Environmental Product Declaration

BioFelt® Flooring

Chilewich Sultan LLC

chilewich®

Founded in 2000, Chilewich pioneered the use of extruded yarns for woven tabletop coverings and soon expanded into flooring, wall textiles, and window coverings for commercial use. Made in the United States, these products combine innovative design and a distinctive color palette with extraordinary durability and easy maintenance.

BioFelt®, Chilewich's composite flooring system, features an integrated moisture barrier between the company's signature fabric and the underlying cushion of recycled felt. This prevents spill absorption and inhibits the growth of mold and mildew beneath flooring.

All Chilewich Contract products are made with TerraStrand®: extruded yarns composed of a fiberglass or polyester core encased in phthalate-free vinyl and containing a minimum of 18% renewable vegetable content.

Engineered for endurance, Chilewich products have a long lifecycle and are washable with water and bio-degradable detergents. **For more information, visit chilewichcontract.com**

UL CERTIFIED
ENVIRONMENTAL PRODUCT DECLARATION
UL.COM/EPD

ENVIRONMENTAL PRODUCT DECLARATION

chilewich®

BioFelt® Flooring

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According to ISO 14025 and EN 15804

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025 and EN15804. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc. Accuracy of Results: EPDs regularly rely on estimations of impacts, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. Comparability: EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules, or are missing relevant environmental impacts. EPDs from different programs may not be comparable.

PROGRAM OPERATOR	UL Environment
DECLARATION HOLDER	Chilewich Sultan LLC
DECLARATION NUMBER	4787689156.101.1
DECLARED PRODUCT	Chilewich BioFelt Flooring
REFERENCE PCR	PCR for EPDs: IBU PCR for Floor Coverings (UL E, V1.0 Aug. 27, 2014)
DATE OF ISSUE	February 23, 2017
PERIOD OF VALIDITY	5 years
CONTENTS OF THE DECLARATION	Product definition and information about building physics Information about basic material and the material's origin Description of the product's manufacture Indication of product processing Information about the in-use conditions Life cycle assessment results Testing results and verifications

The PCR review was conducted by:	Environment and Development Foundation PCR Addendum: UL Environment
This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories ☒ INTERNAL ☐ EXTERNAL	 Wade Stout, ULE EPM
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	 Thomas Gloria, Life-Cycle Services, LLC

This EPD conforms with EN 15804

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Product Definition and Information

Product Description

This environmental product declaration covers all styles of Chilewich's BioFelt flooring, in both tile and wall-to-wall (w2w) applications. Chilewich flooring products are made with woven vinyl fabrics, using bi-colored yarns. Fabrics are laminated to a combination vinyl/polyester backing system with a low melting point adhesive.

Chilewich products meet all US codes for heavy duty use. The products also meet all codes for heavy duty use (Class 33) in the EU.

Chilewich products are low VOC and contain Microban® which inhibits microbial growth and Terrastrand®, a phthalate-free yarn made with renewable vegetable compounds.

Microban® antimicrobial product protection

TerraStrand™

Range of Application

BioFelt products are primarily used in commercial applications but can also be used for hospitality, healthcare, retail, educational and multi-family applications.

Technical Data

The following technical data represents the average case for each type of Chilewich BioFelt flooring.

Technical Data	BioFelt Flooring	Unit
Type of manufacture	Woven Textile	-
Yarn type	PVC w/ Fiberglass Core	-
Total thickness	4.95	mm
Total carpet weight	3,006	g/m^2
Secondary backing	BioFelt Backing	-
Density	607	kg/m^3

Table 1 – Technical Data for BioFelt Flooring

The following standards are applicable for the range of products in this declaration:

- Green Label Plus® Indoor Air Quality Certification certified by the Carpet and Rug Institute
- EN 15114:2008 – Textile Floor Coverings: Classification of textile floor coverings without pile
- EN 13501-1:2007+A1:2009 – Fire classification of construction products and building elements
- EN 14041:2016 – Resilient, textile and laminate floor coverings – Essential characteristics

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Delivery Status

BioFelt Tile floorings are available in 18 inch by 18 inch or in 6 inch by 36 inch tiles, as well as in a wall-to-wall application delivered in a roll 6 feet wide, with a typical square footage of 267 ft^2 per roll.

Base Materials

The raw materials for these BioFelt Flooring products are listed in Table 2 below.

