

# Environmental Product Declaration





**Environmental Product Declaration for a cellulose fiber  
reinforcement product produced by Solomon Colors Inc. at  
their facility in Springfield, IL**



## ADMINISTRATIVE INFORMATION

### International Certified Environmental Product Declaration

<b>Declared Product:</b>	This Environmental Product Declaration (EPD) covers cellulose fibers products produced by Solomon Colors Inc.. Declared unit: 1 kg of cellulose fiber reinforcement for industrial, commercial, residential, architectural and decorative applications.	
<b>Declaration Owner:</b>	Solomon Colors Inc.	
	4050 Color Plant Rd	
	Springfield, IL	
	<a href="http://www.solomoncolors.com/ultrafiber.php#gsc.tab=0">www.solomoncolors.com/ultrafiber.php#gsc.tab=0</a>	
<b>Program Operator:</b>	Labeling Sustainability	
	Address, 11670 W Sunset Blvd.	
	City, State, Los Angeles, CA	
	<a href="http://labelinsustainability.com/">http://labelinsustainability.com/</a>	
<b>Product Category Rule:</b>	ISO 21930:2017 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services.	
	PCR Program Operator: Labeling Sustainability	
	PCR review was conducted by: Geoffrey Guest, Ph. D.	
<b>Independent LCA Reviewer and EPD Verifier:</b>	This declaration was independently verified in accordance with ISO 14025:2006	
	Independent verification of the declaration, according to ISO 14025:2006	
	Internal <input type="checkbox"/> ; External <input checked="" type="checkbox"/>	
	Third Party Verifier	
	Geoffrey Guest, Certified 3rd Party Verifier under Labeling Sustainability Program ( <a href="http://www.labelingsustainability.com">www.labelingsustainability.com</a> ), CSA Group ( <a href="http://www.csaregistries.ca">www.csaregistries.ca</a> )	
<b>Date of Issue:</b>	13 February 2023	
<b>Period of Validity:</b>	5 years; valid until 13 February 2028	
<b>EPD Number:</b>	5f0a436d-b924-41f1-95b9-d9cb21f37d99	





**TABLE OF CONTENTS**

**administrative Information .....1**

**Company Description .....3**

**Study Goal .....3**

**Description Of Product And Scope .....3**

**Cellulose Fiber Reinforcement Design Summary .....4**

**Cellulose Fiber Reinforcement Design Composition .....4**

**A1 Raw Material Recycled Content And Material Losses .....5**

**System Boundaries ..... 6**

**Cut-Off Criteria .....7**

**Data Sources And Data Quality Assessment .....7**

    Raw Material Transport..... 7

    Electricity..... 7

    Process/Space Heating ..... 7

    Fuel Required For Machinery ..... 7

    Waste Generation..... 7

    Recovered Energy. .... 7

    Recycled/Reused Material/Components ..... 7

    Module A1 Material Losses..... 8

    Direct A3 Emissions Accounting..... 8

**Data Quality Assessment .....11**

**Environmental Indicators And Inventory Metrics ..... 12**

**Total Impact Summary ..... 13**

**Additional Environmental Info ..... 13**

**References ..... 14**

    Iso Standards:..... 14

    En Standards: ..... 14

    Other References:..... 14



## COMPANY DESCRIPTION

As a global leader in architectural concrete products, Solomon Colors has provided service and quality to our customers for 90 years while remaining family-owned and employee-owned. Innovation and solutions go hand in hand at Solomon Colors, with research and development as our core focus, beginning with our grinding iron ore for the building industry in the early 20th century to our latest innovations in decorative concrete and polishing. When Solomon Colors customers needed a better way to dispense pigments, they created the ColorSelect® systems for dry, liquid, and granular pigment. When the customers needed decorative products, Solomon Colors acquired Brickform. When the market began embracing polished concrete, they brought Lythic on board. From equipment to color to training – every improvement made is about meeting the customer's needs to help them do their business better.

