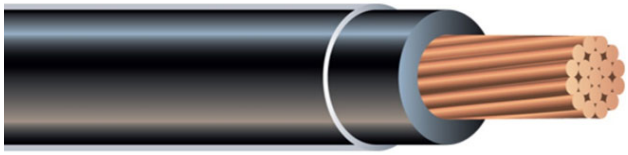
Environmental Product Declaration

Southwire Copper TFFN, TFN/TEWN

Southwire Company, LLC is one of North America's largest wire and cable producers. As a family business, Southwire proudly continues building on our commitment to environmental stewardship and corporate sustainability by prioritizing stakeholder expectations, and supporting the wellbeing of our communities and the environment in which we live. To help us meet this commitment, we organize our sustainability strategy around five core tenets: Growing Green, Living Well, Giving Back, Doing Right, and Building Worth.

Our five core tenets allow us to deepen our vision and commitments by strengthening and aligning our programs, goals, and governance. Driven by the highest standard of excellence, we appreciate the need for continued improvement and are proud that our results continue to build a stronger Southwire. The use of environmental product declarations is growing rapidly in the wire and cable market. Southwire is developing its product stewardship program to evaluate and reduce the impacts of our products and processes throughout the organization.



Southwire Copper TFFN, TFN/TEWN

CERTIFIED
ENVIRONMENTAL PRODUCT DECLARATION
UL.COM/EPD

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025, EN 15804, and ISO 21930-2017. 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.

EPD PROGRAM AND PROGRAM OPERATOR NAME, ADDRESS, LOGO, AND WEBSITE	UL ENVIRONMENT 333 Pfingsten Rd, Northbrook, IL 60062 WWW.UL.COM WWW.SPOT.UL.COM
GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER	Program Operator Rules v 2.7 2022
MANUFACTURER NAME AND ADDRESS	Southwire Company One Southwire Drive Carrollton, GA 30119
DECLARATION NUMBER	4790297660.104.1
DECLARED PRODUCT & FUNCTIONAL UNIT OF DECLARED UNIT	Southwire Copper TFFN, TFN/TEWN Functional Unit = 1 meter of installed cable over a 60 year building lifetime
REFERENCE PCR AND VERSION NUMBER	The Norwegian EPD Foundation: NPCR Part A: Construction Products and Services, v1.0, 2017. The Norwegian EPD Foundation: NPCR 027 Part B: Electrical Cables and Wires, v1.0, October 2020.
DESCRIPTION OF PRODUCT APPLICATION/USE	Southwire cable products are primarily used in commercial, residential, industrial, utility, and institutional settings.
PRODUCT RSL DESCRIPTION	30 Years
MARKETS OF APPLICABILITY	North America
DATE OF ISSUE	December 1, 2022
PERIOD OF VALIDITY	5 Years
EPD TYPE	Product Specific
DATASET VARIABILITY	N/A
EPD SCOPE	Cradle-to-Grave
YEAR(S) OF REPORTED PRIMARY DATA	2020
LCA SOFTWARE & VERSION NUMBER	SimaPro v9.2
LCI DATABASE(S) & VERSION NUMBER	Ecoinvent v3.5 & USLCI v2.0
LCIA METHODOLOGY & VERSION NUMBER	TRACI 2.1; CML 4.1
The sub-category PCR review was conducted by:	UL Environment - PCR Review Panel - epd@ul.com
This declaration was independently verified in accordance with ISO 14025: 2006. EN 15804 serves as the core PCR, with additional considerations from The Norwegian EPD Foundation: NPCR Part A: Construction Products and Services, v1.0, 2017 and The Norwegian EPD Foundation: NPCR 027 Part B: Electrical Cables and Wires, v1.0, October 2020. ☐ INTERNAL ☒ EXTERNAL	Cooper McC Cooper McCollum, UL Environment
This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:	Sustainable Solutions Corporation
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	James Mellentine, Thrive ESG

Environmental declarations from different programs (ISO 14025) may not be comparable.

Comparison of the environmental performance using EPD information shall consider all relevant information modules over the full life cycle of the products within the building.

This PCR allows EPD comparability only when the same functional requirements between products are ensured and the requirements of ISO 21930:2017 §5.5 are met. It should be noted that different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared.

