ENVIRONMENTAL PRODUCT DECLARATION

RESIDENTIAL BROADLOOM CARPET WITH NYLON-6 FACE FIBER



Residential broadloom carpet has an SBR latex precoat and woven secondary backing.

Shaw

Now, more than ever, life is about choices. People are more conscious about spending and the impacts of their decisions, and we believe in products designed to help people make better choices. It's a tailored approach. No matter the specific need, Shaw Floors offers a smarter, better solution.

People deserve peace of mind. We design our flooring products to support healthy home principles. Our multi-pillar approach drives conversation around material, moisture, sound, air and cleanability. More than ever, these attributes are meaningful and relevant - for people and the planet.

UL CERTIFIED ENVIRONMENTAL PRODUCT DECLARATION UL.COM/EPD

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ENVIRONMENTAL PRODUCT DECLARATION

Residential Broadloom Carpet - Residential Broadloom Carpet with Nylon-6 Face Fiber

According to ISO 14025, EN15804 and ISO 21930:2017

EPD PROGRAM AND PROGRAM OPERATOR NAME, ADDRESS, LOGO, AND WEBSITE	UL Environment 333 Pfingsten Road Northbrook, IL 60611 https://www.ul.com/ https://spot.ul.com
GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER	General Program Instructions v.2.5 March 2020
MANUFACTURER NAME AND ADDRESS	Shaw Flooring 616 E. Walnut Avenue Dalton, GA 30722
DECLARATION NUMBER	4789796942.144.1
DECLARED PRODUCT & FUNCTIONAL UNIT OR DECLARED UNIT	Residential Broadloom Carpet with Nylon-6 Face Fiber Functional Unit=1 m2 of flooring over RSL of 10 Years
REFERENCE PCR AND VERSION NUMBER	UL Environment PCR Part B: Flooring EPD Requirements, v2.0 (September 28, 2018)
DESCRIPTION OF PRODUCT APPLICATION/USE	Residential broadloom carpet with Nylon-6 face fiber intended for use as flooring in residential settings.
PRODUCT RSL DESCRIPTION (IF APPL.)	10 Years
MARKETS OF APPLICABILITY	North America
DATE OF ISSUE	April 1, 2021
DATE OF EXPIRATION	April 1, 2027
EPD TYPE	Product-Specific
RANGE OF DATASET VARIABILITY	N/A
EPD SCOPE	Cradle-to-Grave
YEAR(S) OF REPORTED PRIMARY DATA	2019
LCA SOFTWARE & VERSION NUMBER	GaBi 9.2
LCI DATABASE(S) & VERSION NUMBER	GaBi Sphera database, Service Pack 40
LCIA METHODOLOGY & VERSION NUMBER	TRACI 2.1

This PCR review was conducted by:	UL Environment PCR Review Panel epd@ulenvironment.com
This declaration was independently verified in accordance with ISO 14025: 2006. ☐ INTERNAL ☒ EXTERNAL	Grant R. Martin Grant R. Martin, UL Environment
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

LIMITATIONS

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; the level of accuracy in estimation of effect differs for any particular product line and reported impact.

Comparability: EPDs from different programs may not be comparable. Full conformance with a PCR allows EPD comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible". Example of variations: 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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Residential Broadloom Carpet - Residential Broadloom Carpet with Nylon-6 Face Fiber

According to ISO 14025, EN15804 and ISO 21930:2017

1. Product Definition and Information

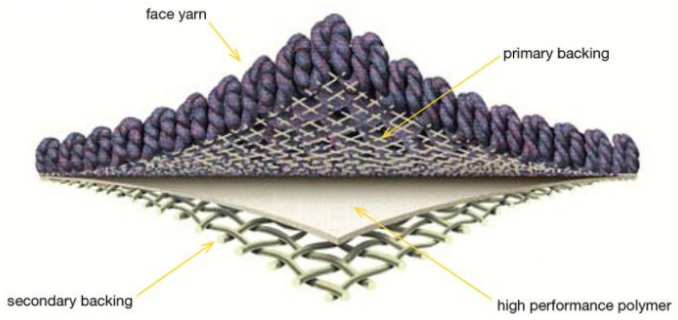
1.1 Description of Company/Organization

Shaw Industries Group, Inc. offers a diverse portfolio of carpet, resilient, hardwood, tile & stone and laminate flooring products, synthetic turf and other specialty items for residential and commercial markets worldwide via its brands Anderson Tuftex™, COREtec®, Patcraft®, Philadelphia Commercial®, Shaw Contract®, Shaw Floors™, Shaw Sports Turf®, Southwest Greens® and more. We are a wholly owned subsidiary of Berkshire Hathaway, Inc. with more than 20,000 associates worldwide. Shaw is headquartered in Dalton, Georgia, with salespeople and/or offices located throughout the U.S. as well as globally.