## STUDY GOAL

The intended application of this life cycle assessment (LCA) is to comply with the procedures for creating a Type III environmental product declaration (EPD) and publish the EPD for public review on the website, [www.epdregistration.com](http://www.epdregistration.com). This level of study is in accordance with EPD Product Category Rule (PCR) for Cellulose fiber published by; International Standards Organization (ISO) 14025:2006 Environmental labels and declarations, Type III environmental declarations-Principles and procedures; ISO 14044:2006 Environmental management, Life cycle assessment- Requirements and guidelines; and ISO 14040:2006 Environmental management, Life cycle assessment-Principles and framework. The performance of this study and its subsequent publishing is in alignment with the business-to-business (B2B) communication requirements for the environmental assessment of building products. The study does not intend to support comparative assertions and is intended to be disclosed to the public.

This project report was commissioned to differentiate Solomon Colors Inc. from their competition for the following reasons: generate an advantage for the organization; offer customers information to help them make informed product decisions; improve the environmental performance of Solomon Colors Inc. by continuously measuring, controlling and reducing the environmental impacts of their products; help project facilitators working on Leadership in Energy and Environmental Design (LEED) projects achieve their credit goal; and to strengthen Solomon Colors Inc.'s license to operate in the community. The intended audience for this LCA report is Solomon Colors Inc.'s employees, their suppliers, project specifiers of their products, architects, and engineers. The EPD report is also available for policy makers, government officials interested in sustainability, academic professors, and LCA professionals. This LCA report does not include product comparisons from other facilities.

## DESCRIPTION OF PRODUCT AND SCOPE

Solomon UltraFiber 500® is cellulose fiber reinforcement for industrial, commercial, residential, architectural, and decorative applications. It also provides an excellent alternative to traditional secondary reinforcement – improving durability, impact resistance, shatter resistance, and freeze/thaw resistance without compromising appearance or finishability. Solomon UltraFiber 500 is the only alkaline-resistant cellulose fiber reinforcement. It is perfect for commercial and residential slabs, composite metal decks, pervious paving, curb, gutter, slip form, architectural and decorative,



shotcrete, wall, and white topping applications. In addition, Ultrafiber 500 cellulose fiber accepts color better than commercially available fiber. UltraFiber 500 provides excellent secondary reinforcement, is safe and easy to use, and provides superior finishability. It can replace traditional secondary reinforcement while improving durability, impact resistance, shatter resistance, and freeze/thaw resistance. Bonding between rebar and cement paste is improved while concrete permeability and absorption are reduced. Unlike polypropylene fiber, UltraFiber 500 is invisible in concrete and does not ball, fuzz, or blemish. It yields an aesthetically perfect finish with no special finishing practices. Also, unlike polypropylene fiber, UltraFiber 500 is derived from renewable resources. UltraFiber 500 has superb finishing quality, unsurpassed crack control, better hydration, excellent bonding for decorative and colored concrete, and utilizes an automated dispensing system.

This LCA assumes the impacts from products manufactured in accordance with the standards outlined in this report. This LCA is a cradle-to-gate study, and therefore, stages extending beyond the plant gate are not included in this LCA. Excluded stages include transportation of the manufactured material to the construction site; on-site construction processes and components; building (infrastructure) use and maintenance; and "end-of-life" effects.

## CELLULOSE FIBER REINFORCEMENT DESIGN SUMMARY

The following tables provide a list of the cellulose fiber reinforcement products considered in this EPD along with key performance parameters.

Table 1: Declared products with All declared products considered in this environmental product declaration

Prod#	Unique name/ID	Short description	Product type	Unit	Density dry kg/Unit	Bio-carbon content, kg C/FU dry basis	Product Group
1	UltraFiber 500®	Solomon UltraFiber 500 is an alkaline resistant cellulose fiber reinforcement.	cellulose fiber	kg	1.00	0.46	cellulose fiber

## CELLULOSE FIBER REINFORCEMENT DESIGN COMPOSITION

The following figures provide mass breakdown (kg per functional unit) of the material composition of each cellulose fiber reinforcement design considered.



