

Superior Essex 4-Pair Copper Data Cable

PLENUM RATED



All Superior Essex 4-Pair plenum copper data cables inclusive of 6+, 6A, 6, 6eX, 5e+, and 5e



At Superior Essex we believe that the technology that interconnects the world, should also respect it. Cabling that is manufactured sustainably in a third-party certified zero waste to landfill facility as well as a facility that has reduced their Scope 1 and Scope 2 Carbon emissions by 21% since 2011 is just the start. We take pride in transparency of our total life cycle impacts through our environmental product declaration efforts and are working diligently to not only be transparent about our impacts but reducing these impacts for the betterment of today and to the future, tomorrow.

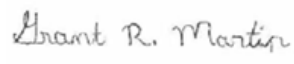
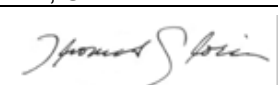


ENVIRONMENTAL PRODUCT DECLARATION



Copper Plenum Cable: 10Gain XP Category 6A, 10Gain Category 6A, Category 6A STP (U/FTP), Category 6A ScTP (F/UTP), Category 6+ ScTP (F/UTP), NextGain® Category 6eX, DataGain® Category 6+, Category 6 with FEP Jacket, Category 6, Cobra Category 5e+, Category 5e+ ScTP (F/UTP), Marathon LAN® Category 5e, Powerwise™ Category 5e+ 4PPoE

According to ISO 14025

PROGRAM OPERATOR	UL Environment	
DECLARATION HOLDER	Superior Essex	
DECLARATION NUMBER	4789047039.101.1	
DECLARED PRODUCT	4-Pair Copper Plenum Cable	
REFERENCE PCR	P.E.P. Association. PCR for Electrical, Electronic and HVAC-R Products (2015) P.E.P. Association. PSR for Wires, Cables and Accessories (2015)	
DATE OF ISSUE	October 1, 2019	
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:	PEP ecopassport Program	
	PCR Review Committee	
This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories ☐ INTERNAL ☒ EXTERNAL	 Grant R. Martin, UL Environment	
	 Thomas Gloria, Industrial Ecology Consultants	
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:		

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1. Product Definition and Information

Description of Company/Organization

Superior Essex is a global leader in the design, manufacture and supply of wire and cable products. This declaration is presented as we develop our product stewardship program to evaluate and reduce the impacts of products and processes throughout the corporation and business groups.

Product Description

Thirteen plenum copper data cable products are covered in this declaration. Plenum cables are installed in the plenum spaces of buildings and must meet associated fire safety test standards. All products listed below are UL Listed CMP and have been UL or ETL verified as Category 6+, Category 6A, Category 6, Category 6eX, Category 5e+, or Category 5e products. Various packaging options exist for these products, but most are shipped in 1000-foot length spools or boxes.

10Gain® XP Category 6A Part Number: 6H-272-xB.

10Gain XP Category 6A is the first category 6A cable without a continuous shield to offer 3dB margin over Alien Crosstalk (AXT) performance requirements in ANSI/TIA-568-C.2. The uniquely designed isolation wrap contains discontinuous sections of metallized material, held in place by a polymeric layer.

10Gain® Category 6A Part number: 6A-272-xB

10Gain cable brings Category 6A UTP performance to a new level. This cable meets the internal and alien cross-talk performance requirements of ANSI/TIA-568-C.2 as tested in a 6 around 1 configuration. With guaranteed performance out to 500 MHz and independently verified and monitored by UL, 10Gain Category 6A cable demonstrates superior capability for 10 Gigabit Ethernet (10 GbE) and all other bandwidth intensive and legacy applications.

Category 6A STP (U/FTP) Part number: 6S-220-xB

Superior Essex offers Shielded Twisted Pair (STP) Category 6A plenum cables. The cable has guaranteed performance to 600 MHz and meets or exceeds ANSI/TIA-568-C.2 for Category 6A cables required for 10GBASE-T applications. The cable consists of four (4) balanced 23 AWG copper pairs. Each pair is wrapped with a Mylar® backed aluminum foil with the drain wire in the center of all 4 copper pairs. The wrapped pairs are then jacketed with an appropriate flexible PVC jacket for plenum applications.

Category 6A ScTP (F/UTP) Part number: 6F-272-xB/6F-273-B

Category 6A ScTP (F/UTP) cable, swept out to 650 MHz, meets or exceeds ANSI/TIA-568-C.2 for Category 6A cables, a requirement for 10GBASE-T applications. The cable is UL verified Category 6A and has a typical Alien Crosstalk margin of 18 dB. The cable consists of four (4) balanced 23 AWG copper pairs around a flame retardant cross-web. The core is wrapped with a Mylar backed aluminum foil. A drain wire is applied longitudinally against the tape. The cable is then protected with a flexible plenum rated PVC jacket. Standard features include ColorTip™ circuit identification system and QuickCount® length marking system measured in both feet and meters.

Category 6+ ScTP (F/UTP): Part number: 6T-272-xB

Category 6+ ScTP (F/UTP) cable, with guaranteed performance out to 500 MHz, exceeds ANSI/TIA-568-C.2 for Category 6 cables. The cable is UL verified Category 6 and has a typical Alien Crosstalk margin of 18 dB. The cable can be used for 10GBASE-T applications for up to 55 meters per ANSI/TIA/EIA-TSB-155. The cable consists of four (4) balanced 23 AWG copper pairs around a flame retardant cross-web. The core is wrapped with a Mylar-backed aluminum foil. A drain wire is applied longitudinally against the tape. The cable is then protected with a flexible plenum



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rated PVC jacket. Standard features include ColorTip™ circuit identification system and QuickCount® length marking system measured in both feet and meters.

NextGain® Category 6eX, Part number: 54-246-xB/54-272-xB

NextGain® Category 6eX cable brings UTP performance to a new level. Guaranteed for 7 dB of margin (headroom) over base requirements of Category 6 NEXT standards, this cable maximizes bandwidth for today's leading edge applications and those of the future. With positive ACR verified beyond 300 MHz, NextGain Category 6eX cable demonstrates superior capability for ATM, Gigabit Ethernet and other bandwidth intensive applications.

DataGain® Category 6+, Part number: 66-246-xB, 66-272-xB, 66-240-xB

DataGain® cable provides the best value in Category 6+ cables on the market today. The innovative design, which utilizes a tape separator, yields exceptional performance that exceeds TIA/EIA Category 6 specifications. DataGain easily surpasses the performance of other cost-competitive Category 6 cables.

Category 6 with FEP Jacket, Part number: 66-246-xP/66-272-xP

FEP Jacketed Category 6 Plenum is designed for high-risk applications such as chemical processing plants, petroleum refineries, and temperature extremes. Employing the latest polymer technology, FEP Jacketed Category 6 Plenum is constructed entirely of chemical, oil, heat, and moisture resistant FEP fluoropolymer. It is ideally suited for industrial UTP applications where severe environmental stresses would compromise standard P[8 C plenum cables. Additionally, the cable is specially processed to ensure a more durable print legend.