1.2 Product Description, Identification and Specification

The product is a residential broadloom carpet with Nylon-6 face fiber. Nylon-6 face fiber is made from virgin polymer. The face fiber is tufted into a primary backing sheet, latex is added to hold in the fiber, and a woven secondary backing layer is added.

This declaration covers all products/styles consisting of Residential Broadloom Carpet backing and Nylon-6 face fiber, with face weights ranging from 11 oz per sq. yd. (osy) to 100 osy, and a weighted average face weight of 24.68 osy. The products fall under CSI 09 68 00 and UNSPSC 3161719 classification codes.



1.3 Product Average

The production data used in this EPD considers all Residential Broadloom Carpet with Nylon-6 face fiber produced during the year. The product is manufactured in Dalton, GA. Results are weighted according to production totals.

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1.4 Application

Residential Broadloom Carpet with Nylon-6 face fiber is intended for use as flooring in residential settings. A United States equivalent to *EN 1307: 2008, Textile floor coverings – Classification of pile carpet* does not exist.

1.5 Declaration of Methodological Framework

This EPD is cradle-to-grave in scope with all modules included.

A cut-off criteria was used as per the PCR, Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report. This is defined as less than 1% of renewable and non-renewable primary energy usage and less than 1% of the total mass of a unit process, the sum of which shall not exceed 5% of the energy usage and mass.

In module A1-A3, allocation was used in the calculation of the recycled content of the backing material which comes from the total mass of recycled content used in the backing for a year divided by the total backing weight used for a year.

Reference service life for this product is 10 years. There are no known flows excluded from this EPD.

1.6 Technical data

The table below presents technical data and properties for the product.

Table 1: Technical data

Name	Value	Unit
Yarn type	Nylon-6	-
Primary backing type	Polypropylene	-
Secondary backing type	Polypropylene	-
CRI rating	3.5	2.5 Moderate, 3.0 Heavy, 3.5 Severe
Total thickness	9.4	mm
Product weight	1.92E003	g/m^2
Surface pile thickness	3.7	mm
Surface pile weight	<3390	g/m^2

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1.7 Market Placement/Application Rules

Shaw's Residential Broadloom Carpet with Nylon-6 face fiber meets all required performance standards to comply with building codes. A summary of these standards is provided below:
Residential Broadloom Carpet with Nylon-6 face fiber is manufactured in the US in an ISO 9001 & ISO 14001

Shaw strives to adhere to all applicable laws regarding labor, discrimination and harassment, wages and benefits, health and safety, diversity, and equal opportunity. Through associate engagement, structured safety processes, and a commitment to responsible materials sourcing, Shaw works to improve standards for personal and organizational safety every day. Our programs include:

- Shaw Behavior Based Safety Program to ensure continuous training, awareness, education and safety of all Shaw associates and visitors to Shaw facilities.
- Supply chain, raw materials and waste management programs
- ANSI/NSF 140 compliance
- Green Label Plus Certification (GLP 8878)
- Radiant Panel Class I
- Shaw Management System (SMS) - Based on ISO 9001 and 14001, and OSHAs 18001 standards, SMS brings together Shaw's Quality, Total Productive Manufacturing (TPM), Environmental, Health and Safety systems under one umbrella, providing associates with a "one stop shop" for helping ensure all job steps are followed the same way every time.

Shaw's products do not contain any hazardous substances according to RCRA, Subtitle 3. The product does not release dangerous substances to the environment, including gamma or ionizing radiation, chemicals released to air or leached to water and soil. Some VOCs are released when the product is installed, as detailed in Table 5.