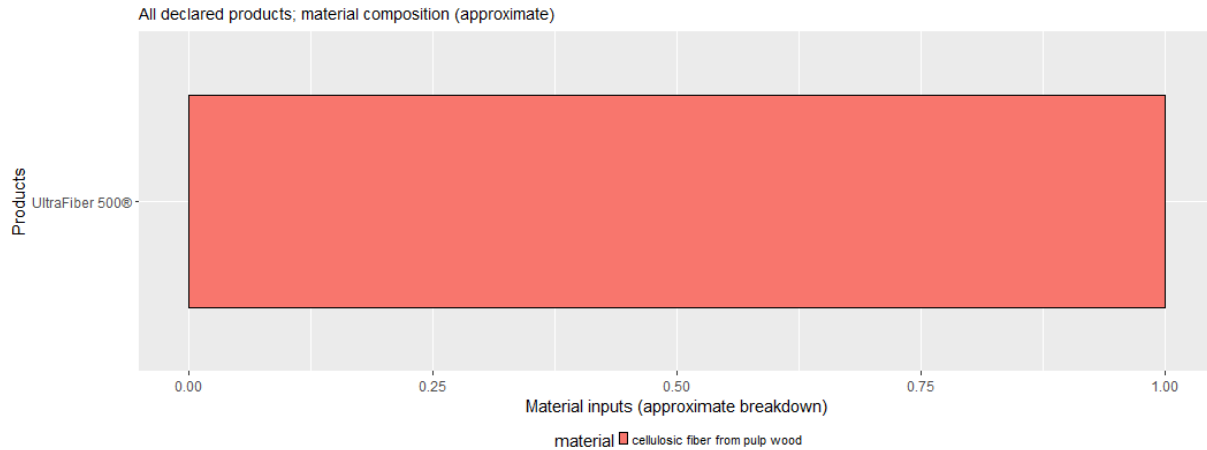


Figure 1: Material composition - All declared products per 1 kg of cellulose fiber reinforcement for industrial, commercial, residential, architectural, and decorative applications.

## A1 RAW MATERIAL RECYCLED CONTENT AND MATERIAL LOSSES

The following table provides a list of the raw material inputs (module A1) across all products considered, their recyclability content and assumed material losses.

Table 2: Module A1 raw material inputs, the recyclability content and assumed material losses (dry basis)

product.name	mix.category	primary.content	post.industrial.content	post.consumer.content	material.losses
Paper Pulp at pulp/fibre production	pulpwood, softwood, measured as solid wood under bark	100%	0%	0%	15%
On-Site Electricity from Biomass at pulp/fibre production	electricity, high voltage	100%	0%	0%	15%
Natural Gas at pulp/fibre production	heat, district or industrial, natural gas	100%	0%	0%	15%
Oil at pulp/fibre production	heat, central or small-scale, other than natural gas	100%	0%	0%	15%
Bulk Waste at pulp/fibre production	municipal solid waste	100%	0%	0%	15%



<b>Hazardous Waste at pulp/fibre production</b>	hazardous waste, for incineration	100%	0%	0%	15%
---	-----------------------------------	------	----	----	-----

## SYSTEM BOUNDARIES

The following figure depicts the cradle-to-gate system boundary considered in this study:

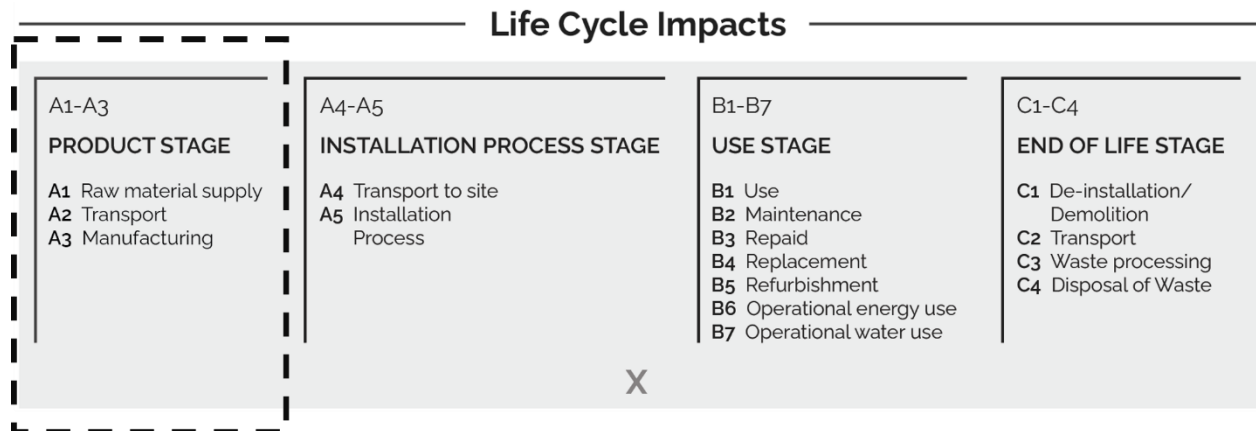


Figure 2: **General life cycle phases for consideration in this study**

This is a Cradle-to-gate life cycle assessment and the following life cycle stages are included in the study:

- A1: Raw material supply (upstream processes) - Extraction, handling, and processing of the materials used in manufacturing the declared products in this LCA.
- A2: Transportation - Transportation of A1 materials from the supplier to the "gate" of the manufacturing facility (i.e., A3).
- A3: Manufacturing (core processes)- The energy and other utility inputs used to store, move, and manufacturer the declared products and to operate the facility.

As according to the PCR, the following figure illustrates the general activities and input requirements for producing cellulose fiber reinforcement products and is not necessarily exhaustive.

In addition, as according to ISO 21930, the following requirements are excluded from this study:

- Production, manufacture and construction of A3 building/capital goods and infrastructure;
- Production and manufacture of steel production equipment, steel delivery vehicles, earth-moving equipment, and laboratory equipment;
- Personnel-related activities (travel, furniture, office supplies);
- Energy use related to company management and sales activities.

For this LCA the manufacturing plant, owned and operated by Solomon Colors Inc., is located at their Solomon Colors facility in Springfield, IL, USA. All operating data is formulated using the actual data from Solomon Colors Inc.'s plant at the above location, including water, energy consumption and waste generation. All inputs for this system boundary are calculated for the plant.

This life cycle inventory was organized in a spreadsheet and was then input into an RStudio environment where pre-calculated LCIA results for relevant products/activities stemming from the



ecoinvent v3.8 database and a local EPD database in combination with primary data from Solomon Colors Inc. were utilized. Explanations of the contribution of each data source to this study are outlined in the section 'Data Sources and Quality'. Further LCI details for each declared product are provided in the sections 'Detailed LCI tables' and 'Transport tables' of the detailed LCA report. A parameter uncertainty analysis was also performed where key statistical results (e.g., min/mean/max etc.) are provided in the detailed LCA report.

No known flows are deliberately excluded from this EPD.

## CUT-OFF CRITERIA

ISO 14044:2006 and the focus PCR requires the LCA model to contain a minimum of 95% of the total inflows (mass and energy) to the upstream and core modules be included in this study. The cut-off criteria were applied to all other processes unless otherwise noted above as follows. A 1% cut-off is considered for all renewable and non-renewable primary energy consumption and the total mass of inputs within a unit process where the total of the neglected inputs does not exceed 5%.

## DATA SOURCES AND DATA QUALITY ASSESSMENT

No recovered on-site energy occurs at this facility.

