BENTLEY®

VERIFIED by SCS GLOBAL SERVICES ENVIRONMENTAL PRODUCT DECLARATION BASED ON LCA

Declaration Owner:
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For more than 30 years, California-based Bentley manufactures and markets broadloom, carpet tile, and area rug products for interiors. The Bentley High PerformancePC Broadloom, produced at the City of Industry, California manufacturing facility is a broadloom carpet with nylon 6,6 face fiber and a backing containing some recycled materials. Many of its products feature high performance and superior Texture Appearance Retention Rating (TARR), as well as Green Label Plus, NSF® 140 Gold, and Cradle to Cradle Silver certifications.

Products

High PerformancePC Broadloom, Solution Dyed Nylon 6,6

Functional Unit

1 m^2 of floor covering provided and maintained for a period of 60 years

EPD Number and Period of Validity

SCS-EPD-04247
Beginning Date: November 18, 2016 – End Date: November 17, 2021

Product Category Rule

Product Category Rule (PCR) for preparing an Environmental Product Declaration (EPD) for Flooring: Carpet, Resilient, Laminate, Ceramic, Wood. NSF International. Version 2. 2014.

Program Operator

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SCSglobal SERVICES

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Disclaimers: *This EPD conforms to ISO 14025, 14040, ISO 14044, and ISO 21930.*

Scope of Results Reported: *The PCR requirements limit the scope of the LCA metrics such that the results exclude environmental and social performance benchmarks and thresholds, and exclude impacts from the depletion of natural resources, land use ecological impacts, ocean impacts related to greenhouse gas emissions, risks from hazardous wastes and impacts linked to hazardous chemical emissions.*

Accuracy of Results: *Due to PCR constraints, this EPD provides estimations of potential impacts that are inherently limited in terms of accuracy.*

Comparability: *The PCR this EPD was based on was not written to support comparative assertions. EPDs based on different PCRs, or different calculation models, may not be comparable. When attempting to compare EPDs or life cycle impacts of products from different companies, the user should be aware of the uncertainty in the final results, due to and not limited to, the practitioner's assumptions, the source of the data used in the study, and the specifics of the product modeled.*

PCR review, was conducted by	Jack Geibig, EcoForm. jgeibig@ecoform.com
Approved: November 18, 2016 - November 17, 2021	
Independent verification of the declaration and data, according to ISO 14025:2006 and ISO 21930:2007.	☐ internal ☑ external
Third party verifier	Tom Gloria, PhD. Industrial Ecology Consultants

PRODUCT DESCRIPTION

High PerformancePC Broadloom, produced at the City of Industry, California manufacturing facility is a broadloom carpet with nylon 6,6 face fiber and a backing containing some recycled materials. It is certified Cradle to Cradle Silver and CRI Green Label Plus. The manufacturer warrants for a period of 10 years from the date of purchase.

