

Environmental Product Declaration

Essence, Lagos, Patchwork, Sideline, Wit, Feeling Plaid, Alter Ego, Dapper, and Stepping Stones



NSF® Certified Environmental Product Declaration www.nsf.org

Program Operator	NSF® International
EPD Registration Number	EPD 10839
Date of Publication	7/1/2023
Date of Validity	7/1/2028

From solids and textures to current patterns, the KnollTextiles line of upholstery focuses on both classic and innovative materials.

An EPD should provide current information, and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com.

KnollTextiles

At KnollTextiles, we advocate for business practices that reduce the use, manufacture, and sale of products that have the potential to cause environmental damage or negatively impact human health and safety. We are dedicated to environmental stewardship and transparency, and as such, we prioritize low-emitting materials, recycled content, natural fibers, and the removal of Chemicals of Concern from our products.

Deepening our commitment to material, production, and operational transparency, we have engaged in Life Cycle Assessments (LCA) for selected products within our line. The LCA is a comprehensive quantitative analysis of the environmental impacts of the entire life cycle of our products. This information will be presented in product-specific Environmental Product Declarations (EPD) that report on the whole-life sustainability impact of operational, embodied, and long-term carbon.

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025 and EN 15804 + A2.

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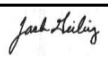
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According to
ISO 14025 and
EN 15804 + A2

EN 15804 +A2

EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. The EPD owner has the sole ownership, liability and responsibility of the EPD. 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. The ranges of the LCIA results are less than 10%.

EPD PROGRAM AND PROGRAM OPERATOR NAME, ADDRESS, LOGO, AND WEBSITE	NSF International, 789 N. Dixboro Rd, Ann Arbor, MI 48105, www.nsf.org	
PRODUCT CATEGORY RULES (PCR):	EN 15804 +A2	
INDEPENDENT THIRD-PARTY VERIFICATION OF THE DECLARATION AND DATA, ACCORDING TO ISO 14025:2006	EPD Process Certification	EPD verification
DECLARATION NUMBER	EPD 10839	
DECLARED PRODUCT & DECLARED UNIT	Essence, Lagos, Patchwork, Sideline, Wit, Feeling Plaid, Alter Ego, Dapper, and Stepping Stones Declared Unit = 1 m ² of fabric	
REFERENCE PCR AND VERSION NUMBER	EN 15804:2012+A2:2019: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction product	
DESCRIPTION OF PRODUCT APPLICATION/USE	Knoll products are primarily used in commercial and residential settings.	
PRODUCT RSL DESCRIPTION	Not applicable for this product category	
MARKETS OF APPLICABILITY	Global	
DATE OF ISSUE	July 1, 2023	
PERIOD OF VALIDITY	5 years	
EPD TYPE	Product Specific	
DATASET VARIABILITY	N/A	
EPD SCOPE	Cradle-to-Gate with Options	
YEAR(S) OF REPORTED PRIMARY DATA	2020	
LCA SOFTWARE & VERSION NUMBER	GaBi 10.6	
LCI DATABASE(S) & VERSION NUMBER	GaBi Sphera database, Service Pack 35	
LCIA METHODOLOGY & VERSION NUMBER	TRACI 2.1; CML 4.1	
PCR REVIEW WAS CONDUCTED BY:	EN15804+A2 Core PCR was developed by the European Committee for Standardization (CEN)	
This declaration was independently verified in accordance with ISO 14025: 2006. EN 15804 +A2 serves as the core PCR.	Tony Favilla, NSF Certification, LLC Afavilla@nsf.org 	
<input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL		
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:	Jack Geibig, EcoForm, LLC jgeibig@ecoform.com 	

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 EN 15804 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.

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General Information

Description of Company/Organization

We at KnollTextiles use modern design to connect people to their work, their lives, their world. Since 1938, we have been recognized internationally for creating workplace and residential furnishings that inspire, evolve, and endure.

Today, our commitment to modern design, our understanding of the nature of work, and our dedication to sustainable design have yielded a unique portfolio of thoughtful products that respond and adapt to changing needs.

Product Description

The upholstery fabrics in this group are high performance and high durability. They are made from recycled polyester as well as natural fibers. The fabrics covered in this EPD are the same across their product lines, where they differ is their final pattern.