General Information

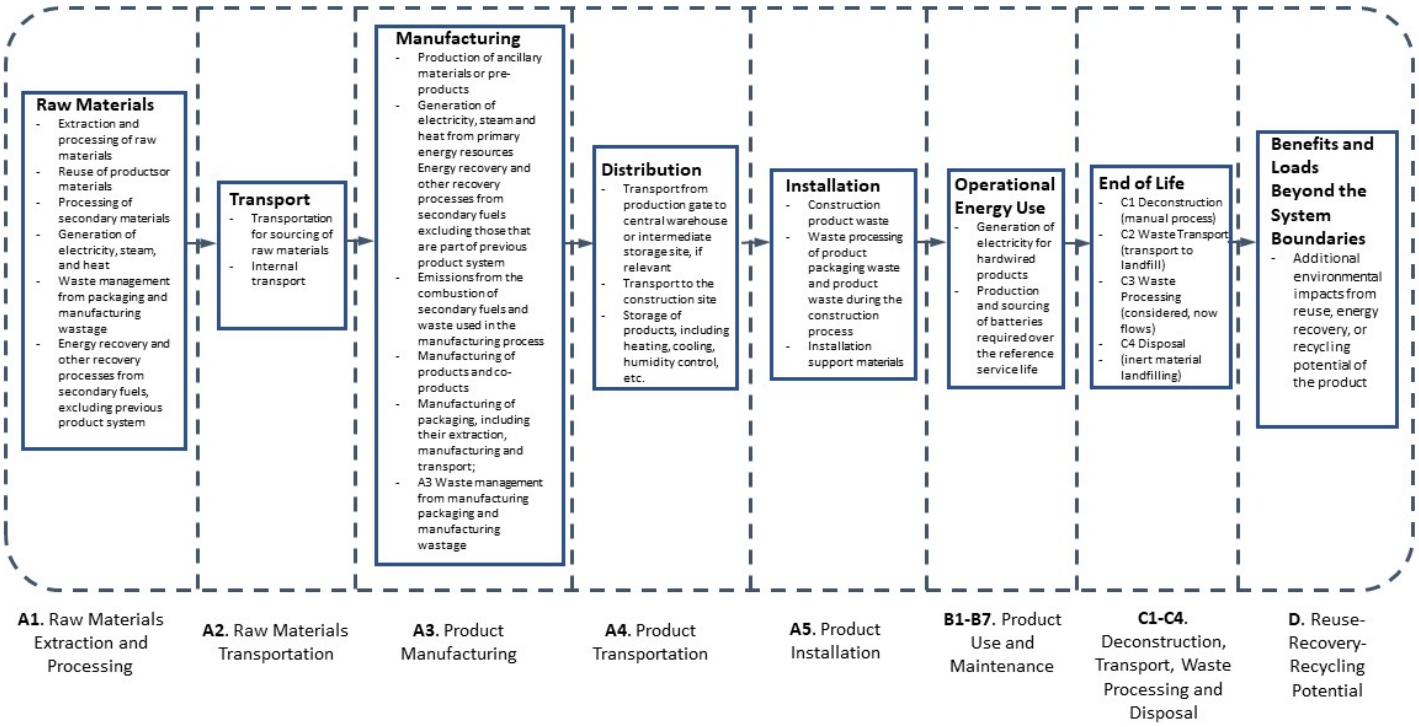
Description of Company/Organization

A leader in technology and innovation, Southwire Company, LLC is one of North America's largest wire and cable producers. Southwire and its subsidiaries manufacture building wire and cable, metal-clad cable, portable and electronic cord products, overhead and underground transmission and distribution wire and cable products, original equipment manufacturer (OEM) wire products, and engineered products. In addition, Southwire supplies assembled products and components, contractor equipment and hand tools, and designs and manufactures systems that produce copper and aluminum rod.

Product Description

Product Type: Copper TFFN, TFN/TEWN
Product Characteristic: Wire & Cable
600 Volt. Copper Conductor. Thermoplastic Insulation/Nylon Sheath. Heat, Moisture, Oil, and Gasoline Resistant II. Also Rated MTW and 105 °C AWM.
Southwire Type TFFN or MTW or AWM copper conductors are annealed (soft) copper, insulated with a tough, heat and moisture resistant polyvinyl chloride (PVC), over which a nylon (polyamide) jacket is applied.
This EPD includes results for the following products: 27032205 (16/26), 27032201 (16/26)

Flow Diagram



Manufacturer Specific EPD

An impact assessment was completed for each product listed within the EPD. Each product within the EPD is the largest product size currently available, meaning that the same product may be sold in smaller sizes, and for the specific product recipe with the corresponding number of conductors. Completing an impact assessment for the largest product size within each group ensures that the products with the highest mass per functional unit are represented in the EPD. If impacts for a product within a product group did not fall within the typically allowable variance of ±10%, impacts for each product were reported in the EPD for clarity.

Application

Southwire Type TFFN or MTW or AWM may be used as fixture wire, machine tool wiring, or appliance wiring material as specified in the National Electrical Code. Voltage for all applications is 600 volts. Allowable temperatures are as follows:

TFFN- Dry locations not to exceed 90°C
MTW- Wet locations or when exposed to oil or coolant at temperatures not to exceed 60°C
MTW- Dry locations at Temperatures not to exceed 90°C (with ampacity limited to that for 75°C conductor temperature per NFPA 79)
AWM- When rated as appliance wiring material in dry locations, conductor temperatures not to exceed 105°C
TEWN- Wet or dry locations conductor temperatures not to exceed 105°C

Material Composition

The primary product components and/or materials must be indicated as a percentage mass to enable the user of the EPD to understand the composition of the product in delivery status.

The different compositions of a Southwire Copper TFFN, TFN/TEWN Residential, Industrial, Tertiary cable are as follows:

	Percentage in mass (%)	
Material	**27032205 (16/26)**	**27032201 (16/26)**
Colorant	0.62%	0.63%
Conductor	73.50%	73.48%
Cross Filler	0.00%	0.00%
Drain Wire	0.00%	0.00%
Insulation	0.00%	0.00%
Jacketing	25.88%	25.89%
Rip Cord	0.00%	0.00%
Tape	0.00%	0.00%
Other	0.00%	0.00%
Total	100.00%	100.00%

Placing on the Market / Application Rules

Southwire Type TFFN or MTW or AWM complies with:
• ASTM- All Applicable Standards
• UL Standards 66, 758, and 1063
• National Electrical Code, NFPA 70, 2011 Edition

Properties of Declared Product as Shipped

Southwire Copper TFFN, TFN/TEWN Residential, Industrial, Tertiary cables are delivered as a complete unit, inclusive of all installation materials and instructions.