PRODUCT PERFORMANCE

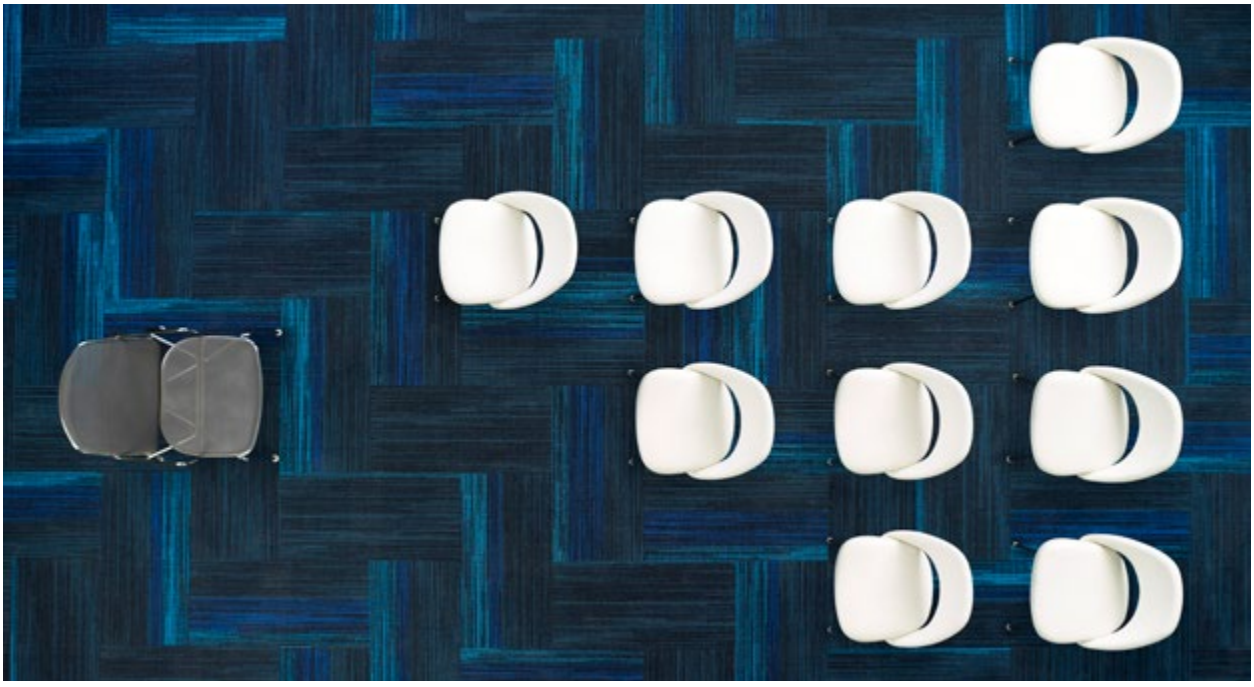
Table 1. *Product performance test results for High PerformancePC Broadloom Carpet, Solution Dyed Nylon 6,6.*

Carpet Test Method	Test Results & Supporting Documentation
AATCC Test Method 134 Electrostatic Propensity of Carpets	≤ 3.5 kV
AATCC Test Method 16, Option 3 Colorfastness to Light	4 at 40 AFUs
ASTM E648 Standard Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source	Class 1, ≥ 0.45 W/cm^2
ASTM E662 Standard test Method for Specific Optical Density of Smoke Generated by Solid Materials	< 450 Dm Corrected[1]
ASTM D5252 Standard Practice for the Operation of the Hexapod Tumble Drum Tester / ASTM D7330 Standard Test Method for Assessment of Surface Appearance Change in Pile Floor Coverings Using Standard Reference Scales	3.0

[1] Dm = the maximum specific optical density

PRODUCT APPLICATION

The Bentley High PerformancePC Broadloom provides the primary function of floor covering in indoor commercial areas.



MATERIAL CONTENT

Table 2. *Origin and availability of material content.*

Component	Materials	Origin of Raw Materials	Availability			Pre- and Post-Consumer Recycled Content	Percent of Total
			Renewable	Non-Renewable	Recycled		
Nylon Yarn	Nylon 6,6 Fiber	United States		Fossil resource, limited			41%
Filler	Calcium Carbonate	United States			Mineral resource, abundant	100%/0%	38%
Latex Base	Styrene-butadiene polymer	United States		Fossil resource, limited			10%
Primary Backing	Polypropylene	United States		Fossil resource, limited			6.3%
Secondary Backing	Polypropylene	United States		Fossil resource, limited			3.5%
Stain/Soil Protection	Proprietary	United States		Fossil resource, limited			0.59%
Latex Additive - Soap	Ammonium Lauryl Sulfate	United States	Plant derived resource, abundant	Fossil resource, limited			0.10%
Latex additive - Thickening Agent	Sodium polyacrylate	United States		Fossil resource, limited			0.05%
Latex additive - Antimicrobial	Inorganic Chemicals	United States		Fossil resource, limited			0.01%

The following regulated hazardous chemicals may be present based on a review of Material Safety Data Sheets for the product component materials:

- Acetaldehyde (CAS #78-07-0)
- Calcium carbonate (CAS #471-34-1)
- Ethanol (CAS #64-17-5)
- Silica, quartz (CAS #14808-60-7)
- 1,2-benzisothiazolin-3-one (2634-33-5)

PRODUCTION OF MAIN MATERIALS

Calcium Carbonate: An abundant mineral found worldwide and a common substance found in rocks. It can be ground into varying particle sizes.

Nylon 6,6: A synthetic polymer that can be utilized for fiber applications and derived from petrochemicals.

Polypropylene: A class of synthetic resins prepared by the polymerization of hydrocarbons and derived from petrochemicals.

