Masland contract

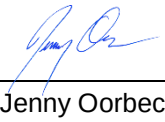
Environmental Product Declaration

Masland Contract Broadloom Carpet Family

Certified Environmental Product Declaration
www.nsf.org

Environmental Product Declaration Program Operator
NSF International
789 N. Dixboro Rd.
Ann Arbor MI 48105 USA
www.nsf.org

Date of Issue: September 16, 2014
Date of Update: July 6, 2018
Valid Until: September 16, 2019
Declaration#: EPD10045

EPD Information			
Program Operator		NSF International	
Declaration Holder		Masland Contract	
Product: Broadloom Carpet	Date of Issue: 09/16/2014 Date of Update: 07/06/2018	Valid Until: September 16, 2019	Declaration Number EPD10045
This EPD was independently verified by NSF International in accordance with ISO 14025: ☐ Internal ☒ External		 Jenny Oorbeck joorbeck@nsf.org	
This life cycle assessment was independently verified by in accordance with ISO 14044 and the reference PCR:		 Jack Geibig jgeibig@ecoform.com	
LCA Information			
Basis LCA		Lifecycle Analysis of Masland Carpets May 10, 2018	
LCA Preparer		Michael Overcash & Evan Griffing Environmental Clarity LLC www.environmentalclarity.com	
This life cycle assessment was critically reviewed in accordance with ISO 14044 by:		Jack Geibig EcoForm jgeibig@ecoform.com	
PCR Information			
Program Operator		NSF International	
Reference PCR		Flooring: Carpet, Resilient, Laminate, Ceramic, Wood Version 2	
Date of Issue		June 23, 2014	
PCR review was conducted by:		Michael Overcash Environmental Clarity mrovercash@earthlink.net	

All products are manufactured in the United States in facilities owned by the manufacturer. There are no ISO certifications for these facilities.

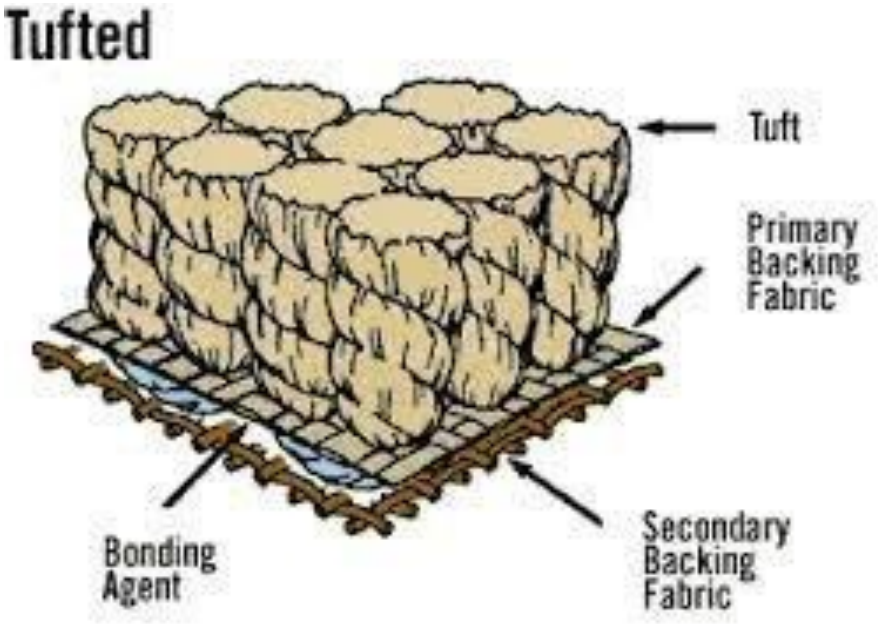
ENVIRONMENTAL PRODUCT DECLARATION: DETAILED VERSION

Product Description

Product classification and description

This Environmental Product Declaration (EPD) report pertains to a solution dyed Masland styrene butadiene latex backed broadloom carpet. This is an update to a previous EPD report (2014) to account for improvements to the carpet architecture. Masland is located at 716 Bill Myles Drive, Saraland, AL, 36571. The carpet has a face fiber weight of 28.9 oz/square yard (sy) (0.98 kg/m^2) and a total weight of 66.8 oz/sy (2.27 kg/m^2). The face fiber is composed of solution dyed nylon 6,6, and it is tufted on a primary backing made from polypropylene (PP). There is a secondary backing sheet of PP, and back coatings are styrene butadiene latex (SBL) with calcium carbonate as filler.