Manufacturer Specific EPD

This product-specific EPD was developed based on the cradle-to-grave with options (modules A1-A4 & C1-D) Life Cycle Assessment. The EPD accounts for raw material extraction and processing, transport, product manufacturing, distribution, and end-of-life. Manufacturing data were gathered directly from company personnel. When updated company-specific data were not available, a proxy was used. Product grouping was considered appropriate if the individual product(s) have a similar application and material composition. Any additional contracted facilities names have been withheld due to confidentiality.

Application

The Essence, Lagos, Patchwork, Sideline, Wit, Feeling Plaid, Alter Ego, Dapper, and Stepping Stones Panel/Upholstery is typically used as a direct glue wallcovering, as well as unbacked for wrapped panel or indoor-outdoor upholstery use.

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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. There are no substances in these products listed in the Candidate List of Substances of Very High Concern for authorization. For more information see <https://www.knoll.com/shop-textiles>.

The average composition of the product(s) is as follows:

Material	Percentage in mass (%)
Nylon	21.00%
Post-Consumer Recycled Polyester	32.00%
Wool	29.00%
Polyester	10.00%
Rayon	6.00%
Cotton	2.00%
Total	100.00%
Total Mass	0.69 kg

Technical Data

For the declared product, the following technical data in the delivery status must be provided with reference to the test standard:

Technical Data	
Composition	Combination of recycled Polyester, Post Consumer Polyester, and Natural fibers
Weave	Jacquard
Color Index	Multi colors and neutrals
Colorfastness Dry	Above ACT minimum Guidelines of Grades between 4 and 5
Colorfastness Wet	Above ACT minimum Guidelines of Grades between 4 and 5
Tensile Strength	Meets above ACT minimum Guidelines
NFPA 260 (UFAC)	Class 1 (Pass)
Cal 117 - 2013 Section	Pass
Brush Pill	Meets ACT minimum Guidelines of Grade 4
Seam Slippage	Meets above ACT minimum Guidelines
Lightfastness 40 hrs.	Above ACT minimum Guidelines of Grades between 4 and 5
Clean Air	Tested to CDPH/BIFMA guidelines

Placing on the Market / Application Rules

The products have high durability and are appropriate for high traffic area applications.

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Methodological Framework

Declared Unit

The declaration refers to the Declared Unit of 1 m² of Essence, Lagos, Patchwork, Sideline, Wit, Feeling Plaid, Alter Ego, Dapper, and Stepping Stones as specified in EN 15804 +A2. The declared unit was chosen to be consistent with the unit defined by EPD International PCR: Woven, Knitted or Crocheted Fabrics (of Synthetic Fibres) which was used to inform the EPD created under EN 15804 +A2 and because the use phase is out of scope.

Name	Value	Unit
Declared Unit	1 m ² (one square meter)	of fabric
Mass	0.69	kg

System Boundary

This is a cradle-to-gate with options 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	MND	MND	MND	MND	MND	MND	MND	MND	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 textile is not applicable because the use phase is out of scope. The building estimated service life is 75 years.

Allocation

Allocation was determined on the declared unit for primary data, 1 m². For secondary data, cut-off methodology was used.

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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 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 known processes were neglected or excluded. 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 KnollTextiles. Secondary data from the GaBi Sphera database were utilized. These data were evaluated and have temporal, geographic, and technical coverage appropriate to the scope of the product category rules.

Data Quality

The data sources used are complete and representative of a global system boundary 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 manufacturer. 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 EN 15804. Biogenic carbon is only released through packaging materials.

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. Only EPDs that comply with EN 15804 are comparable. Full conformance with the PCR allows EPD comparability only when all stages of the fabric 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.