Methodological Framework

Functional Unit

The declaration refers to the functional unit of 1 meter of installed cable as specified in the PCR.

Declared unit		1 meter of installed cable		
Product Number	**Gauge Size**	**Number of Strands**	**Weight (kg/m)**	**Conversion factor to 1 kg**
27032205	16 AWG	26	0.01609	62.14
27032201	16 AWG	26	0.01610	62.13

System Boundary

This is a cradle to grave Environmental Product Declaration. The following life cycle phases were considered:

Product Stage			**Construction Process Stage**		**Use Stage**							**End of Life Stage***				**Benefits and Loads Beyond the System Boundaries**
Raw material supply	Transport	Manufacturing	Transport from gate to the site	Construction/ installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction /demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Description of the System Boundary Stages Corresponding to the PCR
(X = Included; MND = Module Not Declared)

*This includes provision of all materials, products and energy, packaging processing and its transport, as well as waste processing up to the end-of waste state or disposal of final residues.

Reference Service Life

The reference service life of a properly installed Southwire Copper TFFN, TFN/TEWN Residential, Industrial, Tertiary cable is 30 years. The building estimated service life is 60 years.

Allocation

Allocation was determined on a per meter basis.

Cut-off Criteria

Processes whose total contribution to the final result, with respect to their mass and in relation to all considered impact categories, is less than 1% can be neglected. The sum of the neglected processes may not exceed 5% by mass of the considered impact categories. For that a documented assumption is admissible.

For Hazardous Substances the following requirements apply:

- The Life Cycle Inventory (LCI) of hazardous substances will be included, if the inventory is available.
- If the LCI for a hazardous substance is not available, the substance will appear as an input in the LCI of the product, if its mass represents more than 0.1% of the product composition.
- If the LCI of a hazardous substance is approximated by modeling another substance, documentation will be provided.

This EPD is in compliance with the cut-off criteria. No processes were neglected or excluded unless specifically stated in the EPD. Capital items for the production processes (machine, buildings, etc.) were not taken into consideration.

Data Sources

Primary data were collected for every process in the product system under the control of Southwire. Secondary data from the ecoinvent database were utilized when necessary. These data were evaluated and have temporal, geographic, and technical coverage appropriate to the scope of the product category.

Data Quality

The data sources used are complete and representative of North American systems in terms of the geographic and technological coverage and are a recent vintage (i.e. less than ten years old). The data used for primary data are based on direct information sources of the manufacturers. Secondary data sets were used for raw materials extraction and processing, end of life, transportation, and energy production flows. Wherever secondary data is used, the study adopts critically reviewed data for consistency, precision, and reproducibility to limit uncertainty.

Period Under Review

The period under review is the full calendar year of 2020.

Treatment of Biogenic Carbon

The uptake and release of biogenic carbon throughout the product life cycle follows ISO 21930:2017 Section 7.2.7.

Comparability and Benchmarking

A comparison or an evaluation of EPD data is only possible if all data sets to be compared were created according to EN 15804 and the building context, respectively the product-specific characteristics of performance, are taken into account. Environmental declarations from different programs may not be comparable. Full conformance with the PCR allows for EPD comparability only when all stages a product's life cycle have been considered. However, variations and deviations are possible.

Units

The LCA results within this EPD are reported in SI units.

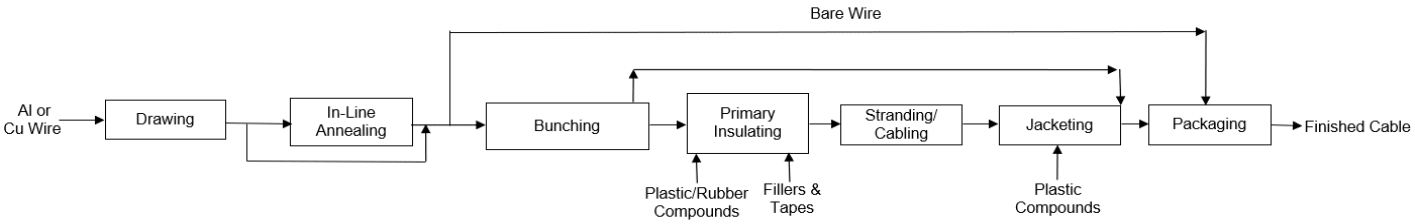
Additional Environmental Information

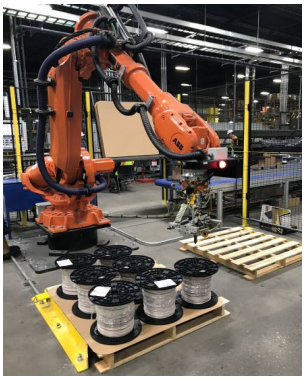
Background data

For life cycle modeling of the considered products, the SimaPro v9.2 Software System for Life Cycle Engineering, developed by PRe Sustainability, is used. The ecoinvent database contains consistent and documented datasets which are documented online. To ensure comparability of results in the LCA, the basic data of the ecoinvent database were used for energy, transportation, and auxiliary materials.