The 2018 carpet has the same nylon 6,6 face fiber and PP backing weights as the 2014 carpet. Improvements come in the form of a reduced quantity of SBL, and replacement of aluminum hydroxide with calcium carbonate.



Applicability

Masland Contract broadloom carpets are intended for installation in medium to high traffic commercial interior spaces. The specific product type determines the suitability for the traffic classification, as defined in the guidelines developed by the Carpet & Rug Institutes. For more detail on the performance recommendations refer to: http://www.carpet-rug.org/commercial-customers/selecting-the-right-carpet/quality-and-performance/index.cfmThe Masland Broadloom Carpet family of products has a reference service life of 15 years.

Product Characteristics

Type of manufacture	Tufted pattern loop, tufted pattern solid and cut pile, tufted pattern solid and tip shear	
Yarn type	Nylon 6,6	
Additional characteristics according to NSF/ANSI 140	Sustainability Assessment for Carpet: *Gold*	
Sustainable certifications	Certified to NSF/ANSI 140	
VOC emissions test method	GLP 1678 and GLP 0138 for solution	
Texture Appearance Retention Rating	≥3	
Characteristics	**Nominal Value**	**Unit**
Total thickness	6.35-9.525 (.25-.375 in)	mm (inch)
Product weight	1,531-2,240 (54-79)	g/m^2 (oz/ft^2)
Surface pile thickness	4.76-8.73(.1875-.34375 in)	mm (inch)
Number of tufts or loops /dm^2	6,221-22,809 (669-2455)	dm^2 (ft^2)
Surface pile weight	566-1,361 (20-48)	g/m^2 (oz/ft^2)
Pile Fiber Composition	43.3	%
Primary and Secondary Backing Fabrics	8.9	
Secondary Backing	47.8	%
Pre-consumer content	3.9 – 8.7	%
Post-Consumer Content	0 – 4.3	%

Product Standards		Results
CRI Green Label Plus		Pass
NSF 140		Gold
ASTM E648 Radiant Panel Flammability Test		Class I
ASTM E662 NBS Smoke Test (Flaming Mode)		≤ 450
AATCC 134 Electrostatic Propensity		≤ 3.0KV
AATCC 16 Colorfastness to Light		≥ 4 at 40 AFU's
ASTM D5252/D7330 Hexapod Tumble Drum Test (TARR)		≥3

Material Content

Component	Material	Mass %	Availability			Origin of Raw Materials
			Renewable	Non-Renewable	Recycled	
Pile Material (Tuft)	Type 6,6 Nylon	43.3%		Fossil resource, limited	0%	Global
Primary Backing Fabric	Polypropylene	6%		Fossil resource, limited	0%	Global
Back coating (Bonding Agent)	Latex	47.8%		Fossil resource, limited	0%	Global
	Calcium Carbonate			Mineral, abundant	0%	US
Secondary Backing Fabric	Polypropylene	3%		Fossil resource, limited	0%	Global

Production of main materials

Nylon Face Fiber – Type 6,6 nylon that is solution dyed. Nylon 6,6 is produced through polycondensation of hexamethylenediamine and adipic acid.

Styrene Butadiene Rubber (SBR) is a synthetic copolymer that is used as a primary cross-linkable binder in the manufacture of rubber flooring products and tires. It is used to provide tuft bind and lamination strength between the nylon fiber and secondary backing.

Calcium carbonate is an abundant mineral found in all parts of the world as the chief substance in rocks (i.e., marble and limestone). It can be ground to varying particle sizes and is widely used as filler in formulated flooring systems.

Polypropylene Backings – The primary backing is utilized to tuft the Type 6,6 nylon fiber to create the carpet. The secondary backing is utilized to provide dimensional stability to the finished carpet.

Life Cycle Assessment Stages and Reported EPD Information

Sourcing/extraction (raw material acquisition) stage

The life cycle assessment stage for sourcing and material extraction begins at the point of the raw materials extraction from its source and ends at the receipt of the raw material at the carpet manufacturing facility. All raw materials are evaluated for quality, availability, consistency, performance, and value before acceptance into the manufacturing process. Once the material and its source have passed the initial evaluation process, on-going evaluation is made using the suppliers' certificate of analysis.