Category 6, Part number: 77-246-xB, 77-272-xB, 77-240-xB, 77-273-xB

Superior Essex Series 77 product line provides exceptional value for jobs that require standards compliant Category 6 cable at a cost-effective price.

Cobra Category 5e+, Part number: 52-200-x8, 52-241-x8

Cobra Category 5e+ cable is the performance leader in its class. Cobra cable is ideal for installations that require true future proofing in channel performance. By design, Cobra cables are manufactured to the highest quality standards, design requirements and materials to ensure that every box provides significant margin over ANSI/TIA- 568-C.2 specifications for NEXT, Power Sum NEXT and Insertion Loss.

Category 5e+ ScTP (F/UTP), Part number: 5F-220-x8

Superior Essex offers Screen Twisted Pair (ScTP) shielded Category 5e+ plenum cables. The cable has guaranteed performance out to 350 MHz and meets all applicable ANSI/TIA-568-C.2 requirements. The cable consists of four balanced 24 AWG copper pairs. The core is wrapped with an aluminum foil tape and has a tin coated drain wire. The tape wrapped core is jacketed with the appropriate flexible PVC jacket for plenum applications.

Marathon LAN® Category 5e, Part number: 51-243-x8, 51-241-x8, 51-220-x8, 51-273-x8

Marathon LAN Category 5e cable offers an exceptional value for jobs that require standards compliance at a cost-effective price. While Marathon LAN cable meets all of the ANSI/TIA-568-C.2 specifications, it also offers other features that make it easier to use, save on installation time and expense and ensure product quality during the installation. From the QuickCount® feature, which marks the exact cable remaining in the box, to the WideMouth payout design, which reduces tension on the wire as it is pulled during installation, Marathon LAN cable provides more overall value than any other Category 5e product available today.

PowerWise™ Category 5e+ 4PPoE, Part number: PW52-H72-x8

PowerWise™ Category 5e+ 4PPoE cables provide the best performance and overall value for 4-Pair Power over Ethernet (4PPoE) applications requiring up to 100W of power and up to 1 Gigabit Ethernet performance.



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PowerWise 5e+ 4PPoE cables are specifically designed to mitigate temperature build-up, offer exceptional energy efficiency and ensure performance (up to 1 Gigabit Ethernet) over the lifetime of a system. This cable is the best solution to connect and power your 4PPoE applications compared to standard 5e and 6 designs.

These plenum copper data cables are manufactured in Hoisington, Kansas. This facility provided the primary data for the life cycle assessment.

Application

The products listed are used in the plenum spaces of buildings. Applications for the plenum products include 10BASE-T through 10GBASE-T Ethernet, Power over Ethernet (PoE) - IEEE 802.3af, PoE+ - IEEE 802.3at Type 1 and 2 and ATM and token ring.



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Material Composition

The raw material inputs for the riser data cables are listed in Table 1. Table 2 details the average amount of packaging associated with each product.

Table 1: Material Inputs for Riser Copper Data Cables [kg / meter]

	10Gain XP 6A	10Gain n 6A	6A STP (U/FTP)	6A ScTP (F/UTP)	6+ ScTP (F/UTP)	NextGain n® 6eX	DataGain n® 6+	6 with FEP jacket	6	Cobra 5+	5e+ ScTP (F/UTP)	Marath on LAN® 5e	Power- wise™ 5e+ 4PPoE
Copper	0.0181	0.0223	0.0203	0.0204	0.0204	0.0179	0.0179	0.0179	0.0172	0.0147	0.0182	0.0141	0.0249
Aluminum	0	0	0.00956	0.00330	0.00330	0	0	0	0	0	0.00307	0	0
FEP	0.015	0.0104	0.0214	0.0175	0.0175	0.0117	0.00787	0.0186	0.0076	0.0061 1	0.0106	0.0056	0.0107
FRPE	0	0	0	0	0	0	0	0	0	0	0	0	0
FRPP	0	0.0028	0	0	0	0	0.00185	0	0	0	0	0	0
Tin	0	0	0	0	0	0	0	0	0	0	0	0	0
PET	0	0	0	0	0	0	0	0	0	0	0	0.0001	0
PVC	0.0123	0.0279	0.0238	0.014	0.014	0.0113	0.0102	0	0.0079	0.0083	0.0126	0.0081	0.011
Total	0.0454	0.0634	0.0751	0.0552	0.0552	0.0409	0.0378	0.0365	0.0327	0.0291	0.0445	0.0279	0.0466

Table 2: Average Packaging Material Inputs[kg / meter]

	10Gain XP 6A	10Gain n 6A	6A STP (U/FTP)	6A ScTP (F/UTP)	6+ ScTP (F/UTP)	NextGain n® 6eX	DataGain n® 6+	6 with FEP jacket	6	Cobra Cat 5+	5e+ ScTP (F/UTP)	Marath on LAN® 5e	Power- wise™ 5e+ 4PPoE
Cardboard	0	0	0	0	0	0	0.00298	0	0	0.0029 8	0	0.00298	0
HDPE	0.0268	0.0268	0.0268	0.0268	0.0268	0	0	0	0.0268	0	0.0268	0	0.0268
PS	0	0	0	0	0	0.00298	0	0.00298	0	0	0	0	0
PP	0	0	0	0	0	0.00149	0	0.00149	0	0	0	0	0
Wood	0.0089 3	0.0089 3	0.00744	0.00744	0.00893	0.00893	0.00446	0.00446	0.0089 3	0.0029 8	0.00893	0.00298	0.00893
Total	0.0357	0.0357	0.0342	0.0342	0.0357	0.0134	0.0074	0.00893	0.0357	0.0060	0.0357	0.0060	0.0357



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Manufacturing

The copper wire first goes through an initial drawing process and then a second drawing process with an immediate subsequent annealing. The wire continues down the line to an electric pre-heater and insulation extruder, where the insulation material is applied to the wire. After extrusion, the insulated wire is cooled and dried. The insulated wire is then taken to an electric twinning machine, where two insulated wires are continually spiraled around each other. Four twinned wires, along with separator tape and shielding material (if applicable) are then fed into an electric bunching machine where the internal contents of the cable are assembled. The bunched wire is then fed into a jacketing machine, where jacket material is extruded onto the bunched cable, the cable is cooled, and spooled for packaging. Various packaging options exist, but most product is shipped in 1000-foot length spools or boxes.