1.8 Material Composition

Table 2: Base materials for Residential Broadloom Carpet with Nylon-6 Face Fiber

Component	Material	Mass %
Face Yarn	Nylon-6	43.70
Primary Backing	Polypropylene	4.83
Latex	SBR Latex Calcium Carbonate Sodium Polyacrylate Ammonium Laurel Sulfate	48.70
Secondary Backing	Polypropylene	2.28
Backing Polymer	N/A	
Topical Layer	Methacrylate Polymer Hydrophobically Modified Thermoplastic Polyester	0.55

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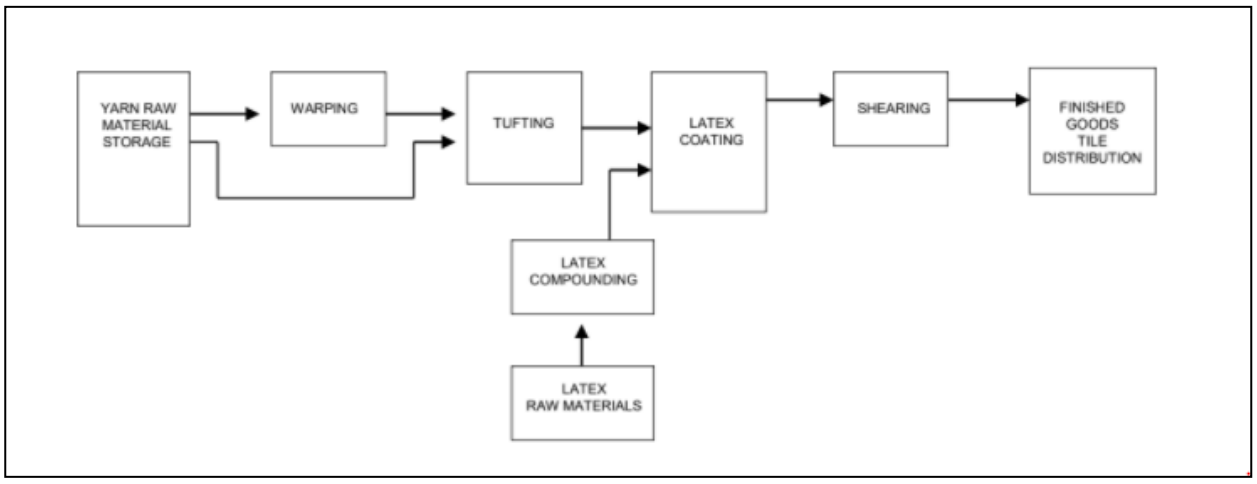
1.9 Manufacturing

Residential Broadloom Carpet with Nylon-6 face fiber is made with Shaw's Nylon-6 face fiber.

Nylon-6 face fiber is produced internally from virgin polymer The Nylon-6 face fiber is turned into yarn through a variety of processes depending on the desired look of the finished product.

The yarn is then tufted into the primary backing layer, after which a performance precoat is applied to ensure maximum tuft bind, followed by the application of a woven Polypropylene secondary backing layer.

Figure 1: Product flow diagram



1.10 Packaging

Shaw's broadloom products are rolled onto a cardboard core manufactured using post-consumer recycled content from our local core suppliers. Packaging should be reused or taken to a local recycling facility after use. The product is wrapped in clear plastic to ship. Packaging is excluded from the scope of this assessment.

1.11 Product Installation

Broadloom installation requires site testing and conditioning for moisture and alkalinity, proper preparation of the floor, and an adhesive applied with the appropriate trowel, as defined in the installation guidelines found on the manufacturer's website.

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1.12 Use Conditions

Indoor emissions during the use stage have been evaluated via Indoor Air Quality testing (Green Label Plus). No health-related concerns are present during the normal use of the flooring.

1.13 Product Reference Service Life and Building Estimated Service Life

The service life of floor coverings strongly depends on the location of installation and adherence to cleaning and maintenance instructions given by the manufacturer. The reference service life chosen for this study is 10 years, based on warranty and testing information.

1.14 Re-use Phase

Shaw has implemented a re[TURN]™ Reclamation Program for all of their carpet products. For more information on the recycling of our products, call 800.509.SHAW or visit shawrecycles.com.

1.15 Disposal

It is assumed that at the end of the useful life of the product, 100% of it is disposed of via landfill, 0% is recycled, and 0% is incinerated, unless Shaw's take-back program is utilized.

1.16 Further Information

For additional product information, visit shawfloors.com.