Styrene-butadiene copolymer: A synthetic thermo-elastic copolymer derived from the monomers, styrene and butadiene.

PRODUCT CHARACTERISTICS

Table 3. *Product Characteristics for High PerformancePC Broadloom Carpet, Solution Dyed Nylon 6,6.*

Characteristics	Description
Type of Manufacture	Tufted Carpet Tile
Yarn Type	Type 6,6 Nylon, Solution Dyed
Additional characteristics according to NSF/ANSI 140	Gold Certified
Sustainable certifications	NSF/ANSI 140 Sustainable Carpet Assessment, Cradle to Cradle Certified™, and CRI Green Label Plus Certified
VOC emissions test method	CRI Green Label Plus
CRI TARR rating[2]	2.5 – 4.0 Moderate – Extreme Traffic

Characteristics	Nominal Value	Minimum Value	Maximum Value	Units
Total thickness	Variable	5.0 (0.195)	11.2 (0.440)	mm (inch)
Product weight	2,155 (63.6)	1,559 (46)	3,221 (95)	g/m^2 (oz/yd^2)
Surface pile thickness	Variable	1.6 (0.062)	8.2 (0.321)	mm (inch)
Number of tufts or loops / dm^2	Variable	3.6 (56)	6.0 (204)	Tufts per cm^2 (Tufts per in^2)
Pile weight	882 (26)	339 (10)	1,967 (58)	g/m^2 (oz/yd^2)
Pile fiber composition	Nylon 6,6			100%
Secondary backing	Styrene Butadiene-based polymer with Polypropylene Secondary			NA

[2] TARR – Textile Appearance Retention Ratings

ADDITIONAL ENVIRONMENTAL INFORMATION

The Bentley facility, located in California, is the first carpet manufacturing facility in the country to receive a Silver rating from the U.S. Green Building Council's Leadership in Energy and Environmental Design Green Building Rating System™ for Existing Buildings (LEED-EB). In 2013, Bentley achieved LEED-EB Gold Certification. For additional information regarding Bentley's LEED-EB Gold Certification, visit: http://www.bentleymills.com/wp-content/uploads/2014/02/BentleyLEEDEBhighlights.pdf.

The Bentley FULFILL™ reclamation program offers to take back any carpet (all Bentley products can be reclaimed) from any manufacturer, guaranteeing 100% landfill diversion. The program has diverted over 250 million pounds of material from the landfill. For additional information regarding the FULFILL™ program, visit: http://www.bentleymills.com/wp-content/uploads/2014/11/FULFILL-Fact-Sheet.pdf.

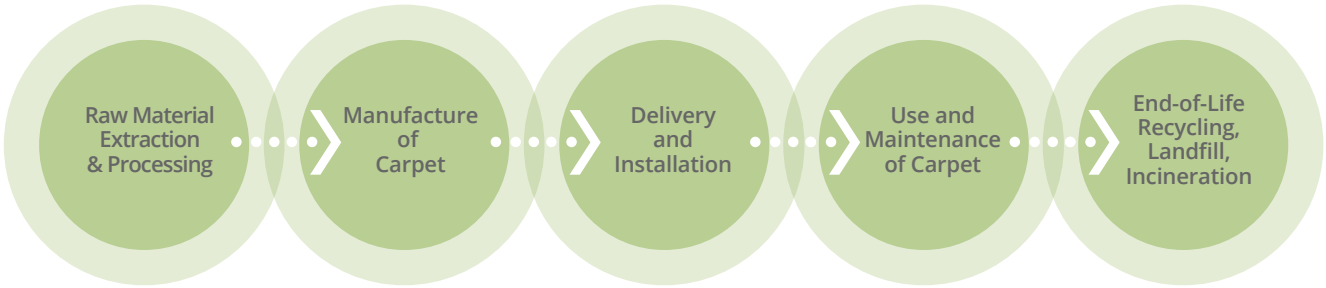
All products manufactured by Bentley meet CRI Green Label Plus requirements and are tested annually. Carpet that is Green Label Plus certified contributes to Indoor Environmental Quality credit points in the LEED rating system.

The High PerformancePC Broadloom is Cradle to Cradle certified at the Silver Level. The Cradle to Cradle certification program is a multi-attribute green label that assesses product safety for health and the human environment, guides design for the future, and leads manufactures toward continuous environmental improvement.

