

ENVIRONMENTAL PRODUCT DECLARATION

PANDUIT 4-PAIR & MULTIPAIR COPPER DATA CABLE

PLENUM RATED



Panduit TX Series Plenum Copper Cabling

PANDUIT[®]
infrastructure for a connected world

At Panduit, we're serious about sustainability.

Everyone's talking about sustainability these days. Companies are making huge changes in the way they do business to meet the demands for energy efficiency, meet environmental standards and exceed international benchmarks.

At Panduit, sustainability drives our business practices. We are committed to providing you with the most cost-efficient and environmentally sound solutions available. Because sustainable business practices have always been at the core of what we do, it's a natural progression for us to create [award-winning](#) solutions that put sustainable business at the foundation of your infrastructure, too.

We walk the talk.

Our world headquarters, a [LEED Gold Certified building](#), is a testament to our commitment to design and implement healthy, energy efficient, and sustainable business environments. Through our experience and expertise, we can help you build an infrastructure that can contribute toward your projects' LEED certification.



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TX5e™ Category 5e U/UTP; TX5500™ Category 5e U/UTP; TX5500™ Category 5e F/UTP; TX5500™ Category 5e U/UTP Multipair; TX6™ Category 6 U/UTP; TX6-28™ Category 6 U/UTP; TX6000™ Category 6 U/UTP; TX6500™ Category 6 U/UTP; TX6A™ 10Gig Category 6A U/UTP MaTriX™; TX6A™ 10Gig Category 6A U/FTP (STP); TX6A™ 10Gig Category 6A F/UTP; TX6A-SD™ 10Gig Category 6A U/UTP MaTriX™
4-pair and Multipair Copper Plenum Data Cable

According to ISO 14025

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025 and ISO 21930. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc. Accuracy of Results: EPDs regularly rely on estimations of impacts, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. Comparability: EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.



PROGRAM OPERATOR	UL Environment	
DECLARATION HOLDER	Panduit	
DECLARATION NUMBER	4787339353.104.1	
DECLARED PRODUCT	Plenum Rated 4-Pair and Multipair Copper Data Cable	
REFERENCE PCR	PCR for EPDs: Wire & Cable PCR 2013:1.0	
DATE OF ISSUE	January 30, 2017	
PERIOD OF VALIDITY	5 years	
CONTENTS OF THE DECLARATION	Product definition and information about building physics Information about basic material and the material's origin Description of the product's manufacture Indication of product processing Information about the in-use conditions Life cycle assessment results Testing results and verifications	
The PCR review was conducted by:	International EPD System	
	PCR Review Panel	
This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories <input checked="" type="checkbox"/> INTERNAL <input type="checkbox"/> EXTERNAL	 Wade Stout, ULE EPM	
	 Thomas P. Gloria, Industrial Ecology Consultants	
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	 Thomas P. Gloria, Industrial Ecology Consultants	

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4-pair and Multipair Copper Plenum Data Cable

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Product Definition and Information

Company Description

Panduit is a world-class developer and provider of leading-edge electrical and networking solutions that help customers optimize the physical infrastructure.

Product Description

Plenum cables are installed in the plenum spaces of buildings and must meet associated fire safety test standards. In this declaration, plenum copper data cable products are covered. All products listed below are UL Listed CMP and have been UL or ETL verified.

Panduit TX5e™ Category 5e U/UTP Part number: PUP5C04**-U

Category 5e, plenum (CMP), 4-pair, U/UTP copper cable. Copper conductors are 24 AWG with FEP/polyolefin insulation, twisted in pairs and protected by a low smoke, flame-retardant PVC jacket.

Panduit TX5500™ Category 5e U/UTP Part number: PUP5504**-UY

Premium Category 5e, plenum (CMP), 4-pair, U/UTP copper cable. Copper conductors are 24 AWG with FEP/polyolefin insulation, twisted in pairs and protected by a low smoke, flame-retardant PVC jacket.

Panduit TX5500™ Category 5e F/UTP Part number: PFP5504**-UY

Category 5e, plenum (CMP), 4-pair, F/UTP shielded copper cable. Copper conductors are 24 AWG with FEP/polyolefin insulation, twisted in pairs, surrounded by an overall metallic foil shield with a copper drain wire and protected by a low smoke, flame retardant PVC jacket.

Panduit TX5500™ Category 5e U/UTP Multi-Pair Part number: PUP5525**-UY

Category 5e, plenum (CMP), 25-pair, U/UTP copper cable. Copper conductors are 24 AWG with FEP/polyolefin insulation, twisted in pairs and placed in a low smoke, flame retardant PVC jacket.

Panduit TX6™ Category 6 U/UTP Part number: PUP6C04**-U

Category 6, plenum (CMP), 4-pair, U/UTP copper cable. Copper conductors are 23 AWG with FEP/polyolefin insulation, twisted in pairs, separated by a tape, and protected by a low smoke, flame retardant PVC jacket.

Panduit TX6-28™ Category 6 U/UTP Part number: PUP6C2804**-U

Category 6, plenum (CMP), 4-pair, U/UTP copper cable. Copper conductors are 28 AWG with FEP/polyolefin insulation, twisted in pairs, separated by an integrated pair divider, and protected by a low smoke, flame retardant PVC jacket.



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4-pair and Multipair Copper Plenum Data Cable

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Panduit TX6000™ Category 6 U/UTP Part number: PUP6004**-W

Enhanced Category 6, plenum (CMP), 4-pair, U/UTP copper cable. Copper conductors are 23 AWG with FEP/polyolefin insulation, twisted in pairs, separated by an integrated pair divider, and protected by a low smoke, flame retardant PVC jacket.

Panduit TX6500™ Category 6 U/UTP Part number: PUP6504**-UY

Premium Category 6, plenum (CMP), 4-pair, U/UTP copper cable. Copper conductors are 23 AWG with FEP/polyolefin insulation, twisted in pairs, separated by an integrated pair divider and protected by a low smoke, flame retardant PVC jacket.

