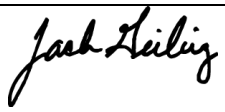
Environmental Product Declaration

AtlasMasland Broadloom Carpet Family

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

Date of Issue: 06/02/2020
Valid Until: 06/02/2025
Declaration#: EPD10348

EPD Information			
Program Operator		NSF Certification, LLC	
Declaration Holder		AtlasMasland Contract	
Product: Broadloom Carpet	Date of Issue: June 2, 2020	Period of Validity: 5 years	Declaration Number EPD10348
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, Ecoform jgeibig@ecoform.com	
LCA Information			
Basis LCA		Lifecycle Analysis of AtlasMasland Carpets April 6, 2020	
LCA Preparer		Michael Overcash & Evan Griffing Environmental Clarity, Inc. www.environmentalclarity.com	
This life cycle assessment was critically reviewed in accordance with ISO 14044 by:		 Jack Geibig, Ecoform	
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.

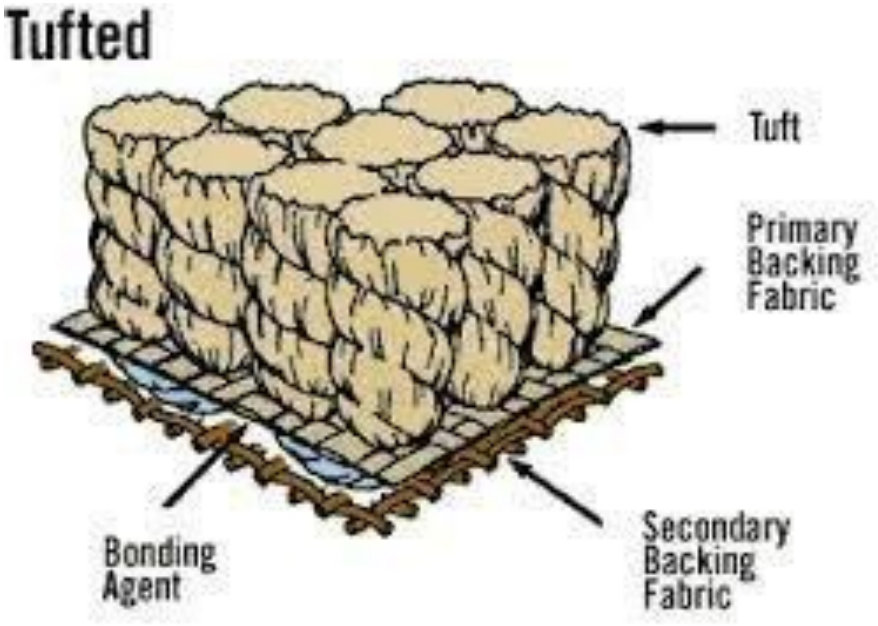
ENVIRONMENTAL PRODUCT DECLARATION: DETAILED VERSION

Product Description

Product classification and description

This Environmental Product Declaration (EPD) report pertains to a market average mix of solution and beck dyed AtlasMasland styrene butadiene latex backed broadloom carpet. All broadloom carpets made by AtlasMasland are included in this study. This is an EPD report to account for improvements to the carpet architecture and a continuing update of products after the merger of Atlas and Masland. AtlasMasland is located at 716 Bill Myles Drive, Saraland, AL, 36571. The carpet evaluated in this study has a weighted average face fiber weight of 31.8 oz/square yard (sy) (1.08 kg/m^2) and a total weight of 69.8 oz/sy (2.37 kg/m^2). All product characteristics fall within the ranges listed in Table 1. The face fiber is composed of 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.

Broadloom Carpet Architecture



Applicability

AtlasMasland 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 Institute. For more detail on the performance recommendations refer to: http://www.carpet-rug.org/commercial-customers/selecting-the-right-carpet/quality-and-performance/index.cfm. The AtlasMasland Broadloom Carpet family of products has a reference service life of 15 years.