2. Life Cycle Assessment Calculation Rules

2.1 Functional Unit

Per the PCR, the functional unit is 1 m^2 of flooring over the reference service life of the product (10 years).

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Table 3: Functional unit information

Name	Value	Unit
Functional unit	1	m^2
Mass (average product)	1.92	kg

2.2 System Boundary

The EPD is considered to be cradle-to-grave. The following modules are included:

A1-A3 Product Stage

All production-related raw materials and emissions are included from cradle-to-gate, including energy supply and production, raw material extraction and processing, transport of materials to manufacturing site, packaging materials and transport (including recycled corrugated boxes, cores, and plastic film), water use and treatment, and waste processing or recycling of manufacturing and packaging waste.

A4 Transport

Transportation of the finished flooring from the manufacturing site to the installation site was included.

A5 Installation

Impacts from the installation of the flooring were calculated, including the production and transport of installation materials (e.g. adhesive) and disposal or recycling of installation waste.

B1 Use

Indoor emissions during the use stage have been evaluated via Indoor Air Quality testing (Green Label Plus) . No health-related concerns are present during the normal use of the flooring.

B2 Maintenance

This includes cleaning of the flooring over its lifetime, according to the reference service life. This includes vacuuming and hot water extraction according to the manufacturer's guidelines.

C2 Transport to End-of-Life

This phase includes the transportation of the flooring product to an end-of-life facility.

C3 Waste Processing

This phase includes any additional waste processing necessary before material recovery. In this case, none is required.

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C4 Disposal

The disposal phase includes any impacts associated with the landfilling or incineration of the product at the end of its useful life.

2.3 Estimates and Assumptions

For the purposes of this EPD, the weighted average of the fiber weight over a year's worth of sales data is used. When an exact match of an LCA dataset to a raw material was not available, an appropriate dataset representing a similar material was chosen as a proxy. When multiple dataset options were available, a conservative one was selected to represent the material.

Use-stage environmental impacts depend on product cleaning assumptions. Information on cleaning frequency and products are based on Shaw's manufacturer recommendations for their products.

Distances for transport to the installation site and from the building site to waste processing are based on assumptions in the PCR. The product is transported 497 miles from the point of purchase to the building site, and 100 miles from the building site to waste processing.

Installation and deconstruction procedures are manual, based on assumptions in the PCR.

2.4 Cut-off Rules

Cut-off criteria were used as per the PCR, Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report. These were defined as less than 1% of renewable and non-renewable primary energy usage and less than 1% of the total mass of a unit process, the sum of which shall not exceed 5% of the energy usage and mass.

2.5 Data Sources

All upstream data have been taken from the GaBi 2020 database (service pack 40), using GaBi software. All manufacturing data were collected from Shaw facilities for the calendar year 2019.

To ensure the highest data quality, primary data were collected by Shaw facilities. Where primary data could not be collected, background LCI data comes from the GaBi database.

2.6 Data Quality

A variety of tests and checks were performed by the LCA practitioner throughout the project to ensure high

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quality of the completed LCA. Checks included an extensive review of product-specific LCA models as well as the background data used.

Temporal coverage

The data are intended to represent residential broadloom carpet during the 2019 calendar year. As such, Shaw has used primary data for 12 consecutive months during the 2019 calendar year.

Geographical coverage

This background LCA represents Shaw's product produced in the United States. Primary data are representative of the United States. Regionally specific datasets were used to represent the manufacturing location's energy consumption. Proxy datasets were used as needed for raw material inputs to address lack of data for a specific material or for a specific geographical region. These proxy datasets were chosen for their technological representativeness of the actual materials.

Technological coverage

Data on material composition were collected directly from Shaw. Manufacturing data were collected by Shaw for the Residential Broadloom Carpet with Nylon-6 face fiber product. Waste, emissions, and energy use are calculated from reported annual production during the reference year.

2.7 Period Under Review

Primary data collected represent production during the 2019 calendar year. This analysis is intended to represent production in 2019.

2.8 Allocation

Multi-output allocation generally follows the requirements of ISO 14044, section 4.3.4.2. When allocation becomes necessary during the data collection phase, the allocation rule most suitable for the respective process step was applied.