Panduit TX6A™ 10Gig Category 6A U/UTP MaTriX™ Part number: PUP6AM04**-UG

Category 6A, plenum (CMP), 4-pair, U/UTP MaTriX copper cable. Copper conductors are 23 AWG with FEP/polyolefin insulation. Conductors are twisted in pairs, separated by an integrated pair divider, surrounded by the MaTriX tape and protected by a low smoke, flame retardant PVC jacket.

Panduit TX6A™ 10Gig Category 6A U/UTP MaTriX™ Part number: PUP6AM04**-UGA

Category 6A, plenum (CMP), 4-pair, U/UTP MaTriX copper cable. Copper conductors are 23 AWG with FEP/polyolefin insulation. Conductors are twisted in pairs, separated by an integrated pair divider, surrounded by the MaTriX tape and protected by a low smoke, flame retardant PVC jacket.

Panduit TX6A™ 10Gig Category 6A U/FTP Part number: PUF6X04**-UG

Category 6A, plenum (CMP), 4-pair, U/FTP shielded copper cable. Copper conductors are 23 AWG with FEP/polyolefin insulation. Conductors are twisted in pairs, each covered by a metallic foil shield with a copper drain wire and protected by a low smoke, flame retardant PVC jacket.

Panduit TX6A™ 10Gig Category 6A F/UTP Part number: PFP6X04**-UG

Category 6A, plenum (CMP), 4-pair, F/UTP shielded copper cable. Copper conductors are 23 AWG with FEP/polyolefin insulation. Conductors are twisted in pairs, each covered by an integrated pair divider, surrounded by an overall metallic shield, and protected by a low smoke, flame retardant PVC jacket.

Panduit TX6A-SD™ 10Gig Category 6A U/UTP MaTriX™ Part number: PUP6ASD04**-UG

Category 6A, plenum (CMP), 4-pair, U/UTP MaTriX copper cable. Copper conductors are 26 AWG with FEP/polyolefin insulation. Conductors are twisted in pairs, separated by an integrated pair divider, surrounded by the MaTriX tape and protected by a low smoke, flame retardant PVC jacket.

** denotes color code

Manufacturing Locations

These data cables are manufactured in the United States with the exception of the PUP6AM04**-UGA; that cable is manufactured in China. Primary data for the life cycle assessment has been provided by each of these facilities and a weighted average has been conducted for each product.

Environment



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4-pair and Multipair Copper Plenum Data Cable

According to ISO 14025

Applications and Uses

These products are used in the plenum spaces of buildings. Applications for the plenum products include IEEE 802.3: 10BASE-T through 10GBASE-T LAN and WLAN applications; CDDI; Token Ring; ATM; broadband and baseband analog video; voice and multimedia systems; data center I/O consolidation; data center server virtualization; consolidation of network interconnects; back-bone aggregation; parallel processing and high speed computing; stacking switches and switch-to-switch links; storage area networks; aggregation of ethernet channels; real-time intensive financial transactions; streaming video; animation; scientific modeling; and medical imaging.

Material Inputs

The raw materials for these plenum data cables are listed in Table 1. Table 2 details the average packaging materials associated with each product.

Material (lb/100ft)	TX5e CAT 5e U/UTP	TX5500 CAT 5e U/UTP	TX5500 CAT 5e F/UTP	TX5500 CAT 5e U/UTP Multipair	TX6 CAT 6 U/UTP	TX6-28 CAT 6 U/UTP	TX6000 CAT 6 U/UTP
Copper	1.0	1.1	1.5	8.5	1.2	0.5	1.3
FEP Compound	0.4	0.5	0.9	7.5	0.6	0.2	0.6
PET	-	-	0.2	-	-	-	-
Tin	-	-	<0.1	-	-	-	-
PVC Compound	0.8	0.7	1.0	0.0	0.8	0.6	0.9
Colorant	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aluminum	-	-	-	-	-	-	-
Total	2.3	2.3	3.5	16.0	2.7	1.3	2.8
Material (lb/100ft)	TX6500 CAT6 U/UTP	TX6A 10Gig CAT6A U/UTP MaTriX		TX6A CAT6A U/FTP	TX6A CAT6A F/UTP	TX6A-SD 10Gig CAT6A U/UTP MaTriX	
		PUP6AM04**--UG	PUP6AM04**--UGA				
Copper	1.4	1.4	1.4	1.4	1.5	0.7	
FEP Compound	0.6	0.9	0.8	1.1	0.7	0.7	
PET	0.2	0.5	0.6	1.1	0.8	0.4	
Tin	-	<0.1	-	0.1	0.1	-	
PVC Compound	0.8	0.9	1.0	1.5	1.0	0.8	
Colorant	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Aluminum	-	<0.1	<0.1	-	-	-	
Total	3.1	3.8	5.3	4.1	2.6	3.1	

Table 1: Material Inputs for Plenum Copper Data Cables



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4-pair and Multipair Copper Plenum Data Cable

According to ISO 14025

Material (lb/100ft)	TX5e CAT5e U/UTP	TX5500 CAT5e U/UTP	TX5500 CAT5e F/UTP	TX5500 CAT5e U/UTP Multipair	TX6 CAT6 U/UTP	TX6-28 CAT6 U/UTP	TX6000 CAT6 U/UTP
Cardboard	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Plastic Spool	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Wood Pallet	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Shrinkwrap	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Material (lb/100ft)	TX6500 CAT6 U/UTP	TX6A 10Gig CAT6A U/UTP MaTriX		TX6A CAT6A U/FTP	TX6A CAT6A F/UTP	TX6A-SD 10Gig CAT6A U/UTP MaTriX	
		PUP6AM04**-UG	PUP6AM04**-UGA				
Cardboard	0.1	0.1	0.1	0.1	0.1	0.1	
Plastic Spool	0.4	0.4	0.4	0.4	0.4	0.4	
Wood Pallet	0.4	0.4	0.4	0.4	0.4	0.4	
Shrinkwrap	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	

Table 2: Average Packaging Material Inputs

Manufacturing Process

Copper wire goes through two drawing processes with an immediate subsequent annealing process. The wire continues down the line to an extruder where the insulation material is applied to the wire. Cooling and drying of the insulated wire then occurs. Two of these insulated wires are then twinned. Four twinned wire pairs, along with other cable components such as separator and/or shielding material, are then stranded together. Subsequently, the stranded wire has a jacket extruded around the stranded cable. After the jacket is applied, the cable is cooled and packaged. Various packaging options exist, but most product is shipped in 1000-foot length spools and/or boxes.

