Environmental Product Declaration

Avant Contract Modular Carpet

EPD Information			
Program Operator		NSF International	
Declaration Holder		Avant Contract	
Product Modular Carpet	**Date of Issue** August 24, 2015	**Period of Validity** 5 Years	**Declaration Number** EPD10060
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 June 28, 2014	
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

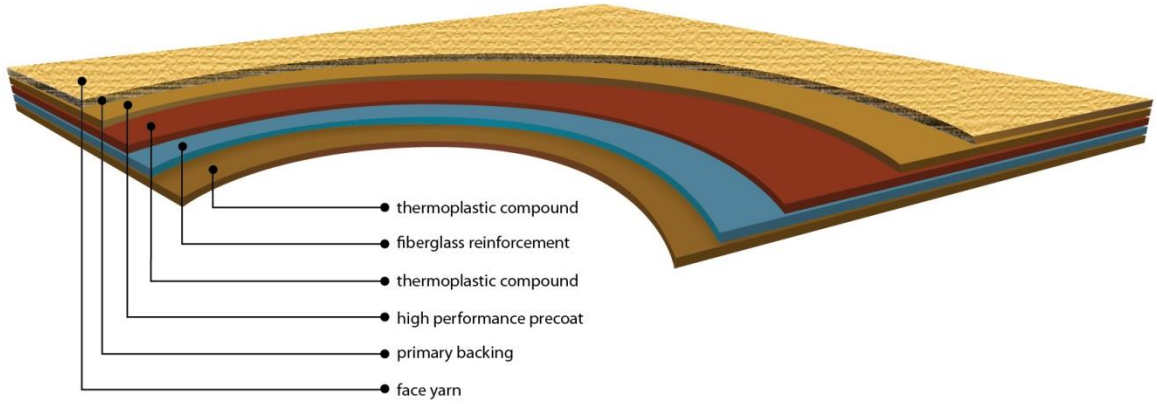
Product Description

Product classification and description

Products covered in this Environmental Product Declaration (EPD) are a broad variety of modular carpets manufactured by Avant Contract backed by thermoplastic backing and made with a type 6,6 nylon. The thermoplastic is comprised of a polyvinyl chloride comprised of at least 30% recycled content with a minimum of 11% post-consumer. The face fiber is 100% nylon 6,6 and is either solution, skein dyed, space dyed, piece dyed, or a combination of the methods. The products are covered by Avant Contract's Lifetime Limited Commercial Warranty.

The products all pass the Carpet & Rugs Institute's (CRI) Green Label.

The average weight of the backing system is 105 oz. per square yard. The variation in weight in the modular products is due to the amount of yarn weight. The weighted average used in the Life Cycle Assessment (LCA) is 22 oz. per square yard, with the minimum yarn weight of 16 oz per square yard, and the maximum yarn weight of 40 oz per square yard.



Applicability

Avant Contract modular carpet is 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 CRI. For details on recommended commercial performance, refer to: http://www.carpet-rug.org/commercial-customers/selecting-the-right-carpet/quality-and-performance/index.cfm

Avant Modular Carpets have a referenced service life of 15 years.

Type of manufacture	Tufted textured loop, Tufted textured tip sheared loop, tufted cut pile	
Yarn type	Nylon 6,6	
VOC emissions test method	Carpet & Rug Institute's Green Label Plus: GLP 1922 and GLP 7910	
CRI- TARR rating	≥3	
Characteristics	**Nominal Value**	**Unit**
Total thickness	6.35 – 11.34 (.25-.4465)	mm (inch)
Product weight	3713.78 – 4394.17 (130 – 155)	g/m^2 (oz/yd^2)
Surface pile thickness	3,969 – 8,167 (.156 - .322)	mm (inch)
Number of tufts or loops /dm^2	15,840 – 21,254 (1,705 – 2,288)	dm^2 (ft^2)
Surface pile weight	456 – 1134 (16 – 40)	g/m^2 (oz/yd^2)
Pile Fiber Composition	15	%
Secondary Backing	85	%
Post-Consumer Recycled Content	8-11	%
Pre-Consumer Recycled Content	7-20	%
Product Standards		**Results**
CRI Green Label Plus		Pass
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/D7330-11 Hexapod Tumble Drum Test (TARR)		≥3
ASTM D5417-10/D7330 -11 Vetterman Drum Test		4.0
ASTM D7570 Dimensional Stability		-.040%