Manufacturing stage

The production process is designed for efficiency, utilizing the strengths of Masland's technology and expertise. It begins with the use of solution dyed fibers. A change to the use of solution dyed nylon was made as a method of reducing water and energy usage. The fiber is then converted into yarn in the spinning process. About 90% of the nylon fiber is processed (twisted, heat set, and warped) on site. The remainder of the fiber is processed by a supplier and purchased in the warped state ready for tufting. These processes utilize water, electricity, and natural gas.

The tufting process incorporates tufting machines that utilize needles to insert the yarn into a synthetic backing material. The needles are controlled to determine the myriad of aesthetics that the marketplace desires. This process requires electricity.

Next is the coating process which applies a high performance precoat to the back of the tufted substrate. This precoat locks the fibers into place giving strength to the material. Following the precoat process, the back coating consisting of SBR latex and a polypropylene backing is added. The coating process uses electricity, gas, and water.

Delivery and installation stage

Delivery

Delivery to the customer is typically through the use of diesel powered trucks. Truck transportation is optimized by load size and geographical logistics. This life cycle analysis has modeled truck transportation with an average distance of 500 miles.

Installation

The recommend adhesive for Masland Broadloom Carpet is Masland Adhesive using a full spread of adhesive. The life cycle assessment modeled the installation stage with Masland Adhesive at a spread rate of 0.15 kg adhesive/sy carpet.

Complete installation instructions are available at:
http://www.maslandcontract.com/mc/web/forms/technical/InstallationInstructions.aspx

Health, safety, and environmental aspects during installation

All MSDS sheets for adhesive may be viewed at
http://www.maslandcontract.com/mc/web/forms/technical/Adhesives.aspx

Masland Contract Modular Adhesive is CRI Green Label Plus certified and meets the requirements of California South Coast Air Quality Management District Rule #1168.

Masland Broadloom Carpet may also be reconditioned by cleaning and reused in less critical areas of a facility or in lower category spaces.

Packaging

Table 1 – Packaging Materials for Masland Broadloom Carpet

Category	Material
cardboard	cores
plastics	Plastic wrap

Use stage

Use of the floor covering

The service life for Masland Broadloom Carpet will vary depending on the amount of floor traffic, level of maintenance and the desired appearance of the floor covering. The reference service life for Masland Broadloom Carpet is 15 years.

The EPD must present results for both a one year and sixty-year period; impacts are calculated for both time periods. The standard assumes that the life of a building is sixty years.

- The one-year impacts are based on the initial installation of one square meter of flooring (production, transport, installation, end-of-life, and use) phase impacts are based on annual cleaning and maintenance guidelines.
- The sixty-year impacts are based on four replacements (occurring once every 15 years) of one square meter of flooring (production, transport, installation, end-of-life and the use phase) impacts for 60 years of total floor maintenance.

Masland Broadloom Carpet is guaranteed by Masland's warranted performance. These warranties may be found at http://www.maslandcontract.com/mc/web/forms/technical/Warranties.aspx

Cleaning and maintenance

The level of cleaning and maintenance varies depending on the amount of floor traffic and the desired appearance of the floor that the end user is seeking. The Carpet and Rug Institute's publication titled *Carpet Maintenance Guidelines for Commercial Applications* offers guidance on how to maintain the carpet at various floor traffic levels.

Masland's maintenance guidelines may be found at:
http://www.maslandcontract.com/mc/web/forms/technical/CleaningAndMaintenance.aspx

The table below is a guideline for the frequency of cleaning established by the IICRC. This is a very good guide for a maintenance schedule. However, each building and traffic patterns are different and modifications to the table may need to be implemented.

