ENVIRONMENTAL PRODUCT DECLARATION

RICHLITE® SURFACES

RICHLITE + SKATELITE SURFACES

Clockwise:
X-Games – Skatelite Ramp Surface, Color: Pro Natural
Gasser Schreinerei – Exterior Cladding, Color: Slate
Brunner Küchen - Residential Cabinet Face, Color: Chocolate Glacier
Epicurean ® - Cutting Board, Color: r50

Declaration for 1 m^2 (10.8 ft^2) of product over a period of 10 years

richlite

With materials made from recycled content and sustainable manufacturing practices, Richlite's goal is to achieve success while leaving behind a smaller footprint. Complete with FSC® Certification, GREENGUARD Accreditation, and Waste-to-Energy manufacturing processes, Richlite is committed to a more sustainable future.

Richlite's openness is designed to create a dialogue on responsible manufacturing while holding the company, our partners, and the industry accountable.

UL CERTIFIED
ENVIRONMENTAL PRODUCT DECLARATION
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RICHLITE + SKATELITE SURFACES

According to ISO 14025 and ISO 21930:2007

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025. 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: EPD not written to support comparative assertions. Differences in functional unit, use, end-of-life assumptions, methodology, allocation methods, data quality (variability in datasets), and assessment software tools may produce incomparable results.

PROGRAM OPERATOR	UL Environment
DECLARATION HOLDER	Richlite Surfaces
DECLARATION NUMBER	4788276914.101.1
DECLARED PRODUCT	Richlite + Skatelite Surfaces
REFERENCE PCR	PCR Residential Countertops, NSF Sustainability, 2018
REFERENCE PCR STANDARD	☐ EN 15804 (2012) ☒ ISO 21930 (2007) ☐ ISO 21930 (2017)
DATE OF ISSUE	January 1, 2019
DATE OF EXPIRATION	December 31, 2024
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 Life cycle assessment results Testing results and verifications

The PCR review was conducted by:	NSF
	PCR Peer Review Panel
	ncss@nsf.org
This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories ☐ INTERNAL ☒ EXTERNAL	Grant R. Martin
	Grant R. Martin, UL Envvironment
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	Thomas P Gloria
	Thomas P Gloria, Industrial Ecology Consultants

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According to ISO 14025

Richlite Surfaces Description

Richlite is a paper-based fiber composite surfacing material made of paper which is treated with resin and then pressed and baked to create solid sheets. All Richlite materials are made either with Forest Stewardship Council (FSC)-Certified paper and/or post-consumer recycled paper. FSC is a global non-profit organization devoted to encouraging the responsible management of the world's forests. Richlite's most popular product lines include:

Name	FSC Paper Source
Northwest Colors	100% Recycled
Heritage Colors	Mixed Credit (Mixed sources: recycled & renewable)
Cascade Colors	100% Recycled
Skatelite	Mixed Credit (Mixed sources: recycled & renewable)

Table 1: Richlite Product Lines

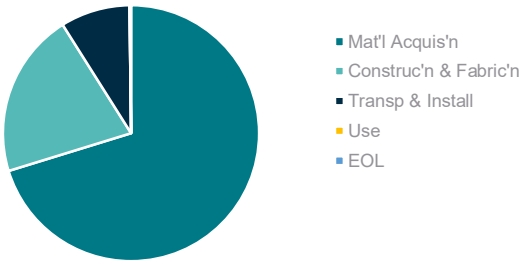
Richlite's product lines are similar in composition and density; they vary mainly by the cellulose fiber content. The underlying Life Cycle Assessment evaluated the surface products by the sales-weighted average of the dimensions, thicknesses and weights. The LCA products are as follows:

Product Name	Popular dimension m (ft)	Popular thickness cm (in)	Weight kg/m² (lb/ft²)	Wt. avg thickness cm (in)	Wt. avg weight kg/m²
LCA Product 1: Richlite FSC Mix Credit, incl. Heritage and Cascade	1.5x3.7 (5x12)	0.635 (0.25)	7.89 (1.61)	1.0 (0.40)	13.0 (2.67)
LCA Product 2: Richlite FSC Recycled Credit, incl. Northwest and Cascade	1.5x3.7 (5x12)	1.9 (0.75)	24.90 (5.10)		
LCA Product 3: Richlite FSC Mix Credit, incl. Heritage	1.5x3.7 (5x12)	1.3 (0.5)	16.60 (3.40)		
LCA Product 4: Skatelite FSC Mix Credit	1.2x2.4 (4x8)	0.635 (0.25)	7.63 (1.56)		