Component	Material	BioFelt Flooring
Yarn/Pile Material	PVC Compound w/ Fiberglass Core	23%
Adhesive	Polyamide/Spunfab 1.5	2%
BioFelt Backing	PVC/Recycled Polyester	75%

Table 2 – Raw Materials

Manufacturing Process

Chilewich's manufacturing process provides its customers with the flexibility to select a fabric and backing system to suit their needs. All products are made to order and almost any order can be filled within 2-3 weeks. All Chilewich manufacturing takes place at their plant in Chatsworth, GA.

Environmental and Health during Manufacture

Chilewich is dedicated to reducing their impact on the environment through their production practices. When considering the environment during manufacture, Chilewich has incorporated energy efficiencies and recycling initiatives. Material efficiencies were also implemented with packaging as raw material packaging are reused between processing steps and, if not able to be reused, packaging is recycled. Chilewich has optimized process efficiency by using lower-melting point adhesives, which allows the laminator to be run at lower temperatures and minimize manufacturing energy consumption.

Packaging

The packaging materials for these woven textile flooring products are listed in Table 3 below.

Material (g/m²)	BioFelt Tile Flooring	BioFelt w2w Flooring
Paper	1.0	1.6
LDPE	5.3	7.4
Cardboard	145.2	113.1
HDPE	1.3	0.7
Tape	-	0.1
Wood	406.4	-
Total	**559.2**	**122.9**

Table 3 – Packaging Materials

Product Installation

An average scrap rate of 5% from installation, as well as a usage of 353 grams per square meter of adhesive compound, were assumed in this study. The disposal of packaging materials is also included in the installation stage. No other materials are required for installation.

Conditions of Use

BioFelt flooring is a passive product after installation and during the use stage. The product consumes no energy directly; however, cleaning is required for regular maintenance and upkeep of the product. Vacuuming twice per week was assumed.

Environment and Health during Use

There is no harmful emissive potential. No damage to health or impairment is expected under normal use of the textile flooring products. Volatile organic chemical (VOC) emissions have been tested and certified to the Green Label Plus® by Carpet and Rug Institute, Inc., as well as to EN 14041:2016, as certified by DiBt.

Reference Service Life

BioFelt Tile floorings have a reference service life and warranty of 10 years.

Extraordinary Effects

Below are the flammability testing results, conducted by ÖTI. No testing to water or mechanical destruction have been performed.

Flammability	Test Results (Mean Value)	Number of Tests
Ignitability, EN ISO 11925-2 Flame Spread ≤ 150 mm	Compliant	6
Burning Behavior, EN ISO 9239-1 Critical Radiant Flux	10.5 kW/m²	3
Burning Behavior, EN ISO 9239-1 Integral of smoke obscuration	54 %.min.	3

Table 4 – Fire Testing

Re-use Phase

This product is not recyclable.

Disposal

The end of life of this product assumes an average US waste disposition, per the US EPA solid waste statistics.

Further Information

For more information, to contact Chilewich Sultan LLC please call Customer Service 888-851-7130, visit http://www.chilewich.com/contract, or email customerservice@chilewich.com.

Life Cycle Assessment: Calculation Rules

Declared Unit

Environmental impacts are reported per declared unit of a product. The declared unit is the basis for comparison in an LCA. For textile flooring products, the functional unit is one square meter of installed flooring.

Life Cycle Boundary	Value	Unit
Conversion Factor to 1 kg	0.33	-
Declared Unit	1	m^2

Table 5 – Declared Unit

System Boundary

The system boundary is cradle-to-gate with options, as shown below in Table 6.

Product			Construction Installation		Use							End of Life				Benefits of loads beyond the system boundary		
Raw Material Extraction and Processing	Transport	Manufacturing	Transport	Construction/ Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	De-Construction/ Demolition	Transport	Waste Processing	Disposal	Reuse	Recovery	Recycling
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	D	D
X	X	X	X	X	MND	X	MND	MND	MND	MND	MND	MND	X	MND	X	MND	MND	MND

Table 6 – Description of the System Boundary (X = Declared Module, MND = Module not declared)

Estimates and Assumptions

For recycled content, the “recycled content methodology,” also known as the “cut-off methodology,” was applied to the raw materials.

Cut-off Criteria

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

This EPD is in compliance with the cut-off criteria. Capital items for the production processes (machines, buildings, etc.) were not taken into consideration.

Background Data

SimaPro v8.2 Software System for Life Cycle Engineering, an internationally recognized LCA modeling software program, was used for life cycle impact assessment modeling. Background and secondary datasets were modeled using the ecoinvent v3 recycled content database, which is developed by the Swiss Centre for Life Cycle Inventories.