Table 2 - Recommended Maintenance for Masland Broadloom Carpet

Traffic Soil Rating	Vacuuming	Spot Cleaning	Interim Maintenance (between restorative cleanings)	Restorative Cleanings
Light <500 foot traffics per day	1 to 2 per week	Daily or as soon as noticed	1 to 3 times annually	1 to 2 times annually
Medium 500-1000 foot traffics per day	Daily in traffic areas, overall 3 to 4 X per week	Daily or as soon as noticed	3 to 6 times annually	2 to 4 times annually
Heavy 1000-2500 foot traffics per day	Daily in traffic areas, overall 4 to 7 X per week	Daily in traffic areas, overall 4 to 7 X per week	6 to 12 times annually	3 to 6 times annually
Very Heavy >2500 foot traffics per day	1 to 2 X daily in traffic areas. Overall 7 X per week	1 to 2 X daily in traffic areas. Overall 7 X per week	12 to 52 times annually	6 to 12 times annually

End of life stage

Recycling, reuse, or repurpose

The Masland families of carpets are designed to achieve a commitment to enhance recycle and reuse. Reuse, repurpose, and recycling of carpet is the preferred method of disposal of carpet at the end of its useful life. Masland Contract is a long-standing member of CARE and supports the efforts to divert carpet from landfills. We support the use of CARE Recycling Partners for the landfill diversion process.

Disposal

Masland Broadloom Carpet can be landfilled where local regulations allow. It can also be incinerated as part of a waste to energy program.

With the end-of-life, we have used energy for collection and transport to landfill as well as energy to operate the landfill. The total process energies (and natural resource energies) are:

48.5 MJ electricity/as is mt of solid waste (0.167 MJ nre/kg carpet)

335 MJ diesel/ as is mt of solid waste (0.385 MJ nre/kg carpet)

Life Cycle Assessment (LCA)

General

The Life Cycle Inventory (LCI) and Life Cycle Impact Assessment (LCIA) were undertaken with guidelines from ISO 14040/ISO 14044 with respect to *Product Category Rule for Environmental Product Declarations Flooring: Carpet, Resilient, Laminate, Ceramic, Wood* (NSF International, 2014). The functional unit is one square meter of carpet. The use phase is one year and can then be scaled to the desired carpet or building life. As cut-off criteria, materials with low mass and environmental impacts of inputs or use per square yard of carpet (less than one percent) are not included in this life cycle as the impact on results is small. Similarly, energy-consuming steps with low values per square yard of carpet (less than one percent) are also not included. No excluded materials were found to have unique environmental relevance in the context of this functional unit.

Several additives were excluded from the LCA calculations based on the PCR cutoff criteria for amount used. The PCR requires that each material or energy flow excluded must be less than 1% of the total mass or energy flow. The cumulative amount of excluded mass or energy must be less than 5% of the total. In this

LCA, the total mass of excluded materials is less than 1% of the carpet mass. No excluded materials were found to have unique environmental relevance in the context of this functional unit, and the impact on results is estimated to be small. The total additives excluded are stated in Table 1. In addition to this, the calcium carbonate is up to 1% silica by mass. All known energy inputs were included. Therefore, this study complies with the PCR mass and energy cutoff rules. Based on the stated goals, there are no significant limitations in the study. In cases where products and byproducts are made in a life cycle inventory gate-to-gate, mass allocation is used. In keeping with standard life cycle practice, the life cycle impacts of materials leaving the boundaries that are recycled (such as most carpet packaging), are assigned to the replacement use and not to the current floor covering.

The Carpet and Rug Institute database (2010) as well as that of Environmental Clarity (Overcash and Griffing, 2018) were utilized for this life cycle. The life cycle inventory data include all relevant process steps and technologies found in the supply chain, manufacturing, use, and end-of-life stages. The databases are derived primarily from the carpet industry data supplemented by supply chain information. For the manufacturing, use, and end-of-life stages the geographical aspects are relevant and therefore reasonable. The use of data on chemical manufacturing found for the commodity chemicals in the supply chain are also felt to be reasonable for the U.S. as global competition and manufacturing technologies are prevalent. Overall the data quality is in the good to high categories. Results are uniformly provided in units of natural resource energy (nre) (MJ/sm carpet). The natural resource energy is calculated from the process energy of each manufacturing plant by first including the high heat value (HHV) of fuel combusted per unit of energy transferred to the process (efficiency) plus secondly the energy used to deliver fuel to the point of use in the energy production plant (often known as pre-combustion or delivered energy). Natural resource energy is similar to cumulative energy demand (CED) in European literature.