For additional information regarding Bentley's environmental efforts, visit: http://www.bentleymills.com/sustainability

LIFE CYCLE ASSESSMENT

A cradle to grave life cycle assessment (LCA) was completed for this product group in accordance with ISO 14040, ISO 14044, ISO 21930, and Product Category Rule for Environmental Product Declarations for Flooring: Carpet, Resilient, Laminate, Ceramic, Wood (Version 2).



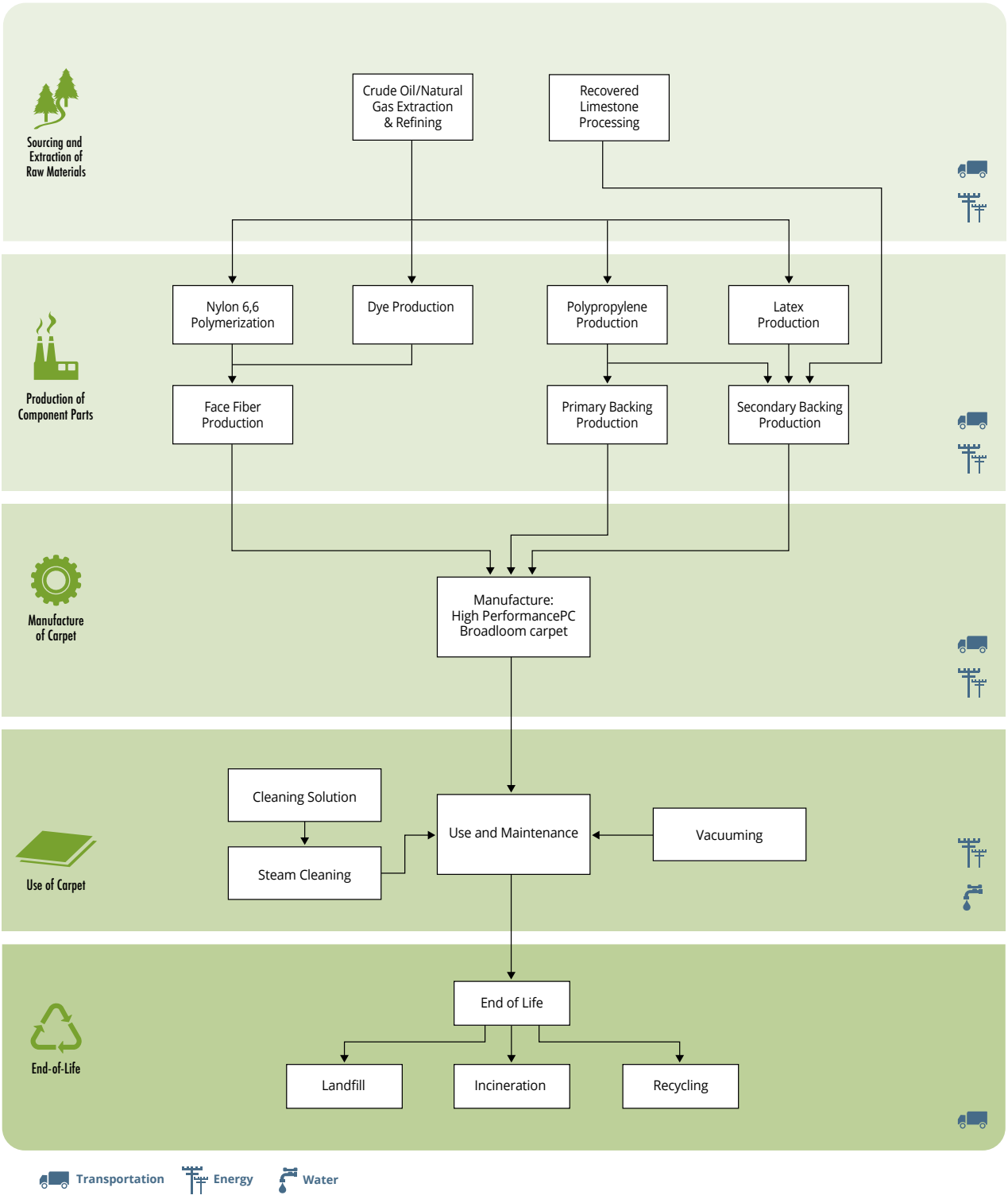
FUNCTIONAL UNIT

The functional unit is, according to the PCR, the total impact for the expected life of the building (60 years). But the service life is depenedent on the product lifetime, which is 10 years in this case. The PCR consequently requires separate reporting of LCA results A) for 1 m^2 of floor covering - extraction/processing, manufacturing, delivery and installation and end of life, B) the average 1- year use stage, and C) for the 60 year life of the building as combined using A) and B), calculated from the reference service life (RSL) of the product.

