Statement of Verification

BREG EN EPD No.: 000515 Issue 02

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

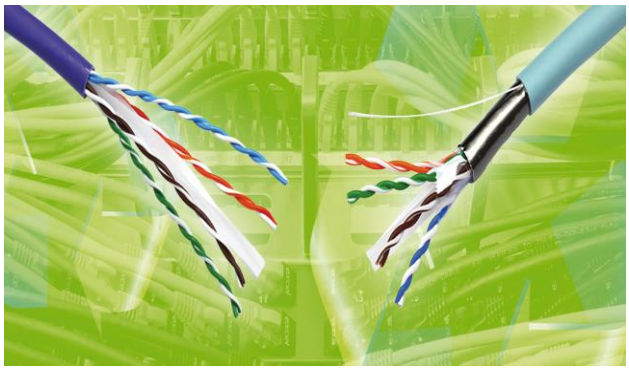
BRE Global Scheme Document SD207

This declaration is for:

Cat6 & Cat6A unshielded (U/UTP) LSOH CPR (CE/UKCa) B2ca 4-pair Ethernet cables

Company Address

Mayflex UK Limited
Unit 15,
Junction Six Industrial Park,
Electric Avenue
Birmingham
B6 7JJ



MAYFLEX
A Sonepar Company

Signed for BRE Global Ltd	Emma Baker Operator	14 August 2023 Date of this Issue
21 July 2023 Date of First Issue		20 July 2028 Expiry Date

BRE Global Verified EPD

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ECO PLATFORM EPD VERIFIED

Environmental Product Declaration

EPD Number: 000515

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 Unit	**Applicability/Coverage**
1 metre of Excel solid conductor Cat6 & Cat6A unshielded (U/UTP) LSOH CPR (CE/UKCa) B2ca 4-pair Ethernet cables.	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: Nigel Jones	
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 solid conductor Cat6 & Cat6A unshielded (U/UTP) LSOH CPR (CE/UKCa) B2ca 4-pair Ethernet cables - designed and manufactured to meet and exceed the ISO, CENELEC and TIA standards and supplied in 305m REELEX® boxes or on 500m reels. The cables deliver Class E / Class EA performance over distances of up 90 metres and support applications up to 10GBASE-T, 10 Gigabit Ethernet. Available in a range of colours. The Cat6A cable uses a non-metallic but reflective barrier tape which increases the performance of the cable and acts as a heat barrier, reducing the combustibility of the cable and giving a higher resilience to fire and decreasing the burn rate. CAT6 & Cat6A UUTP cables are available in a range of colours. In this EPD, Cat6A Cable U/UTP – 500M Reel Ice Blue with the weight of 0.054 kg/m has been taken as a representative among their group.

Product name:	Item Code / Colour	Weight (kg/m)
Cat6 Cable U/UTP 23AWG LSOH CPR B2ca 305m	190-071 – Box Violet	0.0468
Cat6 Cable U/UTP 23AWG LSOH CPR B2ca 500m	190-071-500 Reel Violet	0.0468
Cat6 Cable U/UTP 23AWG LSOH CPR B2ca 305m	190-073 Box Green	0.0468
Cat6 Cable U/UTP 23AWG LSOH CPR B2ca 305m	190-074 Box White	0.0468
Cat6 Cable U/UTP 23AWG LSOH CPR B2ca 305m	190-075 Box Orange	0.0468
Cat6A Cable U/UTP 23AWG LSOH CPR B2ca 500m	190-219 Reel Ice Blue	0.0544