Description of the functional unit

The functional unit has been defined as one square meter as defined in section 6.2 of the PCR. The reference service life for this product group is 15 years while the reference service life for a building is 60 years.

Cut-off criteria

As cut-off criteria, materials with low mass and environmental impacts of inputs or use per square meter of carpet (less than one percent) are not included in this life cycle as the impact on results is small. Similarly, energy-consuming steps with low values per square meter of carpet (less than one percent) are also not included. No excluded materials were found to have unique environmental relevance in the context of this functional unit.

Allocation

In cases where products and byproducts are made in a life cycle inventory gate-to-gate, mass allocation is used. In keeping with standard life cycle practice, the life cycle impacts of materials leaving the boundaries that are recycled (such as most carpet packaging), are assigned to the replacement use and not to the current floor covering.

Background data

The Carpet and Rug Institute database (2010) as well as that of Environmental Clarity (Overcash and Griffing, 2018) were utilized for this life cycle. The life cycle inventory data include all relevant process steps and technologies found in the supply chain, manufacturing, use, and end-of-life stages. The databases are derived primarily from the carpet industry data supplemented by supply chain information. For the manufacturing, use, and end-of-life stages the geographical aspects are relevant and therefore reasonable. The use of data on chemical manufacturing found for the commodity chemicals in the supply chain are also felt to be reasonable for the U.S. as global competition and manufacturing technologies are prevalent. Overall the data quality is in the good to high categories.

Data quality and data quality assessment

The databases are derived primarily from the carpet industry data supplemented by supply chain information. For the manufacturing, use, and end-of-life stages the geographical aspects are relevant and therefore reasonable. The use of data on chemical manufacturing found for the commodity chemicals in the supply chain are also felt to be reasonable for the U.S. as global competition and manufacturing technologies are prevalent. Overall the data quality is in the good to high categories.

The data used in the life cycle assessment represents current products and processes. This data is good to very good which meets the requirements of the product category rules. (NSF International, 2012) A variety of checks were built into the model. Additionally, Masland data was used for all operations performed in Masland facilities. The data for these operations is very good.

Time related coverage – The process data was based on one year of data between 2017 and 2018. The background data sources are based on data less than 10 years old. All the background data sources are modeled using 2010 or newer North American energies. The time related coverage is good.

Geographical coverage – The process data was based on North America. The geographical coverage is good.

Technology coverage – Process data was collected from the actual processes and thus the technology coverage is very good. The background data was selected for technology relevance to ensure the best fit of the life cycle inventory to the real world. The technology coverage is very good.

System boundaries

The life cycle assessment for the Masland Broadloom Carpet family was a cradle to grave study. System boundaries for this study are as follows:

- Source/Extraction Stage – This stage begins with the end in mind for the selection and sourcing of materials, evaluation of viable alternatives, and the results of the design parameters through the extraction of raw materials. This may include the growth, manufacture, extraction of all raw materials and their delivery to the production facilities. Packaging materials are considered in this study.
- Manufacturing Stage – All relevant manufacturing processes indicated by the design concepts are included in this stage. This is optimized for the materials selected in the Source/Extraction Stage. Packaging is included.
- Delivery and Installation Stage – This stage includes the transportation of material from the production facility to the point of use. Materials used for installation and site preparation are included.
- Use Stage – This stage includes cleaning and maintenance of the Masland Broadloom Carpet during its useful life as well as the extraction, manufacturing, and transport of all supporting materials, if relevant for the maintenance.
- End of Life Stage – The End of Life Stage includes the transportation of the used carpet to end of life processes. All the relevant end of life processes are included in the report.

Impact declaration and use stage normalization

The life cycle impact assessments (LCIA) were calculated for two different model scenarios of one square meter of Masland Modular Carpet as per *Section 6.8.1 Impact declaration and use stage normalization*. (NSF International, 2012)

- "For Table A, the LCIA for each life cycle stage shall be based on the RSL (reference service life) of a building which is currently 60 years. The use stage shall be for one year of routine maintenance

(cleaning and other daily/weekly/monthly/annual maintenance) and extrapolated out to the reference service life of a building. This one year of LCA impacts will not include the maintenance activities that occur infrequently to the flooring product (refinishing, grout restoration, etc.) during the RSL of the building.