The cut-off allocation approach is adopted in the case of any post-consumer and post-industrial recycled content, which is assumed to enter the system burden-free. Only environmental impacts from the point of recovery and forward (e.g., inbound transports, grinding, processing, etc.) are considered.

In module A1-A3, allocation was used in the calculation of the recycled content of the fiber and backing material. The recycled content percentage of the fiber was calculated based on the annual mass of recycled content used by all fiber facilities, divided by the annual mass of fiber produced which contains recycled content. The recycled content of the backing was calculated from the annual mass of the recycled content used in the backing divided by the annual mass backing produced.

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2.9 Comparability and Benchmarking

A comparison or an evaluation of EPD data is only possible if all datasets to be compared were created according to EN 15804 and the building context, and if product-specific performance characteristics, are taken into account. This analysis uses the GaBi 2020 database for secondary data.

3. Life Cycle Assessment Scenarios and Additional Technical Information

Table 4: Transport to the building site (A4)

Name	Value	Unit
Fuel type	Diesel	-
Liters of fuel	38.4	l/100km
Transport distance	497	miles
Capacity utilization	65	%
Capacity utilization volume factor	1	-

Table 5: Installation in the building (A5)

Name	Value	Unit
Ancillary materials	0.0274	kg
Material loss	10	%
VOC emissions	77	ug/m^2

Table 6: Maintenance (B2)

Name	Value	Unit
Hot water extraction cycle	1	1/year
Vacuum cycle	52	1/year
Water consumption	0.000447	m^3/RSL
Electricity consumption	6.99	kWh/RSL

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Table 7: Reference service life

Name	Value	Unit
Reference service life	10	years

Table 8: End of life (C1 - C4)

Name	Value	Unit
Collected as mixed construction waste	1.92	kg
Recycling	0	kg
Energy recovery	0	kg
Landfilling	1.92	kg

4. Life Cycle Assessment Results

The results in this EPD are for 1 m^2 of flooring over the reference service life of the product.

4.1 Description of the System Boundary

The EPD is cradle-to-grave in scope. See Figure 2 for included life cycle stages. Note that modules B3, B4, B5, B6, B7 and C1 have no environmental impact and are excluded from results tables to improve readability.

Product Stage			Construction Process Stage		Use Stage							End-of-Life Stage				Benefits and Loads Beyond the System Boundaries
Raw Material Supply	Transport	Manufacturing	Transport	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	De-construction demolition	Transport	Waste Processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X			X	X	X	X	X	X	X	X	X	X	X	X	X	MND

4.2 Results of the LCA - Environmental Impact: 1 m^2 of flooring over RSL of product

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Residential Broadloom Carpet - Residential Broadloom Carpet with Nylon-6 Face Fiber

According to ISO 14025, EN15804 and ISO 21930:2017

	Unit	A1-A3	A4	A5	B1	B2	C2	C3	C4
CML 2001 - April 2013									
ADPE	kg Sb eq.	6.08E-006	2.43E-008	1.05E-007	0	8.48E-007	4.4E-009	0	3.13E-008
ADPF	MJ	228	1.9	1.88	0	49.1	0.344	0	1.25
AP	kg SO_2 eq.	0.0172	0.000169	0.000256	0	0.00563	3.52E-005	0	0.000335
EP	kg $(PO_4)^{3-}$ eq.	0.0042	5.65E-005	7.63E-005	0	0.000619	1.14E-005	0	4.47E-005
GWP	kg CO_2 eq.	13.7	0.134	0.0834	0	3.83	0.0243	0	0.0785
ODP	kg CFC11 eq.	4.56E-014	1.73E-017	9.58E-011	0	1.84E-014	3.12E-018	0	2.69E-016
POCP	kg ethane eq.	0.00201	-3.48E-005	6.99E-005	1.16E-008	0.000406	-8.51E-006	0	2.93E-006
TRACI 2.1									
ADPF	MJ	29.1	0.254	0.256	0	3.97	0.046	0	0.163
AP	kg SO_2 eq.	0.0214	0.000219	0.000281	0	0.00584	4.61E-005	0	0.000364
EP	kg N eq.	0.0032	3.49E-005	7E-005	0	0.000492	6.74E-006	0	2.05E-005
GWP	kg CO_2 eq.	13.7	0.13	0.0844	0	3.83	0.0235	0	0.0823
ODP	kg CFC11 eq.	4.76E-014	1.73E-017	1.02E-010	0	1.84E-014	3.12E-018	0	2.69E-016
SFP	kg O_3 eq.	0.437	0.00478	0.00333	2.13E-007	0.0828	0.00102	0	0.00641