Period under Review

Primary data used refer to the production processes of the manufacturing facility and were derived from June to October 2018 data.

Allocation

Allocation for manufacturing energy, water, and waste items were allocated based on production pounds at the Chatsworth plant. For recycled content, the “recycled content methodology,” or also known as the “cut-off methodology,” was applied to the raw materials. No credits from recycling or energy recovery of materials or waste were used in the modeling of this study.

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.

LCA: Scenarios and Additional Technical Information

The following technical information is a basis for the declared modules or can be used for developing specific scenarios in the context of a building assessment if modules are not declared.

Name	BioFelt Tile Flooring	BioFelt w2w Flooring	Unit
Fuel	0.0070	0.0070	liters/100km
Average Transport Distance	1922	1922	km
Gross Density of Products Transported	346.46	1054.21	kg/m^3

Table 7 – Transport to the Construction Site (A4)

Name	Value	Unit (per m^2 installed)
Auxiliary	0.353	kg
Water Consumption	-	m^3
Electricity Consumption	-	kWh
Other Energy Carriers	-	MJ
Material Loss	5	%
Output Substances following Waste Treatment on Site	-	kg
Dust in the Air	-	kg

Table 8 – Installation into the Building (A5)

Name	Value	Unit (per RSL)
Information on Maintenance	Vacuuming twice per week	-
Maintenance Cycle	Vacuum twice per week	-
Water Consumption	-	m^3
Auxiliary	-	kg
Electricity Consumption	3.77	kWh
Other Energy Carriers	-	MJ
Material Loss	-	kg

Table 9 – Maintenance (B2)

Name	Value	Unit
Collected Separately	-	kg
Collected as Mixed Construction Waste	3.01	kg
Reuse	-	kg
Recycling	-	kg
Energy Recovery	-	kg
Landfilling	2.46	kg
Incineration	0.54	kg

Table 10 – End of Life (C1-C4)

Life Cycle Impact Assessment

The environmental impacts listed below were assessed throughout the life cycle of the flooring products as defined above, per square meter of flooring. The environmental impacts were analyzed using TRACI 2.1 and CML methodology.

TRACI 2.1		A1-A3	A4	A5	B2	C4	Units
GWP	Global warming potential	1.04E+01	1.53E+00	8.77E-01	2.54E+00	1.54E+00	kg CO_2 Eq.
ODP	Depletion potential of the stratospheric ozone layer	4.45E-07	2.66E-07	5.78E-08	3.95E-11	1.24E-08	kg CFC-11 Eq.
AP	Acidification potential	6.62E-02	7.44E-03	2.03E-03	2.20E-02	7.27E-04	kg SO_2 Eq.
EP	Eutrophication potential	1.07E-02	9.96E-04	5.81E-03	2.94E-04	1.76E-02	kg N Eq.
POCP	Photochemical ozone creation potential	5.16E-01	1.94E-01	2.59E-02	1.46E-01	1.68E-02	kg O_3 Eq.
ADPF	Abiotic depletion potential for fossil resources	2.52E+01	3.00E+00	1.55E+00	1.90E+00	1.54E-01	MJ surplus energy
CML		**A1-A3**	**A4**	**A5**	**B2**	**C4**	**Units**
GWP	Global Warming Potential	1.06E+01	1.54E+00	9.59E-01	2.56E+00	1.84E+00	kg CO_2 Eq.
ODP	Depletion potential of stratospheric ozone layer	4.06E-07	1.99E-07	4.59E-08	1.68E-11	9.50E-09	kg CFC-11 Eq.
AP	Acidification potential	6.99E-02	6.27E-03	2.04E-03	2.38E-02	5.59E-04	kg SO_2 Eq.
EP	Eutrophication potential	6.83E-03	1.22E-03	2.32E-03	7.77E-04	6.66E-03	kg $(PO_4)^3$ Eq.
POCP	Photochemical ozone creation potential	4.08E-03	2.63E-04	3.51E-04	9.20E-04	3.41E-04	kg ethane Eq.