- For Table B, the LCA impacts for each life cycle stage shall be based on the RSL of a building which is currently 60 years. Table B use stage will not only include the annual maintenance activities calculated in table A, but also includes the activities that occur infrequently (refinishing, grout restoration, etc.) throughout the RSL of the building. For example, tile re-grouting impact every 30 years would be included in the use stage for Table B." (NSF International, 2012)

Results of the Assessment

Table 1 - Energy use for each life cycle stage of Masland SBL carpet - Single	Sourcing/Extraction	Manufacturing	Delivery and installation	Use (one year)	End-of-Life	Total
Natural Resource Energy, MJ/SY	100.3	21.6	4.27	2.75	1.12	130
Natural Resource Energy, MJ/M^2	120	25.9	5.10	3.29	1.34	156

Life Cycle Inventory Analysis

The life cycle inventory data (energy and process emissions) were converted to life cycle impact assessment (LCIA) results for the impact categories specified in the NSF International flooring product category rules (PCR) (NSF International, 2014). The LCIA results are relative expressions and do not predict impacts on category endpoints, exceeding any thresholds, safety margins, or risks. Six impact assessment categories from the CML 2 baseline 2000 version 3.01 method (CML, 2013) were used. In addition to the CML impact assessment categories, non-renewable and renewable primary energy usage were calculated as required by the PCR using the cumulative energy demand method version 1.08 from ecoinvent (Ecoinvent, 2010). This method was modified to include raw materials from the Environmental Clarity database.

The full inventory of emissions was calculated by combining Environmental Clarity gate-to-gate data with energy modules from the USLCI database with an electricity profile updated with EIA 2015 data (EIA, 2016).

The energy modules used for the LCIA are shown in **Error! Reference source not found.**.

LCIA results for the cradle to end of life of the carpet are shown for each phase except the use phase in Table A in PCR. LCIA results for the use phase are shown in Table B in PCR. LCIA results for the reference service life of the building (60 years) are shown in Table C in PCR. The service life of the carpet is 15 years. Thus, Table C results can be calculated by multiplying Table A by 4, multiplying Table B by 60, and combining the results. These results are expressed per square meter of carpet and are thus directly usable in the EPD.

Note on use stage

The Masland Broadloom Carpet family of products has a reference service life of 15 years. Recommended maintenance schedules for these products can be reviewed on-line at: http://www.maslandcontract.com/mc/web/forms/technical/CleaningAndMaintenance.aspx

Table 2: Energy Consumption – Masland Broadloom Carpet

	Units	Amount	Per Cent
Primary Energy, Non-Renewable	MJ	184	>95
Primary Energy, Renewable	MJ	0	<5

The amount of renewable energy is less than 5%. The renewable energy is almost totally focused in the use phase of the process and is referenced in Table 5. The life-cycle inventories for all materials used in the product and evaluated in the LCA are contained in the CRI, Carpet and Rug Institute, Life cycle database developed by Georgia Institute of Technology and carpet industry, Dalton, GA, 2010.

Table 3. Energy modules used in the life cycle impact assessment.

	SimaPro name	Library	Conversions and notes
Electricity	Used customized grid based on 2015 data from EIA and USLCI for electricity by fuel types.	USLCI	This is US average electricity for 2015 mix.
Natural gas	Natural gas combusted in industrial boiler/US	USLCI	0.027027 m3 / MJ
Dowtherm	Natural gas combusted in industrial boiler/US	USLCI	1 MJ natural gas / 0.8 MJ Dowtherm to process
Steam	Natural gas combusted in industrial boiler/US	USLCI	1 MJ natural gas / (0.8 * 0.92) MJ steam to process
Direct fuel	Natural gas combusted in industrial boiler/US	USLCI	1 MJ natural gas / MJ direct fuel
Coal	Bituminous coal combusted in industrial boiler/US	USLCI	1 kg coal = 25 MJ
Diesel (process)	Diesel combusted in industrial boiler/US	USLCI	0.85 kg/L & 45 MJ/kg
Diesel (transport)	Transport, combination truck, average fuel mix/US	USLCI	0.027224 L/tkm (USLCI), 45 MJ/kg, 0.85 kg/L
Undefined	Same as diesel		
Heavy oil: refinery	Same as diesel		
Hydro power: refinery	Same as electricity		
Nuclear power: refinery	Same as electricity		
Refrigeration	1/3 of Electricity value		Most industrial refrigeration temperatures use approximately this much
Potential recovery	Same as steam, but negative values		Potential recovery is assumed to off-set steam use

Table 3A. Impact assessment and primary energy results for a market average of SBL broadloom carpets. All results are per square meter of carpet.