ADPE = abiotic depletion potential for non-fossil-fuel resources; ADPF = abiotic depletion potential for fossil resources; AP = acidification potential; EP = eutrophication potential; GWP = global warming potential; ODP = ozone depletion potential; POCP = smog = formation of tropospheric ozone photochemical oxidants

4.3 Results of the LCA - Resource Use: 1 m^2 of flooring over RSL of product

	Unit	A1-A3	A4	A5	B1	B2	C2	C3	C4
PERE	MJ	7.11	0.0806	0.0636	0	10.1	0.0146	0	0.104
PERM	MJ	0	0	0	0	0	0	0	0
PERT	MJ	7.11	0.0806	0.0636	0	10.1	0.0146	0	0.104
PENRE	MJ	197	1.91	1.36	0	63.6	0.346	0	1.28
PENRM	MJ	43.8	0	0.577	0	0	0	0	0
PENRT	MJ	240	1.91	1.94	0	63.6	0.346	0	1.28
SM	MJ	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m^3	6.46E003	0.359	0.594	23.3	23.3	0.065	0	0.182

PERE = use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = use of renewable primary energy resources as raw materials; PERT = total use of renewable primary energy resources; PENRE = use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = use of non-renewable primary energy resources used as raw materials; PENRT = total use of non-renewable primary energy resources; SM = use of secondary material; RSF = use of renewable secondary fuels; NRSF = use of non-renewable secondary fuels; FW = use of net fresh water

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Residential Broadloom Carpet - Residential Broadloom Carpet with Nylon-6 Face Fiber

According to ISO 14025, EN15804 and ISO 21930:2017

4.4 Results of the LCA - Output Flows and Waste Categories: 1 m^2 of flooring over RSL of product

	Unit	A1-A3	A4	A5	B1	B2	C2	C3	C4
HWD	kg	1.48E-007	3.27E-008	1.26E-009	0	2.45E-008	5.92E-009	0	8.57E-009
NHWD	kg	1.93	0.000137	0.212	0	0.0244	2.48E-005	0	1.92
RWD	kg	0.005	4.31E-006	2.39E-005	0	0.00566	7.8E-007	0	1.09E-005
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0	0

HWD = hazardous waste deposited; NHWD = non-hazardous waste deposited; RWD = radioactive waste deposited; CRU = components for re-use; MFR = materials for recycling; MER = materials for energy recovery; EEE = exported electrical energy; EET = exported thermal energy

4.5 LCA Interpretation

The majority of the impact of the flooring is contained within the product stage (A1-A3), with the maintenance component of the use stage (B2) making up the bulk of the remaining impact. Within the product stage, the largest contributor is the face fiber. As the fiber weight of a specific flooring style changes within the specified range, so do the impacts. The higher face weight products have a higher impact than this average, and the lower face weight products have a lower impact than this average.

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5. References

GaBi 2020	Sphera Solutions; GaBi: Software-System and Database for Life Cycle Engineering. Copyright, TM. Stuttgart, Echterdingen, 1992-2020.
EN 15804	EN 15804:2012-02 Sustainability of construction works - Environmental Product Declarations - Core rules for the product category of construction products
ISO 14025	ISO 14025:2011-10 Environmental labels and declarations - Type III environmental declarations - Principles and procedures
ISO 14040	ISO 14040:2009-11 Environmental management - Life cycle assessment - Principles and framework
ISO 14044	ISO 14044:2006-10 Environmental management - Life cycle assessment - Requirements and guidelines
ISO 21930	ISO 21930:2017 Sustainability in buildings and civil engineering works—Core rules for environmental product declarations of construction products and services. Geneva: International Organizational for Standardization
UL Environment 2018	PCR Part A: Life Cycle Assessment Calculation Rules and Report Requirements. Version 3.2, 12.12.2018
UL Environment 2018	PCR Part B: Flooring EPD Requirements. Product Category Rule (PCR) Guidance for Building-Related Products and Services. Version 2.0, 09.2018
UL Environment 2020	Program Operator Rules v2.5

6. Contact Information

Study Commissioner

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