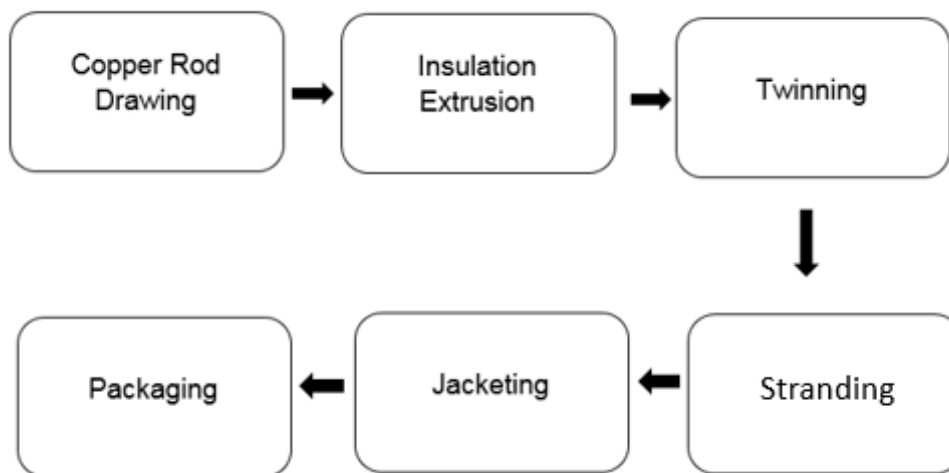


Figure 1: Manufacturing Process Flow of Copper Data Cable



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4-pair and Multipair Copper Plenum Data Cable

According to ISO 14025

Life Cycle Assessment Description

Functional Unit

Environmental impacts are reported per functional unit of a product and the functional unit is the basis for comparison in an LCA. For copper data cable, the functional unit is 100ft of cable.

Life Cycle Stages Assessed

Life Cycle Boundary	EPD Life Cycle Stage
Panduit Plenum Cable Business-to-Business	Raw Material Acquisition
	Manufacturing
	Packaging/Storage
Panduit Plenum Cable Business-to-Consumer	Marketing and Distribution
	Installation and Use
	Waste Disposal

Table 3: Life Cycle Stages Assessed



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System Boundary

This project considers the life cycle activities from resource extraction through installation and end-of-life effects. The boundary covers raw material acquisition, manufacturing, marketing, use and waste disposal as seen in Figure 2.

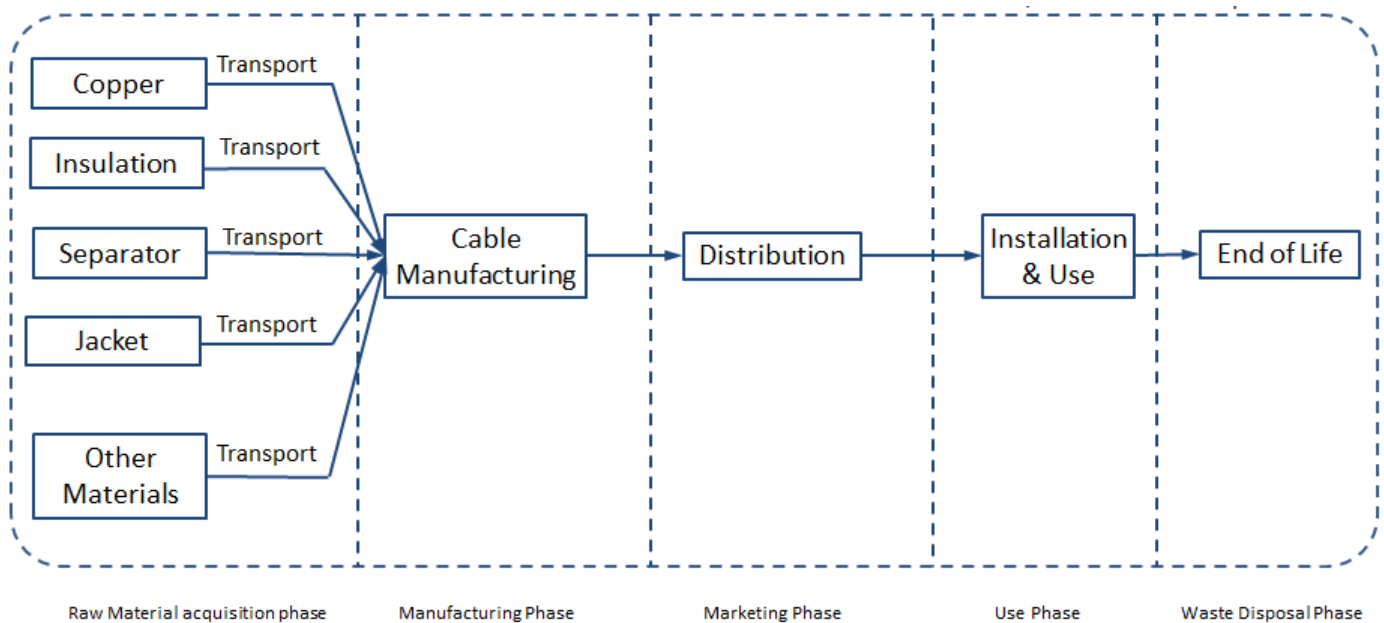


Figure 2: System Boundary

Allocation

Allocation for manufacturing energy, water, and waste items was conducted per length of production based on manufacturing zones of each facility.