Impact category	Units	Souring/ Extraction	Manufacturing	Delivery and Installation	End of Life	Total
Abiotic depletion, non-energy	kg Sb eq	0	0	0	0	0
Acidification	kg SO2 eq	0.0975	0.0135	2.00E-03	2.27E-04	0.113
Eutrophication	kg PO4--- eq	1.33E-02	3.42E-04	2.24E-04	6.30E-06	1.38E-02
Global warming (GWP100)	kg CO2 eq	8.25	1.41	0.331	0.0852	10.1
Ozone layer depletion (ODP)	kg CFC-11 eq	3.60E-11	6.78E-12	2.12E-11	1.33E-13	6.41E-11
Photochemical oxidation	kg C2H4 eq	0.0220	1.02E-03	7.80E-04	2.77E-05	0.0238
Primary energy, non-renewable	MJ	191	21.8	7.05	1.18	221
Primary energy, renewable	MJ	5.59	2.65	0.0249	0.0529	8.32

Life cycle impact assessment

The results of the calculations on impact assessments for one square meter of Masland Broadloom Carpet are reflected in table 4 and 5. Table 4 satisfies the requirements of Table A in the PCR and Table 5 satisfies Table B requirements.

Table 4. Impact assessment and primary energy results for a market average of SBL broadloom carpets. All results are per square meter of carpet. This table satisfies the requirement of Table A in the PCR.

Impact Category	Units	Sourcing/ Extraction	Manufacturing	Delivery and installation	Use (one year)	End of life	Total
Abiotic depletion, non-energy	kg Sb eq	0	0	0	0	0	0
Acidification	kg SO2 eq	0.0975	0.0135	2.00E-03	0.101	2.27 E-04	0.113
Eutrophication	kg PO4--- eq	1.33E-02	3.42E-04	2.24E-04	2.95E -03	6.30 E-06	1.38 E-02
Global warming (GWP100)	kg CO2 eq	8.25	1.41	0.331	10.7	0.0852	10.1
Ozone layer depletion (ODP)	kg CFC-11 eq	3.60E-11	6.78E-12	2.12E-11	6.42E -11	1.33 E-13	6.41 E-11
Photochemical oxidation	kg C2H4 eq	0.0220	1.02E-03	7.80E-04	8.56E -03	2.77 E-05	0.0238
Primary energy, non-renewable	MJ	191	21.8	7.05	159	1.18	221
Primary energy, renewable	MJ	5.59	2.65	0.0249	25.7	0.0529	8.32

Table 5. Impacts over the use stage of one square meter of carpet. This table satisfies the requirements of Table B in the PCR.

Impact category	Units	Use (one year)
Abiotic depletion, non-energy	kg Sb eq	0
Acidification	kg SO2 eq	1.68E-03
Eutrophication	kg PO4--- eq	4.91E-05
Global warming (GWP100)	kg CO2 eq	0.178
Ozone layer depletion (ODP)	kg CFC-11 eq	1.07E-12
Photochemical oxidation	kg C2H4 eq	1.43E-04
Primary energy, non-renewable	MJ	2.64
Primary energy, renewable	MJ	0.429

Table 6. Impact assessment and primary energy results for a market weighted average of Solution dyed SBL broadloom carpets. All results are per square meter of carpet. This covers a 60-year building service life.