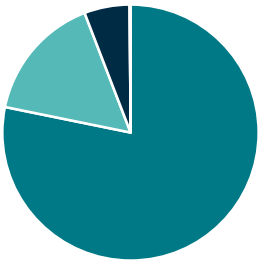
Table 2: Richlite Surfaces Evaluated

Key Environmental Parameters

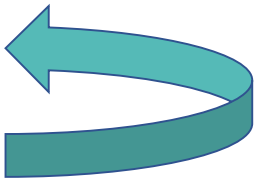
Global Warming Potential
68 kg CO2-eq



Primary Energy Demand
1,577 MJ



Recycled Paper Content *
27% fully recycled
73% unknown recycled content



* Recycled paper content varies on product selected. For example, Northwest Colors contain 100% recycled paper while Heritage Colors contains various percentages of recycled paper content.

RICHLITE + SKATELITE SURFACES

According to ISO 14025

Specifications

Product Applications

Richlite Surfaces are used for architectural millwork, countertop surfaces, backsplashes, cabinet faces, exterior cladding, wainscoting, stage flooring, guitar fretboards, furniture, industrial tooling, skate ramp surfaces (Skatelite), and other architectural applications.

Product Characteristics

Richlite Surfaces adhere to the NSF/ANSI 51 technical specifications for polymeric solid surfaces. Performance properties and characteristics are summarized below.

Property	Description	Value
Electrical Properties	Dielectric Strength (Volts/mil)	150
	Dielectric Constant	9.24
Thermal Properties	Coeff. Of Thermal Expansion In X Dir (min/in.□F)	5.2
	Coeff of Thermal Expansion In Y Dir (min/in.□F)	12.8
	Coeff of Thermal Expansion In Z Dir (min/in.□F)	45.9/73.5”
	Thermal Conductivity (Cal cm/cm2 sec □C)	0.00051
Tensile Strength	Density	75.84 lbs per cubic foot
	X Direction(psi)	19,200
	Y Direction (psi)	13,100
Compressive Strength	X Direction (psi) Strain @ Failure	18,400 7.09%
	Y Direction (psi) Strain @ Failure	15,900 7.15%
	Z Direction (psi) Strain @ Failure	30,000 [a]20%
Flexural Strength (Face In Tension)	X Direction (psi)	22,000
	Y Direction (psi)	17,300
Flexural Strength (Edge In Tension)	X Direction (psi)	20,400
	Y Direction (psi)	16,100
Izod Impact (Face Impact)	X Direction (ft. lb. Per Inch of width)	2.48
	Y Direction (ft. lb. Per Inch of width)	1.46
Izod Impact (Edge Impact)	X Direction (ft. lb. Per Inch of width)	0.68
	Y Direction (ft. lb. Per Inch of width)	0.62
Abrasion Resistance – Taber Abraser (CS-17) (1/4x”x4”x4”)	Weight Loss per 1000 revs	0.0112%
	Wear per 1000 revs (Inches)	0.00011
	Coefficient of Friction (Unpolished)	0.2
Burning Rate		Very Slow
Heat Resistance		Up to 350 degrees
Fire-test Evaluation	Flame Spread Index	25
	Smoke Index	40
Specific Gravity	21% heavier than water by volume	1.213
Aging	Mechanical and Electrical Properties	Improves

Sunlight		Darkens Surface
Clarity		Opaque
Weak Acids		None to slight depending on Acid
Strong Acids		None to slight for reducing and organic
Decomposed by oxidizing acids	Weak Alkali	Slight to marked depending on alkalinity
	Strong Alkali	Decomposes
Organic Solvents		None
Metal Inserts		Inert

Table 3: Richlite Surfaces Characteristics

Material Content

The following table summarizes the weighted average mass, thickness, and material composition of Richlite surfaces.