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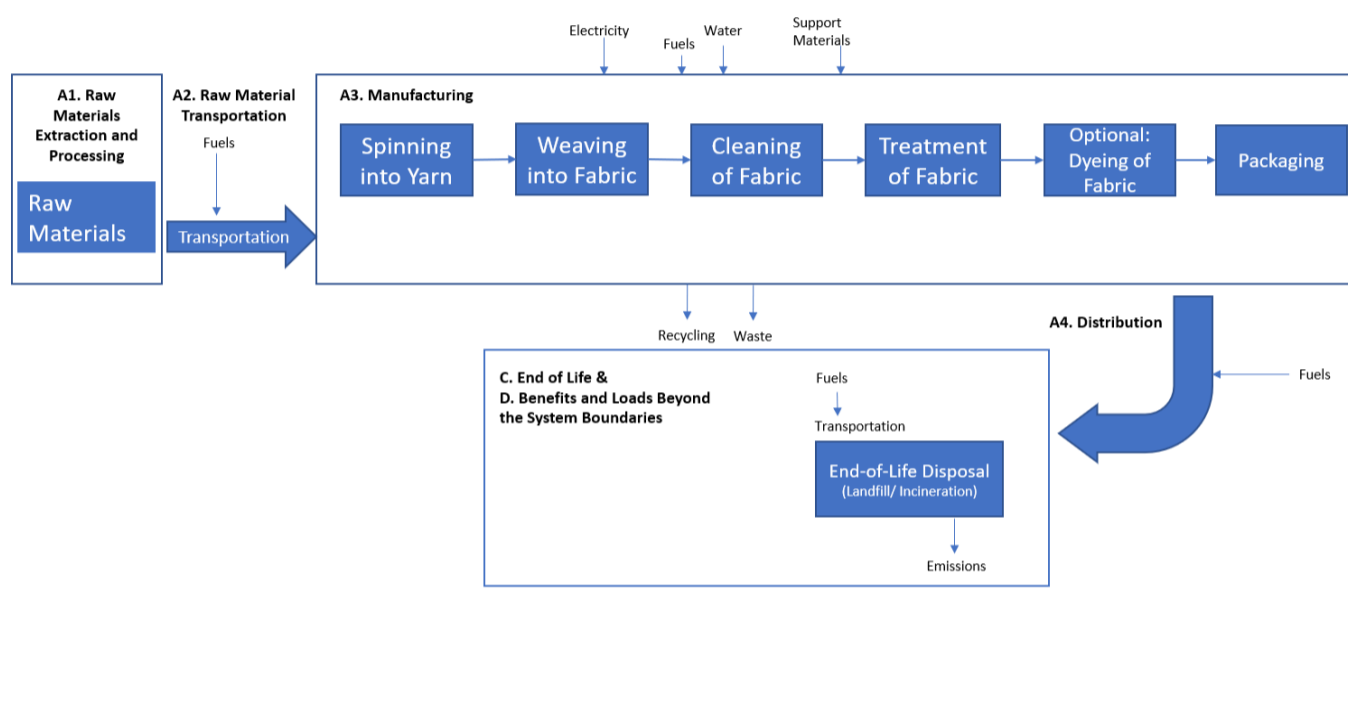
Additional Environmental Information

Background data

For life cycle modeling of the considered products, the GaBi 10.6 Software System for Life Cycle Engineering, developed by Sphera, is used. The GaBi-database contains consistent and documented datasets which are documented in the online GaBi-documentation. To ensure comparability of results in the LCA, the basic data of GaBi database were used for energy, transportation and auxiliary materials.

Manufacturing

There are three basic steps required for fabric production. The first step is yarn production. This happens after the raw materials have been harvested and involves spinning the material into yarn and threads. For most manufacturing sites, this is completed using mechanized spinning wheels. After the raw materials are spun into yarn, the individual threads are joined together to form fabric. This step is called weaving and is done on a machine called a loom. After the fabric has been woven, it is removed from the loom and processed. In this step, the fabric is cleaned and treated with various chemicals and cleaners to remove impurities from the final product. The result of these steps is an all-white fabric. The last, optional, step is the dyeing of the fabric to its final color/pattern.



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Packaging

All packaging is fully recyclable. The packaging material is composed by cardboard, HDPE, LDPE, paper, and tape.

Material	Quantity (% By Weight)	Mass (g/m2)
Cardboard	93.32%	63.30
HDPE	0.34%	0.23
LDPE	6.10%	4.14
Paper	0.13%	0.09
Tape	0.10%	0.07
Total	100%	67.83

Transportation

Transport to Building Site (A4)		
Name	Value	Unit
Fuel type	Diesel	
Liters of fuel	38	l/100km
Transport distance	800	km
Capacity utilization (including empty runs)	90	%
Gross density of products transported	-	kg/m ³
Weight of products transported	-	kg
Volume of products transported	-	m ³
Capacity utilization volume factor	1.00	-

Disposal

End of life (C1-C4)		
Name	Value	Unit
Collected separately	0.00	kg
Collected as mixed construction waste	0.13	kg
Reuse	0.00	kg
Recycling	0.00	kg
Landfilling	0.13	kg
Incineration with energy recovery	0.00	kg
Energy conversion	44%	%
Material for final deposition	0.13	kg
Removals of biogenic carbon	9.91	kg

Re-use Phase

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

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LCA Results per Declared Unit