Manufacturing

The primary manufacturing processes occur in multiple locations. 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 together around each other. Four twinned wire pairs, along with other cable components such as separator tape and/or shielding material, are then bunched together. Subsequently, the bunched wire has a jacket extruded around the bunched 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.





Packaging

All packaging is fully recyclable. The packaging material is composed primarily of wood, with cardboard and plastic materials used for individual product packaging. Packaging can vary based on final product size and length. The percent breakdown of packaging is based on manufacturing facilities but actual amounts will be based on the product's final weight or density.

Material	Quantity (% By Weight)
Cardboard	0.00%
Other	0.25%
Plastic	0.09%
Wood	99.66%
Total	100.00%

Transformation

Transport to Building Site (A4)		
Name	**Value**	**Unit**
Fuel type	Diesel	
Liters of fuel	38	l/100km
Transport distance	300	km
Capacity utilization (including empty runs)	-	%
Gross density of products transported	-	kg/m^3
Weight of products transported	-	kg
Volume of products transported	-	m^3
Capacity utilization volume factor	0.9	-

Product Installation

Southwire Copper TFFN, TFN/TEWN Residential, Industrial, Tertiary cables are distributed through and installed by trained installation technicians adhering to local/national standards and requirements. Installation accounts for the energy consumption, material wastage, and support materials use during the installation process, as well as waste treatment of packaging materials. The installation scrap was assumed to be a 5% average in accordance with the PCR. Installation is typically completed using battery-powered equipment, but this is below the cut-off criteria.

Installation into the building (A5)			
Name	**27032205 (16/26)**	**27032201 (16/26)**	**Unit**
Auxiliary materials	-	-	kg
Water consumption	-	-	m^3
Other resources	-	-	kg
Electricity consumption	-	-	kWh
Other energy carriers	-	-	MJ
Product loss per functional unit	0.001	0.001	kg
Waste materials at construction site	0.001	0.001	kg
Output substance (recycle)	0.001	0.001	kg
Output substance (landfill)	0.000	0.000	kg
Output substance (incineration)	0.000	0.000	kg
Packaging waste (recycle)	0.007	0.007	kg
Packaging waste (landfill)	0.002	0.002	kg
Packaging waste (incineration)	0.000	0.000	kg
Direct emissions to ambient air*, soil, and water	0.000	0.002	kg CO_2
VOC emissions	-	-	kg

*CO2 emissions to air from disposal of packaging

Reference Service Life		
Name	**Value**	**Unit**
Reference Service Life	30	years
Estimated Building Service Life	60	years
Number of Replacements	1	number

Product Use

No cleaning, maintenance, repair, or refurbishment is required.

Operational energy use was modeled as use phase losses determined by the IEC 60228 standard. The maximum loss values for each cable are determined using the equation below and were used in the B6 stage.

Operational Energy Use (B6)			
Name	**27032205 (16/26)**	**27032201 (16/26)**	**Unit**
Water consumption (from tap, to sewer)	-	-	m^3
Electricity consumption	2.72	2.72	kWh
Other energy carriers	-	-	MJ
Equipment output	-	-	kW
Direct emissions to ambient air, soil, and water	-	-	kg

The equation below was used to calculate the electricity used in the B6 stage.

$$E=Z \times I^2 \times \Delta t \qquad \text{(Equation 1)}$$

Where Z is the linear resistivity of the cable, I is the current, and t is the time that they are used for.

Disposal

The product can be mechanically dissembled to separate the different materials. 85% of the metals used are recyclable, the remining 15% of metals are sent to landfill. The remainder of components are disposed of through waste incineration with energy recovery, in accordance with the PCR.

End of life (C1-C4)			
Name	**27032205 (16/26)**	**27032201 (16/26)**	**Unit**
Collected separately	0.01	0.01	kg
Collected as mixed construction waste	0.01	0.01	kg
Reuse	0.00	0.00	kg
Recycling	0.01	0.01	kg
Landfilling	0.00	0.00	kg
Incineration with energy recovery	0.00	0.00	kg
Energy conversion	44.00	44.00	%
Removals of biogenic carbon	-	-	kg

Re-use Phase

Re-use of the product is not common due to the nature of hard-wiring the product into the building system.

Re-Use, recovery, And/Or Recycling Potential (D)			
Name	**27032205 (16/26)**	**27032201 (16/26)**	**Unit**
Net energy benefit from energy recovery from waste treatment declared as exported energy in C3 (R>0.6)	0.04	0.04	MJ
Net energy benefit from thermal energy due to treatment of waste declared as exported energy in C4 (R<0.6)	0.00	0.00	MJ
Net energy benefit from material flow declared in C3 for energy recovery	0.00	0.00	MJ
Process and conversion efficiencies			
Further assumptions for scenario development (e.g. further processing technologies, assumptions on correction factors);			

LCA Results - 27032205 (16/26)

Results shown below were calculated using TRACI 2.1 Methodology.