Table 11 – BioFelt Tile Flooring Life Cycle Impact Assessment Results

TRACI 2.1		A1-A3	A4	A5	B2	C4	Units
GWP	Global warming potential	1.03E+01	1.35E+00	6.54E-01	2.54E+00	1.54E+00	kg CO_2 Eq.
ODP	Depletion potential of the stratospheric ozone layer	3.97E-07	2.34E-07	5.60E-08	3.95E-11	1.24E-08	kg CFC-11 Eq.
AP	Acidification potential	6.51E-02	6.54E-03	1.93E-03	2.20E-02	7.27E-04	kg SO_2 Eq.
EP	Eutrophication potential	1.04E-02	8.76E-04	3.26E-03	2.94E-04	1.76E-02	kg N Eq.
POCP	Photochemical ozone creation potential	2.51E+01	2.64E+00	1.53E+00	1.90E+00	1.54E-01	kg O_3 Eq.
ADPF	Abiotic depletion potential for fossil resources	1.03E+01	1.35E+00	6.54E-01	2.54E+00	1.54E+00	MJ surplus energy
CML		**A1-A3**	**A4**	**A5**	**B2**	**C4**	**Units**
GWP	Global Warming Potential	1.05E+01	1.35E+00	6.92E-01	2.56E+00	1.84E+00	kg CO_2 Eq.
ODP	Depletion potential of stratospheric ozone layer	3.57E-07	1.75E-07	4.46E-08	1.68E-11	9.50E-09	kg CFC-11 Eq.
AP	Acidification potential	6.90E-02	5.51E-03	1.96E-03	2.38E-02	5.59E-04	kg SO_2 Eq.
EP	Eutrophication potential	6.68E-03	1.07E-03	1.36E-03	7.77E-04	6.66E-03	kg $(PO_4)^3$ Eq.
POCP	Photochemical ozone creation potential	3.99E-03	2.31E-04	3.02E-04	9.20E-04	3.41E-04	kg ethane Eq.

Table 12 – BioFelt w2w Flooring Life Cycle Assessment Results

The following table details the use of resources across the life cycle of the products.

BioFelt Tile Flooring		A1-A3	A4	A5	B2	C4	Unit
PERE	Use of RENEWABLE primary energy excluding the RENEWABLE primary energy used as raw materials	7.79E-01	6.06E-02	1.99E-01	0.00E+00	4.56E-02	MJ
PERM	Use of RENEWABLE primary energy resources used as raw materials	1.74E+00	1.82E-02	8.28E-02	0.00E+00	4.16E-03	MJ
PERT	Total use of RENEWABLE primary energy resources	2.52E+00	7.88E-02	2.82E-01	0.00E+00	4.97E-02	MJ
PENRE	Use of NON-RENEWABLE primary energy excluding the NON-RENEWABLE primary energy resources used as raw materials	2.15E+02	2.27E+01	1.42E+01	3.62E+01	1.48E+00	MJ
PENRM	Use of NON-RENEWABLE primary energy as raw materials	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MJ
PENRT	Total use of NON-RENEWABLE primary energy	2.15E+02	2.27E+01	1.42E+01	3.62E+01	1.48E+00	MJ
SM	Use of secondary materials	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	kg
RSF	RENEWABLE secondary fuels	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MJ
NRSF	Use of NON-RENEWABLE secondary fuels	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MJ
FW	Use of fresh water resources	1.38E+00	1.93E-04	1.37E+00	0.00E+00	2.52E-01	m^3

Table 13 – BioFelt Tile Flooring Use of Resources

BioFelt Tile Flooring		A1-A3	A4	A5	B2	C4	Unit
PERE	Use of RENEWABLE primary energy excluding the RENEWABLE primary energy used as raw materials	7.72E-01	5.33E-02	1.92E-01	0.00E+00	4.56E-02	MJ
PERM	Use of RENEWABLE primary energy resources used as raw materials	1.40E+00	1.60E-02	8.22E-02	0.00E+00	4.16E-03	MJ
PERT	Total use of RENEWABLE primary energy resources	2.17E+00	6.93E-02	2.74E-01	0.00E+00	4.97E-02	MJ
PENRE	Use of NON-RENEWABLE primary energy excluding the NON-RENEWABLE primary energy resources used as raw materials	2.13E+02	2.00E+01	1.40E+01	3.62E+01	1.48E+00	MJ
PENRM	Use of NON-RENEWABLE primary energy as raw materials	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MJ
PENRT	Total use of NON-RENEWABLE primary energy	2.13E+02	2.00E+01	1.40E+01	3.62E+01	1.48E+00	MJ
SM	Use of secondary materials	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	kg
RSF	RENEWABLE secondary fuels	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MJ
NRSF	Use of NON-RENEWABLE secondary fuels	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MJ
FW	Use of fresh water resources	1.37E+00	1.70E-04	1.33E+00	0.00E+00	2.52E-01	m^3

Table 14 – BioFelt w2w Flooring Use of Resources

Waste and other outputs from the life cycle of these flooring products are listed in Table 15, below.