Technical Information

Property	CAT6A	CAT6
Conductor surface	Bare	Bare
Conductor AWG	23	23
Conductor category	Class 1 = Solid	Class 1 = Solid
Total number of conductors	8	8
Stranding element	Pairs	Pairs
Conductor Insulation	PE	PE
Core identification	Colour	Colour
Overall screening	None	None
Conductor screening	None	None
Outer sheath material	Copolymer, thermoplastic (LS0H)	Copolymer, thermoplastic (LS0H)
Outer sheath colour	Ice Blue	Violet
Reaction-to-fire class according to EN 13501-6	B2ca	B2ca
Smoke development class according to EN 13501-6	s1a	s1a
Euro class flaming droplets/particles according to EN13501-6	d0	d0
Euro class acidity according to EN 13501-6	a1	a1
Halogen free (acc. EN 60754-1/2)	Yes	Yes
Flame retardant	In accordance with EN 60332-1-2 and EN 50399	In accordance with EN 60332-1-2 and EN 50399
Low smoke (acc. BS EN 61034-2)	Yes	Yes
Outer diameter approx.	7.0 mm	6.2 mm
Installation Temperature Range	0 to 50 °C	-10 to 60 °C
Operating Temperature Range	-20 to 60 °C	-10 to 60 °C
Category	6A	6
NVP value	68%	65%

Note: Technical properties of all products assessed within this EPD

Standard	Subject
ISO/IEC 11801-1:2017	Information technology - Generic cabling for customer premises: Part 1 General Requirements
IEC 61156-5:2020	Multicore and symmetrical pair/quad cables for digital communications - Part 5: Symmetrical pair/quad cables with transmission characteristics up to 1 000 MHz - Horizontal floor wiring - Sectional specification
EN 50173-1:2018	Information technology. Generic cabling systems - General requirements
EN 50173-2:2018	Information technology. Generic cabling systems - Office premises

Standard	Subject
BS EN 50288-3-1:2013	Multi-element metallic cables used in analogue and digital communication and control. Sectional specification for unscreened cables characterised up to 250 MHz
EN 50399:2011+A1:2016	Common test methods for cables under fire conditions. Heat release and smoke production measurement on cables during flame spread test. Test apparatus, procedures, results
IEC 60332-1-2:2004 + A12:2020	Tests on electric and optical fibre cables under fire conditions. Test for vertical flame propagation for a single insulated wire or cable. Procedure for 1 kW pre-mixed flame
ANSI/TIA 568-D:2015	Balanced Twisted-Pair Telecommunications Cabling and Components Standards
IEC 60754-2:2014	Test on gases evolved during combustion of materials from cables - Part 2: Determination of acidity (by pH measurement) and conductivity
IEC 61034-2:2005+A2:2020	Measurement of smoke density of cables burning under defined conditions – Part 2: Test procedure and requirements
EN 50575:2014 + A1:2016	Power, control and communication cables — Cables for general applications in construction works subject to reaction to fire requirements
IEEE 802.3bt (Type 4)	Compliant to IEEE 802.3bt (Type 4)
RoHS	Compliant to the Restriction of Hazardous Substances
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	%
Copper	30-35
Polyethylene	15-20
LSOH (Co-polymer)	35-40
PET	0-5
Barrier Tape	10-15

Note: Material composition of all products assessed within this EPD

Manufacturing Process

The manufacturing processes for these cables involves several stages of extrusion starting with the pure copper rod and finishing with the completed cable, which consists of multiple elements. The first process is to extrude pure copper rod through a series of precision dies, heated and pulled (extruded) to achieve the required gauge of the wire. This is a highly accurate process requiring that the wire diameter is continually monitored as it exits the extruder to ensure that its diameter remains constant.