EN15804 + A2 Impact Assessment											
Parameter	Parameter	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
Climate Change	Total	kg CO2 eq	1.04E+01	5.63E-02	4.64E-01	1.02E-01	0.00E+00	6.52E-03	0.00E+00	4.58E-01	0.00E+00
	Fossil	kg CO2 eq	9.95E+00	5.63E-02	4.61E-01	1.02E-01	0.00E+00	6.52E-03	0.00E+00	1.09E-01	0.00E+00
	Biogenic	kg CO2 eq	4.33E-01	0.00E+00	3.51E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.49E-01	0.00E+00
	Land use and land use change	kg CO2 eq	1.38E-02	0.00E+00	2.29E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.15E-06	0.00E+00
Ozone Depletion		kg CFC-11 eq	2.06E-09	1.43E-12	1.68E-13	2.61E-12	0.00E+00	1.66E-13	0.00E+00	3.70E-14	0.00E+00
Acidification		Mole of H+ eq	4.43E-02	3.66E-04	2.64E-04	6.66E-04	0.00E+00	4.24E-05	0.00E+00	6.80E-04	0.00E+00
Eutrophication	Freshwater	kg P eq	2.31E-04	1.57E-08	3.28E-07	2.86E-08	0.00E+00	1.82E-09	0.00E+00	2.16E-05	0.00E+00
	Marine	kg N eq	6.88E-03	1.41E-04	1.27E-04	2.56E-04	0.00E+00	1.63E-05	0.00E+00	3.48E-04	0.00E+00
	Terrestrial	Mole of N eq	9.30E-02	1.54E-03	1.04E-03	2.80E-03	0.00E+00	1.78E-04	0.00E+00	2.97E-03	0.00E+00
Photochemical ozone formation	Human Health	kg NMVOC eq	1.82E-02	4.15E-04	3.12E-04	7.55E-04	0.00E+00	4.81E-05	0.00E+00	3.83E-04	0.00E+00
Depletion of abiotic resources	Mineral and metals	kg Sb eq	8.82E-06	0.00E+00	2.98E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.72E-10	0.00E+00
	Fossils	MJ	1.41E+02	7.09E-01	6.85E+00	1.29E+00	0.00E+00	8.20E-02	0.00E+00	2.64E-01	0.00E+00
Water Use		m ³ world eq	5.07E+00	0.00E+00	5.78E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.79E-02	0.00E+00
Particulate matter		Disease incidences	4.29E-07	1.45E-09	3.48E-09	2.63E-09	0.00E+00	1.67E-10	0.00E+00	5.10E-09	0.00E+00
Ionizing Radiation ¹	Human Health	kBq U235 eq.	6.43E-01	1.25E-20	1.13E-03	2.27E-20	0.00E+00	1.44E-21	0.00E+00	3.97E-04	0.00E+00
Ecotoxicity ²	Freshwater	CTUe	1.04E+02	2.99E+00	9.01E-01	5.43E+00	0.00E+00	3.46E-01	0.00E+00	5.10E+00	0.00E+00
Human Toxicity ²	Cancer	CTUh	1.11E-08	1.49E-11	8.59E-11	2.71E-11	0.00E+00	1.73E-12	0.00E+00	5.72E-11	0.00E+00
	Non-cancer	CTUh	9.56E-07	1.41E-09	1.90E-09	2.56E-09	0.00E+00	1.63E-10	0.00E+00	6.61E-09	0.00E+00
Land Use ²		Pt	3.27E+02	0.00E+00	7.94E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.63E-02	0.00E+00

Disclaimer 1 - This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure, nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon, and from some construction materials is also not measured by this indicator.

Disclaimer 2 - The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high, or as there is limited experience with the indicator.

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Results shown below were calculated using TRACI 2.1 Methodology.