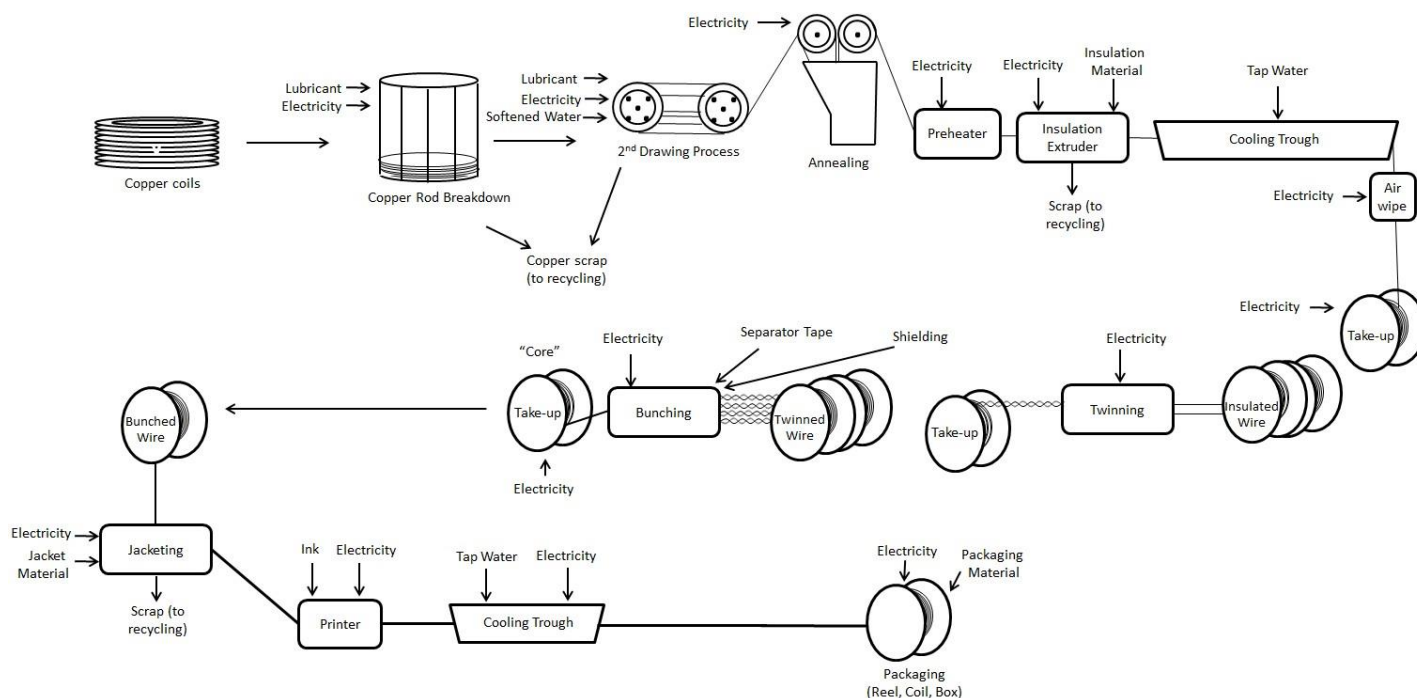


Figure 1: Manufacturing Process Flow of Plenum Copper Data Cable



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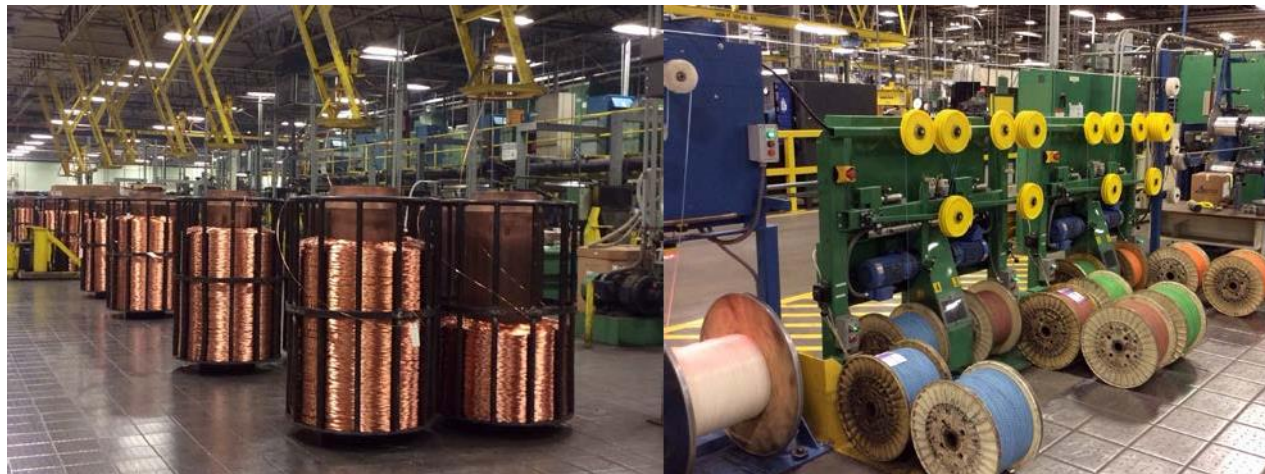


Figure 2: Photographs of Manufacturing Process

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2. Life Cycle Assessment Background Information

Functional Unit

The functional unit for the study is therefore defined as required by the PEP PSR for Wire, Cable, and Accessories, Product Specific Rules and PEP-PCR-ed3-EN-2015 04 02 as:

“To transmit a communication signal on 1 meter, according to the protocol and category relevant to each cable (outlined below), for a period of 30 years with a 70% use rate.”

Cable category and supported communication protocols for each cable product are listed below.

Table 3: Cable category and supported communication protocols for each cable product

Product	Category	Protocols
10Gain XP 6A	6A	• 10BASE-T through 10GBASE-T Ethernet • Power over Ethernet (PoE) - IEEE 802.3bt Type 1 to 4 • ATM and token ring • Backward compatible to legacy protocols and applications • HDBaseT Class A and B
10Gain 6A	6A	• 10BASE-T through 10GBASE-T Ethernet • Power over Ethernet (PoE) - IEEE 802.3bt Type 1 to 4 • ATM and token ring • Backward compatible to legacy protocols and applications
6A STP (U/FTP)	6A	• 10BASE-T through 10GBASE-T Ethernet • Power over Ethernet (PoE) - IEEE 802.3bt Type 1 to 4 • ATM and token ring • Backward compatible to legacy protocols and applications
6A ScTP (F/UTP)	6A	• 10BASE-T through 10GBASE-T Ethernet • Power over Ethernet (PoE) – IEEE 802.3af • 4PPoE+ - IEEE 802.3bt Type 3 and 4 draft D1.2 • ATM and token ring • Backward compatible to legacy protocols and applications
6+ ScTP (F/UTP)	6+	• 10GBASE-T (up to 55 meters), 1000BASE-T, 100BASE-T and legacy Ethernet applications • Power over Ethernet (PoE) – IEEE 802.3af • PoE+ – IEEE 802.3at Type 1 and 2 • ATM and token ring • HDBaseT Class A and B
NextGain® 6eX	6eX	• 10BASE-T through 1000BASE-T Ethernet • Power over Ethernet (PoE) – IEEE 802.3af • PoE+ – IEEE 802.3at Type 1 and 2 • ATM and token ring • Supports legacy protocols and applications
DataGain® 6+	6+	• 10BASE-T through 1000BASE-T Ethernet • Power over Ethernet (PoE) - IEEE 802.3bt Type 1 to 4 • ATM and token ring