Property and Material	Value	Type of Material Resource
Mass kg/m2 (lb/ft2)	17.3 (3.54)	n/a
Thickness	1.0 cm (0.4 in)	n/a
Paper %	63%	Virgin renewable resource; recycled resource
Phenolic resin %	37%	Non-renewable material resource

Table 4: Richlite Surface Properties and Material Composition

Production & Environmental Aspects

Production Process

Richlite surface products are manufactured in Tacoma, Washington. Paper rolls are run through a thermosetting resin and processed through a vertical drying tower using Waste-to-Energy (WE) Technology. This provides for a closed-loop system where little to no outside energy is used during the manufacturing process. Saturated paper rolls are then cut to length, stacked to desired thickness and cured in a press. Panels are then trimmed and shipped.

Waste

Trim waste is used as hog fuel at local paper mills. Richlite recycles office paper, waste production paper, cans and plastic, cardboard, and paper roll ends. Richlite is deemable a “small producer” of hazardous waste, generating less than 2,000 lbs. per year.

Environmental Aspects

At the Richlite plant, spent solvent in the process is used as an energy source to dry the paper using the WE™ (Waste-to-Energy) technology. In addition, up to 84 percent of Richlite’s Tacoma electricity grid mix comes from hydropower. Closed loop water tanks are used to cool the saturators. According to the Stormwater Pollution Prevention Plan and, specifically, Richlite’s stormwater permit, no outflow of domestic water is contributed into the storm drains – only rain water.

Life Cycle Assessment

A cradle-to-grave Life Cycle Assessment (LCA) was completed on this product in accordance with ISO 14040/ISO 14044. The study was reviewed for conformance with ISO 14044, the NSF countertops PCR (2013), and the surfaces PCR addendum (undated).

System Boundaries

Richlite surfaces are studied as a cradle-to-grave system. The unit process stages included in the system boundaries are:

1. Material acquisition and preprocessing. Also called the production stage, it encompasses all relevant processes from "cradle-to-factory gate." This includes the extraction and manufacture of raw materials and their transportation to Richlite production facility, as well as their pre-processing and refining.
2. Construction, which includes fabrication of main parts and components and construction of Richlite surfaces before installation. This stage includes the delivery of Richlite surfaces to distribution and fabrication facilities.
3. Installation related activities at the building site, including management of installation waste.
4. Use, which includes routine cleaning and maintenance required over the life of the product.
5. End-of-life. Richlite surfaces are often reused once they are removed from their installed location. They may also be safely disposed of in a landfill. For the most conservative results, at end of life, Richlite surfaces are transported to and disposed in a sanitary landfill.

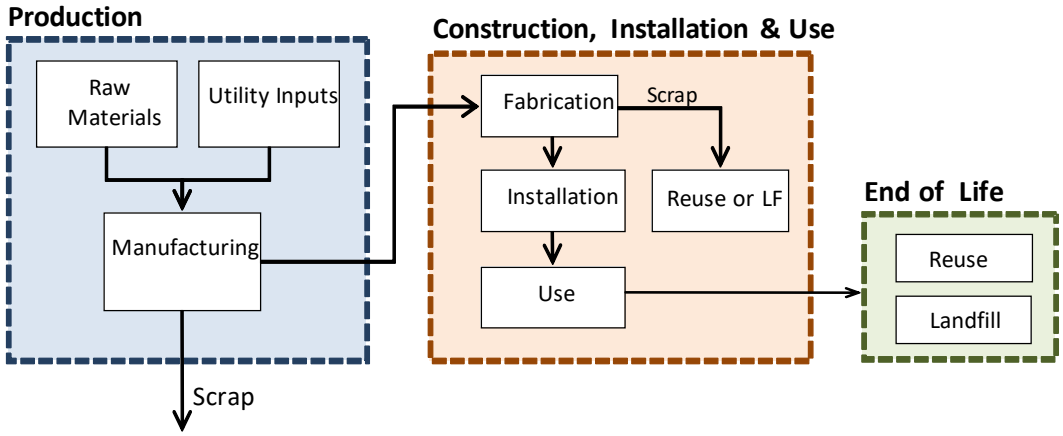


Figure 1: Richlite Surface System Boundaries

The system boundaries exclude capital equipment and human activities at the plant. Sinks, cook tops, plumbing fixtures, cabinetry hardware and other materials related to the surface product are also excluded.

Functional Unit

The functional unit for this study has been defined as 1 m^2, 1 cm thick of installed Richlite surfaces, for a reference service life of ten years. Richlite surfaces have an effective useful life of 20 years.

