	1.34E+00	1.25E+00	4.80E+00	3.52E-01	5.15E+00
Construction process stage	Transport	A4	1.13E-04	0.00E+00	1.13E-04	7.85E-03	0.00E+00	7.85E-03
	Construction	A5	-5.95E-01	6.33E-01	3.75E-02	1.44E-01	1.06E-02	1.55E-01
Use stage	Use	B1	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND
100% - Landfill								
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	8.19E-06	0.00E+00	8.19E-06	5.71E-04	0.00E+00	5.71E-04
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	8.84E-03	0.00E+00	8.84E-03	-1.06E-01	3.15E-01	2.08E-01
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

PERE = Use of renewable primary energy excluding renewable primary energy 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 resource

LCA Results (continued)

Parameters describing resource use, secondary materials and fuels, use of water						
			SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m^3
Product stage	Raw material supply	A1	3.06E-05	0.00E+00	0.00E+00	5.27E-04
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	2.29E-05
	Manufacturing	A3	0.00E+00	0.00E+00	0.00E+00	7.90E-04
	Total (Consumption grid)	A1-3	3.06E-05	0.00E+00	0.00E+00	1.34E-03
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	8.91E-07
	Construction	A5	9.19E-07	0.00E+00	0.00E+00	3.82E-05
Use stage	Use	B1	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND
100% - Landfill						
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	6.48E-08
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	1.70E-04
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	0.00E+00

SM = Use of secondary material;
RSF = Use of renewable secondary fuels;
NRSF = Use of non-renewable secondary fuels;
FW = Net use of fresh water

LCA Results (continued)

Other environmental information describing waste categories					
			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	1.50E-02	6.86E-02	1.79E-06
	Transport	A2	2.90E-04	5.16E-03	6.52E-01
	Manufacturing	A3	4.49E-02	4.47E-01	9.33E-06
	Total (Consumption grid)	A1-3	6.02E-02	5.21E-01	6.52E-01
Construction process stage	Transport	A4	8.81E-06	1.57E-04	5.41E-08
	Construction	A5	1.81E-03	1.56E-02	1.96E-02
Use stage	Use	B1	MND	MND	MND
	Maintenance	B2	MND	MND	MND
	Repair	B3	MND	MND	MND
	Replacement	B4	MND	MND	MND
	Refurbishment	B5	MND	MND	MND
	Operational energy use	B6	MND	MND	MND
	Operational water use	B7	MND	MND	MND
100% - Landfill					
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	6.41E-07	1.14E-05	3.93E-09
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	2.84E-02	1.39E-02	1.34E-06
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00

HWD = Hazardous waste disposed;
NHWD = Non-hazardous waste disposed;
RWD = Radioactive waste disposed

LCA Results (continued)

Other environmental information describing output flows – at end of life								
			CRU	MFR	MER	EE	Biogenic carbon (product)	Biogenic carbon (packaging)
			kg	kg	kg	MJ per energy carrier	kg C	kg C
Product stage	Raw material supply	A1	0.00E+00	1.06E-06	1.20E-08	3.18E-04	0.00E+00	0.00E+00
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Manufacturing	A3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.81E-02
	Total (Consumption grid)	A1-3	0.00E+00	1.06E-06	1.20E-08	3.18E-04	0.00E+00	1.81E-02
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Construction	A5	0.00E+00	3.18E-08	3.61E-10	9.52E-06	0.00E+00	5.43E-04
Use stage	Use	B1	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND
100% - Landfill								
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

CRU = Components for reuse;
MFR = Materials for recycling

MER = Materials for energy recovery;
EE = Exported Energy

LCA Results - Singlemode & Multimode fibre optic Patchcords with 0.01441 kg/m

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts									
			GWP-total	GWP-fossil	GWP-biogenic	GWP-luluc	ODP	AP	EP-freshwater
			kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CFC11 eq	mol H^+ eq	kg $(PO_4)^{3-}$ eq
Product stage	Raw material supply	A1	4.62E-02	4.61E-02	1.25E-04	1.68E-05	3.64E-09	2.07E-04	8.81E-06
	Transport	A2	1.21E-02	1.21E-02	1.92E-05	7.68E-06	2.52E-09	1.43E-04	1.38E-06
	Manufacturing	A3	8.51E-02	9.56E-02	-1.07E-02	1.25E-04	2.72E-09	5.24E-04	2.67E-05
	Total (Consumption grid)	A1-3	1.43E-01	1.54E-01	-1.06E-02	1.49E-04	8.88E-09	8.74E-04	3.68E-05
Construction process stage	Transport	A4	4.12E-04	4.12E-04	3.51E-07	1.62E-07	9.53E-11	1.67E-06	2.65E-08
	Construction	A5	4.68E-02	6.22E-03	4.06E-02	4.91E-06	4.57E-10	3.79E-05	1.60E-06
Use stage	Use	B1	MND	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND	MND
100% - Landfill									
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	3.00E-05	2.99E-05	2.55E-08	1.17E-08	6.92E-12	1.21E-07	1.93E-09
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	3.49E-02	3.49E-02	4.28E-05	7.98E-06	4.13E-09	5.22E-05	9.85E-06
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