PRODUCT LIFE CYCLE FLOW DIAGRAM

The diagram below is a representation of the most significant contributions to the life cycle of Bentley High PerformancePC Broadloom Carpet. This includes resource extraction and processing, product manufacture, use and maintenance, and end-of-life.

Product Life Cycle Flow Diagram for High PerformancePC Broadloom



LIFE CYCLE ASSESSMENT STAGES AND REPORTED EPD INFORMATION

Sourcing/Extraction Stage (raw material acquisition)

This stage includes extraction of virgin materials and reclamation of non-virgin feedstock. Resource use and emissions associated with both extraction of the raw materials and manufacture of carpet components are included.

Manufacturing Stage

This stage includes all the relevant manufacturing processes and flows, including packaging. Production of capital goods, infrastructure, production of manufacturing equipment, and personnel-related activities are not included.

Delivery and Installation Stage

Delivery

This stage includes the delivery of the carpet to the point of installation. Modeling used in the life cycle assessment assumed an estimated distribution distance to point of sale of 2,500 miles via diesel truck, representing transport across the United States.

Installation

The High PerformancePC Broadloom is installed with HealthBond 1000 multipurpose adhesive. The recommended application rate is 0.03 gallons per square meter (0.11 kg/m^2).

Waste

Waste generated during product installation can be disposed of in a landfill, incinerated, or recycled.

Packaging

Table 4. *Packaging material for High PerformancePC Broadloom, Solution Dyed Nylon 6,6. Results are shown per 1 m^2 flooring.*

Material	kg	Percent of Total
Corrugated board	$7.4x10^{-3}$	79%
Packaging film (LDPE)	$1.9x10^{-3}$	21%

Use Stage

Cleaning and maintenance

Table 5. *List of maintenance activities and frequency for light traffic (500 traffics or less daily).*

Cleaning Process	Cleaning and Maintenance Frequency (Light Traffic)	Frequency over 10 year Reference Service Life (RSL)	Energy & Resource Use
Vacuuming	Twice or more each week	1,040 times or more over 10 year RSL	Electricity
Interim Maintenance (Steam cleaning)	Once per year	10 times over 10 year RSL	Electricity; water
Restorative Maintenance (Steam cleaning)	Once per year; should include pile lifting	10 times over 10 year RSL	Electricity; water

End-of-Life Stage

Recycling, reuse, or repurpose

Data for estimation of recycling rates for the product and packaging are taken from the Carpet America Recovery Effort's (CARE) 2014 Annual Report and the US Environmental Protection Agency's Municipal Solid Waste Report, respectively. For product materials, it is assumed that 4% are recycled, while recycling rates for packaging materials vary, depending on waste material type.

Disposal

For disposal of product materials which are not recycled, it is assumed that 4.5% are incinerated and ~92% go to a landfill. Transportation of waste materials at end of life assumes a 20 mile average distance to disposal, consistent with assumptions used in the US EPA WARM model.

LIFE CYCLE INVENTORY

In accordance with ISO 21930, the following aggregated inventory flows are included in the LCA, in addition to the LCIA and inventory flow requirements specified by the PCR:

- Use of renewable material resources
- Consumption of freshwater
- Hazardous Waste
- Non-hazardous Waste

All results are calculated using the SimaPro 8.2 model using primary and secondary inventory data. Classification for Use of Renewable Material Resources is based on review of elementary flows and resources considered renewable on a human time scale. Elementary flows related to use of wood, minerals, and land occupation were not included. Water consumption is also not included as this is reported separately. Based on this classification process, no renewable material resources are estimated for the product system under consideration.