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Product	Category	Protocols
6 with FEP Jacket (<i>plenum only</i>)	6	• 10BASE-T through 1000BASE-T Ethernet • Power over Ethernet (PoE) – IEEE 802.3af • PoE+ – IEEE 802.3at Type 1 and 2 • ATM and token ring • Works well in high-risk environments • For installations with thermal or chemical exposure
6	6	• 10BASE-T through 1000BASE-T Ethernet • Power over Ethernet (PoE) – IEEE 802.3af • PoE+ – IEEE 802.3at Type 1 and 2 • ATM and token ring
Cobra 5e+	5e+	• 10BASE-T through 1000BASE-T Ethernet • Power over Ethernet (PoE) – IEEE 802.3af • PoE+ – IEEE 802.3at Type 1 and 2 • ATM and token ring
5e+ ScTP (F/UTP)	5e+	• 10BASE-T through 1000BASE-T Ethernet • Power over Ethernet (PoE) – IEEE 802.3af • PoE+ – IEEE 802.3at Type 1 and 2 • ATM and token ring • Applications requiring secure networks or protection from EMI/RFI
Marathon LAN® 5e	5e	• 10BASE-T through 1000BASE-T Ethernet • Power over Ethernet (PoE) – IEEE 802.3af • PoE+ – IEEE 802.3at Type 1 and 2 • ATM and token ring
PowerWise™ 5e+ 4PPoE	5e+	• 10BASE-T through 1000BASE-T Ethernet • Power over Ethernet (PoE) – IEEE 802.3af • PoE+ – IEEE 802.3at Type 1 and 2 • 4PPoE – IEEE 802.3bt Type 3 and 4 draft D1.2 • ATM and token ring • HDBaseT Class A and B

System Boundary

This project considers the life cycle activities from resource extraction through installation and end-of-life effects. The system boundary covers raw material acquisition, manufacturing, marketing, use and waste disposal as seen in Figure 3.



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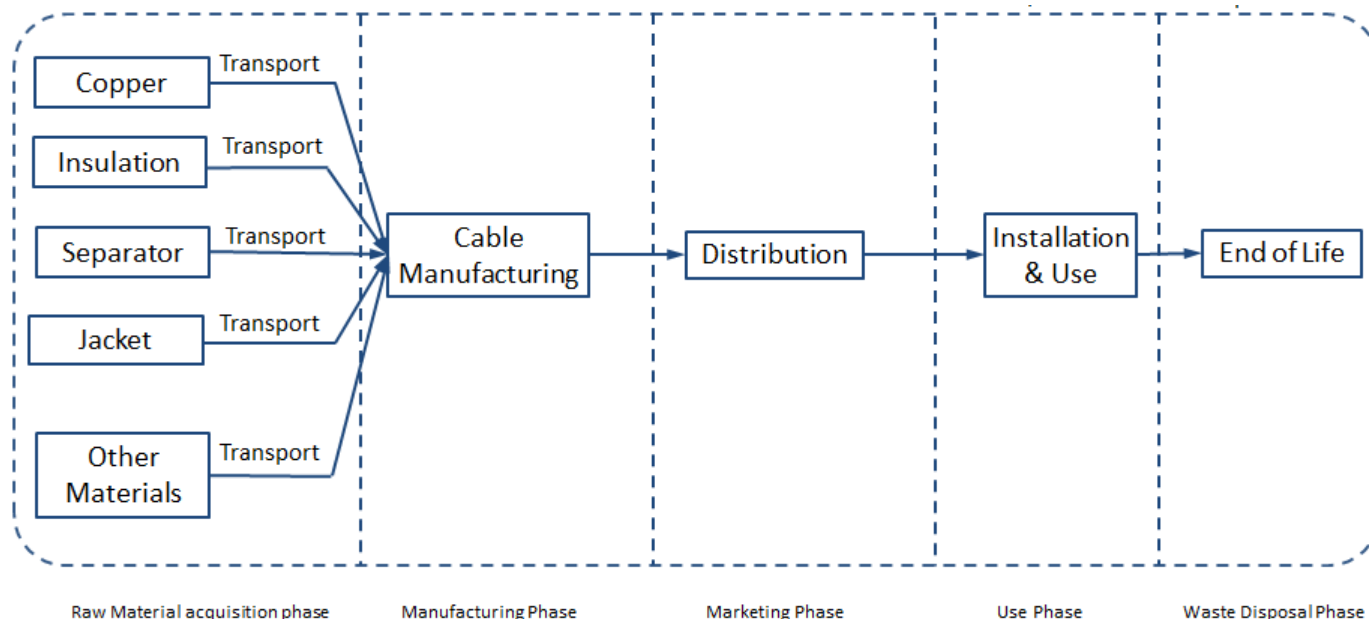


Figure 3: System Boundary

Cut-off Criteria

For any impact category, if the sum of various impacts from a specific process/activity is less than 1% of the impact equivalent in that category, such a 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. Capital items for the production processes (machines, buildings, etc.) were not taken into consideration.

Period under Review

The data used refer to the production processes of the copper cable production facilities from calendar year 2018.

Allocation

Allocation for manufacturing energy was conducted based on production mass and then multiplied by the product weight per hundred feet. Water and waste items were allocated per length of production.

Comparability (Optional)

The LCA model was created using the GaBi 9 Software system for life cycle engineering, developed by thinkstep AG. The GaBi 2019 LCI database (Service Pack 38) provides the life cycle inventory data for several of the raw and process materials obtained from the background system.



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Transportation

The manufacturing plant provided resource transportation mode and distance 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. Final products were modelled as being shipped 953 miles by truck. This was a calculated average provided by Superior Essex sales data from their 2014 EPDs, which have seen no dramatic changes in the makeup or locations of customers.

Installation and Use Stage

The copper cable products are distributed globally, but primarily used throughout the United States and Canada. An average installation scrap rate of 5% was assumed in this study, as determined by interviews with installers and the expertise of Superior Essex. Installers routinely use battery-powered signal testing devices (a popular brand name is Fluke) during installation to ensure cable has been installed properly. The electricity consumed (based on calculations from the specifications of a late model Fluke device) is negligible compared to the rest of the installation or life cycle impacts and therefore was excluded from the study as allowed by the cut-off criteria.

Use phase losses were determined by standards and refer to the loss maximum values as specified in the respective reference standards (cable performance standard IEC 61156-5). For a twisted pair cable of fixed length, power loss is governed by signal characteristics (i.e., frequency, amplitude) and wire resistivity. The PSR has simplified the power consumption based on cable type, shown below, as cable type will also be indicative of the use application.