TRACI 2.1 Impact Assessment											
Parameter	Parameter	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
GWP	Fossil	kg CO ₂ -Eq.	1.07E+01	5.50E-02	4.47E-01	1.00E-01	0.00E+00	6.37E-03	0.00E+00	2.62E-01	0.00E+00
	Biogenic	kg CO ₂ -Eq.	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Land Use and Land Transformation	kg CO ₂ -Eq.	8.79E+00	5.38E-02	4.27E-01	9.79E-02	0.00E+00	6.23E-03	0.00E+00	2.80E-01	0.00E+00
	Total	kg CO ₂ -Eq.	1.95E+01	1.09E-01	8.74E-01	1.98E-01	0.00E+00	1.26E-02	0.00E+00	5.42E-01	0.00E+00
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	3.73E-09	2.08E-12	3.23E-15	3.79E-12	0.00E+00	2.41E-13	0.00E+00	9.20E-16	0.00E+00
AP Air	Acidification potential for air emissions	kg SO ₂ -Eq.	3.76E-02	3.31E-04	2.71E-04	6.02E-04	0.00E+00	3.83E-05	0.00E+00	1.63E-03	0.00E+00
EP	Eutrophication potential	kg N-Eq.	6.30E-03	1.83E-05	5.51E-05	3.33E-05	0.00E+00	2.12E-06	0.00E+00	6.31E-04	0.00E+00
SP	Smog formation potential	kg O ₃ -Eq.	3.45E-01	9.10E-03	6.28E-03	1.66E-02	0.00E+00	1.05E-03	0.00E+00	5.82E-03	0.00E+00
FFD	Fossil Fuel Depletion	MJ-surplus	1.38E+01	9.74E-02	9.47E-01	1.77E-01	0.00E+00	1.13E-02	0.00E+00	5.31E-02	0.00E+00

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

Results shown below were calculated using CML Methodology.

CML 4.1 Impact Assessment											
Parameter	Parameter	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
GWP	Global warming potential	kg CO ₂ -Eq.	1.08E+01	5.52E-02	4.51E-01	1.00E-01	0.00E+00	6.39E-03	0.00E+00	2.82E-01	0.00E+00
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	3.75E-09	2.08E-12	1.88E-13	3.78E-12	0.00E+00	2.41E-13	0.00E+00	5.36E-14	0.00E+00
AP Air	Acidification potential for air emissions	kg SO ₂ -Eq.	3.72E-02	2.72E-04	2.12E-04	4.94E-04	0.00E+00	3.14E-05	0.00E+00	5.87E-04	0.00E+00
EP	Eutrophication potential	kg(PO ₄) ³ -Eq.	5.78E-03	4.84E-05	4.71E-05	8.80E-05	0.00E+00	5.60E-06	0.00E+00	7.03E-04	0.00E+00
POCP	Formation potential of tropospheric ozone photochemical oxidants	kg ethane-Eq.	2.36E-03	3.17E-05	3.98E-05	5.77E-05	0.00E+00	3.67E-06	0.00E+00	1.33E-04	0.00E+00
ADPE	Abiotic depletion potential for non-fossil resources	kg Sb-Eq.	2.68E-05	2.29E-11	1.71E-07	4.16E-11	0.00E+00	2.65E-12	0.00E+00	1.31E-08	0.00E+00
ADPF	Abiotic depletion potential for fossil resources	MJ	1.26E+02	7.02E-01	6.63E+00	1.28E+00	0.00E+00	8.13E-02	0.00E+00	4.20E-01	0.00E+00

*All 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	A2	A3	A4	C1	C2	C3	C4	D
SM	Use of secondary material	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	Use of nonrenewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	Use of net fresh water	m ³	1.84E-01	0.00E+00	1.76E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.53E-04	0.00E+00
PERE	Use of renewable primary energy	MJ	5.51E+01	0.00E+00	9.01E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.87E-02	0.00E+00
PERM	Use of renewable primary energy resources used as raw materials	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	Total Use of Renewable primary energy	MJ	5.51E+01	0.00E+00	9.01E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.87E-02	0.00E+00
PENRE	Use of Non-renewable Primary Energy	MJ	1.43E+02	7.09E-01	6.86E+00	1.29E+00	0.00E+00	8.20E-02	0.00E+00	2.67E-01	0.00E+00
PENRM	Use of non-renewable primary energy resources used as raw materials	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	Total Use of Non-renewable Primary Energy	MJ	1.43E+02	7.09E-01	6.86E+00	1.29E+00	0.00E+00	8.20E-02	0.00E+00	2.67E-01	0.00E+00

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

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

Output Flows and Waste Categories											
Parameter	Parameter	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
HWD	Hazardous waste disposed	kg	2.95E-05	0.00E+00	5.09E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.79E-11	0.00E+00
NHWD	Non-hazardous waste disposed	kg	1.92E-01	0.00E+00	9.75E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.05E-01	0.00E+00
HLRW	High-level radioactive waste	kg or m ³	5.95E-03	0.00E+00	1.15E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.35E-06	0.00E+00
ILLRW	Intermediate- and low-level radioactive waste	kg or m ³	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU	Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR	Materials for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	Recovered energy exported from system	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