The following statements explain how the above facility requirements/generation were derived:

**Raw material transport:** This study includes primary information from Solomon Colors for the manufacturing and transporting the cellulose fiber. The study also contains primary data from the cellulose fiber manufacturer, including the pulpwood, energy, on-site electricity generation, and waste produced at both facilities. Cellulose fiber manufacturer is a separate manufacturer, Solomon Colors only processes the fiber to specification.

All information in the pulp manufacturing was copied from a third-party peer reviewed life cycle of the exact pulp fiber production used by Solomon Colors. No additional data was available beyond the life cycle provided. There are no co-products manufactured at this facility.

**Electricity:** The manufacturer of the cellulose fiber raw material reported primary data for the electricity generated on-site from biomass residuals.

**Process/space heating:** Space heating values are only reported for the pulp production. Solomon Colors does not use natural gas at their facility.

**Fuel required for machinery:** All machinery for the Solomon facility uses electricity.

**Waste generation:** Waste generated during the fiber processing has been included in this study based on primary reported data for the reference year 2021.

**Recovered energy:** No energy is recovered from this site.

**Recycled/reused material/components:** No recycling is assumed in this cradle to gate study.





**Module A1 material losses:** Direct reported material losses were used in this study.

**Direct A3 emissions accounting:** There are no direct emissions reported in this study.

The following tables depict a list of assumed life cycle inventory utilized in the LCA modeling to generate the impact results across the life cycle modules in scope. An assessment of the quality of each LCI activities utilized from various sources is also provided.

Table 3: LCI inputs assumed for module A1 (i.e., raw material supply)

Input	LCI.activity	Data.source	Geo	Year	Technology	Time	Geography	Reliability	Completeness
<b>Wastewater at pulp/fibre production</b>	market for wastewater from soft fibreboard production/wastewater from soft fibreboard production/RoW/m3	ecoinvent v3.8	California	v3.8 in 2021	1	3	1	3	3
<b>Paper Pulp at pulp/fibre production</b>	market for pulpwood, softwood, measured as solid wood under bark/pulpwood, softwood, measured as solid wood under bark/RoW/m3	ecoinvent v3.8	California	v3.8 in 2021	1	3	1	3	3
<b>Natural Gas at pulp/fibre production</b>	heat production, natural gas, at boiler condensing modulating >100kW/heat, district or industrial, natural gas/RoW/MJ	ecoinvent v3.8	California	v3.8 in 2021	2	3	1	3	3
<b>Hazardous Waste at pulp/fibre production</b>	treatment of hazardous waste, hazardous waste incineration/hazardous waste, for incineration/RoW/kg	ecoinvent v3.8	California	v3.8 in 2021	2	3	1	3	3
<b>On-Site Electricity from Biomass at pulp/fibre production</b>	heat and power co-generation, wood chips, 6667 kW, state-of-the-art 2014/electricity, high voltage/US-WECC/kWh	ecoinvent v3.8	California	v3.8 in 2021	2	3	1	3	3
<b>Bulk Waste at</b>	treatment of municipal solid waste, sanitary	ecoinvent v3.8	California	v3.8 in 2021	2	3	1	3	3





<b>pulp/fibre production</b>	landfill/municipal solid waste/RoW/kg								
<b>Oil at pulp/fibre production</b>	heat production, light fuel oil, at boiler 100kW, non-modulating/heat, central or small-scale, other than natural gas/CH/MJ	ecoinvent v3.8	California	v3.8 in 2021	2	3	1	3	3

Table 4: LCI inputs assumed for module A2 (i.e., transport of A1 inputs)