GWP-total = Global warming potential, total;
GWP-fossil = Global warming potential, fossil;
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; and
EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts									
			EP-marine	EP-terrestrial	POCP	ADP-mineral &metal	ADP-fossil	WDP	PM
			kg N eq	mol N eq	kg NMVOC eq	kg Sb eq	MJ, net calorific value	m^3 world eq deprived	disease incidence
Product stage	Raw material supply	A1	4.34E-05	4.26E-04	1.53E-04	3.42E-07	7.13E-01	1.96E-02	2.47E-09
	Transport	A2	3.80E-05	4.20E-04	1.19E-04	1.31E-07	1.73E-01	1.05E-03	1.06E-09
	Manufacturing	A3	1.27E-04	1.25E-03	3.13E-04	4.23E-07	1.14E+00	1.30E-02	6.55E-09
	Total (Consumption grid)	A1-3	2.09E-04	2.10E-03	5.86E-04	8.96E-07	2.02E+00	3.37E-02	1.01E-08
Construction process stage	Transport	A4	5.03E-07	5.50E-06	1.68E-06	1.43E-09	6.22E-03	2.80E-05	3.55E-11
	Construction	A5	1.42E-05	1.19E-04	3.17E-05	3.08E-08	7.00E-02	1.67E-03	3.94E-10
Use stage	Use	B1	MND	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND	MND
100% - Landfill									
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	3.66E-08	4.00E-07	1.22E-07	1.04E-10	4.52E-04	2.04E-06	2.58E-12
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	1.14E-05	1.12E-04	3.07E-05	6.96E-08	1.64E-01	5.11E-03	4.92E-10
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment;
EP-terrestrial = Eutrophication potential, accumulated exceedance;
POCP = Formation potential of tropospheric ozone;
ADP-mineral&metals = Abiotic depletion potential for non-fossil resources;
ADP-fossil = Depletion potential of the stratospheric ozone layer;
WDP = Water (user) deprivation potential, deprivation-weighted water consumption; and
PM = Particulate matter.

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts							
			IRP	ETP-fw	HTP-c	HTP-nc	SQP
			kBq U^{235} eq	CTUe	CTUh	CTUh	dimensionless
Product stage	Raw material supply	A1	1.73E-03	9.45E-01	5.93E-11	7.22E-10	6.63E-02
	Transport	A2	1.01E-03	1.57E-01	1.55E-11	1.84E-10	7.33E-02
	Manufacturing	A3	7.40E-03	3.04E+00	4.20E-11	1.22E-09	1.72E+00
	Total (Consumption grid)	A1-3	1.01E-02	4.14E+00	1.17E-10	2.13E-09	1.86E+00
Construction process stage	Transport	A4	3.20E-05	4.86E-03	1.57E-13	5.09E-12	4.28E-03
	Construction	A5	3.58E-04	2.51E-01	1.27E-11	1.49E-10	5.95E-02
Use stage	Use	B1	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND
100% - Landfill							
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	2.33E-06	3.53E-04	1.14E-14	3.70E-13	3.11E-04
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	1.07E-03	6.77E-01	2.18E-11	2.53E-10	3.50E-02
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

IRP = Potential human exposure efficiency relative to U235;
ETP-fw = Potential comparative toxic unit for ecosystems;
HTP-c = Potential comparative toxic unit for humans;
HTP-nc = Potential comparative toxic unit for humans; and
SQP = Potential soil quality index.