*All 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	C1	C2	C3	C4	D
BCRP	Biogenic Carbon Removal from Product	kg CO ₂	1.08E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEP	Biogenic Carbon Emissions from Product	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCRK	Biogenic Carbon Removal from Packaging	kg CO ₂	7.80E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEK	Biogenic Carbon Emissions from Packaging	kg CO ₂	0.00E+00	0.00E+00	7.80E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEW	Biogenic Carbon Emissions from Combustion of Waste from Renewable Sources Used in Production Process	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCE	Calcination Carbon Emissions	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCR	Carbonation Carbon Removal	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CWNR	Carbon Emissions from Combustion of Waste from Non-renewable Sources Used in Production Process	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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

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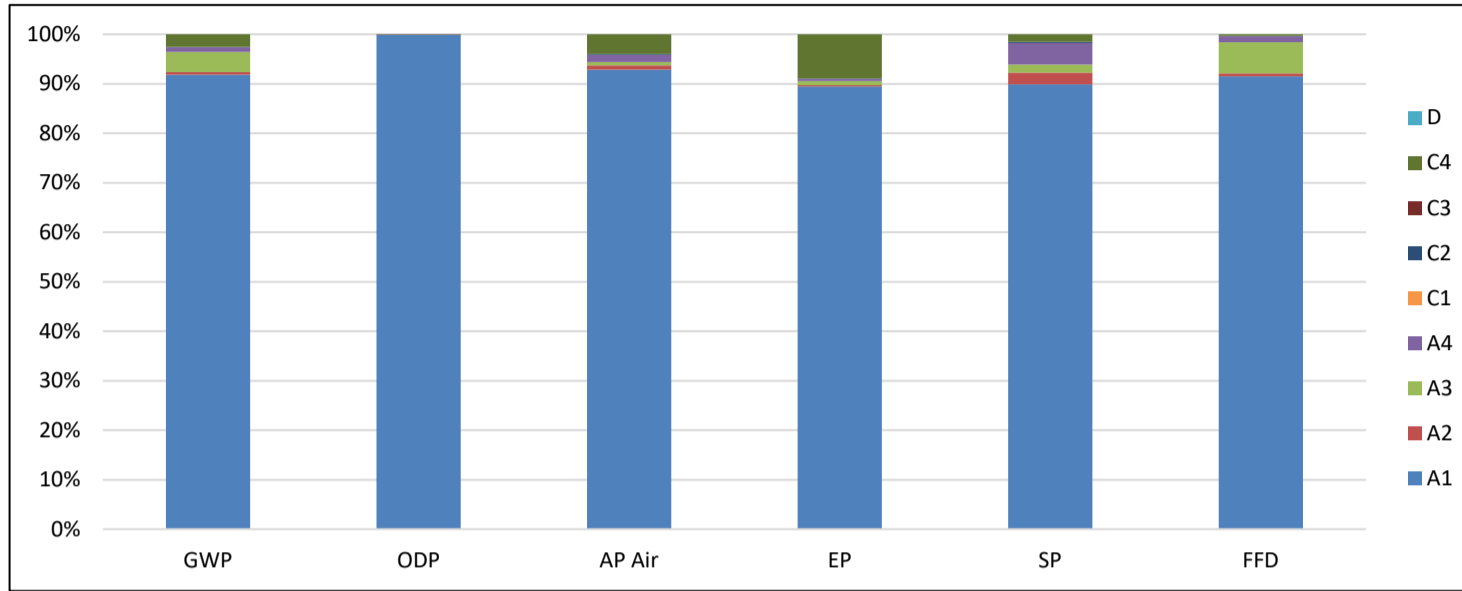
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LCA Interpretation

The raw materials life cycle stage (A1) dominates the impacts across all impact categories. This is due to the upstream production of materials used in the product. Transportation of raw materials and final distribution impacts were low compared to the raw materials themselves in all categories.



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Additional Environmental Information

Environmental and Health During Manufacturing

There are no known health and safety concerns when manufacturing the fabrics in this group. There are no emissions to indoor air after or during installation.

Environmental and Health During Installation

There is no known 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

No danger to the environment can be anticipated.

Water

Contains no known substances that have any impact on water in case of flood.

Mechanical Destruction

No danger to the environment can be anticipated during mechanical destruction.

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

Globally recognized for pioneering modern fabrics using advanced materials and techniques, KnollTextiles is proud to offer a wide selection of sustainably designed products. Dedicated to environmental stewardship and transparency, we strive to meet our customers' needs for sustainability, healthier materials and third-party certification.

Further Information

KnollTextiles 1235 Water Street East Greenville, PA 18041

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