Input	LCI.activity	Data.source	Geo	Year	Technology	Time	Geography	Reliability	Completeness
<b>Bulk Waste-freight transport via Truck</b>	market for transport, freight, lorry 7.5-16 metric ton, EURO6/transport, freight, lorry 7.5-16 metric ton, EURO6/RoW/tkm	ecoinvent v3.8	RoW	v3.8 in 2021	2	3	1	3	3
<b>Bulk Waste at pulp/fibre production-freight transport via Truck</b>	market for transport, freight, lorry 7.5-16 metric ton, EURO6/transport, freight, lorry 7.5-16 metric ton, EURO6/RoW/tkm	ecoinvent v3.8	RoW	v3.8 in 2021	2	3	1	3	3
<b>Carton-freight transport via Truck</b>	market for transport, freight, lorry 7.5-16 metric ton, EURO6/transport, freight, lorry 7.5-16 metric ton, EURO6/RoW/tkm	ecoinvent v3.8	RoW	v3.8 in 2021	2	3	1	3	3
<b>Hazardous Waste at pulp/fibre production-freight transport via Truck</b>	market for transport, freight, lorry 7.5-16 metric ton, EURO6/transport, freight, lorry 7.5-16 metric ton, EURO6/RoW/tkm	ecoinvent v3.8	RoW	v3.8 in 2021	2	3	1	3	3
<b>Paper Pulp at pulp/fibre production-freight</b>	market for transport, freight, lorry 7.5-16 metric ton, EURO6/transport, freight, lorry 7.5-16	ecoinvent v3.8	RoW	v3.8 in 2021	2	3	1	3	3





<b>transport via Truck</b>	metric ton, EURO6/RoW/tkm									
<b>Polyethylene bag-freight transport via Truck</b>	market for transport, freight, lorry 7.5-16 metric ton, EURO6/transport, freight, lorry 7.5-16 metric ton, EURO6/RoW/tkm	ecoinvent v3.8	RoW	v3.8 in 2021		2	3	1	3	3
<b>Transport fiber to Solomon Facility</b>	transport, freight, lorry >32 metric ton, EURO6/transport, freight, lorry >32 metric ton, EURO6/RoW/tkm	ecoinvent v3.8	RoW	v3.8 in 2021		2	3	1	3	3

Table 5: LCI inputs assumed for module A3

<b>Input</b>	<b>LCI.activity</b>	<b>Data.source</b>	<b>Geo</b>	<b>Year</b>	<b>Technology</b>	<b>Time</b>	<b>Geography</b>	<b>Reliability</b>	<b>Completeness</b>	
<b>Bulk Waste</b>	treatment of waste packaging paper, municipal incineration/waste packaging paper/RoW/kg	ecoinvent v3.8	Illinois	v3.8 in 2021		1	3	1	3	3
<b>Carton</b>	folding boxboard carton production/folding boxboard carton/RoW/kg	ecoinvent v3.8	Multiple Regions	v3.8 in 2021		1	3	1	3	3
<b>Electricity</b>	market for electricity, medium voltage/electricity, medium voltage/US-SERC/kWh	ecoinvent v3.8	Illinois	v3.8 in 2021		2	3	2	3	3
<b>Pallet</b>	market for EUR-flat pallet/EUR-flat pallet/RoW/unit	ecoinvent v3.8	Multiple Regions	v3.8 in 2021		2	3	2	3	3
<b>Polyethylene bag</b>	packaging film production, low density polyethylene/packaging film, low density polyethylene/RoW/kg	ecoinvent v3.8	Multiple Regions	v3.8 in 2021		1	3	1	3	3



## DATA QUALITY ASSESSMENT

Data quality/variability requirements, as specified in the PCR, are applied. This section describes the achieved data quality relative to the ISO 14044:2006 requirements. Data quality is judged based on its precision (measured, calculated, or estimated), completeness (e.g., unreported emissions), consistency (degree of uniformity of the methodology applied within a study serving as a data source) and representativeness (geographical, temporal, and technological).

**Precision:** Through measurement and calculation, the manufacturers collected and provided primary data on their annual production. For accuracy, the LCA practitioner and 3rd Party Verifier validated the plant gate-to-gate data.

**Completeness:** All relevant specific processes, including inputs (raw materials, energy, and ancillary materials) and outputs (emissions and production volume) were considered and modeled to represent the specified and declared products. Most relevant background materials and processes were taken from ecoinvent v3.8 LCI datasets where relatively recent region-specific electricity inputs were utilized. The most relevant EPDs requiring key A1 inputs were also utilized where readily available.