Cut-off Criteria

For any impact category, should the sum of various impacts from a specific process/activity be less than 1% of the impact equivalent in that category, the process/activity may be neglected during the inventory analysis. Nonetheless, the accumulated impact of neglected process/activity may not exceed 5%. Components and materials omitted from the LCA shall be documented.

This EPD is in compliance with the cut-off criteria. Components and materials omitted from the LCA shall be documented and include installation energy from signal testing devices in the installation of data communication cable. Capital items for the production processes (machines, buildings, etc.) were not taken into consideration.



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Period under Consideration

Primary data used refer to the production processes of the manufacturing facility and were derived from calendar year 2014, or calendar year 2015, depending on manufacturing facility.

Software and Background Data

SimaPro v8.02 Software System for Life Cycle Engineering, an internationally recognized LCA modeling software program, was used for life cycle impact assessment modeling. Background and secondary datasets were modeled using the US LCI database, developed by the National Renewable Energy Laboratory, as well as the ecoinvent v3 database, which is developed by the Swiss Centre for Life Cycle Inventories. FEP material impact data was obtained from an LCA on data cable conducted for the Environmental Protection Agency.

Marketing and Distribution

The plenum cable products are distributed globally, but primarily throughout the United States and Canada. Final plenum copper data cable products were modeled as being shipped 1000 miles by truck, based on the location of Panduit manufacturing locations and distribution centers.

Transportation

Panduit provided resource transportation mode and location data to support the calculation of raw material transportation flows. The transportation LCI data from the US LCI database (kg-km basis) were used to develop the resource transportation LCI profile.

Installation and Use Stage

A scrap rate of 5% was assumed in the installation of the product in the use stage for this study. This rate was based on the expertise of Panduit. Installers routinely use signal testing devices to ensure cable has been installed properly; however, this device has negligible energy consumption compared to the rest of the installation and life cycle impacts and so was excluded from the study as allowed by the cut-off criteria.

The lifetimes of these products are widely variable and most often data cable is replaced due to increased bandwidth and data speed requirements, and not because of product performance or degradation. Copper data cable is a passive product after installation and during the use stage, meaning no energy is consumed nor is additional maintenance required during the products' use. Therefore, no use stage impacts were measured, and thus none are presented in these results.

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End-of-Life

A distance of 20 miles to the recycling facility was assumed for products at the end-of-life. A 95% recycling rate was assumed with the remaining 5% being disposed as the average US municipal solid waste disposition, as cited in a study conducted by DuPont (Krieger, 2007). The US disposition rates of 82% landfill and 18% incineration were assumed for the remaining 5% of product material. The cut-off methodology (also known as the recycled content method) was used for any materials that were sent to recycling such as scrap and the end-of-life disposition. This methodology assumes the processing of the recycled material at the recycler will be applied to the next product life cycle. Data not available in life cycle databases used models found in the Waste Reduction Model (WARM), developed by the US EPA.



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4-pair and Multipair Copper Plenum Data Cable

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Life Cycle Inventory

Energy Use

The following table and figure details the cumulative energy demand of the Panduit plenum copper cables through each life cycle stage of the product.

Life Cycle Stage	TX5e CAT5e U/UTP	TX5500 CAT5e U/UTP	TX5500 CAT5e F/UTP	TX5500 CAT 5e U/UTP Multipair	TX6 CAT6 U/UTP	TX6-28 CAT6 U/UTP	TX6000 CAT6 U/UTP
Materials	1.10E+02	1.20E+02	1.50E+02	8.20E+02	1.30E+02	5.20E+01	1.30E+02
Manufacturing	3.20E+01	3.20E+01	3.10E+01	2.00E+02	3.40E+01	3.90E+01	3.60E+01
Marketing	8.90E+00	8.70E+00	1.60E+01	7.10E+01	1.00E+01	5.60E+00	1.10E+01
Use	7.30E+00	8.00E+00	1.00E+01	5.50E+01	8.50E+00	4.80E+00	9.00E+00
Waste Disposal	8.00E-02	7.40E-02	1.20E-01	2.40E-01	8.90E-02	4.10E-02	8.60E-02
Cradle to Grave	1.50E+02	1.70E+02	2.10E+02	1.10E+03	1.80E+02	1.00E+02	1.90E+02
Life Cycle Stage	TX6500 CAT6 U/UTP	TX6A 10Gig CAT6A U/UTP MaTriX PUP6AM04**-UG	TX6A 10Gig CAT6A U/UTP MaTriX PUP6AM04**-UGA	TX6A CAT6A U/FTP	TX6A CAT6A F/UTP	TX6A-SD 10Gig CAT6A U/UTP MaTriX	
Materials	1.70E+02	2.00E+02	2.5E+02	3.10E+02	2.40E+02	1.20E+02	
Manufacturing	3.50E+01	3.80E+01	2.0E+01	3.80E+01	3.80E+01	3.70E+01	
Marketing	1.20E+01	1.20E+01	3.3E-02	2.00E+01	1.70E+01	9.70E+00	
Use	1.10E+01	1.30E+01	1.3E+01	1.80E+01	1.50E+01	8.10E+00	
Waste Disposal	9.70E-02	1.00E-01	1.2E-01	2.00E-01	1.00E-01	1.00E-01	
Cradle to Grave	2.20E+02	2.10E+02	2.8E+02	3.90E+02	3.20E+02	1.70E+02	