LCA Results (continued)

Parameters describing resource use, primary energy								
			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	1.80E-02	0.00E+00	1.80E-02	4.81E-01	2.41E-01	7.22E-01
	Transport	A2	3.80E-03	0.00E+00	3.80E-03	1.70E-01	0.00E+00	1.70E-01
	Manufacturing	A3	6.41E-02	7.25E-01	7.89E-01	3.36E+00	3.84E-02	3.40E+00
	Total (Consumption grid)	A1-3	8.59E-02	7.25E-01	8.11E-01	4.01E+00	2.79E-01	4.29E+00
Construction process stage	Transport	A4	8.77E-05	0.00E+00	8.77E-05	6.11E-03	0.00E+00	6.11E-03
	Construction	A5	2.77E-03	2.18E-02	2.45E-02	1.18E-01	1.52E-02	1.33E-01
Use stage	Use	B1	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND
100% - Landfill								
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	6.37E-06	0.00E+00	6.37E-06	4.44E-04	0.00E+00	4.44E-04
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	6.88E-03	0.00E+00	6.88E-03	-8.27E-02	2.45E-01	1.62E-01
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

PERE = Use of renewable primary energy excluding renewable primary energy 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 resource

LCA Results (continued)

Parameters describing resource use, secondary materials and fuels, use of water						
			SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m^3
Product stage	Raw material supply	A1	2.22E-05	0.00E+00	0.00E+00	4.64E-04
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	2.61E-05
	Manufacturing	A3	0.00E+00	0.00E+00	0.00E+00	3.82E-04
	Total (Consumption grid)	A1-3	2.22E-05	0.00E+00	0.00E+00	8.72E-04
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	6.94E-07
	Construction	A5	6.66E-07	0.00E+00	0.00E+00	4.18E-05
Use stage	Use	B1	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND
100% - Landfill						
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	5.04E-08
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	1.23E-04
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	0.00E+00

SM = Use of secondary material;
RSF = Use of renewable secondary fuels;
NRSF = Use of non-renewable secondary fuels;
FW = Net use of fresh water

LCA Results (continued)

Other environmental information describing waste categories					
			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	1.06E-02	4.49E-02	1.14E-06
	Transport	A2	3.22E-04	5.95E-03	7.87E-01
	Manufacturing	A3	4.26E-02	3.57E-01	4.97E-06
	Total (Consumption grid)	A1-3	5.35E-02	4.08E-01	7.87E-01
Construction process stage	Transport	A4	6.86E-06	1.22E-04	4.21E-08
	Construction	A5	2.17E-03	1.25E-02	2.36E-02
Use stage	Use	B1	MND	MND	MND
	Maintenance	B2	MND	MND	MND
	Repair	B3	MND	MND	MND
	Replacement	B4	MND	MND	MND
	Refurbishment	B5	MND	MND	MND
	Operational energy use	B6	MND	MND	MND
	Operational water use	B7	MND	MND	MND
100% - Landfill					
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	4.99E-07	8.86E-06	3.06E-09
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	2.04E-02	9.98E-03	9.66E-07
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00

HWD = Hazardous waste disposed;
NHWD = Non-hazardous waste disposed;
RWD = Radioactive waste disposed

LCA Results (continued)

Other environmental information describing output flows – at end of life								
			CRU	MFR	MER	EE	Biogenic carbon (product)	Biogenic carbon (packaging)
			kg	kg	kg	MJ per energy carrier	kg C	kg C
Product stage	Raw material supply	A1	0.00E+00	7.70E-07	8.73E-09	2.30E-04	0.00E+00	0.00E+00
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Manufacturing	A3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.37E-03
	Total (Consumption grid)	A1-3	0.00E+00	7.70E-07	8.73E-09	2.30E-04	0.00E+00	9.37E-03
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Construction	A5	0.00E+00	2.31E-08	2.62E-10	6.90E-06	0.00E+00	2.81E-04
Use stage	Use	B1	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND
100% - Landfill								
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

CRU = Components for reuse;
MFR = Materials for recycling

MER = Materials for energy recovery;
EE = Exported Energy

Scenarios and additional technical information

Scenarios and additional technical information				
Scenario	Parameter		Units	Results
A4 – Transport to the building site	Mayflex receives the cable from PRC and without any further processing in the distribution sector they will be distributed to the customer site.			
	Fuel type / Vehicle type		Road transport	16–32-ton lorry
	Distance: Mayflex to customer site		Km	172
	Capacity utilisation (incl. empty returns)		%	49
	Bulk density of transported products		kg/m^3	342
A5 – Installation in the building	Installation of pigtails & patchcords is generally carried out by manual labour, and in the case of pigtails, a splicing machine is used to fuse the pigtails to the cable. But there are some wastes at the end of the box, and it was assumed as 3% of the cables waste; this will be collected and sent to landfill.			
	Packaging and cable waste	**Pigtails**	**Patchcords**	**Result**
	Cable waste (kg/m)	0.001	0.0004	Landfill
	Pallets	0.010	0.006	Incinerated
	Packaging paper	0.042	0.022	Recycled
	Plastic Wrap	0.0004	0.001	Landfill
End of life	The Singlemode & Multimode fibre optic pigtails & Patchcords are removed manually, and it is assumed that the product is not recycled so will be sent to landfill.			
C2 – Transportation	Recovered cables are taken back by the registered broker to landfill.		km	12.5
C4 - Disposal	Recovered cables are taken back by the registered broker to landfill.			
Module D	As the products are not recycled therefore there are no Module D recycling benefits considered in this study.			