Product Characteristics

Table 1 – AtlasMasland 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 5278 for Predyed GLP 2950 and GLP 4428 for Post dyed	
Texture Appearance Retention Rating	≥3	
Characteristics	**Nominal Value**	**Unit**
Total thickness	0.25-0.375	inch
Product weight	56-76	oz/ft^2
Surface pile thickness	0.156-0.250	inch
Number of tufts or loops $/dm^2$	19,008-24,192	ft^2
Surface pile weight	18-40	oz/ft^2
Pile Fiber Composition	43.0	%
Primary and Secondary Backing Fabrics	9.0	%
Secondary Backing	48.0	%
Pre-consumer content	34-57	%
Post-Consumer Content	0 – 3.3	%

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

Table 2. AtlasMasland Broadloom material contents

Component	Material	Mass %	Availability			Origin of Raw Materials
			Renewable	Non-Renewable	Recycled	
Pile Material (Tuft)	Type 6,6 Nylon	45.0%		Fossil resource, limited	20% Pre-consumer 10% Post Consumer	Global
Primary Backing Fabric	Polypropylene	6%		Fossil resource, limited	0%	Global
Back coating (Bonding Agent)	Latex	46.0%		Fossil resource, limited	0%	Global
	Calcium Carbonate			Mineral, abundant	45% Pre-consumer	US
Secondary Backing Fabric	Polypropylene	3%		Fossil resource, limited	0%	Global

No materials excluded from the Table are considered to adversely affect human health or the environment. Therefore, there are no reportable compounds as required by federal or state regulatory guidelines.

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 AtlasMasland's technology and expertise. It begins with the use of undyed or solution dyed fibers. A change to use more 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. Most of the nylon fiber is processed (twisted, heat set when appropriate, 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 primarily uses 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.

In the case of beck dyed carpets, the tufted face fibers are transported to a dyeing facility and dyed before the coating process.

Delivery and installation stage

Delivery

Delivery to the customer is typically by 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 AtlasMasland Broadloom Carpet is AtlasMasland Adhesive using a full spread of adhesive. The life cycle assessment modeled the installation stage with AtlasMasland Adhesive at a spread rate of 0.15 kg adhesive/sy carpet.

Complete installation instructions are available at:
http://www.atlasmasland.com/documents/InstallationOfPatternedCarpet.pdf

Health, safety, and environmental aspects during installation

All MSDS sheets for adhesive may be viewed at http://www.atlasmasland.com/all-products/accessories

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

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

Packaging

Table 3 – Packaging Materials for AtlasMasland Broadloom Carpet

Category	Material
cardboard	cores
plastics	Plastic wrap

Use stage

Use of the floor covering

The service life for AtlasMasland 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 AtlasMasland Broadloom Carpet is 15 years. The use phase is defined by the cleaning and maintenance activities.

AtlasMasland Broadloom Carpet is guaranteed by AtlasMasland's warranted performance. These warranties may be found at http://www.atlasmasland.com/technical/warranties

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.

AtlasMasland's maintenance guidelines may be found at: http://www.atlasmasland.com/documents/AtlasMaslandCleaningMaintenanceGuide.pdf

Table 4 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 4 - Recommended Maintenance for AtlasMasland 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 AtlasMasland 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. AtlasMasland 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

AtlasMasland 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).

Based on the stated goals, there are no significant limitations in the study.

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. Additionally, use phase data are accumulated on a 1-year basis.

Cut-off criteria

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. Several additives were excluded from the LCA calculations based on the PCR cutoff criteria for amount used. 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. All known energy inputs were included. Therefore, this study complies with the PCR mass and energy cutoff rules.

All materials and substances used in the manufacture of AtlasMasland broadloom carpets are void of any chemicals considered to adversely affect human health and the environment as declared by government regulations. All processes and materials omitted from the inventory analyses are less than 1% of the total mass or total environmental impacts used to manufacture the product.