**Consistency:** To ensure consistency, the same modeling structure across the respective product systems was utilized for all inputs, which consisted of raw material inputs and ancillary material, energy flows, water resource inputs, product, and co-products outputs, returned and recovered materials, emissions to air, water and soil, and waste recycling and treatment. The same background LCI datasets from the ecoinvent v3.8 database were used across all product systems. Crosschecks concerning the plausibility of mass and energy flows were continuously conducted. The LCA team conducted mass and energy balances at the plant and selected process level to maintain a high level of consistency.

**Reproducibility:** Internal reproducibility is possible since the data and the models are stored and available in a machine-readable project file for all foreground and background processes, and in Labeling Sustainability's proprietary LCA calculator\* for all production facility and product-specific calculations. A considerable level of transparency is provided throughout the detailed LCA report as the specifications and material quantity make-up for the declared products are presented and key primary and secondary LCI data sources are summarized. The provision of more detailed publicly accessible data to allow full external reproducibility was not possible due to reasons of confidentiality.

\*Labeling Sustainability has developed a proprietary tool that allows the calculation of PCR-compliant LCA results for 1 kg of cellulose fiber. The tool auto-calculates results by scaling base-unit technosphere inputs (i.e. 1 kg sand, 1 kWh electricity, etc.) to replicate the reference flow conversions that take place in any typical LCA software like openLCA or SimaPro. The tool was tested against several LCAs performed in openLCA and the tool generated identical results to those realized in openLCA across every impact category and inventory metric (where comparisons could be readily made).

**Representativeness:** The representativeness of the data is summarized as follows.

- Time related coverage of the manufacturing processes' primary collected data from 2021-01-01 to 2021-12-31.
- Upstream (background) LCI data was either the PCR specified default (if applicable) or more appropriate LCI datasets as found in the country-adjusted ecoinvent v3.8 database.



- Geographical coverage for inputs required by the A3 facility(ies) is representative of its region of focus; other upstream and background processes are based on US, North American, or global average data and adjusted to regional electricity mixes when relevant.
- Technological coverage is typical or average and specific to the participating facilities for all primary data.

## ENVIRONMENTAL INDICATORS AND INVENTORY METRICS

Per the PCR, this EPD supports the life cycle impact assessment indicators and inventory metrics as listed in the tables below. As specified in the PCR, the most recent US EPA Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI), impact categories were utilized as they provide a North American context for the mandatory category indicators to be included in the EPD. Additionally, the PCR requires a set of inventory metrics to be reported with the LCIA indicators (see tables below).

Table 6: Life cycle impact categories and life cycle inventory metrics

ID	LCIA.indicators	Abbreviations	Units
1	Environmental impact: acidification	AP	moles of H <sup>+</sup> -Eq
2	Environmental impact: eutrophication	EP	kg N
3	Environmental impact: global warming	GWP	kg CO <sub>2</sub> -Eq
4	Environmental impact: ozone depletion	ODP	kg CFC-11-Eq
5	Environmental impact: photochemical oxidation	PCOP	kg NO <sub>x</sub> -Eq
6	Material resources: metals/minerals: abiotic depletion potential (ADP): elements (ultimate reserves)	ADPe	kg Sb-Eq
7	Energy resources: non-renewable: abiotic depletion potential (ADP): fossil fuels	ADPf	MJ, net calorific value
<b>Inventory metrics</b>			
8	Total primary energy	TPE	MJ-Eq
9	Renewable energy	RE	MJ-Eq
10	Non-renewable energy	NRE	MJ-Eq
11	Non-Renewable Resources	NRR	kg
12	Renewable Resources	RR	m <sup>3</sup>
13	Water depletion: WDP	WDP	m <sup>3</sup>
14	Land filling: bulk waste	LFW	kg waste
15	Land filling: hazardous waste	LFHW	kg waste
16	Resource: carbon, biogenic, fixed	bioC	kg

A summary description of each of the impact categories and inventory metrics is provided in the following table:

It should be noted that emerging LCA impact categories and inventory items are still under development and can have high levels of uncertainty that preclude international acceptance pending further development. Use caution when interpreting data in any of the following categories.