Table 6. *Results for aggregated inventory flows, shown in kg per 1 m^2 of flooring maintained for 60 years.*

Parameter	Value	Unit
Freshwater consumption	1,400	kg
Hazardous Wastes	$4.0x10^{-3}$	kg
Non-hazardous Wastes	24	kg

LIFE CYCLE IMPACT ASSESSMENT

Life cycle impact assessment is the process of converting the life cycle inventory results into a representation of environmental and human health impacts. For example, emissions such as carbon dioxide, methane, and nitrous oxide (inventory) together contribute to climate change (impact assessment). The impact assessment for the EPD is conducted in accordance with requirements of the PCR. Impact category indicators are estimated using the CML 2001 (Oct 2013) characterization method. Aggregated inventory flows for energy use and wastes are also calculated. The LCIA and inventory flow results are calculated using SimaPro 8.2 software.

Table 7. *Cradle to install and end of life for High PerformancePC Broadloom, Solution Dyed Nylon 6,6. Results are shown per 1 m^2 flooring for an average 1-year time horizon. (Table A of the PCR)*

Impact Category	Units	Extraction & Processing	Manufacturing	Delivery & Installation	Disposal	Total
Global Warming Potential, 100 year time horizon	kg CO_2 eq	7.7	3.9	4.1	0.82	17
Acidification Potential	kg SO_2 eq	$2.4x10^{-2}$	$2.5x10^{-2}$	$2.1x10^{-2}$	$2.8x10^{-4}$	$7.1x10^{-2}$
Ozone Depletion Potential	kg CFC-11 eq	$1.9x10^{-7}$	$1.9x10^{-7}$	$2.7x10^{-7}$	$9.2x10^{-9}$	$6.6x10^{-7}$
Photochemical Ozone Creation Potential	kg C_2H_4	$1.0x10^{-3}$	$1.2x10^{-3}$	$9.5x10^{-4}$	$1.9x10^{-4}$	$3.4x10^{-3}$
Eutrophication Potential	kg PO_4^{3-} eq	$1.5x10^{-2}$	$1.5x10^{-3}$	$2.7x10^{-3}$	$7.2x10^{-3}$	$2.7x10^{-2}$
Abiotic Depletion Potential, Elements	kg Sb eq	$3.1x10^{-6}$	$9.9x10^{-7}$	$6.7x10^{-6}$	$8.3x10^{-8}$	$1.1x10^{-5}$
Abiotic Depletion Potential, Fossil Fuels	MJ	120	60	64	0.81	240
Renewable Energy	MJ	1.7	4.2	0.57	$3.1x10^{-2}$	6.4
Non-renewable Energy	MJ	120	69	71	1.0	260

Table 8. *Average 1 year use stage impacts for High PerformancePC Broadloom, Solution Dyed Nylon 6,6 per 1 m^2 flooring. (Table B of the PCR)*

Impact Category	Units	Use & Maintenance
Global Warming Potential, 100 year time horizon	kg CO_2 eq	0.36
Acidification Potential	kg SO_2 eq	$2.7x10^{-3}$
Ozone Depletion Potential	kg CFC-11 eq	$9.4x10^{-9}$
Photochemical Ozone Creation Potential	kg C_2H_4	$1.1x10^{-4}$
Eutrophication Potential	kg PO_4^{3-} eq	$6.7x10^{-4}$
Abiotic Depletion Potential, Elements	kg Sb eq	$4.3x10^{-7}$
Abiotic Depletion Potential, Fossil Fuels	MJ	5.5
Renewable Energy	MJ	0.26
Non-renewable Energy	MJ	6.0

Table 9. *Life cycle stage impacts for High PerformancePC Broadloom, Solution Dyed Nylon 6,6, per 1 m^2 flooring over an average building life of 60 years. (Table C of the PCR)*