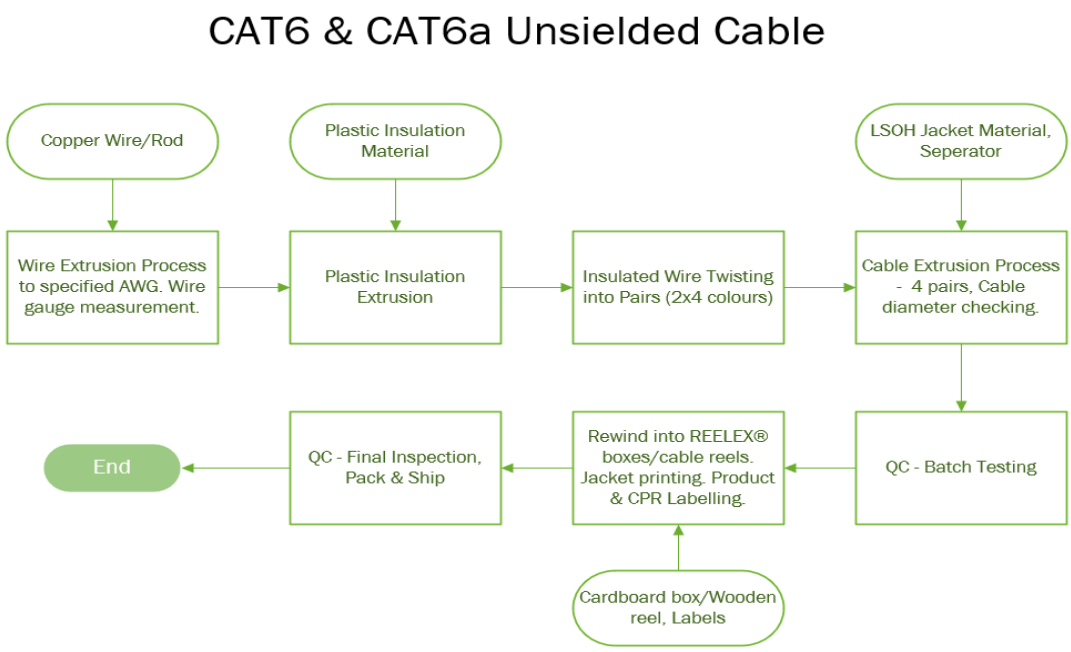
The next stage is to apply the wire insulation which requires another extrusion process, where the wire is drawn through the extrusion machine whilst the molten plastic insulation is injected around the wire. The plastic insulation is colour coded, and this process is repeated 8 times to provide the 8 colours required for the final cable (blue, blue/white, orange, orange/white, green, green/white, brown, brown/white).

Each pair of wires then go to the next process which twists them together. 2 reels of insulated wire are spun and pulled simultaneously to provide a precise and consistent twist. Each pair is given a slightly different twist length. No 2 pairs are the same. This is critical for the performance of the finished cable. It is also critical that the twist length remains consistent to ensure good performance.

Once all 8 wires are twisted into their respective pairs, all 4 pairs are again extruded into the final cable. This involves drawing the 4 pairs through the final extrusion process. The pairs are drawn through a die together with a plastic separator, the LSOH cable jacket material (molten plastic) and any other elements that are used in the final cable design (such as non-metallic foils etc.). The pairs are also twisted slightly as they are extruded. As the cable exits the machine, it is passed through a water bath for cooling and its diameter is continuously measured.

The cable is coiled onto large reels initially and is finally re-reeled into REELEX® boxes (305m) or smaller wooden drums (500m) as required. The cable is tested to ensure compliance to the required standards. During the final boxing/reeling process, the cable is printed at 1m intervals with the cable details, batch information and the metre markings. The boxes/drums are also labelled with the cable and batch details, and the CPR information.

Process flow diagram



Construction Installation

Installation of data cables is generally carried out by manual labour, with teams of operatives pulling and dressing cables. No powered equipment or consumable items are used in this process, so no waste is generated during the installation. But there are some wastes at the end of the box, and it was assumed as 3% of the cables waste; they will be collected and sent to recycling.

End of life

Cables, that are the indispensable parts of electrical and electronic industry, consist of plastics, aluminium, and copper. At the end-of-life the cables are removed manually from the construction buildings. Waste cables are shredded into small chips first and the metallic parts are separated from the plastics physically by using gravity and electrostatic separation techniques (Celik et al., 2019).

Life Cycle Assessment Calculation Rules

Declared unit description.

1 metre of Excel solid conductor Cat6 & Cat6A unshielded (U/UTP) LSOH CPR (CE/UKCa) B2ca 4-pair Ethernet cables.