Interpretation of results:

The bulk of the environmental impacts are attributed to the manufacturing of Singlemode & Multimode fibre optic pigtails & Patchcords Cables covered by information modules A1-A3 of EN15804:2012+A2:2019.

References

BSI. Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products. BS EN 15804:2012+A2:2019. London, BSI, 2019.

BSI. Environmental labels and declarations – Type III Environmental declarations – Principles and procedures. BS EN ISO 14025:2010 (exactly identical to ISO 14025:2006). London, BSI, 2010.

BSI. Environmental management – Life cycle assessment – Principles and framework. BS EN ISO 14040:2006. London, BSI, 2006.

BSI. Environmental management – Life cycle assessment – requirements and guidelines. BS EN ISO 14044:2006. London, BSI, 2006.

Annex:

Product name:	Item Code	Weight (kg/m)
Excel Enbeam Fibre Pigtail OM4 50/125 LC/UPC TIA 598 Colour Code 1 m (12-Pack)	200-547	0.0185
Excel Enbeam Fibre Pigtail OS2 9/125 LC/UPC TIA 598 Colour Code 1 m (12-Pack)	200-548	
Excel Enbeam Fibre Pigtail OM4 50/125 LC/UPC Violet 1 m (12-Pack)	200-647	
Excel Enbeam Fibre Pigtail OS2 9/125 LC/UPC Yellow 1 m (12-Pack)	200-650	
Excel Enbeam OS2 Fibre Optic Patch Lead LC-SC Singlemode 9/125 Duplex LS0H Yellow 1 m	200-686	0.01441
Excel Enbeam OS2 Fibre Optic Patch Lead LC-LC Singlemode 9/125 Duplex LS0H Yellow 1 m	200-678	
Excel Enbeam OM4 Fibre Optic Patch Lead LC-SC Multimode 50/125 Duplex LS0H Violet 1 m	204-334	
Excel Enbeam OM4 Fibre Optic Patch Lead LC-LC Multimode 50/125 Duplex LS0H Violet 1 m	204-330	
Excel Enbeam OS2 Fibre Optic Patch Lead LC-LC Singlemode 9/125 Duplex LS0H Yellow 2 m	200-680	0.0107
Excel Enbeam OS2 Fibre Optic Patch Lead LC-SC Singlemode 9/125 Duplex LS0H Yellow 2 m	200-688	
Excel Enbeam OM4 Fibre Optic Patch Lead LC-LC Multimode 50/125 Duplex LS0H Violet 2 m	204-331	
Excel Enbeam OM4 Fibre Optic Patch Lead LC-SC Multimode 50/125 Duplex LS0H Violet 2 m	204-335	
Excel Enbeam OS2 Fibre Optic Patch Lead LC-SC Singlemode 9/125 Duplex LS0H Yellow 3 m	200-690	0.0095
Excel Enbeam OS2 Fibre Optic Patch Lead LC-LC Singlemode 9/125 Duplex LS0H Yellow 3 m	200-682	
Excel Enbeam OM4 Fibre Optic Patch Lead LC-SC Multimode 50/125 Duplex LS0H Violet 3 m	200-336	
Excel Enbeam OM4 Fibre Optic Patch Lead LC-LC Multimode 50/125 Duplex LS0H Violet 3 m	204-332	
Excel Enbeam OM4 Fibre Optic Patch Lead LC-LC Multimode 50/125 Duplex LS0H Violet 5 m	204-332	0.0085
Excel Enbeam OM4 Fibre Optic Patch Lead LC-SC Multimode 50/125 Duplex LS0H Violet 5 m	204-337	
Excel Enbeam OS2 Fibre Optic Patch Lead LC-LC Singlemode 9/125 Duplex LS0H Yellow 5 m	200-684	
Excel Enbeam OS2 Fibre Optic Patch Lead LC-SC Singlemode 9/125 Duplex LS0H Yellow 5 m	200-692	