Impact category	Units	Life cycle stages					
		User defined Reference Service Life** of product = 15 years					
		Number of installations over 60 years = 4					
		Sourcing and extraction	Manufacturing	Delivery and installation	Use	End of life	Total
Abiotic depletion	kg Sb eq	0	0	0	0	0	0
Acidification	kg SO2 eq	0.390	0.0541	8.01E-03	0.101	0.001	.55
Eutrophication	kg PO4--- eq	0.0531	1.37E-03	8.98E-04	2.95E-03	0.0000	0.058
Global warming (GWP100a)	kg CO2 eq	33.0	5.66	1.33	10.7	.3	51
Ozone layer depletion (ODP)	kg CFC-11 eq	1.44E-10	2.71E-11	8.48E-11	6.42E-11	5.32E-13	3.21E-10
Photochemical oxidation	kg C2H4 eq	0.088	4.07E-03	3.12E-03	8.56E-03	0.000	0.104
Primary energy, non-renewable	MJ	765	87	28.2	159	5	1,044
Primary energy, renewable	MJ	22.4	10.6	0.0994	25.7	0.211	59.0

Interpretation

Interpretations gleaned from the Masland Broadloom Carpet family (2018) update shows that the manufacturing process changes made have reduced the influence of manufacturing and now Sourcing/Extraction is the largest contributor to the studied impact categories. Masland has continually reduced the manufacturing impacts by the replacement of poor performing components with more favorable materials and by a massive reduction of water consumption leading to lower energy requirements. Increased investigations into Sourcing/Extraction is warranted to discover raw materials that carry a lessened impact on the studied categories. Also, when these studies are reviewed over the useful life of the product, it is apparent that in the use stage maintenance is an area that requires development of less impactful processes. Global Warming impacts are the largest of the studied impacts. A reduction in this category can be seen from better Sourcing/Extraction.

Additional Environmental Information

Health, safety, and environmental aspects during production

Masland Carpets has a long-term policy of providing its associates with modern, clean, safe, and pleasant working conditions. In recent years, there have been investments in modernizing all facilities. Masland stresses that a safe and clean operation is essential for the accident-free production of products.

Masland continues emphasis on these efforts to be accident free by on-going Safety Training through Safe Start, an awareness and culture of being mindful of associates' surroundings and the production processes around them. There are daily stand up safety meetings, monthly safety inspections of all plants and operations, and annual OSHA training and corporate audits.

Masland Carpets has a safety incident rate of 1.61 that is inclusive of eight manufacturing locations and all sales and support personnel. The lost time severity rate is 0.00.

Structural damage

Subfloor preparation instructions can be found at:
http://www.maslandcontract.com/mc/web/forms/technical/InstallationInstructions.aspx

Disclaimer

It should be noted that environmental declarations from different programs may not be comparable and may not be qualified as replacements for each other without detailed analysis.

References

CML (2013) CML 2 baseline 2000 v 3.01, impact assessment method, as provided by Simapro 8.0, http://cml.leiden.edu/software/data-cmlia.html.

CRI, Carpet and Rug Institute, Life cycle database developed by Georgia Institute of Technology and carpet industry, Dalton, GA, 2010.

EIA (2016) Electric Power Monthly with data for October 2016, Energy Information Agency, url= https://www.eia.gov/electricity/monthly/archive/december2016.pdf

U.S. Environmental Protection Agency (2008). Municipal solid waste in the United States: 2007 Facts and figures, Office of Solid Waste and Emergency Response, EPA 530-R-08-010, Washington, D.C. Retrieved from http://www.epa.gov/osw/nonhaz/municipal/pubs/msw07-rpt.pdf Accessed on 13 April 2009.

Manfredi, S, D. Tonini, T. Christensen (2009) “Landfilling of waste: accounting of greenhouse gases and global warming contributions,” *Waste management and research*, **27**:825-836.

NSF International (2014). Product Category Rule for Environmental Product Declarations Flooring: Carpet, Resilient, Laminate, Ceramic, Wood, Version 2. Ann Arbor, MI: NSF International.

Overcash, M. and E. Griffing. 1998-2017. Life cycle inventory (lci) database, edited by Environmental Clarity, LLC, Reston, VA (available in collaborative projects with research teams).

Realff, M. and M. Overcash, Environmental Competitiveness of Carpet Products - Life Cycle Inventory Data Generation and Migration to Sustainability Standards, Traditional Industries Program, State of Georgia, 2008

Simapro 7.3.3 (2011) http://www.pre-sustainability.com/

U.S. Environmental Protection Agency (2008). Municipal solid waste in the United States: 2007 Facts and figures, Office of Solid Waste and Emergency Response, EPA 530-R-08-010, Washington, D.C. Retrieved from http://www.epa.gov/osw/nonhaz/municipal/pubs/msw07-rpt.pdf Accessed on 13 April 2009.