TRACI 2.1 Impact Assessment

Parameter	Parameter	Unit	A1-A3	A4	A5	B4	B6	C2	C3	C4	D
GWP	Global warming potential	kg CO_2-Eq.	1.2E-01	4.7E-04	2.2E-04	1.3E-01	1.8E+00	1.5E-04	1.3E-02	3.1E-04	-1.4E-01
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	1.3E-08	1.8E-14	7.0E-12	1.4E-08	2.9E-11	5.7E-15	2.6E-10	2.2E-11	-9.4E-09
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	1.8E-03	2.8E-06	7.4E-07	1.8E-03	1.6E-02	8.9E-07	5.9E-06	9.1E-07	-2.7E-03
EP	Eutrophication potential	kg N-Eq.	1.1E-02	1.6E-07	1.4E-05	1.1E-02	2.1E-04	5.0E-08	3.0E-06	2.7E-06	-1.8E-02
SP	Smog formation potential	kg O_3-Eq.	3.8E-02	7.7E-05	2.0E-05	3.8E-02	1.0E-01	2.4E-05	9.3E-05	1.9E-05	-5.7E-02
FFD	Fossil Fuel Depletion	MJ-surplus	1.3E-01	9.0E-04	2.4E-04	1.4E-01	1.6E+00	2.9E-04	1.2E-03	2.2E-04	-1.4E-01

**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

Results shown below were calculated using CML 2001 - April 2013 Methodology.

CML 4.1 Impact Assessment

Parameter	Parameter	Unit	A1-A3	A4	A5	B4	B6	C2	C3	C4	D
GWP	Global warming potential	kg CO_2-Eq.	1.2E-01	4.7E-04	2.5E-04	1.3E-01	1.8E+00	1.5E-04	1.3E-02	3.1E-04	-1.4E-01
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	1.1E-08	1.8E-14	5.3E-12	1.2E-08	2.9E-11	5.7E-15	2.6E-10	2.2E-11	-9.4E-09
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	1.4E-03	2.3E-06	6.1E-07	1.5E-03	1.6E-02	8.9E-07	5.9E-06	9.1E-07	-2.7E-03
EP	Eutrophication potential	kg$(PO_4)^3$-Eq.	5.0E-03	4.1E-07	5.0E-06	5.0E-03	2.1E-04	5.0E-08	3.0E-06	2.7E-06	-1.8E-02
POCP	Formation potential of tropospheric ozone photochemical oxidants	kg ethane-Eq.	3.2E-05	1.1E-07	5.4E-08	1.7E-04	1.0E-01	2.4E-05	9.3E-05	1.9E-05	-5.7E-02
ADPE	Abiotic depletion potential for non-fossil resources	kg Sb-Eq.	3.2E-05	0.0E+00	8.1E-11	1.8E-03	1.6E+00	2.9E-04	1.2E-03	2.2E-04	-1.4E-01
ADPF	Abiotic depletion potential for fossil resources	MJ	1.3E+00	6.0E-03	1.6E-03	1.3E+00	1.8E+00	1.5E-04	1.3E-02	3.1E-04	-1.4E-01

**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

Results below contain the resource use throughout the life cycle of the product.

Resource Use

Parameter	Parameter	Unit	A1-A3	A4	A5	B4	B6	C2	C3	C4	D
RPR_E	Renewable primary energy as energy carrier	MJ	7.3E-01	0.0E+00	9.8E-06	7.3E-01	0.0E+00	0.0E+00	1.1E-03	8.5E-05	-6.5E-01
RPR_M	Renewable primary energy resources as material utilization	MJ	1.5E-01	0.0E+00	7.4E-03	1.6E-01	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
$NRPR_E$	Nonrenewable primary energy as energy carrier	MJ	1.4E+00	6.0E-03	1.6E-03	1.4E+00	2.5E+01	1.9E-03	1.1E-02	2.0E-03	-1.7E+00
$NRPR_M$	Nonrenewable primary energy as material utilization	MJ	9.2E-02	0.0E+00	2.5E+00	2.6E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SM	Use of secondary material	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
RSF	Use of renewable secondary fuels	MJ	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
NRSF	Use of nonrenewable secondary fuels	MJ	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
RE	Energy recovered from disposed waste	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-2.3E+00
FW	Use of net fresh water	m^3	1.1E-03	0.0E+00	3.8E-07	1.5E-03	0.0E+00	0.0E+00	3.6E-04	1.1E-06	-1.4E-03

**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

Results below contain the output flows and wastes throughout the life cycle of the product.

Output Flows and Waste Categories

Parameter	Parameter	Unit	A1-A3	A4	A5	B4	B6	C2	C3	C4	D
HWD	Hazardous waste disposed	kg	1.1E-06	0.0E+00	5.4E-08	1.1E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NHWD	Non-hazardous waste disposed	kg	6.4E-05	0.0E+00	1.9E-03	3.7E-03	0.0E+00	0.0E+00	0.0E+00	1.8E-03	0.0E+00
HLRW	High-level radioactive waste	kg	4.4E-06	0.0E+00	2.9E-09	4.5E-06	0.0E+00	0.0E+00	5.4E-08	9.9E-09	-2.5E-06
ILLRW	Intermediate- and low-level radioactive waste	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
CRU	Components for re-use	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
MR	Materials for recycling	kg	6.4E-05	0.0E+00	7.0E-03	1.7E-02	0.0E+00	0.0E+00	1.0E-02	0.0E+00	0.0E+00
MER	Materials for energy recovery	kg	0.0E+00	0.0E+00	4.7E-04	4.7E-03	0.0E+00	0.0E+00	4.3E-03	0.0E+00	0.0E+00
EE	Recovered energy exported from system	MJ	0.0E+00	0.0E+00	0.0E+00	4.1E-02	0.0E+00	0.0E+00	4.1E-02	0.0E+00	0.0E+00

**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

Results below contain direct greenhouse gas emissions and removals throughout the life cycle of the product.