Table 4: Cradle to Grave Cumulative Energy Demand (MJ) per 100 feet of Cable



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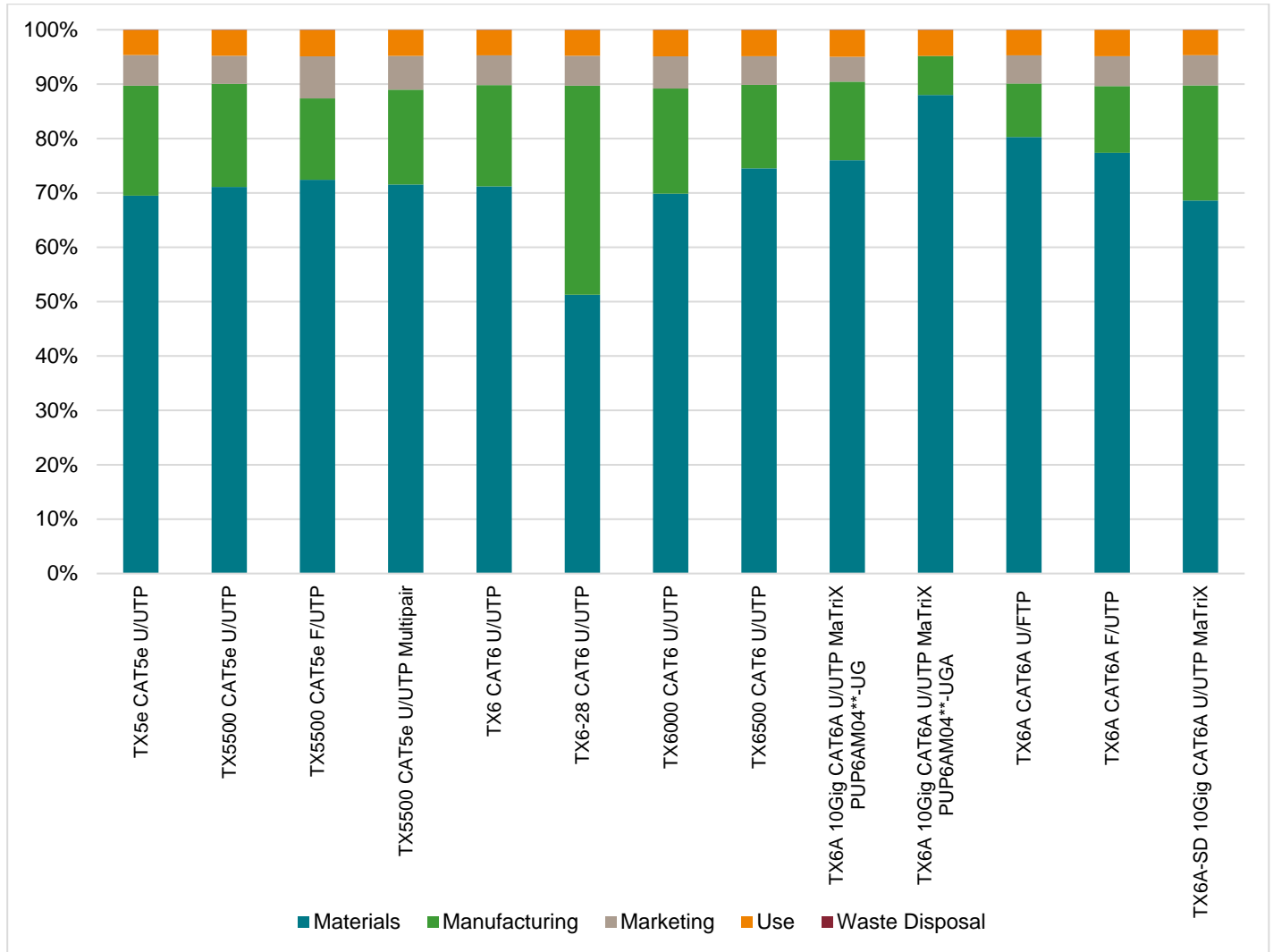


Figure 3: Cradle to Grave Cumulative Energy Demand



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TX5e™ Category 5e U/UTP; TX5500™ Category 5e U/UTP; TX5500™ Category 5e F/UTP; TX5500™ Category 5e U/UTP Multipair; TX6™ Category 6 U/UTP; TX6-28™ Category 6 U/UTP; TX6000™ Category 6 U/UTP; TX6500™ Category 6 U/UTP; TX6A™ 10Gig Category 6A U/UTP MaTriX™; TX6A™ 10Gig Category 6A U/FTP (STP); TX6A™ 10Gig Category 6A F/UTP; TX6A-SD™ 10Gig Category 6A U/UTP MaTriX™
4-pair and Multipair Copper Plenum Data Cable

According to ISO 14025

Waste Management

Methods of waste handling is detailed for the Panduit plenum copper cables for the entire life cycle of the products per 100 feet of cable.

Table 5: Cradle to Grave Waste (kg) per 100ft of Cable

Waste Management (kg/100 feet)	TX5e CAT5e U/UTP	TX5500 CAT5e U/UTP	TX5500 CAT5e F/UTP	TX5500 CAT5e U/UTP Multipair	TX6 CAT6 U/UTP	TX6-28 CAT6 U/UTP	TX6000 CAT6 U/UTP
Incineration (with and without energy recovery)	1.3E-01	1.8E-01	5.5E-02	0.0E+00	1.5E-01	3.5E-02	1.6E-01
Landfill (nonhazardous waste)	1.5E+00	1.5E+00	2.2E+00	1.1E+01	1.7E+00	7.7E-01	1.9E+00
Hazardous Waste	1.3E-02	1.3E-02	2.2E-02	3.9E-02	1.4E-02	7.2E-03	1.5E-02
Landfill Avoidance (recycling)	1.0E+00	1.0E+00	1.6E+00	7.0E+00	1.2E+00	6.1E-01	1.3E+00
Waste Management (kg/100 feet)	TX6500 CAT6 U/UTP	TX6A 10Gig CAT6A U/UTP MaTriX		TX6A CAT6A U/FTP	TX6A CAT6A F/UTP	TX6A-SD 10Gig CAT6A U/UTP MaTriX	
		PUP6AM04**-UG	PUP6AM04**-UGA				
Incineration (with and without energy recovery)	3.2E-01	3.3E-01	1.1E-02	5.9E-01	4.1E-01	3.0E-01	
Landfill (nonhazardous waste)	2.1E+00	2.2E+00	2.1E+00	2.5E+00	2.4E+00	1.1E+00	
Hazardous Waste	1.8E-02	3.0E-02	2.2E-02	5.2E-02	3.3E-02	3.1E-02	
Landfill Avoidance (recycling)	1.4E+00	1.6E+00	3.9E+00	2.3E+00	1.8E+00	1.2E+00	