- Renewable primary energy resources as energy (fuel);
- Renewable primary resources as material;
- Non-renewable primary resources as energy (fuel);





- Non-renewable primary resources as material;
- Secondary Materials;
- Renewable secondary fuels;
- Non-renewable secondary fuels;
- Recovered energy;
- Abiotic depletion potential for non-fossil mineral resources.
- Land use related impacts, for example on biodiversity and/or soil fertility;
- Toxicological aspects;
- Emissions from land use change [GWP 100 (land-use change)];
- Hazardous waste disposed;
- Non-hazardous waste disposed;
- High-level radioactive waste;
- Intermediate and low-level radioactive waste;
- Components for reuse;
- Materials for recycling;
- Materials for energy recovery;
- Recovered energy exported from the product system.

## TOTAL IMPACT SUMMARY

The following table reports the total LCA results for 1 kg of cellulose fiber.

Table 7: Total life cycle (across modules in scope) impact results for 1 kg of cellulose fiber

a) Midpoint Impact Categories:

Indicator/LCI Metric	AP	EP	GWP	ODP	PCOP	ADPe	ADPf
Unit	moles of H <sup>+</sup> -Eq	kg N	kg CO <sub>2</sub> -Eq	kg CFC-11-Eq	kg NO <sub>x</sub> -Eq	kg Sb-Eq	MJ, net calorific value
UltraFiber 500®	0.34	0.00362	1.08	1.82e-07	0.00504	4.43e-06	14.7

b) Inventory Metrics:

Indicator/LCI Metric	TPE	RE	NRE	NRR	RR	WDP	LFW	LFHW	bioC
Unit	MJ-Eq	MJ-Eq	MJ-Eq	kg	m <sup>3</sup>	m <sup>3</sup>	kg waste	kg waste	kg
UltraFiber 500®	80.7	65	15.5	0.419	0.00663	0.00349	0.389	3.35e-05	0.91

## ADDITIONAL ENVIRONMENTAL INFO

No regulated substances of very high concern are utilized on site.



## REFERENCES

---

### ISO Standards:

- ISO 6707-1: 2014 Buildings and Civil Engineering Works - Vocabulary - Part 1: General Terms
- ISO 14021:1999 Environmental Labels and Declarations - Self-declared Environmental Claims (Type II Environmental Labeling)
- 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
- ISO 14067:2018 Greenhouse Gases – Carbon Footprint of Products – Requirements and Guidelines for Quantification
- ISO 14050:2009 Environmental Management - Vocabulary
- ISO 21930:2017 Sustainability in Building Construction - Environmental Declaration of Building Products

### EN Standards:

- EN 16757 Sustainability of construction works - Environmental product declarations – Product Category Rules for concrete and concrete elements
- EN 15804 Sustainability of construction works - Environmental product declarations -Core rules for the product category of construction products

### Other References:

- USGBC LEED v4 for Building Design and Construction, 11 Jan 2019 available at <https://www.usgbc.org/resources/pcr-committee-process-resources-part-b>
- USGBC PCR Committee Process & Resources: Part B, USGBC, 7 July 2017 available at <https://www.usgbc.org/resources/pcr-committee-process-resources-part-b>.
- US EPA (2020) Advancing Sustainable Materials Management: 2018 Fact Sheet, [https://www.epa.gov/sites/production/files/2021-01/documents/2018\\_ff\\_fact\\_sheet\\_dec\\_2020\\_fnl\\_508.pdf](https://www.epa.gov/sites/production/files/2021-01/documents/2018_ff_fact_sheet_dec_2020_fnl_508.pdf)