Product Characteristics

Material Content

Material content of the product

Component	Material	Mass %	Availability			Origin of Raw Materials
			Renew-able	Non-Renewable	Recycled	
Pile Material	Type 6,6 Nylon	15%		Fossil resource, limited	16% recycled (6% preconsumer, 10% postconsumer)	Global
Primary Backing	Polyester	3%		Fossil resource, limited		Global
Precoat	PVC	14%		Fossil resource, limited		Global
	Calcium Carbonate	6%		Mineral, abundant		US
Back Coating	PVC	17%		Fossil resource, limited		Global
	Calcium Carbonate	14%		Mineral, abundant		US
	Glass	10%		Silica, abundant	100% post-consumer	US
	Coal Fly Ash	20%		Fossil resource, limited	100% pre-consumer	US
Secondary Backing	Fiberglass	1%		Fossil resource, limited		Global

The fiber content consists of 82% virgin fiber, 6% post-consumer, and 12% post-industrial content.

None of the materials and substances used in the manufacture of Avant Modular Carpet is considered by any government regulation as adversely affecting human health or the environment. Avant Modular Carpet is not required to report on a MSDS. The material and its chemical discharges are not considered critical air pollutants or hazardous air pollutants. Likewise, none of the materials or discharges are subject to any governmental regulation for water pollutants or to US EPA disclosure policies for hazardous substances. No material produced is listed as a persistent organic pollutant by the Stockholm Convention.

Production of main materials

Nylon Face Fiber – Type 6,6 nylon that are solution dyed, skein dyed, space dyed or piece dyed or a combination of the different methods. Nylon 6,6 is produced through polycondensation of hexamethylenediamine and adipic acid.

Synthetic Primary Backing – The yarn is tufted into a woven polyester backing. The term "polyester" as a specific material most commonly refers to polyethylene terephthalate (PET). The material is categorized as containing core ester functional groups in their main chain.

Thermoplastic Layers -- Three layers of polyvinyl chloride material are utilized to bond the tufted carpet to the primary backing giving the product stability and long term performance. The backing layers contain both post-consumer and pre-consumer recycled content. Polyvinyl chloride is produced by polymerization of the monomer vinyl chloride. It can be made softer and more flexible by the addition of plasticizers such as phthalates.

Reinforcement Layer – A fiberglass fabric is embedded in backing layers to provide dimensional stability. Fiberglass is the common name for glass-reinforced plastic or alternatively glass-fiber reinforced plastic. Fiberglass is a fiber reinforced polymer made of plastic reinforced by glass fibers, commonly woven into a mat.

Calcium Carbonate – an abundant mineral found in all parts of the world as the chief substance in marble and limestone. It can be ground to varying particle sizes and is widely used as filler in formulated flooring systems.

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 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 Avant Contract's technology and expertise. It begins with the dyeing of the fiber or in some cases the use of solution dyed fibers. The determination of the dyeing process lies in the intended purpose and aesthetics of the product. The fiber is then converted into yarn in the spinning process. 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 coat locks the fibers into place giving strength to the material. The coating process uses electricity, gas, and water.

Backing of the carpet tiles is accomplished by applying a vinyl layer to the carpeting. This layer adds dimensional stability and completes the performance package for the carpet tile. This process uses electricity and gas.

The last step in the carpet tile process is cutting and packaging. The material that has now been completed in widths up to 12 feet is cut using a tile cutter into 18 inch squares and packaged for shipment. This process utilizes electricity.

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 Avant Modular Carpet is Avant Contract Premium Carpet Adhesive using a full spread of adhesive. The life cycle assessment modeled the installation stage with Avant Contract Premium Carpet Adhesive at a spread rate of 0.15 kg adhesive per square meter of carpet.

Complete installation instructions are available at:
http://www.avantcontract.com/web/files/INSTALLATION/CARPET_TILE_INSTALLATION_INSTRUCTIONS.pdf

Health, safety, and environmental aspects during installation

For MSDS on adhesive, please contact Avant Contract's Technical Services Department at 855-469-2826.