System boundary

This is a cradle-to-gate with options 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 CAT6A UUTP manufactured as a proportion of the total manufactured during the data collection period (01/01/21-31/12/21) that was calculated at 3.7%. 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 CAT6 & CAT6A U/UTP cables, 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. During the cable extrusion process no waste have been recorded.

The CAT6 & CAT6A U/UTP cables are available in a range of colours and may have slightly differing mass per metre because the cables are in 305-metre REELEX® boxes or on 500-metre reels, which results in a change in the mass per metre. So, in this EPD the cable which has the highest mass per metre is taken as a representative among the group. The LCA analysis has been performed using 0.054 kg/m, which is for the CAT6A UUTP 190-219 LSZH B2ca product. 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.

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. The inventory process in this LCA includes all data related to raw material, packaging material and consumable items. Process energy, water use, and discharge are included, except the production waste and non-production waste.

LCA Results - CAT6A UUTP 190-219 LSZH B2ca with weight of 0.054 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	1.81E-01	1.80E-01	4.10E-04	2.56E-04	1.07E-08	9.95E-03	7.76E-04
	Transport	A2	1.30E-03	1.30E-03	1.11E-06	5.11E-07	3.01E-10	5.29E-06	8.39E-08
	Manufacturing	A3	4.75E-02	5.15E-02	-3.99E-03	1.94E-05	4.79E-10	2.68E-04	9.98E-06
	Total (Consumption grid)	A1-3	2.30E-01	2.33E-01	-3.58E-03	2.75E-04	1.15E-08	1.02E-02	7.86E-04
Construction process stage	Transport	A4	2.77E-01	2.77E-01	3.75E-05	1.78E-04	5.74E-08	6.93E-03	1.14E-05
	Construction	A5	1.14E-02	1.15E-02	-1.01E-04	9.55E-06	8.47E-10	3.14E-04	2.47E-05
97.2% - Recycling & 2.8% 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	2.08E-03	2.08E-03	1.77E-06	8.16E-07	4.81E-10	8.43E-06	1.34E-07
	Waste processing	C3	9.46E-02	9.44E-02	1.66E-04	2.36E-05	1.08E-08	1.46E-04	2.57E-05
	Disposal	C4	9.70E-04	9.69E-04	1.19E-06	2.22E-07	1.15E-10	1.45E-06	2.74E-07
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-2.62E-01	-2.62E-01	5.06E-04	-2.81E-04	-9.22E-09	-1.01E-02	-7.73E-04
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	1.13E-04	1.13E-04	9.63E-08	4.44E-08	2.62E-11	4.59E-07	7.28E-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	1.32E-01	1.32E-01	1.62E-04	3.01E-05	1.56E-08	1.97E-04	3.72E-05
Potential benefits and loads beyond the system	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)

Parameters describing environmental impacts									
			EP-marine	EP-terrestrial	POCP	ADP-mineral& metals	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	5.15E-04	7.00E-03	2.01E-03	2.34E-04	3.24E+00	1.82E-01	2.47E-08
	Transport	A2	1.59E-06	1.74E-05	5.33E-06	4.53E-09	1.97E-02	8.86E-05	1.12E-10
	Manufacturing	A3	6.42E-05	6.21E-04	1.61E-04	5.67E-08	4.66E-01	-4.70E-03	3.86E-09
	Total	A1-3	5.81E-04	7.64E-03	2.17E-03	2.34E-04	3.72E+00	1.78E-01	2.87E-08
Construction process stage	Transport	A4	1.72E-03	1.91E-02	5.00E-03	5.33E-07	3.71E+00	1.11E-02	1.26E-08
	Construction	A5	1.94E-05	2.47E-04	7.05E-05	7.02E-06	1.36E-01	6.08E-03	9.55E-10
97.2% - Recycling & 2.8% - 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	2.54E-06	2.78E-05	8.50E-06	7.22E-09	3.14E-02	1.41E-04	1.79E-10
	Waste processing	C3	3.55E-05	3.35E-04	9.44E-05	2.07E-07	4.67E-01	1.48E-02	1.59E-09
	Disposal	C4	3.16E-07	3.11E-06	8.52E-07	1.93E-09	4.56E-03	1.42E-04	1.37E-11
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-5.55E-04	-7.39E-03	-2.22E-03	-2.32E-04	-4.64E+00	-2.34E-01	-2.77E-08
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	1.38E-07	1.51E-06	4.62E-07	3.93E-10	1.71E-03	7.69E-06	9.75E-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	4.30E-05	4.24E-04	1.16E-04	2.63E-07	6.21E-01	1.93E-02	1.86E-09
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)