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4-pair and Multipair Copper Plenum Data Cable

According to ISO 14025

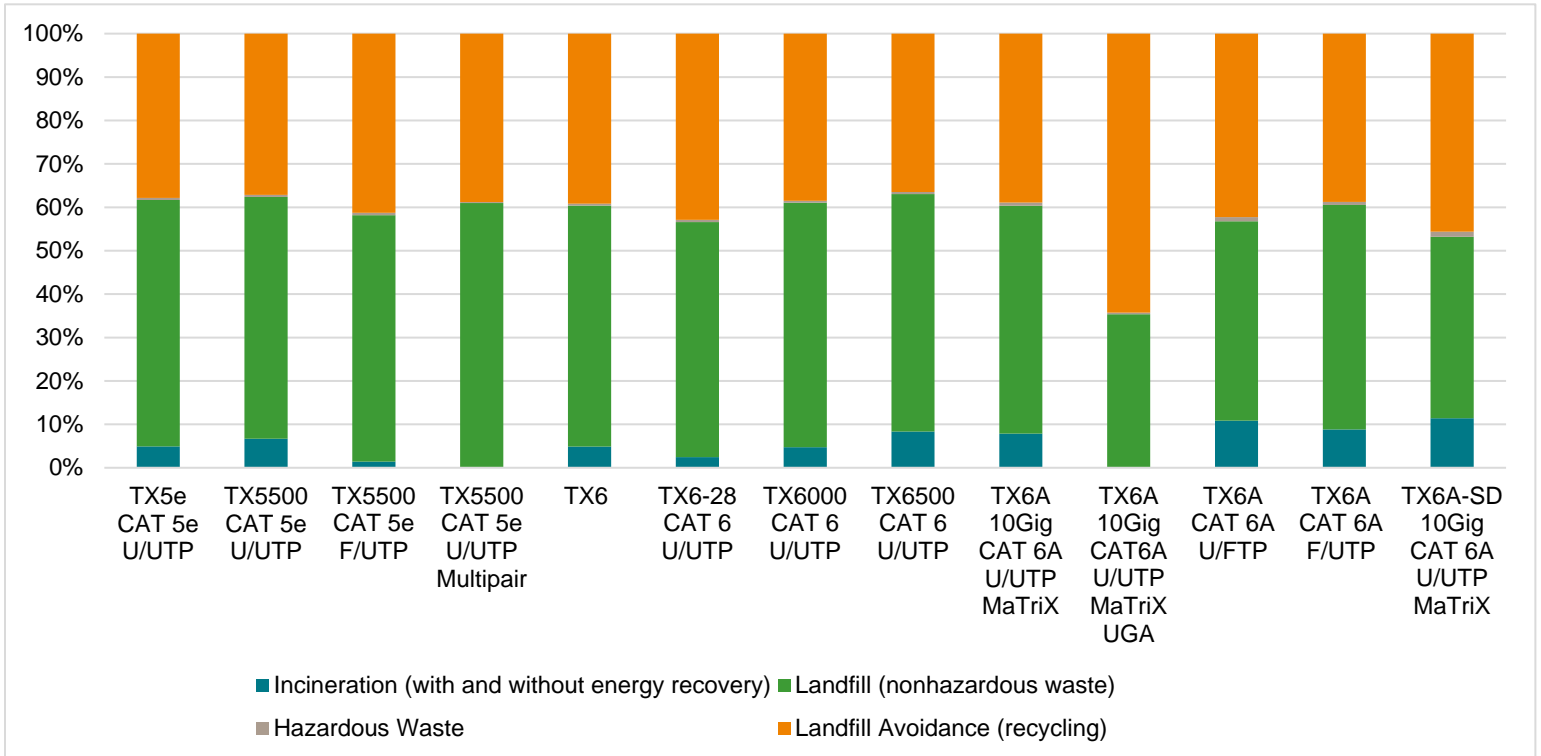


Figure 4: Cradle to Grave Waste



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TX5e™ Category 5e U/UTP; TX5500™ Category 5e U/UTP; TX5500™ Category 5e F/UTP; TX5500™ Category 5e U/UTP Multipair; TX6™ Category 6 U/UTP; TX6-28™ Category 6 U/UTP; TX6000™ Category 6 U/UTP; TX6500™ Category 6 U/UTP; TX6A™ 10Gig Category 6A U/UTP MaTriX™; TX6A™ 10Gig Category 6A U/FTP (STP); TX6A™ 10Gig Category 6A F/UTP; TX6A-SD™ 10Gig Category 6A U/UTP MaTriX™

4-pair and Multipair Copper Plenum Data Cable

According to ISO 14025

Life Cycle Impact Assessment

The environmental impacts listed below were assessed throughout the life cycle of the plenum data cable products as defined above, per 100 feet of cable. The environmental impacts were analyzed using TRACI 2.1 methodology.