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

Waste

Avant Modular Carpet is designed with the end in mind. Manufacturing waste is recycled and an aggressive resource stewardship program is in place. Waste materials from installation may be recycled into new carpet or other new products utilizing CARE recyclers and other local recyclers. Other post-installation carpet waste may be thermally recycled in a waste incineration plant and materially recycled in the cement industry. The packaging materials may be recycled utilizing local recyclers.

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

Packaging

Table – Packaging Materials for Avant Modular Carpet

Category	Material
Pallet	Wood
Tray Caps	Cardboard
Shrink Wrap	Plastic
Labeling and Instructions	Paper

These materials are below the cut-off and are not considered in the LCA review.

Use stage

Use of the floor covering

The service life for Avant Modular Carpet will vary depending on the amount of floor traffic, level of maintenance, and the desired appearance of the floor covering. Impacts for the use stage are primarily due to cleaning and periodic maintenance. These activities have been stated on a yearly basis and can therefore be used for any carpet service life or building service life. The referenced service life for Avant Modular Carpet is 15 years.

The EPD presents results for both a one-year and 60-year period; impacts are calculated for both time periods. The EPD assumes that the life of a building is 60 years.

- The one-year use phase impacts are based on the initial installation of one square meter of flooring (transport, installation) phase impacts are based on annual cleaning and maintenance guidelines.
- The 60-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.

Avant Modular Carpet is guaranteed by Avant's warranted performance. These warranties may be found at: http://www.avantcontract.com/web/files/Warranty/Avant_Lifetime_Commercial_Limited_Warranty.pdf

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. CRI's publication titled *Carpet Maintenance Guidelines for Commercial Applications* offers guidance on how to maintain the carpet at various floor traffic levels.

Avant's maintenance guidelines may be found at:
http://www.avantcontract.com/web/files/Cleaning/Avant_cleaning_and_maintinance.pdf

The table below is a guideline for the frequency of cleaning established by the The Institute of Inspection, Cleaning and Restoration Certification (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 – Recommended Maintenance for Avant Modular Carpet

Traffic Soil Rating (foot traffic per day)	**Vacuuming** (times per week)	**Spot Cleaning** (times per week)	**Interim Maintenance** (times per year)	**Restorative Cleanings** (times per year)
Light <500	1-2	Daily or as soon as noticed	1-3	1-2
Medium 500-1,000	Daily in traffic areas, overall 3-4	Daily or as soon as noticed	3-6	2-4
Heavy 1000-2,500	Daily in traffic areas, overall 4-7	Daily in traffic areas, overall 4-7	6-12	3-6
Very Heavy >2,500	1-2 daily in traffic areas, overall 7	1-2 daily in traffic areas, overall 7	12-52	6-12

End of life stage

Recycling, reuse, or repurpose

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

Disposal

Avant Modular 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

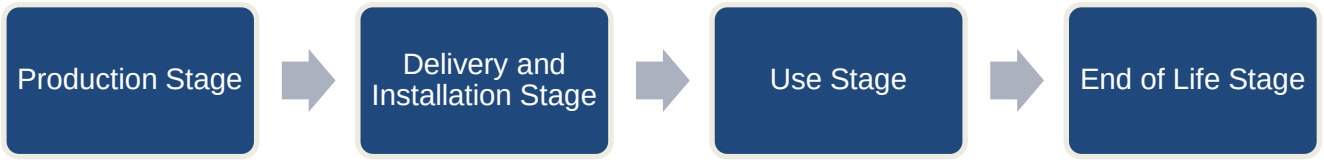
The Life Cycle Inventory (LCI) and Life Cycle Impact Assessment (LCIA) were undertaken with guidelines from ISO 14040/ISO 14044 with respect to *Product Category Rule for Environmental Product Declarations Flooring: Carpet, Resilient, Laminate, Ceramic, Wood* (Flooring PCR, NSF International, 2014). The functional unit is one square meter (sm) 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 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.

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 CRI (2010) and Environmental Clarity (Overcash and Griffing, 2014) databases 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 were also determined 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

Materials with low mass and environmental impacts of inputs or use (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 CRI (2010) and Environmental Clarity (Overcash and Griffing, 2014) databases were utilized for this life cycle. These gate-to-gate datasets were combined with USLCI energy modules throughout the life cycle. The life cycle inventory data includes all relevant process steps and technologies found in the supply chain, manufacturing, use, and end-of-life stages.