Impact Category	Units	Extraction & Processing	Manufacturing	Delivery & Installation	Use	End of life	Total
Global Warming Potential, 100 year time horizon	kg CO_2 eq	46	23	25	22	4.9	120
Acidification Potential	kg SO_2 eq	0.15	0.15	0.13	0.16	$1.7x10^{-3}$	0.59
Ozone Depletion Potential	kg CFC-11 eq	$1.1x10^{-6}$	$1.1x10^{-6}$	$1.6x10^{-6}$	$5.7x10^{-7}$	$5.5x10^{-8}$	$4.5x10^{-6}$
Photochemical Ozone Creation Potential	kg C_2H_4 eq	$6.2x10^{-3}$	$7.4x10^{-3}$	$5.7x10^{-3}$	$6.6x10^{-3}$	$1.1x10^{-3}$	$2.7x10^{-2}$
Eutrophication Potential	kg $(PO_4)^{3-}$ eq.	$9.2x10^{-2}$	$8.9x10^{-3}$	$1.6x10^{-2}$	$4.0x10^{-2}$	$4.3x10^{-2}$	0.20
Abiotic Depletion Potential, Elements	kg Sb eq	$1.8x10^{-5}$	$6.0x10^{-6}$	$4.0x10^{-5}$	$2.6x10^{-5}$	$5.0x10^{-7}$	$9.1x10^{-5}$
Abiotic Depletion Potential, Fossil Fuels	MJ	690	360	380	330	4.9	1,800
Renewable Energy	MJ eq	9.9	25	3.4	16	0.19	54
Non-renewable Energy	MJ eq	710	420	430	360	6.0	1,900

SUPPORTING TECHNICAL INFORMATION

Data Sources

Unit processes are developed with SimaPro 8.2 software, drawing upon data from multiple sources. Primary data were provided by Bentley and some of its suppliers for their manufacturing processes. The primary sources of secondary LCI data are from Ecoinvent Database.

Table 10. *Data sources used for the LCA.*

Component	Material Description	Flow Name	Data Source	Publication Date
Product				
Carpet Protector/Stain Release	stain/soil resistance	Chemical, inorganic {GLO} | market for | Alloc Rec	Proprietary data	2015
Secondary Backing; Dispersant, Thickener	Sodium Polyacrylate	Acrylic dispersion, without water, in 65% solution state {GLO} | market for | Alloc Rec	Ecoinvent	2015
Face fiber*	face fiber – nylon 6,6	Nylon 6-6 {GLO} | market for | Alloc Rec; Nylon spinning and drawing	Ecoinvent Carpet & Rug Institute	2015; 2006
Face fiber*	face fiber – nylon 6,6	Nylon 66 fiber /US	Primary Data	2012
Filler	CaCO3	Limestone, crushed, washed {GLO} | market for | Alloc Rec	Ecoinvent	2008
Secondary Backing, Latex base	Styrene-butadiene-based polymer	Acrylonitrile-butadiene-styrene copolymer {GLO} | market for | Alloc Rec; Water, deionised, from tap water, at user ({GLO} | market for | Alloc Rec	Ecoinvent	2015
Secondary Backing, Soap	Ammonium Lauryl Sulfate	Soap {GLO} | market for | Alloc Rec	Ecoinvent	2015
Solution Dye	Solution dyeing process	CuPc in polymer pellet for solution dyeing	Carpet & Rug Institute	2006
Pigment	Pigment	Beta-copper phthalocyanine	Carpet & Rug Institute	2006
Packaging				
Packaging	Corrugated board	Corrugated board, recycling fibre, single wall, at plant/RER	Ecoinvent	2007
Packaging	Packaging film	Packaging film, low density polyethylene {GLO} | market for | Alloc Rec	Ecoinvent	2015
Transportation				
Transport	Truck	Transport, freight, lorry 16-32 metric ton, EURO4 {GLO} | market for | Alloc Rec	Ecoinvent	2015

**NOTE- Nylon yarn is modeled as a weighted average, based on a combination of primary and representative data representing multiple suppliers.*