Impact Category	TX5e CAT5e U/UTP						TX5500 CAT5e U/UTP						TX5500 CAT5e F/UTP					
	Raw Material	Manufacturing	Marketing	Use	Waste Disposal	Cradle to Grave	Raw Material	Manufacturing	Marketing	Use	Waste Disposal	Cradle to Grave	Raw Material	Manufacturing	Marketing	Use	Waste Disposal	Cradle to Grave
Global Warming (kg CO ₂ eq)	6.0E+00	1.9E+00	6.5E-01	4.3E-01	1.5E-02	9.0E+00	6.8E+00	1.8E+00	6.4E-01	4.6E-01	1.5E-02	9.8E+00	8.9E+00	2.1E+00	1.2E+00	6.1E-01	2.4E-02	1.3E+01
Acidification (kg SO ₂ eq)	2.2E-01	1.6E-02	3.9E-03	1.2E-02	3.4E-05	2.6E-01	2.3E-01	1.6E-02	3.8E-03	1.3E-02	3.2E-05	2.7E-01	3.1E-01	1.7E-02	6.9E-03	1.7E-02	4.9E-05	3.5E-01
Eutrophication (kg N eq)	9.4E-01	8.7E-04	2.4E-04	4.7E-02	1.6E-05	9.9E-01	9.8E-01	8.2E-04	2.5E-04	4.9E-02	1.5E-05	1.0E+00	1.3E+00	9.3E-04	3.8E-04	6.6E-02	2.5E-05	1.4E+00
Smog (kg O ₃ eq)	1.1E+00	1.7E-01	1.1E-01	7.1E-02	6.1E-04	1.5E+00	1.2E+00	1.4E-01	1.0E-01	7.2E-02	6.0E-04	1.5E+00	1.6E+00	3.1E-01	1.9E-01	1.1E-01	8.7E-04	2.2E+00
Ozone Depletion (kg CFC-11 eq)	1.9E-05	2.9E-08	4.5E-09	9.3E-07	3.6E-10	2.0E-05	3.1E-05	3.4E-08	7.3E-09	1.6E-06	3.4E-10	3.3E-05	3.3E-05	3.8E-08	4.4E-11	1.6E-06	5.2E-10	3.4E-05
Impact Category	TX5500 CAT5e U/UTP Multipair						TX6 CAT6 U/UTP						TX6-28 CAT6 U/UTP					
	Raw Material	Manufacturing	Marketing	Use	Waste Disposal	Cradle to Grave	Raw Material	Manufacturing	Marketing	Use	Waste Disposal	Cradle to Grave	Raw Material	Manufacturing	Marketing	Use	Waste Disposal	Cradle to Grave
Global Warming (kg CO ₂ eq)	4.9E+01	1.3E+01	5.2E+00	3.4E+00	9.7E-02	7.0E+01	7.2E+00	2.0E+00	7.6E-01	5.0E-01	1.8E-02	1.0E+01	2.9E+00	2.5E+00	4.1E-01	2.9E-01	8.4E-03	6.2E+00
Acidification (kg SO ₂ eq)	1.8E+00	1.2E-01	3.1E-02	9.6E-02	1.1E-04	2.0E+00	2.6E-01	1.7E-02	4.5E-03	1.4E-02	3.8E-05	3.0E-01	1.1E-01	2.1E-02	2.4E-03	6.7E-03	1.8E-05	1.4E-01
Eutrophication (kg N eq)	7.7E+00	4.7E-03	1.7E-03	3.9E-01	4.8E-05	8.1E+00	1.1E+00	9.3E-04	2.7E-04	5.5E-02	1.8E-05	1.2E+00	4.7E-01	1.4E-03	1.4E-04	2.3E-02	8.8E-06	4.9E-01
Smog (kg O ₃ eq)	9.0E+00	1.7E+00	8.5E-01	5.8E-01	3.0E-03	1.2E+01	1.3E+00	2.0E-01	1.2E-01	8.3E-02	7.0E-04	1.7E+00	5.7E-01	2.1E-01	6.7E-02	4.2E-02	3.0E-04	8.8E-01
Ozone Depletion (kg CFC-11 eq)	2.7E-04	9.0E-08	2.0E-10	1.3E-05	1.2E-09	2.8E-04	2.6E-05	3.2E-08	4.7E-09	1.3E-06	4.1E-10	2.7E-05	7.9E-06	3.2E-08	1.6E-11	4.0E-07	1.8E-10	8.4E-06

Table 6: Cradle to Grave Life Cycle Impact Assessment Results per 100 ft of Cable – Part 1



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TX5e™ Category 5e U/UTP; TX5500™ Category 5e U/UTP; TX5500™ Category 5e F/UTP; TX5500™ Category 5e U/UTP Multipair; TX6™ Category 6 U/UTP; TX6-28™ Category 6 U/UTP; TX6000™ Category 6 U/UTP; TX6500™ Category 6 U/UTP; TX6A™ 10Gig Category 6A U/UTP MaTriX™; TX6A™ 10Gig Category 6A U/FTP (STP); TX6A™ 10Gig Category 6A F/UTP; TX6A-SD™ 10Gig Category 6A U/UTP MaTriX™
4-pair and Multipair Copper Plenum Data Cable