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According to ISO 14025

Background Data

The SimaPro LCA software was used to model the life cycle of the product. Richlite supplied primary data on their surfaces' bill of materials and manufacturing operations. Background data came from EcoInvent 3.3, EcoInvent 2.2-US, and the U.S. LCI database, which were used with the highest quality data in mind, both for appropriateness for geographical representation as well as temporal and technological representation.

Cut-off Criteria

Over 99.5% of mass and energy flows have been included in the product system, meeting the cut-off criteria of 1% each of mass and energy flows that may be omitted from the inventory analysis. All reported materials and energy involved in the systems were modeled in order to capture any aspect that may be environmentally relevant.

Allocation

Allocation of the production data for this product was based on a total facility mass basis.

Data Quality

The data applied to this study represent current products and practices. Data from 2016 for the Tacoma, WA, manufacturing facility were used. Data for manufacturing included all operations related to processing materials into surfaces and represented the average energy use based on total production. The product formulations are current. Energy and transportation data are based on the 2010's and are North American. Production data for materials are based on mid 2000's to 2010's. They are based on a combination of North American and European sources; EcoInvent 3.3, and in some cases EcoInvent 2.2-US, were used. Technological coverage for the materials and processes upstream and downstream of Richlite operations are in most cases industry average, and in some instances, typical.

Life Cycle Assessment Results & Interpretation

The sections below present the cradle-to-grave results for 1 m^2 of Richlite surfaces over a period of 10 years. Results are presented in terms of the product total for the life cycle and the contribution of each of the defined unit process stages as percentages of the total. As shown in the tables, for all of the impact categories and inventory flows, the material acquisition and construction stages dominate the life cycle, while transportation and installation of the product account for a small portion. End of life is in most cases less than one percent, except for a couple of the air emissions and the waste (as waste). Use phase has negligible impacts.

Energy Consumption

The energy categories required by the PCR come from the Life Cycle Inventory (LCI) output.

Environmental Indicator	Unit	Total	Mat'l Acquis'n	Construc'n & Fabric'n	Transport & Installation	Use	EOL
Primary Energy Demand	MJ	1576.57	78%	16%	6%	0%	0%
Fossil Fuel Based Energy	MJ	1274.64	74%	19%	7%	0%	0%
Nuclear Energy	MJ	61.76	85%	13%	1%	0%	0%
Renewable Energy	MJ	240.16	100%	0%	0%	0%	0%

Note: 0% means less than 0.1%

Impact Assessment

The life cycle impact assessment (LCIA) results have been calculated using the TRACI v.2.1 and CML methodologies.

Environmental Indicator	Unit	Total	Mat'l Acquis'n	Construc'n & Fabric'n	Transport & Installation	Use	EOL
TRACI Impact Category							
Global Warming Potential (climate change)	kg CO2 eq	68.00	70%	21%	9%	0%	0%
Acidification Potential	kg SO2 eq	0.33	83%	5%	12%	0%	0%
Eutrophication Potential	kg N eq	0.18	98%	0%	1%	0%	0%
Photochemical Ozone	kg O3 eq	4.83	72%	5%	22%	0%	1%
Ozone Depletion Potential	kg CFC-11 eq	5.20E-06	55%	45%	0%	0%	0%
CML Impact Category							
Global Warming Potential	kg CO2 eq	68.00	70%	21%	9%	0%	0%
Acidification Potential	kg SO2 eq	0.31	87%	5%	8%	0%	0%
Eutrophication Potential	kg PO4 eq	0.10	93%	1%	6%	0%	0%
Photochemical Ozone	kg C2H4 eq	0.03	93%	3%	4%	0%	0%
Ozone Depletion Potential	kg CFC-11 eq	4.39E-06	54%	45%	0%	0%	0%
Abiotic depletion	kg Sb eq	1.32E-04	99%	1%	0%	0%	0%
Abiotic depletion (fossil fuels)	MJ	1273.63	74%	19%	7%	0%	0%

Note: 0% means less than 0.1%

Emissions

The air emissions, water effluents, and water input required by the PCR come from the Life Cycle Inventory (LCI) output.