Table 4: Power consumption by cable type

Cable type	Protocol	Power loss (mW/m)
5e	Ethernet 100M BP(*)=100MHz	0.454
6	1 G Ethernet BP(*) = 250 MHz	0.565
6a	10G Ethernet BP(*) = 500 MHz	1.364

Note: BP(*) = cable bandwidth

End-of-Life

According to the PEP PCR, this study assumes that metal components of copper cables are separated and recycled at the end of life with all remaining materials being disposed as the average US municipal solid waste disposition. The average US disposition includes 82% landfill and 18% incineration.



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3. Life Cycle Assessment Results

Life Cycle Impact Assessment Results

The environmental impacts listed below were assessed throughout the life cycle of the plenum data cable products as defined above, per one meter of cable. The environmental impacts were analyzed using CML methodology.

Table 5: Cradle-to-Grave Life Cycle Impact Assessment Results per 1 meter of Cable

Impact Category	Unit	10Gain XP Category 6A					10Gain Category 6A				
		Manufacturing	Distribution	Installation	Use	EoL	Manufacturing	Distribution	Installation	Use	EoL
GWP	kg CO ₂ -eq.	0.349	0.0125	0.0362	0.147	0.0119	0.419	0.0149	0.0402	0.147	0.015
AP	kg SO ₂ -eq.	1.11E-03	3.00E-05	9.65E-05	4.39E-04	3.30E-05	1.54E-03	3.58E-05	1.20E-04	4.39E-04	4.17E-05
EP	kg PO ₄ ³⁻ -eq.	1.07E-04	8.56E-06	1.40E-05	2.39E-05	4.87E-06	1.28E-04	1.02E-05	1.53E-05	2.39E-05	6.38E-06
ODP	kg R11-eq.	7.29E-12	1.25E-18	3.84E-13	4.82E-16	1.02E-16	1.11E-11	1.49E-18	5.85E-13	4.82E-16	1.15E-16
POCP	kg C ₂ H ₄ -eq.	8.02E-05	-8.86E-06	7.49E-06	2.66E-05	-1.38E-06	1.09E-04	-1.06E-05	8.90E-06	2.66E-05	-2.08E-06
ADPe	kg Sb-eq.	4.11E-05	2.52E-09	2.17E-06	3.50E-08	2.80E-09	4.43E-04	3.01E-09	2.33E-05	3.50E-08	3.57E-09
PED	MJ	7.49	0.188	0.489	2.348	0.186	8.67	0.224	0.555	2.348	0.234
Net Water Use	m ³	0.00258	2.25E-05	1.49E-04	8.22E-04	1.04E-04	0.003	2.68E-05	1.71E-04	8.22E-04	1.19E-04
Air Pollution	m ³	10000	0.59	4.08	7.29	0.77	11100	0.70	4.08	7.29	0.96
Water Pollution	m ³	30.99	0.01	0.00	0.04	0.00	34.26	0.01	0.00	0.04	0.01

Impact Category	Unit	Category 6A STP (U/FTP)					Category 6A ScTP (F/UTP)				
		Manufacturing	Distribution	Installation	Use	EoL	Manufacturing	Distribution	Installation	Use	EoL
GWP	kg CO ₂ -eq.	0.549	0.0168	0.0451	0.147	0.0174	0.418	0.0137	0.0379	0.147	0.0141
AP	kg SO ₂ -eq.	1.81E-03	4.04E-05	1.31E-04	4.39E-04	4.86E-05	1.39E-03	3.30E-05	1.08E-04	4.39E-04	3.91E-05
EP	kg PO ₄ ³⁻ -eq.	1.58E-04	1.15E-05	1.61E-05	2.39E-05	7.66E-06	1.26E-04	9.43E-06	1.42E-05	2.39E-05	5.86E-06
ODP	kg R11-eq.	1.49E-11	1.69E-18	7.83E-13	4.82E-16	1.20E-16	9.74E-12	1.38E-18	5.13E-13	4.82E-16	1.16E-16
POCP	kg C ₂ H ₄ -eq.	1.24E-04	-1.19E-05	8.67E-06	2.66E-05	-2.78E-06	9.60E-05	-9.77E-06	7.34E-06	2.66E-05	-1.76E-06
ADPe	kg Sb-eq.	4.64E-05	3.40E-09	2.44E-06	3.50E-08	4.19E-09	4.64E-05	2.78E-09	2.44E-06	3.50E-08	3.34E-09
PED	MJ	10.8	0.253	0.67	2.348	0.27	8.56	0.207	0.545	2.348	0.22
Net Water Use	m ³	0.00482	3.03E-05	2.67E-04	8.22E-04	1.26E-04	0.00344	2.48E-05	1.94E-04	8.22E-04	1.19E-04
Air Pollution	m ³	11200	0.79	3.44	7.29	1.10	11300	0.65	3.43	7.29	0.91
Water Pollution	m ³	34.92	0.01	0.00	0.04	0.01	34.95	0.01	0.00	0.04	0.00



ENVIRONMENTAL PRODUCT DECLARATION



Copper Plenum Cable: 10Gain XP Category 6A, 10Gain Category 6A, Category 6A STP (U/FTP), Category 6A ScTP (F/UTP), Category 6+ ScTP (F/UTP), NextGain® Category 6eX, DataGain® Category 6+, Category 6 with FEP Jacket, Category 6, Cobra Category 5e+, Category 5e+ ScTP (F/UTP), Marathon LAN® Category 5e, Powerwise™ Category 5e+ 4PPoE

According to ISO 14025

Impact Category	Unit	Category 6+ ScTP (F/UTP)					NextGain® Category 6eX				
		Manufacturing	Distribution	Installation	Use	EoL	Manufacturing	Distribution	Installation	Use	EoL
GWP	kg CO ₂ -eq.	0.417	0.014	0.0399	0.0608	0.0141	0.244	0.0083	0.027	0.0608	0.0111
AP	kg SO ₂ -eq.	1.40E-03	3.36E-05	1.12E-04	1.82E-04	3.91E-05	9.34E-04	2.01E-05	7.69E-05	1.82E-04	3.07E-05
EP	kg PO ₄ ³⁻ -eq.	1.26E-04	9.59E-06	1.51E-05	9.90E-06	5.86E-06	8.01E-05	5.73E-06	1.04E-05	9.90E-06	4.45E-06
ODP	kg R11-eq.	9.75E-12	1.40E-18	5.13E-13	2.00E-16	1.16E-16	7.00E-12	8.38E-19	3.68E-13	2.00E-16	9.96E-17
POCP	kg C ₂ H ₄ -eq.	9.64E-05	-9.93E-06	8.26E-06	1.10E-05	-1.76E-06	6.33E-05	-5.93E-06	8.10E-06	1.10E-05	-1.16E-06
ADPe	kg Sb-eq.	4.64E-05	2.82E-09	2.44E-06	1.45E-08	3.34E-09	4.06E-05	1.69E-09	2.14E-06	1.45E-08	2.60E-09
PED	MJ	8.57	0.21	0.548	0.972	0.22	4.68	0.126	0.288	0.972	0.174
Net Water Use	m ³	0.00344	2.52E-05	1.94E-04	3.41E-04	1.19E-04	0.00212	1.51E-05	1.18E-04	3.41E-04	1.01E-04
Air Pollution	m ³	11300	0.66	4.08	3.02	0.91	9890	0.39	3.90	3.02	0.73
Water Pollution	m ³	34.96	0.01	0.00	0.01	0.00	30.62	0.00	0.00	0.01	0.00