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 were also determined 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 considered to be good to very good which meets the requirements of the product category rules. (NSF International, 2014) A variety of checks were built into the model. Additionally, a series of tests were conducted on the model to ensure that the model quality is very good.

Time related coverage – The process data was based on one year of data between 2012 and 2013. The background data sources are based on data less than 10 years old. All of 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 Avasnt Modular 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. Overhead and personnel related items are not 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 Avant Contract Modular Carpet during its useful life as well as the extraction, manufacturing, and transport of all supporting materials, if relevant for the maintenance and above the cut-off levels.
- 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 Avant Modular Carpet as per *Section 6.8.1 Impact declaration and use stage normalization*.

- "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, 2014)

Results of the Assessment

Table – Life cycle inventory analysis in MJ natural resource energy per square meter of carpet

Carpet LCI stages	Supply Chain	Manufacturing	Delivery & Installation	Use (one year)	End-of-Life	Total
PVC-backed tile with solution dyeing	124	27.4	6.9	2.8	2.3	164
PVC-backed tile with skein dyeing	124	39.3	6.9	2.8	2.3	176
PVC-backed tile with continuous dyeing	124	28.9	6.9	2.8	2.3	165

Life Cycle Impact Assessment

The life cycle inventory data 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). Six impact assessment categories from the CML 2 baseline 2000 version 2.05 method (CML, 2009) were used. The abiotic depletion potential was modified to remove primary energy materials (coal, oil and gas) to comply with the PCR. Non-renewable and renewable primary energy usage was calculated 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 inventory was calculated by combining Environmental Clarity gate-to-gate data with energy modules from the USLCI database. The energy modules used for the LCIA are shown in Table 3.

LCIA results relevant to the NSF flooring PCR are shown in Tables 4,5, and 6. These results are expressed per square meter of carpet. Most of the environmental impacts are derived from energy consumption throughout the life cycle.

Table – Energy Consumption – Avant Modular Carpet

	Units	Amount	Percent
Primary Energy, Non-Renewable	MJ	206	>99
Primary Energy, Renewable	MJ	0	<1

The amount of renewable energy is less than 1% and approaches 0 MJ. For purposes of this report 0 MJ are used.

Table – Energy modules used in the life cycle impact assessment

	SimaPro name	Library	Conversions and notes
Electricity	Electricity, at grid, US/US	USLCI	
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

Table – Non-Energy Impacts used in the Life Cycle Assessment

Impact category	Units	Sourcing/ Extraction	Manufacturing	Delivery & 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	0.101	0.0255	3.42E-03	1.91E-03	8.69E-04	0.133
Eutrophication	kg PO4--- eq	0.0111	7.40E-04	4.28E-04	6.86E-05	5.05E-05	0.0124
Global warming (GWP100)	kg CO2 eq	10.5	2.76	0.602	0.206	0.189	14.3
Ozone layer depletion (ODP)	kg CFC-11 eq	6.66E-11	1.86E-11	3.53E-11	1.67E-12	5.14E-12	1.27E-10
Photochemical oxidation	kg C2H4 eq	0.0165	1.85E-03	6.40E-04	1.71E-04	7.21E-05	0.0192
Primary energy, non renewable	MJ	218	48.9	11.3	2.90	2.73	284
Primary energy, renewable	MJ	0	0	0	0	0	0

Life cycle impact assessment

The results of the calculations on impact assessments for one square meter of Avant Modular Carpet are reflected in tables below, which satisfy the PCR requirements.