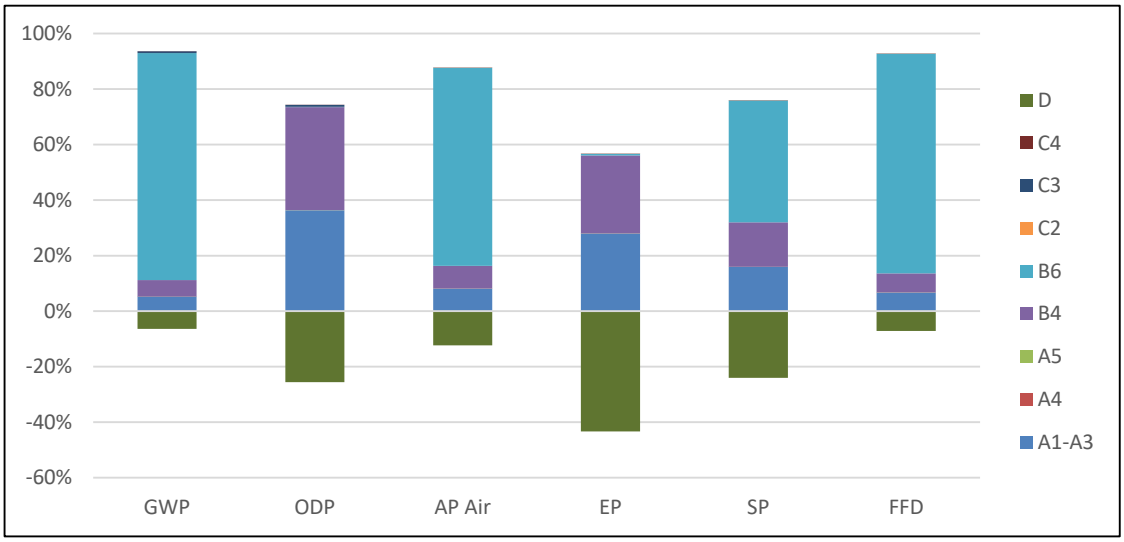
Resource Use

Parameter	Parameter	Unit	A1-A3	A4	A5	B4	B6	C2	C3	C4	D
BCRP	Biogenic Carbon Removal from Product	kg CO_2	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
BCEP	Biogenic Carbon Emissions from Product	kg CO_2	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
BCRK	Biogenic Carbon Removal from Packaging	kg CO_2	2.4E-03	0.0E+00	0.0E+00	2.4E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
BCEK	Biogenic Carbon Emissions from Packaging	kg CO_2	0.0E+00	0.0E+00	2.4E-03	2.4E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
BCEW	Biogenic Carbon Emissions from Combustion of Waste from Renewable Sources Used in Production Process	kg CO_2	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
CCE	Calcination Carbon Emissions	kg CO_2	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
CCR	Carbonation Carbon Removal	kg CO_2	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
CWNR	Carbon Emissions from Combustion of Waste from Non-renewable Sources Used in Production Process	kg CO_2	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

**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

LCA Interpretation - 27032205 (16/26)

The production life cycle stage (A1-A3) and in life energy usage (B6) dominate the impacts across all impact categories. This is due to the upstream production of materials used in the product, along with electricity use in the manufacturing of the product and the consumption of electricity during the cable's usage. These cables have a smaller diameter so they consume more energy and use less materials, making B6 the primary dirver. With one replacement required over a life-span of a building, the replacement stage (B4) dominates from duplicating these stages. Module B4 excludes operational energy use and all benefits and loads beyond the system boundary. As one replacement occurs in the specified building service life, module B6 includes the energy usage of two products and module D includes the benefits of two products.



LCA Results - 27032201 (16/26)

Results shown below were calculated using TRACI 2.1 Methodology.

TRACI 2.1 Impact Assessment

Parameter	Parameter	Unit	A1-A3	A4	A5	B4	B6	C2	C3	C4	D
GWP	Global warming potential	kg CO_2-Eq.	1.2E-01	4.7E-04	2.2E-04	1.3E-01	1.8E+00	1.5E-04	1.3E-02	3.1E-04	-1.4E-01
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	1.3E-08	1.8E-14	7.0E-12	1.4E-08	2.9E-11	5.7E-15	2.6E-10	2.2E-11	-9.4E-09
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	1.8E-03	2.8E-06	7.4E-07	1.8E-03	1.6E-02	8.9E-07	5.9E-06	9.1E-07	-2.7E-03
EP	Eutrophication potential	kg N-Eq.	1.1E-02	1.6E-07	1.4E-05	1.1E-02	2.1E-04	5.0E-08	3.0E-06	2.7E-06	-1.8E-02
SP	Smog formation potential	kg O_3-Eq.	3.8E-02	7.7E-05	2.0E-05	3.8E-02	1.0E-01	2.4E-05	9.3E-05	1.9E-05	-5.7E-02
FFD	Fossil Fuel Depletion	MJ-surplus	1.3E-01	9.0E-04	2.4E-04	1.4E-01	1.6E+00	2.9E-04	1.2E-03	2.2E-04	-1.4E-01

**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

Results shown below were calculated using CML 2001 - April 2013 Methodology.