Impact Category	Unit	DataGain® Category 6+					Category 6 with FEP Jacket				
		Manufacturing	Distribution	Installation	Use	EoL	Manufacturing	Distribution	Installation	Use	EoL
GWP	kg CO ₂ -eq.	0.207	0.007	0.0222	0.0608	0.0106	0.242	0.007	0.0205	0.0608	0.0103
AP	kg SO ₂ -eq.	1.04E-03	1.68E-05	7.64E-05	1.82E-04	2.93E-05	8.90E-04	1.68E-05	6.25E-05	1.82E-04	2.85E-05
EP	kg PO ₄ ³⁻ -eq.	7.58E-05	4.80E-06	8.80E-06	9.90E-06	4.20E-06	7.43E-05	4.80E-06	7.40E-06	9.90E-06	4.05E-06
ODP	kg R11-eq.	6.74E-12	7.03E-19	3.55E-13	2.00E-16	9.88E-17	4.51E-12	7.03E-19	2.37E-13	2.00E-16	9.84E-17
POCP	kg C ₂ H ₄ -eq.	6.47E-05	-4.97E-06	7.55E-06	1.10E-05	-1.01E-06	5.53E-05	-4.97E-06	5.02E-06	1.10E-05	-9.30E-07
ADPe	kg Sb-eq.	3.08E-04	1.41E-09	1.62E-05	1.45E-08	2.48E-09	4.06E-05	1.41E-09	2.14E-06	1.45E-08	2.41E-09
PED	MJ	3.74	0.105	0.223	0.972	0.167	4.79	0.105	0.282	0.972	0.163
Net Water Use	m ³	0.00199	1.26E-05	1.09E-04	3.41E-04	9.99E-05	0.0021	1.26E-05	1.15E-04	3.41E-04	9.93E-05
Air Pollution	m ³	9880	0.33	3.20	3.02	0.70	9900	0.33	1.98	3.02	0.68
Water Pollution	m ³	30.58	0.00	0.00	0.01	0.00	30.66	0.00	0.00	0.01	0.00

Impact Category	Unit	Category 6					Cobra Category 5e+				
		Manufacturing	Distribution	Installation	Use	EoL	Manufacturing	Distribution	Installation	Use	EoL
GWP	kg CO ₂ -eq.	0.269	0.0105	0.0318	0.0608	0.0095	0.157	0.0054	0.0174	0.0489	0.0083
AP	kg SO ₂ -eq.	9.71E-04	2.53E-05	8.85E-05	1.82E-04	2.63E-05	7.12E-04	1.29E-05	5.48E-05	1.46E-04	2.30E-05
EP	kg PO ₄ ³⁻ -eq.	8.98E-05	7.24E-06	1.30E-05	9.90E-06	3.68E-06	6.03E-05	3.69E-06	7.05E-06	7.96E-06	3.24E-06

Environment



ENVIRONMENTAL PRODUCT DECLARATION



Copper Plenum Cable: 10Gain XP Category 6A, 10Gain Category 6A, Category 6A STP (U/FTP), Category 6A ScTP (F/UTP), Category 6+ ScTP (F/UTP), NextGain® Category 6eX, DataGain® Category 6+, Category 6 with FEP Jacket, Category 6, Cobra Category 5e+, Category 5e+ ScTP (F/UTP), Marathon LAN® Category 5e, Powerwise™ Category 5e+ 4PPoE

According to ISO 14025

Impact Category	Unit	Category 6					Cobra Category 5e+				
		Manufacturing	Distribution	Installation	Use	EoL	Manufacturing	Distribution	Installation	Use	EoL
ODP	kg R11-eq.	6.04E-12	1.06E-18	3.18E-13	2.00E-16	9.40E-17	5.48E-12	5.40E-19	2.88E-13	1.60E-16	8.06E-17
POCP	kg C ₂ H ₄ -eq.	6.74E-05	-7.50E-06	6.94E-06	1.10E-05	-7.76E-07	4.62E-05	-3.83E-06	5.81E-06	8.84E-06	-7.13E-07
ADPe	kg Sb-eq.	3.91E-05	2.13E-09	2.06E-06	1.45E-08	2.21E-09	3.34E-05	1.09E-09	1.76E-06	1.17E-08	1.93E-09
PED	MJ	5.69	0.159	0.391	0.972	0.151	2.79	0.081	0.168	0.781	0.131
Net Water Use	m ³	0.0022	1.90E-05	1.28E-04	3.41E-04	9.45E-05	0.00158	9.70E-06	8.67E-05	2.74E-04	8.11E-05
Air Pollution	m ³	9520	0.50	4.09	3.02	0.64	8130	0.25	2.60	2.42	0.55
Water Pollution	m ³	29.46	0.01	0.00	0.01	0.00	25.16	0.00	0.00	0.01	0.00

Impact Category	Unit	Category 5e+ ScTP (F/UTP)					Marathon LAN® Category 5e				
		Manufacturing	Distribution	Installation	Use	EoL	Manufacturing	Distribution	Installation	Use	EoL
GWP	kg CO ₂ -eq.	0.346	0.0123	0.036	0.0489	0.0118	0.151	0.0052	0.017	0.0489	0.008
AP	kg SO ₂ -eq.	1.22E-03	2.96E-05	1.02E-04	1.46E-04	3.26E-05	6.85E-04	1.25E-05	5.33E-05	1.46E-04	2.21E-05
EP	kg PO ₄ ³⁻ -eq.	1.09E-04	8.46E-06	1.41E-05	7.96E-06	4.79E-06	5.82E-05	3.58E-06	6.93E-06	7.96E-06	3.11E-06
ODP	kg R11-eq.	8.81E-12	1.24E-18	4.64E-13	1.60E-16	1.02E-16	5.30E-12	5.23E-19	2.79E-13	1.60E-16	7.73E-17
POCP	kg C ₂ H ₄ -eq.	8.41E-05	-8.77E-06	7.71E-06	8.84E-06	-1.32E-06	4.45E-05	-3.70E-06	5.73E-06	8.84E-06	-6.88E-07
ADPe	kg Sb-eq.	4.14E-05	2.49E-09	2.18E-06	1.17E-08	2.77E-09	3.20E-05	1.05E-09	1.68E-06	1.17E-08	1.86E-09
PED	MJ	7.05	0.185	0.466	0.781	0.185	2.67	0.078	0.161	0.781	0.126
Net Water Use	m ³	0.00298	2.22E-05	1.70E-04	2.74E-04	1.04E-04	0.00152	9.40E-06	8.33E-05	2.74E-04	7.78E-05
Air Pollution	m ³	10100	0.58	4.08	2.42	0.77	7800	0.24	2.60	2.42	0.53
Water Pollution	m ³	31.18	0.01	0.00	0.01	0.00	24.13	0.00	0.00	0.01	0.00