Table – Impact assessment and primary energy results for a market weighted average of PVC tile carpets. All results are per square meter of carpet. The PVC tile market is 68% solution, 25% skein, and 7% continuous by carpet area. 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	0.101	0.0255	3.42E-03	1.91E-03	8.69E-04	0.133
Eutrophication	kg PO4--- eq	0.0111	7.40E-04	4.28E-04	6.86E-05	5.05E-05	0.0124
Global warming (GWP100)	kg CO2 eq	10.5	2.76	0.602	0.206	0.189	14.3
Ozone layer depletion (ODP)	kg CFC-11 eq	6.66E-11	1.86E-11	3.53E-11	1.67E-12	5.14E-12	1.27E-10
Photochemical oxidation	kg C2H4 eq	0.0165	1.85E-03	6.40E-04	1.71E-04	7.21E-05	0.0192
Primary energy, non renewable	MJ	218	48.9	11.3	2.90	2.73	284
Primary energy, renewable	MJ	0	0	0	0	0	0

Table – 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	1.91E-03
Eutrophication	kg PO4--- eq	6.86E-05
Global warming (GWP100)	kg CO2 eq	0.206
Ozone layer depletion (ODP)	kg CFC-11 eq	1.67E-12
Photochemical oxidation	kg C2H4 eq	1.71E-04
Primary energy, non renewable	MJ	2.90
Primary energy, renewable	MJ	0

Table – Impact assessment and primary energy results for a market weighted average of PVC tile carpets. All results are per square meter of carpet. The PVC tile market is 68% solution, 25% skein, and 7% continuous by carpet area.

Impact category	Units	Sourcing/ Extraction	Manufacturing	Delivery & 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	0.101	0.0255	3.42E-03	1.91E-03	8.69E-04	0.133
Eutrophication	kg PO4--- eq	0.0111	7.40E-04	4.28E-04	6.86E-05	5.05E-05	0.0124
Global warming (GWP100)	kg CO2 eq	10.5	2.76	0.602	0.206	0.189	14.3
Ozone layer depletion (ODP)	kg CFC-11 eq	6.66E-11	1.86E-11	3.53E-11	1.67E-12	5.14E-12	1.27E-10
Photochemical oxidation	kg C2H4 eq	0.0165	1.85E-03	6.40E-04	1.71E-04	7.21E-05	0.0192
Primary energy, non renewable	MJ	218	48.9	11.3	2.90	2.73	284
Primary energy, renewable	MJ	0	0	0	0	0	0

Table – Impact assessment and primary energy results over a reference service life of 60 years for a market weighted average of PVC tile carpets. All results are per square meter of carpet. The PVC tile market is 68% solution, 25% skein, and 7% continuous by carpet area. This table satisfies the requirement of Table C in the PCR.

	User defined reference service life of product = 15 years Number of installations over 60 years = 4						
Impact category	**Units**	**Sourcing/ Extraction**	**Manufacturing**	**Delivery & installation**	**Use** (60 years)	**End of life**	**Total**
Abiotic depletion, non-energy	kg Sb eq	0	0	0	0	0	0
Acidification	kg SO2 eq	0.405	0.1019	1.37E-02	1.15E-01	3.48E-03	0.532
Eutrophication	kg PO4--- eq	0.0445	2.96E-03	1.71E-03	4.11E-03	2.02E-04	0.0497
Global warming (GWP100)	kg CO2 eq	42.1	11.06	2.41	12.4	0.754	57.2
Ozone layer depletion (ODP)	kg CFC-11 eq	2.66E-10	7.44E-11	1.41E-10	1.00E-10	2.06E-11	5.09E-10
Photochemical oxidation	kg C2H4 eq	0.0659	7.40E-03	2.56E-03	1.02E-02	2.88E-04	0.0768
Primary energy, non renewable	MJ	873	195.7	45.0	174.15	10.94	1137
Primary energy, renewable	MJ	0	0	0	0	0	0

Interpretation

Interpretations gleaned from the Avant Modular Carpet family reinforces that the supply chain stage is the largest contributor of the studied impact categories. However, when these studies are reviewed over the useful life of the product, it is apparent that the use stage, namely maintenance, is an area that requires development of less impactful processes. Eutrophication due to the disposal of primary liquids into the environment is the largest concern across all stages of the product.

Future modular product developments should consider waste water conservation and contaminant clean-up for manufacturing and maintenance. Additional innovations in the area of maintenance are important for overall product impact improvements.

Additional Environmental Information

Health, safety, and environmental aspects during production

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

Avant Contract 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.

Avant Contract 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.avantcontract.com/web/files/INSTALLATION/CARPET_TILE_INSTALLATION_INSTRUCTIONS.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.

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