There are no reportable compounds in the AtlasMasland broadloom carpets that are required to be reported due to air pollution, water pollution, EPA guidelines such as EPCRA Section 313, RCRA guidelines, or Stockholm Convention POP lists. All materials are certified to CRI Green Label Plus for Indoor Air Quality, NSF 140, and have Health Product Declarations available.

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, 2020) were utilized for the supply chain, delivery and installation, use, and end of life stages of 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. Energy background data for cradle through combustion of energy use were based on data from USLCI (2019). 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.

Relevant data concerning energy modules in the LCA are included in Table 5. The process LCI data have some energy types that are not available in the USLCI database. Therefore, conversions were used to calculate the appropriate amount of energy in the USLCI database. Several gtgs in the background data have unusual energy types. For example, several gtgs have undefined energy inputs or have refrigeration as a service. Undefined energy was modeled as if it were process diesel. Refrigeration uses electricity, and the amount is a function of the temperatures of the cooled stream and the secondary cooling water circuit. In our heuristic, cooling a process

stream to 2 °C requires about 1/3 MJ electricity per MJ of refrigeration. Undefined and refrigeration comprise less than 1% of the total ctg energy. When streams are cooled within processes, a portion of energy that is removed is considered recoverable. This portion is estimated based on the temperature of the cooled stream, and the energy is referred to as potential energy recovery. This represents opportunities for heat integration in chemical processes.

Table 5. 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	The US average electricity mix and Alabama electricity mix are very similar to 2015 US average. Therefore, US average was deemed appropriate.
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 (process)		
Heavy oil: refinery	Same as diesel (process)		
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 electricity
Potential recovery	Same as steam, but negative values		Potential recovery is assumed to off-set steam use

Data quality and data quality assessment

AtlasMasland data were collected for one year at each facility. The energy data were allocated between products using energy models provided by AtlasMasland for each operation. The data for these operations are very good. The Carpet and Rug Institute database (2010) as well as that of Environmental Clarity (Overcash and Griffing, 2020) data were utilized for other stages in 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, delivery and installation, 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, which meets the requirements of the product category rules. (NSF International, 2014)

Time related coverage – The process data were based on one year of data between 2018 and 2019. 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 were based on North America. The geographical coverage is good.

Technology coverage – Process data were collected from the actual processes and thus the technology coverage is very good. The background data were 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 AtlasMasland 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 the 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. Energy data were based on metered usage, and include all metered energy. Production of capital equipment is excluded. Packaging is included.
- Delivery and Installation Stage – This stage includes the transportation of material from the production facility to the point of use. Adhesive materials used for installation and site preparation are included.
- Use Stage – This stage includes cleaning and maintenance of the AtlasMasland Broadloom Carpet during the 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 is included in the report.

Impact declaration and use stage normalization

The life cycle impact assessments (LCIA) were calculated for the market average of solution and beck dyed AtlasMasland Carpets. The results are specified in three Tables as specified in the PCR (NSF International, 2014).

Table A: Specifies the impacts for sourcing/extraction, manufacturing, delivery and installation, and end-of-life stages for one square meter.

Table B: Specifies the impacts for the use stage for one square meter for one year.

Table C: Specifies the impacts over the reference service life of a building (60 years).

Life Cycle Impact Assessment

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 (Wernet et al., 2016). 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).

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.

The results of the calculations on impact assessments for one square meter of AtlasMasland Broadloom Carpet are reflected in Table 6 through 8. Table 6 satisfies the requirements of Table A, Table 7 satisfies Table B requirements, and Table 8 satisfies the Table C requirements.

Table 6. (PCR Table A Requirement) Impact assessment and primary energy results for a market average of SBL broadloom carpets from cradle to disposal omitting use phase. All results are per square meter of carpet. This Table satisfies the requirement of Table A in the PCR.