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-02	7.88E+01	1.82E-09	1.30E-07	3.19E+00
	Transport	A2	1.01E-04	1.54E-02	4.98E-13	1.61E-11	1.35E-02
	Manufacturing	A3	1.05E-03	1.39E+00	1.64E-11	5.41E-10	4.44E-01
	Total	A1-3	1.84E-02	8.02E+01	1.84E-09	1.31E-07	3.64E+00
Construction process stage	Transport	A4	1.74E-02	2.46E+00	1.51E-10	1.93E-09	1.11E+00
	Construction	A5	7.07E-04	2.49E+00	5.83E-11	3.95E-09	1.19E-01
97.2% - Recycling & 2.8% - Landfill							
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	1.61E-04	2.45E-02	7.94E-13	2.57E-11	2.16E-02
	Waste processing	C3	3.03E-03	1.78E+00	6.28E-11	7.04E-10	1.37E-01
	Disposal	C4	2.98E-05	1.88E-02	6.05E-13	7.03E-12	9.73E-04
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-1.70E-02	-7.77E+01	-1.77E-09	-1.28E-07	-3.29E+00
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	8.78E-06	1.33E-03	4.32E-14	1.40E-12	1.17E-03
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	4.05E-03	2.56E+00	8.23E-11	9.56E-10	1.32E-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