Impact Category	Unit	Powerwise™ Category 5e+ 4PPoE				
		Manufacturing	Distribution	Installation	Use	EoL
GWP	kg CO ₂ -eq.	0.346	0.0127	0.0361	0.0489	0.0137
AP	kg SO ₂ -eq.	1.32E-03	3.04E-05	1.07E-04	1.46E-04	3.77E-05
EP	kg PO ₄ ³⁻ -eq.	1.16E-04	8.69E-06	1.45E-05	7.96E-06	5.26E-06
ODP	kg R11-eq.	8.71E-12	1.27E-18	4.58E-13	1.60E-16	1.36E-16
POCP	kg C ₂ H ₄ -eq.	8.89E-05	-9.01E-06	7.93E-06	8.84E-06	-1.08E-06
ADPe	kg Sb-eq.	5.65E-05	2.56E-09	2.97E-06	1.17E-08	3.17E-09
PED	MJ	6.96	0.191	0.461	0.781	0.216

Environment



ENVIRONMENTAL PRODUCT DECLARATION



Copper Plenum Cable: 10Gain XP Category 6A, 10Gain Category 6A, Category 6A STP (U/FTP), Category 6A ScTP (F/UTP), Category 6+ ScTP (F/UTP), NextGain® Category 6eX, DataGain® Category 6+, Category 6 with FEP Jacket, Category 6, Cobra Category 5e+, Category 5e+ ScTP (F/UTP), Marathon LAN® Category 5e, Powerwise™ Category 5e+ 4PPoE

According to ISO 14025

Impact Category	Unit	Powerwise™ Category 5e+ 4PPoE				
		Manufacturing	Distribution	Installation	Use	EoL
Net Water Use	m³	0.00297	2.28E-05	1.69E-04	2.74E-04	1.36E-04
Air Pollution	m³	13800	0.60	4.08	2.42	0.91
Water Pollution	m³	42.58	0.01	0.00	0.01	0.00

Life Cycle Impact Inventory Results

In the table below, the following abbreviations (per EN 15804) have been used for the Inventory metrics:

- PERT = Primary Energy Renewable Total
- PENRT = Primary Energy Non-Renewable Total
- FW = Fresh Water
- HWD = Hazardous Waste Disposed
- NHWD = Non Hazardous Waste Disposed
- RWD = Recycled Waste Disposed

Table 6: Inventory metrics per 1 meter of Cable

Impact Category	Unit	10Gain XP Category 6A					10Gain Category 6A				
		Manuf.	Distribution	Installation	Use	EoL	Manuf.	Distribution	Installation	Use	EoL
PERT	MJ	5.62E-01	6.11E-03	2.56E-03	3.21E-01	3.04E-02	6.51E-01	7.29E-03	2.56E-03	3.21E-01	3.54E-02
PENRT	MJ	7.88E+00	1.97E-01	6.98E-02	2.35E+00	1.92E-01	9.13E+00	2.36E-01	6.98E-02	2.35E+00	2.41E-01
FW	m³	2.72E-03	2.37E-05	7.95E-06	8.22E-04	1.05E-04	3.16E-03	2.83E-05	7.95E-06	8.22E-04	1.20E-04
HWD	kg	4.67E-08	1.60E-09	5.21E-10	1.03E-09	6.92E-10	5.39E-08	1.91E-09	5.21E-10	1.03E-09	9.28E-10
NHWD	kg	6.20E-03	7.44E-06	3.45E-02	7.38E-04	3.08E-02	8.00E-03	8.88E-06	3.45E-02	7.38E-04	4.56E-02
RWD	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Impact Category	Unit	Category 6A STP (U/FTP)					Category 6A ScTP (F/UTP)				
		Manuf.	Distribution	Installation	Use	EoL	Manuf.	Distribution	Installation	Use	EoL
PERT	MJ	1.08E+00	8.23E-03	2.60E-03	3.21E-01	3.81E-02	7.32E-01	6.73E-03	2.59E-03	3.21E-01	3.50E-02
PENRT	MJ	1.14E+01	2.66E-01	6.83E-02	2.35E+00	2.80E-01	9.01E+00	2.18E-01	6.81E-02	2.35E+00	2.27E-01
FW	m³	5.07E-03	3.19E-05	7.84E-06	8.22E-04	1.28E-04	3.62E-03	2.61E-05	7.81E-06	8.22E-04	1.20E-04
HWD	kg	1.38E-04	2.16E-09	5.01E-10	1.03E-09	1.14E-09	4.75E-05	1.76E-09	5.00E-10	1.03E-09	8.40E-10
NHWD	kg	2.96E-02	1.00E-05	3.35E-02	7.38E-04	6.00E-02	1.45E-02	8.20E-06	3.34E-02	7.38E-04	3.90E-02
RWD	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Impact Category	Unit	Category 6+ ScTP (F/UTP)					NextGain® Category 6eX				
		Manuf.	Distribution	Installation	Use	EoL	Manuf.	Distribution	Installation	Use	EoL
PERT	MJ	7.50E-01	6.85E-03	2.56E-03	1.33E-01	3.50E-02	4.66E-01	4.09E-03	2.68E-04	1.33E-01	2.95E-02



ENVIRONMENTAL PRODUCT DECLARATION



Copper Plenum Cable: 10Gain XP Category 6A, 10Gain Category 6A, Category 6A STP (U/FTP), Category 6A ScTP (F/UTP), Category 6+ ScTP (F/UTP), NextGain® Category 6eX, DataGain® Category 6+, Category 6 with FEP Jacket, Category 6, Cobra Category 5e+, Category 5e+ ScTP (F/UTP), Marathon LAN® Category 5e, Powerwise™ Category 5e+ 4PPoE