BioFelt Tile Flooring		A1-A3	A4	A5	B2	C4	Units
HWD	Disposed-of-hazardous WASTE	7.46E-03	5.72E-06	1.17E-05	0.00E+00	3.50E-06	kg
NHWD	Disposed-of non-hazardous WASTE	6.05E-01	1.37E-02	6.57E-01	0.00E+00	2.60E+00	kg
RWD	Disposed-of Radioactive WASTE	3.20E-05	1.13E-04	1.74E-05	0.00E+00	3.19E-06	kg
CRU	Components for reuse	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	kg
MFR	Materials for recycling	2.38E-05	2.96E-07	1.89E-07	0.00E+00	1.21E-07	kg
MET	Materials for energy recovery	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	kg
EEE	Exported electrical energy (waste to energy)	0.00E+00	1.77E-03	0.00E+00	0.00E+00	0.00E+00	MJ
EET	Exported thermal energy (waste to energy)	2.38E-05	1.77E-03	0.00E+00	0.00E+00	0.00E+00	MJ

Table 15 – BioFelt Tile Flooring Output Flows and Wastes

BioFelt Tile Flooring		A1-A3	A4	A5	B2	C4	Units
HWD	Disposed-of-hazardous WASTE	7.46E-03	5.03E-06	1.11E-05	0.00E+00	3.50E-06	kg
NHWD	Disposed-of non-hazardous WASTE	6.03E-01	1.20E-02	2.80E-01	0.00E+00	2.60E+00	kg
RWD	Disposed-of Radioactive WASTE	3.16E-05	9.90E-05	1.69E-05	0.00E+00	3.19E-06	kg
CRU	Components for reuse	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	kg
MFR	Materials for recycling	2.38E-05	2.96E-07	1.89E-07	0.00E+00	1.21E-07	kg
MET	Materials for energy recovery	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	kg
EEE	Exported electrical energy (waste to energy)	0.00E+00	1.77E-03	0.00E+00	0.00E+00	0.00E+00	MJ
EET	Exported thermal energy (waste to energy)	2.38E-05	1.77E-03	0.00E+00	0.00E+00	0.00E+00	MJ

Table 16 – BioFelt w2w Output Flows and Wastes

LCA Interpretation

The raw material and extraction phase, along with the maintenance and manufacturing (including packaging materials) phases are the key drivers of environmental impacts for BioFelt Tile flooring products. Raw materials dominate all impact categories due to the upstream processing of the materials Chilewich uses in its products. The maintenance of vacuuming twice per week is a secondary driver for BioFelt Tile flooring, due to electricity usage over the 10 year lifespan of the product. For manufacturing, energy consumption (electricity and natural gas) account for the majority of the impacts, while the upstream processing of packaging materials contributes the majority of the impacts on ozone depletion due to cardboard production.

References

- Product Category Rules for Building-Related Products and Services *Adapted for UL Environment from the range of Environmental Product Declarations of Institute Construction and Environment e.V. (IBU) Version 1.3*
- Product Category Rules for preparing an environmental product declaration (EPD) for PCR: *Addendum for IBU Part B: Floor Coverings, version 1.5 October 2014*
- (ILCD, 2010) Joint Research Commission, 2010, ILCD Handbook: General Guide for Life Cycle Assessment
- Intergovernmental Panel on Climate Change (IPCC)
- ISO 14025:2006 *Environmental labels and declarations – Type III environmental declarations – Principles and procedures*
- ISO 14040:2006 *Environmental management - Life cycle assessment – Principles and framework*
- ISO 14044:2006 *Environmental management - Life cycle assessment – Requirements and guidelines*
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- California Specification 01350 v1.1 *Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers*
- EN 15114:2008 *Textile Floor Coverings - Classification of textile floor coverings without pile*
- EN 13501-1:2007+A1:2009 *Classification of Burning Behaviour - Fire classification of construction products and building elements*
- EN 14041:2016 – Resilient, textile and laminate floor coverings: Essential characteristics

LCA Development

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

SustainableSolutions CORPORATION

Contact Chilewich

To contact Chilewich Sultan LLC, please call 212-679-9204, visit https://www.chilewich.com/contract/, or email info@chilewich.com.