According to ISO 14025

Impact Category	TX6000 CAT6 U/UTP						TX6500 CAT6 U/UTP						TX6A CAT6A U/UTP MaTriX PUP6AM04**-UG					
	Raw Material	Manufacturing	Marketing	Use	Waste Disposal	Cradle to Grave	Raw Material	Manufacturing	Marketing	Use	Waste Disposal	Cradle to Grave	Raw Material	Manufacturing	Marketing	Use	Waste Disposal	Cradle to Grave
Global Warming (kg CO ₂ eq)	7.6E+00	2.2E+00	8.1E-01	5.3E-01	1.8E-02	1.1E+01	1.1E+01	2.0E+00	9.2E-01	7.3E-01	3.1E-02	1.5E+01	1.1E+01	1.9E+00	8.9E-01	7.0E-01	3.1E-02	1.5E+01
Acidification (kg SO ₂ eq)	2.9E-01	1.9E-02	4.8E-03	1.5E-02	3.7E-05	3.2E-01	3.2E-01	1.8E-02	5.4E-03	1.6E-02	5.0E-05	3.6E-01	3.1E-01	1.7E-02	5.2E-03	1.6E-02	5.0E-05	3.5E-01
Eutrophication (kg N eq)	1.2E+00	8.8E-04	2.9E-04	6.0E-02	1.8E-05	1.3E+00	1.3E+00	9.2E-04	3.7E-04	6.6E-02	2.6E-05	1.3E+00	1.3E+00	6.6E-04	3.6E-04	6.4E-02	2.6E-05	1.3E+00
Smog (kg O ₃ eq)	1.5E+00	2.2E-01	1.3E-01	9.0E-02	7.0E-04	1.9E+00	1.6E+00	1.4E-01	1.5E-01	9.8E-02	1.0E-03	2.1E+00	1.6E+00	1.2E-01	1.4E-01	9.4E-02	9.9E-04	2.0E+00
Ozone Depletion (kg CFC-11 eq)	2.4E-05	2.9E-08	5.6E-09	1.2E-06	3.9E-10	2.5E-05	6.9E-05	5.2E-08	1.5E-08	3.5E-06	5.3E-10	7.2E-05	6.5E-05	4.8E-08	1.5E-08	3.3E-06	5.3E-10	6.8E-05
Impact Category	TX6A CAT6A U/UTP MaTriX PUP6AM04**-UGA						TX 6A CAT6A U/FTP (STP)						TX 6A CAT6A F/UTP (ScTP)					
	Raw Material	Manufacturing	Marketing	Use	Waste Disposal	Cradle to Grave	Raw Material	Manufacturing	Marketing	Use	Waste Disposal	Cradle to Grave	Raw Material	Manufacturing	Marketing	Use	Waste Disposal	Cradle to Grave
Global Warming (kg CO ₂ eq)	1.4E+01	2.1E+00	2.2E-03	8.2E-01	3.4E-02	1.7E+01	1.8E+01	2.0E+00	1.5E+00	1.1E+00	4.5E-02	2.2E+01	1.4E+01	2.0E+00	1.3E+00	8.7E-01	3.8E-02	1.8E+01
Acidification (kg SO ₂ eq)	3.0E-01	2.0E-02	1.1E-05	1.6E-02	5.3E-05	3.4E-01	3.6E-01	1.8E-02	8.7E-03	1.9E-02	7.6E-05	4.0E-01	3.6E-01	1.8E-02	7.5E-03	1.9E-02	5.9E-05	4.0E-01
Eutrophication (kg N eq)	1.2E+00	2.3E-03	1.7E-06	6.2E-02	2.8E-05	1.3E+00	1.4E+00	8.4E-04	6.0E-04	7.2E-02	4.0E-05	1.5E+00	1.5E+00	8.4E-04	5.2E-04	7.4E-02	3.0E-05	1.6E+00
Smog (kg O ₃ eq)	1.6E+00	1.7E-01	2.5E-04	9.0E-02	1.0E-03	1.9E+00	1.9E+00	1.3E-01	2.4E-01	1.1E-01	1.4E-03	2.4E+00	1.9E+00	1.3E-01	2.1E-01	1.1E-01	1.2E-03	2.3E+00
Ozone Depletion (kg CFC-11 eq)	1.1E-04	1.6E-08	3.3E-10	5.5E-06	5.6E-10	1.2E-04	1.4E-04	5.4E-08	2.4E-08	6.8E-06	8.0E-10	1.4E-04	9.1E-05	5.4E-08	2.1E-08	4.6E-06	6.2E-10	9.6E-05
Impact Category	TX6A-SD CAT6A U/UTP MaTriX																	
	Raw Material	Manufacturing	Marketing	Use	Waste Disposal	Cradle to Grave												
Global Warming (kg CO ₂ eq)	6.1E+00	1.9E+00	7.1E-01	4.4E-01	2.1E-02	9.2E+00												
Acidification (kg SO ₂ eq)	1.7E-01	1.7E-02	4.2E-03	9.5E-03	3.4E-05	2.0E-01												
Eutrophication (kg N eq)	6.2E-01	6.6E-04	2.9E-04	3.1E-02	1.7E-05	6.5E-01												
Smog (kg O ₃ eq)	8.7E-01	1.2E-01	1.2E-01	5.5E-02	6.6E-04	1.2E+00												
Ozone Depletion (kg CFC-11 eq)	2.5E-05	4.8E-08	1.2E-08	1.3E-06	3.6E-10	2.6E-05												

Table 7: Cradle to Grave Life Cycle Impact Assessment Results per 100 ft of Cable – Part 2



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4-pair and Multipair Copper Plenum Data Cable

According to ISO 14025

References

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- C22.2 NO. 214-08 (R2013) - Communications cables (Bi-national standard, with UL 444)
- ISO 21930: Sustainability in building construction – Environmental declaration of building products
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- EPA, Wire and Cable Insulation and Jacketing: Life-Cycle Assessments for Selected Applications, June 2008, EPA 744-R-08-001
- FTC Part 260, Green guides
- (ILCD, 2010) Joint Research Commission, 2010, ILCD Handbook: General Guide for Life Cycle Assessment
- Intergovernmental Panel on Climate Change (IPCC)
- ISO 14025:2006 *Environmental labels and declarations – Type III environmental declarations – Principles and procedures*
- ISO 14040:2006 *Environmental management - Life cycle assessment – Principles and framework*
- ISO 14044:2006 *Environmental management - Life cycle assessment – Requirements and guidelines*
- NFPA 262: Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces
- NFPA 70®: National Electrical Code
- UL 44 Standard Thermoset-Insulated Wires and Cables
- UL 1666 Test for Flame Propagation Height of Electrical and Optical-Fiber Cables Installed Vertically in Shafts
- USEPA Waste Reduction Model (WARM)
- Krieger, T. et al. *New Fire Hazard and Environmental Burden Evaluations of Electrical Cable Installations Utilizing ISO 14040 Environmental Methodologies*. DuPont. November 10, 2007.

LCA Development

This EPD and corresponding LCA were prepared by Sustainable Solutions Corporation of Royersford, Pennsylvania.



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