Data Quality

Table 11. *Data quality assessment of Life Cycle Inventory.*

Data Quality Parameter	Data Quality Discussion
Time-Related Coverage: Age of data and the minimum length of time over which data is collected	The most recent available data are used, based on other considerations such as data quality and similarity to the actual operations. Typically, these data are less than 10 years old (typically 2006 or more recent). All of the data used represented an average of at least one year's worth of data collection, and up to three years in some cases. Manufacturer-supplied data (primary data) are based on annual production for 2015.
Geographical Coverage: Geographical area from which data for unit processes is collected to satisfy the goal of the study	The data used in the analysis provide the best possible representation available with current data. Actual processes for upstream operations are primarily North American. Surrogate data used in the assessment are representative of North American or European operations. Data representative of European operations are considered sufficiently similar to actual processes. Data representing product disposal are based on US statistics.
Technology Coverage: Specific technology or technology mix	For the most part, data are representative of the actual technologies used for processing, transportation, and manufacturing operations. Representative fabrication datasets, specific to the type of material, are used to represent the actual processes, as appropriate.
Precision: Measure of the variability of the data values for each data expressed.	Precision of results are not quantified due to a lack of data. Data collected for operations were typically averaged for one or more years and over multiple operations, which is expected to reduce the variability of results.
Completeness: Percentage of flow that is measured or estimated	The LCA model included all known mass and energy flows for production of the flooring products. In some instances, surrogate data used to represent upstream and downstream operations may be missing some data which is propagated in the model. No known processes or activities contributing to more than 1% of the total environmental impact for each indicator are excluded. In total, these missing data represent less than 5% of the mass or energy flows.
Representativeness: Qualitative assessment of the degree to which the data set reflects the true population of interest	Data used in the assessment represent typical or average processes as currently reported from multiple data sources, and are therefore generally representative of the range of actual processes and technologies for production of these materials. Considerable deviation may exist among actual processes on a site-specific basis; however, such a determination would require detailed data collection throughout the supply chain back to resource extraction.
Consistency: Qualitative assessment of whether the study methodology is applied uniformly to the various components of the analysis	The consistency of the assessment is considered to be high. Data sources of similar quality and age are used; with a bias towards Ecoinvent v3.2 data where available. Different portions of the product life cycle are equally considered; however, it must be noted that final disposition of the product is based on assumptions of current average practices in the United States.
Reproducibility: Qualitative assessment of the extent to which information about the methodology and data values would allow an independent practitioner to reproduce the results reported in the study	Based on the description of data and assumptions used, this assessment would be reproducible by other practitioners. All assumptions, models, and data sources are documented.
Sources of the data: Data quality assessment examples include (but not limited to) USLCI and ILCD	Data representing energy use at the Bentley California facility represent an annual average and are considered of high quality due to the length of time over which these data are collected, as compared to a snapshot that may not accurately reflect fluctuations in production. For secondary LCI datasets, Ecoinvent v2.2 and v3.2 LCI data are used, with a bias towards Ecoinvent v3.2 data.
Uncertainty of the information: E.g. data, models, and assumptions	Uncertainty related to materials in the flooring products and packaging is low. Actual supplier data for upstream operations was sought but not available for all suppliers and the study relied upon the use of existing representative datasets. These datasets contained relatively recent data (<10 years), but lacked geographical representativeness. Uncertainty related to the impact assessment methods used in the study are high. The impact assessment method required by the PCR includes impact potentials, which lack characterization of providing and receiving environments or tipping points.

Allocation

Resource use at the City of Industry, California facility (e.g., water and energy) was allocated to the product based on the unit price as a fraction of the total facility sales.

The High PerformancePC Broadloom system includes recycled materials, which are allocated using the recycled content allocation method (also known as the 100-0 cut off method). Using the recycled content allocation approach, system inputs with recycled content do not receive any burden from the previous life cycle other than reprocessing of the waste material. At end of life, materials which are recycled leave the system boundaries with no additional burden.

Impacts from transportation were allocated based on the mass of material and distance transported.

System boundaries

The system boundaries of the life cycle assessment for High PerformancePC Broadloom Carpet was cradle to grave. A description of the system boundaries for this study are as follows:

- **Sourcing/extraction stage –** This stage includes extraction of virgin materials and reclamation of non-virgin feedstock. Resource use and emissions associated with both extraction of the raw materials product component manufacturing are included. Upstream transportation is also included.
- **Manufacturing stage –** This stage includes all the relevant manufacturing processes and flows, including packaging. Production of capital goods, infrastructure, production of manufacturing equipment, and personnel-related activities are not included.
- **Delivery and installation stage –** This stage includes the delivery of the High PerformancePC Broadloom Carpet to the point of installation.
- **Use stage –** The use stage includes the cleaning and maintenance of the floor covered during its lifetime, as well as extraction, manufacturing and transport of all sundry material for maintenance and cleaning.
- **End of life stage –** The end of life stage includes the transport of the floor covering to end of life processes including landfill, incineration, and recycling.

Cut-off criteria

According to the PCR, processes contributing greater than 1% of the total environmental impact indicator for each impact must be included in the inventory. In the present study, except as noted, all known materials and processes were included in the life cycle inventory.

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