CML 4.1 Impact Assessment

Parameter	Parameter	Unit	A1-A3	A4	A5	B4	B6	C2	C3	C4	D
GWP	Global warming potential	kg CO_2-Eq.	1.2E-01	4.7E-04	2.5E-04	1.3E-01	1.8E+00	1.5E-04	1.3E-02	3.1E-04	-1.4E-01
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	1.1E-08	1.8E-14	5.3E-12	1.2E-08	2.9E-11	5.7E-15	2.6E-10	2.2E-11	-9.4E-09
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	1.4E-03	2.3E-06	6.1E-07	1.5E-03	1.6E-02	8.9E-07	5.9E-06	9.1E-07	-2.7E-03
EP	Eutrophication potential	kg$(PO_4)^3$-Eq.	5.0E-03	4.1E-07	5.0E-06	5.0E-03	2.1E-04	5.0E-08	3.0E-06	2.7E-06	-1.8E-02
POCP	Formation potential of tropospheric ozone photochemical oxidants	kg ethane-Eq.	3.2E-05	1.1E-07	5.4E-08	1.7E-04	1.0E-01	2.4E-05	9.3E-05	1.9E-05	-5.7E-02
ADPE	Abiotic depletion potential for non-fossil resources	kg Sb-Eq.	3.2E-05	0.0E+00	8.1E-11	1.8E-03	1.6E+00	2.9E-04	1.2E-03	2.2E-04	-1.4E-01
ADPF	Abiotic depletion potential for fossil resources	MJ	1.3E+00	6.0E-03	1.6E-03	1.3E+00	1.8E+00	1.5E-04	1.3E-02	3.1E-04	-1.4E-01

**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

Results below contain the resource use throughout the life cycle of the product.

Resource Use

Parameter	Parameter	Unit	A1-A3	A4	A5	B4	B6	C2	C3	C4	D
RPR_E	Renewable primary energy as energy carrier	MJ	7.3E-01	0.0E+00	9.8E-06	7.3E-01	0.0E+00	0.0E+00	1.1E-03	8.5E-05	-6.5E-01
RPR_M	Renewable primary energy resources as material utilization	MJ	1.5E-01	0.0E+00	7.4E-03	1.6E-01	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
$NRPR_E$	Nonrenewable primary energy as energy carrier	MJ	1.4E+00	6.0E-03	1.6E-03	1.4E+00	2.5E+01	1.9E-03	1.1E-02	2.0E-03	-1.7E+00
$NRPR_M$	Nonrenewable primary energy as material utilization	MJ	9.2E-02	0.0E+00	2.5E+00	2.6E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SM	Use of secondary material	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
RSF	Use of renewable secondary fuels	MJ	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
NRSF	Use of nonrenewable secondary fuels	MJ	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
RE	Energy recovered from disposed waste	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-2.3E+00
FW	Use of net fresh water	m^3	1.1E-03	0.0E+00	3.8E-07	1.5E-03	0.0E+00	0.0E+00	3.6E-04	1.1E-06	-1.4E-03

**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

Results below contain the output flows and wastes throughout the life cycle of the product.

Output Flows and Waste Categories

Parameter	Parameter	Unit	A1-A3	A4	A5	B4	B6	C2	C3	C4	D
HWD	Hazardous waste disposed	kg	1.1E-06	0.0E+00	5.4E-08	1.1E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NHWD	Non-hazardous waste disposed	kg	6.4E-05	0.0E+00	1.9E-03	3.7E-03	0.0E+00	0.0E+00	0.0E+00	1.8E-03	0.0E+00
HLRW	High-level radioactive waste	kg	4.4E-06	0.0E+00	2.9E-09	4.5E-06	0.0E+00	0.0E+00	5.4E-08	9.9E-09	-2.5E-06
ILLRW	Intermediate- and low-level radioactive waste	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
CRU	Components for re-use	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
MR	Materials for recycling	kg	6.4E-05	0.0E+00	7.0E-03	1.7E-02	0.0E+00	0.0E+00	1.0E-02	0.0E+00	0.0E+00
MER	Materials for energy recovery	kg	0.0E+00	0.0E+00	4.7E-04	4.7E-03	0.0E+00	0.0E+00	4.3E-03	0.0E+00	0.0E+00
EE	Recovered energy exported from system	MJ	0.0E+00	0.0E+00	0.0E+00	4.1E-02	0.0E+00	0.0E+00	4.1E-02	0.0E+00	0.0E+00

**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

Results below contain direct greenhouse gas emissions and removals throughout the life cycle of the product.