Impact Category	Units	Sourcing/ Extraction	Manufactur-ing	Delivery and Installation	End of life	Total
Abiotic depletion, non-energy	kg Sb eq	3.57E-06	0	1.21E-07	0	3.69E-06
Acidification	kg SO2 eq	0.1061	0.0397	2.05E-03	2.31E-04	0.148
Eutrophication	kg PO4--- eq	1.45E-02	9.02E-04	2.32E-04	6.40E-06	1.57E-02
Global warming (GWP100)	kg CO2 eq	8.95	4.18	0.340	0.0865	13.6
Ozone layer depletion (ODP)	kg CFC-11 eq	3.89E-11	1.64E-11	2.15E-11	1.35E-13	7.70E-11
Photochemical oxidation	kg C2H4 eq	0.0230	2.75E-03	7.82E-04	2.81E-05	0.0266
Primary energy, non-renewable	MJ	206	66.1	7.17	1.20	281
Primary energy, renewable	MJ	6.02	6.25	0.0249	0.0537	12.34

Table 7. (PCR Table B Requirements) Impacts over the use stage of one square meter of carpet per year. 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 8. (PCR Table C) Impact assessment and primary energy results for a market weighted average of 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	1.43E-05	0	4.85E-07	0	0	1.47E-05
Acidification	kg SO2 eq	0.424	0.159	8.18E-03	0.101	9.23E-04	0.693
Eutrophication	kg PO4--- eq	0.0582	3.61E-03	9.29E-04	2.95E-03	2.56E-05	0.066
Global warming (GWP100a)	kg CO2 eq	35.8	16.7	1.36	10.7	0.346	64.9
Ozone layer depletion (ODP)	kg CFC-11 eq	1.55E-10	6.57E-11	8.62E-11	6.42E-11	5.40E-13	3.72E-10
Photochemical oxidation	kg C2H4 eq	0.092	0.011	3.13E-03	8.56E-03	1.13E-04	0.115
Primary energy, non-renewable	MJ	824	265	28.7	159	4.78	1,281
Primary energy, renewable	MJ	24.1	25.0	0.0994	25.7	0.215	75.1

Note on use stage

The AtlasMasland 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.atlasmasland.com/documents/AtlasMaslandCleaningMaintenanceGuide.pdf

Interpretation

Interpretations gleaned from the AtlasMasland Broadloom Carpet family (2020) update shows Sourcing/Extraction to be the largest contributor to the studied impact categories. AtlasMasland 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. AtlasMasland continues to reduce manufacturing energy and has achieved significant reductions through improved processing. Post-dyed carpets have a higher energy use, and additional efforts have focused on reducing the post-dyed carpets as a percentage of the overall product line.

Most of the environmental impacts included in this study were driven by energy consumption. Abiotic depletion was based solely on mostly on raw material use in the sourcing and extraction of raw materials. Eutrophication and photochemical oxidation had significant contributions from process (non-energy related) emissions in the raw material extraction phase. A more detailed description of these emissions is given in the accompanying LCA.

Increased investigations into Sourcing/Extraction is warranted to discover raw materials that carry a lessened impact on the studied categories. The consolidation of manufacturing at one location will assist in reductions since the transportation of materials will be shortened.

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.

Additional Environmental Information

Health, safety, and environmental aspects during production

AtlasMasland 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. AtlasMasland stresses that a safe and clean operation is essential for the accident-free production of products.

AtlasMasland 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.

Structural damage

Subfloor preparation instructions can be found at:

http://www.atlasmasland.com/documents/InstallationofPatternedCarpet.pdf

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, 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. 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.

USLCI, United States Life Cycle Inventory Database, accessed 8/1/2019, https://www.lcacommons.gov/lca-collaboration/

Wernet, G., Bauer, C., Steubing, B., Reinhard, J., Moreno-Ruiz, E., and Weidema, B., 2016. The ecoinvent database version 3 (part I): overview and methodology. The International Journal of Life Cycle Assessment, [online] 21(9), pp.1218–1230. Available at: http://link.springer.com/10.1007/s11367-016-1087-8.