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	1.51E+00	0.00E+00	1.51E+00	2.40E+00	1.08E+00	3.48E+00
	Transport	A2	2.77E-04	0.00E+00	2.77E-04	1.93E-02	0.00E+00	1.93E-02
	Manufacturing	A3	1.74E-01	4.77E-02	2.22E-01	1.59E+00	1.50E-03	1.59E+00
	Total	A1-3	1.68E+00	4.77E-02	1.73E+00	4.01E+00	1.08E+00	5.09E+00
Construction process stage	Transport	A4	3.31E-02	0.00E+00	3.31E-02	3.64E+00	0.00E+00	3.64E+00
	Construction	A5	-6.48E-01	7.00E-01	5.19E-02	3.96E-02	1.13E-01	1.53E-01
97.2% - Recycling & 2.8% - 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	4.43E-04	0.00E+00	4.43E-04	3.08E-02	0.00E+00	3.08E-02
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	-7.43E-01	7.43E-01	0.00E+00
	Disposal	C4	1.91E-04	0.00E+00	1.91E-04	-2.30E-03	6.80E-03	4.50E-03
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-1.46E+00	0.00E+00	-1.46E+00	-1.39E+00	0.00E+00	-1.39E+00
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	2.41E-05	0.00E+00	2.41E-05	1.68E-03	0.00E+00	1.68E-03
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	2.60E-02	0.00E+00	2.60E-02	-3.12E-01	9.25E-01	6.12E-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	5.66E-05	0.00E+00	0.00E+00	4.46E-03
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	2.19E-06
	Manufacturing	A3	0.00E+00	0.00E+00	0.00E+00	-6.50E-05
	Total	A1-3	5.66E-05	0.00E+00	0.00E+00	4.39E-03
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	2.75E-04
	Construction	A5	1.70E-06	0.00E+00	0.00E+00	1.50E-04
97.2% - Recycling & 2.8% - 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	3.50E-06
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	3.56E-04
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	3.41E-06
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	-5.66E-03
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	1.90E-07
	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	4.63E-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	6.29E-02	2.33E+00	1.27E-05
	Transport	A2	2.17E-05	3.86E-04	1.33E-07
	Manufacturing	A3	2.32E-02	1.51E-01	1.00E-06
	Total	A1-3	8.62E-02	2.48E+00	1.38E-05
Construction process stage	Transport	A4	4.71E-03	5.00E-02	2.56E-05
	Construction	A5	2.58E-03	7.43E-02	4.15E-07
97.2% - Recycling & 2.8% Landfill					
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	3.46E-05	6.15E-04	2.13E-07
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	5.68E-04	2.77E-04	2.68E-08
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-3.82E-02	-2.20E+00	-9.77E-06
100% - Landfill					
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	1.88E-06	3.35E-05	1.16E-08
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	7.72E-02	3.77E-02	3.65E-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	1.96E-06	2.23E-08	5.86E-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	0.08762
	Total	A1-3	0.00E+00	1.96E-06	2.23E-08	5.86E-04	0.00E+00	0.08762
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	5.89E-08	6.68E-10	1.76E-05	0.00E+00	0.00E+00
97.2% - Recycling & 2.8% - 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	5.41E-02	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
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	Once the cables are manufactured, they will be transported to Mayflex's Birmingham site via water transport and road transport. Once the cables are received, they will be distributed to the customer site.		
	Transport mode / Vehicle type	Water transport	Container Freight ship
	Factory (made under contract in the PRC) – Southampton port	km	21694
	Transport mode / Vehicle type	Road transport	16–32-ton lorry
	Southampton Port – Birmingham distribution unit (Mayflex)	km	266
	Transport mode / 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 data cables is carried out by manual labour - teams of operatives pulling and dressing cables. No powered equipment or consumable items are used in this process, so no waste is generated during the installation. 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 recycling.		
Cable wastes	Cable offcuts – Copper and plastic insulation	Recycled	0.00162 kg
Packaging	Wooden Spool waste	Recycled	0.0478 kg
	Reelex Box	Reused	0.0221 kg
	Cable and wire pull out tube	Recycled	0.0019 kg
End of life	Cables are removed manually from the building sites. Therefore, no energy is associated while removing the cables from the building.		
C2 – Transportation	Recovered cables are taken back by the registered broker	Road transport	16–32-ton lorry
	Distance: Deconstruction unit to pre-processing unit	km	12.5
C3 – Pre processing	CAT6A UUTP cables are made of copper, polymer, polyethylene, and other materials. At the end-of-life, cables are removed manually from the building sites, and they will be sent to pre-processing unit. At the pre-processing unit, waste cables are shredded first to decrease their size and the metallic parts are separated from plastics physically by using gravity and electrostatic separation techniques. The copper is recovered from other metallic elements by smelting and refining. The shredding and separation, and smelting processes have not been included in module C3 because it is assumed to be very small and are effectively negligible. (Celik et al., 2019).		
	Recovered cable to recycling	%	97.2
C4 – Disposal	The recovered cable is sent recycling while a small portion is assumed to be unrecoverable which is considered to send to landfill		
	Unrecoverable cable to landfill	%	2.8

Scenarios and additional technical information			
Scenario	Parameter	Units	Results
Module D	It is assumed that 97.2% of the cable used in the construction building is recovered for recycling and remaining 2.8% is sent to landfill. The calculation assumes that there is no yield-loss during the recycling process. Recycling (97.2%): 0.0541 kg/m. Landfill (2.8%): 0.00041 kg/m.		
	Copper – Recycled	kg/m	0.0172
	Polyethylene – Recycled	kg/m	0.0098
	Co-polymer – Recycled	kg/m	0.0194
	PET – Recycled	kg/m	0.0021
	Barrier Tape - Recycled	kg/m	0.0054

Summary

Interpretation results

The bulk of the environmental impacts are attributed to the manufacturing of CAT6A UUTP cable covered by information modules A1-A3 of EN15804:2012+A2:2019.

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