Environmental Indicator	Unit	Total	Mat'l Acquis'n	Construc'n & Fabric'n	Transport & Installation	Use	EOL
Emissions to Air							
Sulfur oxides	kg	8.11E-03	31%	0%	68%	0%	1%
Nitrogen oxides	kg	0.19	72%	6%	22%	0%	1%
Carbon dioxide	kg	57.94	67%	23%	10%	0%	0%
Methane	kg	0.25	83%	13%	3%	0%	0%
Nitrous oxides	kg	1.18E-02	99%	1%	0%	0%	0%
Carbon monoxide	kg	0.18	77%	3%	20%	0%	0%
Water Usage and Emissions to Water							
Phosphates	kg	1.10E-02	99%	0%	0%	0%	0%
Nitrates	kg	3.99E-01	100%	0%	0%	0%	0%
Dioxin	kg	0.00E+00	0%	0%	0%	0%	0%
Heavy Metals (arsenic, lead mercury, cadmium, and chromium)	kg	6.15E-05	60%	3%	36%	0%	0%
Total Water Input	kg	589.76	87%	13%	0%	0%	0%

Note: 0% means less than 0.1%

Waste

The waste categories required by the PCR come from the Life Cycle Inventory (LCI) output.

Environmental Indicator	Unit	Total	Mat'l Acquis'n	Construc'n & Fabric'n	Transport & Installation	Use	EOL
Incineration with Energy Recovery	Kg	0	0%	0%	0%	0%	0%
Incineration without Energy Recovery	Kg	0	0%	0%	0%	0%	0%
Landfill (non-hazardous solid waste)	Kg	15.23	0%	3%	9%	0%	88%
Hazardous Waste	Kg	0	0%	0%	0%	0%	0%
Landfill Avoidance (Recycling)	Kg	0	0%	0%	0%	0%	0%

Note: 0% means less than 0.1%

Certifications & Environmental Testing

CARB 2 / EPA Emission Standards

Richlite products do not fall under regulations for CARB 2 or the EPA Formaldehyde Emission Standards for Products Containing Composite Wood. Those regulations are specifically for hardwood plywood, medium-density fiberboard, and particleboard. Richlite surfaces are none of those products, however, we still fall well below the comparative emissions standards. Maximum allowable emissions for CARB and EPA regulations are .05ppm. Our emissions, as tested by UL and Certified by Greenguard, are <0.001ppm.

REACH

Richlite products are free of hazardous substances listed in the SVHC candidate list of the REACH-regulation in a concentration greater than 0.1%.*

RoHS

Richlite products are RoHS compliant according to the RoHS directive 2011/65/EC.*

* Please visit richlite.com for actual test results.

References

EcoInvent Database, Ecoinvent Centre, Ecoinvent data v2.0 and v3.0 (Dübendorf: Swiss Centre for Life Cycle Inventories, 2007), http://www.ecoinvent.org/.

Forest Stewardship Council (FSC): https://us.fsc.org/en-us.

Four Elements Consulting, LLC, Seattle, WA, Life Cycle Assessment of Richlite Countertops, dated May 24, 2018.

ISO 14025:2006, the International Organization for Standardization, Environmental Labels and Declarations - Type III Environmental Declarations - Principals and Procedures, Edition 1.

ISO 14040:2006, the International Standard of the International Standardization Organization, Environmental Management - Life Cycle Assessment - Principles and Framework.

ISO 14044:2006, the International Standard of the International Standardization Organization, Environmental Management - Life Cycle Assessment – Requirements and guidelines.

Leiden University Institute of Environmental Sciences (CML), Life Cycle Impact Assessment methodology, version 4.2, released in April, 2013. More information can be found at http://cml.leiden.edu/software/data-cmlia.html.

National Renewable Energy Laboratory (NREL): U.S. Life-Cycle Inventory Database. 2005. Golden, CO. Found at: http://www.nrel.gov/lci/database.

Product Category Rule: NSF International, Product Category Rule for EPDs: Residential Countertops, valid through Sept 17, 2018; Thinkstep, Addendum to NSF Countertop PCR: Surfaces and ISO Conformance (undated document).

SimaPro v. 8.0 Life Cycle Assessment software. Found at: https://simapro.com/.

U.S. Environmental Protection Agency ORD/NRMRL/Sustainable Technology Division Systems Analysis Branch STD Standard Operating Procedure (SOP) SOP No. S-10637-OP-1-0 (2012) Tool for the Reduction and Assessment of Chemical and other Environmental Impacts (TRACI) version 2.1 USER'S MANUAL. More information can be found at http://www.epa.gov/nrmrl/std/sab/traci/.