According to ISO 14025

Impact Category	Unit	Category 6+ ScTP (F/UTP)					NextGain® Category 6eX				
		Manuf.	Distribution	Installation	Use	EoL	Manuf.	Distribution	Installation	Use	EoL
PENRT	MJ	9.02E+00	2.21E-01	6.98E-02	9.72E-01	2.27E-01	4.92E+00	1.32E-01	2.00E-02	9.72E-01	1.79E-01
FW	m³	3.62E-03	2.65E-05	7.95E-06	3.41E-04	1.20E-04	2.23E-03	1.58E-05	1.99E-06	3.41E-04	1.02E-04
HWD	kg	4.75E-05	1.79E-09	5.21E-10	4.27E-10	8.40E-10	3.98E-08	1.07E-09	1.93E-10	4.27E-10	6.25E-10
NHWD	kg	1.45E-02	8.34E-06	3.45E-02	3.06E-04	3.90E-02	5.49E-03	4.98E-06	1.09E-02	3.06E-04	2.63E-02
RWD	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Impact Category	Unit	DataGain® Category 6+					Category 6 with FEP Jacket				
		Manuf.	Distribution	Installation	Use	EoL	Manuf.	Distribution	Installation	Use	EoL
PERT	MJ	4.51E-01	3.43E-03	-1.58E-04	1.33E-01	2.90E-02	4.10E-01	3.43E-03	3.66E-04	1.33E-01	2.87E-02
PENRT	MJ	3.94E+00	1.11E-01	8.28E-03	9.72E-01	1.71E-01	5.04E+00	1.11E-01	1.51E-02	9.72E-01	1.67E-01
FW	m³	2.10E-03	1.33E-05	6.63E-07	3.41E-04	1.01E-04	2.21E-03	1.33E-05	1.61E-06	3.41E-04	1.00E-04
HWD	kg	3.36E-08	8.98E-10	1.05E-10	4.27E-10	5.83E-10	2.65E-08	8.98E-10	1.30E-10	4.27E-10	5.59E-10
NHWD	kg	6.39E-03	4.17E-06	5.14E-03	3.06E-04	2.33E-02	5.57E-03	4.17E-06	7.88E-03	3.06E-04	2.16E-02
RWD	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Impact Category	Unit	Category 6					Cobra Category 5e+				
		Manuf.	Distribution	Installation	Use	EoL	Manuf.	Distribution	Installation	Use	EoL
PERT	MJ	4.51E-01	5.17E-03	2.56E-03	1.33E-01	2.72E-02	3.62E-01	2.64E-03	-1.28E-04	1.07E-01	2.34E-02
PENRT	MJ	5.99E+00	1.67E-01	7.00E-02	9.72E-01	1.55E-01	2.93E+00	8.52E-02	6.72E-03	7.81E-01	1.35E-01
FW	m³	2.31E-03	2.00E-05	7.97E-06	3.41E-04	9.51E-05	1.66E-03	1.02E-05	5.38E-07	2.74E-04	8.17E-05
HWD	kg	1.83E-08	1.35E-09	5.22E-10	4.27E-10	5.04E-10	2.31E-08	6.90E-10	8.54E-11	3.43E-10	4.45E-10
NHWD	kg	5.23E-03	6.29E-06	3.46E-02	3.06E-04	1.84E-02	4.73E-03	3.21E-06	4.17E-03	2.46E-04	1.67E-02
RWD	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Impact Category	Unit	Category 5e+ ScTP (F/UTP)					Marathon LAN® Category 5e				
		Manuf.	Distribution	Installation	Use	EoL	Manuf.	Distribution	Installation	Use	EoL
PERT	MJ	6.43E-01	6.04E-03	2.56E-03	1.07E-01	3.04E-02	3.51E-01	2.55E-03	-1.28E-04	1.07E-01	2.25E-02
PENRT	MJ	7.42E+00	1.95E-01	6.98E-02	7.81E-01	1.90E-01	2.81E+00	8.25E-02	6.72E-03	7.81E-01	1.29E-01
FW	m³	3.14E-03	2.34E-05	7.95E-06	2.74E-04	1.05E-04	1.60E-03	9.89E-06	5.38E-07	2.74E-04	7.84E-05
HWD	kg	4.42E-05	1.58E-09	5.21E-10	3.43E-10	6.79E-10	2.42E-08	6.69E-10	8.54E-11	3.43E-10	4.28E-10
NHWD	kg	1.29E-02	7.36E-06	3.45E-02	2.46E-04	2.98E-02	4.56E-03	3.11E-06	4.17E-03	2.46E-04	1.61E-02
RWD	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00



ENVIRONMENTAL PRODUCT DECLARATION



According to ISO 14025

Copper Plenum Cable: 10Gain XP Category 6A, 10Gain Category 6A, Category 6A STP (U/FTP), Category 6A ScTP (F/UTP), Category 6+ ScTP (F/UTP), NextGain® Category 6eX, DataGain ® Category 6+, Category 6 with FEP Jacket, Category 6, Cobra Category 5e+, Category 5e+ ScTP (F/UTP), Marathon LAN® Category 5e, Powerwise™ Category 5e+ 4PPoE

Impact Category	Unit	Powerwise™ Category 5e+ 4PPoE				
		Manuf.	Distribution	Installation	Use	EoL
PERT	MJ	5.68E-01	6.20E-03	2.56E-03	1.07E-01	3.93E-02
PENRT	MJ	7.33E+00	2.01E-01	6.98E-02	7.81E-01	2.22E-01
FW	m³	3.13E-03	2.41E-05	7.95E-06	2.74E-04	1.37E-04
HWD	kg	5.33E-08	1.63E-09	5.21E-10	3.43E-10	7.17E-10
NHWD	kg	7.29E-03	7.56E-06	3.45E-02	2.46E-04	2.58E-02
RWD	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00



ENVIRONMENTAL PRODUCT DECLARATION



Copper Plenum Cable: 10Gain XP Category 6A, 10Gain Category 6A, Category 6A STP (U/FTP), Category 6A ScTP (F/UTP), Category 6+ ScTP (F/UTP), NextGain® Category 6eX, DataGain® Category 6+, Category 6 with FEP Jacket, Category 6, Cobra Category 5e+, Category 5e+ ScTP (F/UTP), Marathon LAN® Category 5e, Powerwise™ Category 5e+ 4PPoE

According to ISO 14025

Optional Environmental Information

Organizational Third-Party Certification

A third-party audit was conducted by GreenCircle Certified, LLC for the hazardous and non-hazardous waste streams and verified that the Hoisington, KS facility is a Zero Waste to Landfill facility during this study's reference period.



References

- ANSI/TIA-568.2-D *Balanced Twisted-Pair Telecommunications Cabling and Components*
- ISO/IEC 11801-1 *Information Technology – Generic Cabling for Customer Premises – Part 1: General Requirements*
- C22.2 NO. 214-08 (R2013) - Communications cables (Bi-national standard, with UL 444)
- EN 15804:2012 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
- EPA, Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI)
- 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
- P.E.P. Association. PSR *Product Specific Rules for Wires, Cables and Accessories*. 2015.
- P.E.P. Association. PCR. *Product Category Rules for Electrical, Electronic and HVAC-R Products*. 2015.
- 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)



ENVIRONMENTAL PRODUCT DECLARATION



Copper Plenum Cable: 10Gain XP Category 6A, 10Gain Category 6A, Category 6A STP (U/FTP), Category 6A ScTP (F/UTP), Category 6+ ScTP (F/UTP), NextGain® Category 6eX, DataGain® Category 6+, Category 6 with FEP Jacket, Category 6, Cobra Category 5e+, Category 5e+ ScTP (F/UTP), Marathon LAN® Category 5e, Powerwise™ Category 5e+ 4PPoE

According to ISO 14025

- 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 thinkstep with GaBi Software and data.



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