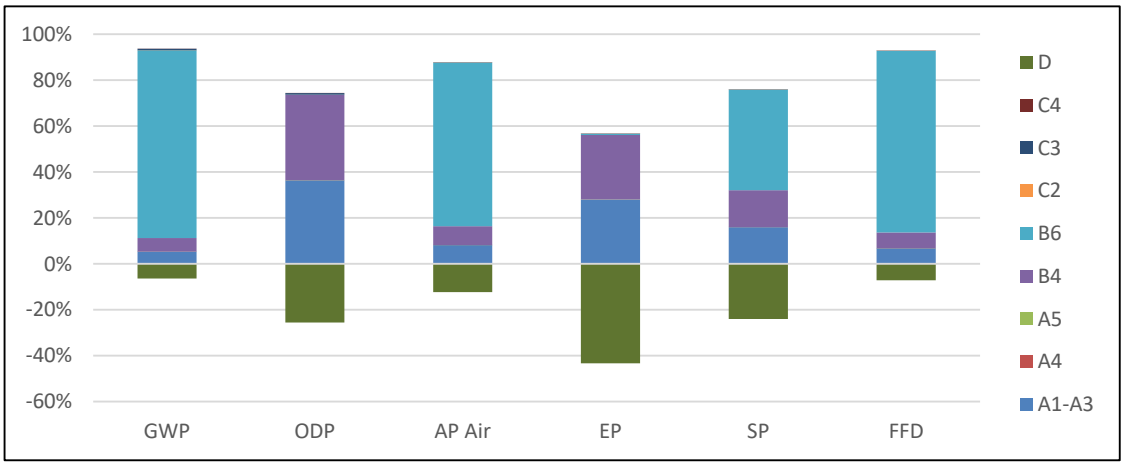
Resource Use

Parameter	Parameter	Unit	A1-A3	A4	A5	B4	B6	C2	C3	C4	D
BCRP	Biogenic Carbon Removal from Product	kg CO_2	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
BCEP	Biogenic Carbon Emissions from Product	kg CO_2	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
BCRK	Biogenic Carbon Removal from Packaging	kg CO_2	2.4E-03	0.0E+00	0.0E+00	2.4E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
BCEK	Biogenic Carbon Emissions from Packaging	kg CO_2	0.0E+00	0.0E+00	2.4E-03	2.4E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
BCEW	Biogenic Carbon Emissions from Combustion of Waste from Renewable Sources Used in Production Process	kg CO_2	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
CCE	Calcination Carbon Emissions	kg CO_2	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
CCR	Carbonation Carbon Removal	kg CO_2	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
CWNR	Carbon Emissions from Combustion of Waste from Non-renewable Sources Used in Production Process	kg CO_2	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

**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

LCA Interpretation - 27032201 (16/26)

The production life cycle stage (A1-A3) and in life energy usage (B6) dominate the impacts across all impact categories. This is due to the upstream production of materials used in the product, along with electricity use in the manufacturing of the product and the consumption of electricity during the cable's usage. These cables have a smaller diameter so they consume more energy and use less materials, making B6 the primary dirver. With one replacement required over a life-span of a building, the replacement stage (B4) dominates from duplicating these stages. Module B4 excludes operational energy use and all benefits and loads beyond the system boundary. As one replacement occurs in the specified building service life, module B6 includes the energy usage of two products and module D includes the benefits of two products.



Additional Environmental Information

Environmental and Health During Manufacturing

At Southwire, we nurture the culture of a “Southwire family” and we work each day to enhance the lives of our employees by building a workplace that is diverse, supportive and engaging. Safety and health are top priorities, and we will always treat each other with dignity and respect. Southwire is committed to operating its facilities in compliance with applicable local, state/provincial, and federal environmental, health and safety (EHS) regulations, as well as implementing more stringent internal standards when necessary to protect our environment, our employees, and the general public. We are dedicated to prevent, reduce or eliminate pollution and health and safety risks at the source and are committed to continual improvement of our management systems to enhance performance, engage employees, and work toward a culture of zero incidents. Southwire recognizes the universal need for care and protection of our natural resources. In addition, Southwire acknowledges that our greatest asset is our people, and we seek to create a workplace where employee safety and health are always top priority.

Environmental and Health During Installation

There is no harmful emissive potential. No damage to health or impairment is expected under normal use corresponding to the intended use of the product.

Extraordinary Effects

Fire
Cable is specified for use up to 60C and complies with EN50575 EuroClass performance such as Dca, s2, d2, a1 or the IEC 60332-1 flammability test.

Water
None.

Mechanical Destruction
None.

Delayed Emissions

Global warming potential is calculated using the TRACI 2.1 and CML 4.1 impact assessment methodologies. Delayed emissions are not considered.

Environmental Activities and Certifications

Southwire monitors and changes processes and/or raw materials, where feasible, to reduce the volume and toxicity of waste generated. Wastes that are unavoidably generated are managed in accordance with regulatory agency-approved methods, and we recycle and reuse waste materials to the greatest extent feasible. Healthy air is vital to the well-being of the Southwire employees, the general public, and the environment. Through a variety of control technologies and operational measures, Southwire strives to minimize our pollutant emissions from our activities. In addition, we have established voluntary targets to reduce some of our air emissions beyond regulatory requirements. Southwire recognizes that water is an essential natural resource that is critical to our communities, the environment, and our business operations. We conserve water by minimizing the water consumption intensity associated with our operations and activities. We also seek to reduce or eliminate wastewaters from our processes where feasible and maintain the quality of our wastewater discharges within applicable regulatory limits. Southwire has achieved ISO 14001 certification at several of our manufacturing facilities.

Further Information

Southwire Company
One Southwire Drive
Carrollton, GA 30119
USA

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- IEC 60228:2004 — Conductors of Insulated Cables

Contact Information

Study Commissioner

Mark Rogers
Sr. Product Stewardship Coordinator
Southwire Company
One Southwire Drive
Carrollton, Georgia 30119
Tel: (770) 832-5359
Email: mark.rogers@southwire.com

LCA Practitioner

Sustainable Solutions Corporation
155 Railroad Plaza, Suite 203
Royersford, PA 19468 USA
(+1) 610 569-1047
info@sustainablesolutionscorporation.com
www.sustainablesolutionscorporation.com