

ENVIRONMENTAL PRODUCT DECLARATION

POWERBOND® MEDFLOOR®

TANDUS CENTIVA
COMMERCIAL FLOOR COVERING



Tandus Centiva Powerbond® Medfloor®, Style Nano

Tandus Centiva

A Tarkett Company

Tandus Centiva, A [Tarkett](#) Company, creates innovative floorcovering solutions through our unique product line of Powerbond, Freeform, modular, broadloom, woven and luxury vinyl tile (LVT) products. With industry-leading product design, unrivaled service and a commitment to environmental and social stewardship, Tandus Centiva provides the ultimate flooring experience. Tandus Centiva prides itself on a heritage of innovation and design leadership. The company is committed to closed loop, circular design through the use of good materials, resource stewardship, creating products for people friendly spaces, and recycling at the end of use. The company utilizes Cradle to Cradle principals to strategically design and manufacture its products and has fully implemented Life Cycle Analysis (LCA) as a means to continually improve its operations, products and their use. Operating the industry's first closed-loop recycling program since 1994, Tandus Centiva has contributed to the circular economy for more than 20 years. For more information visit www.tandus-centiva.com



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This declaration is an environmental product declaration in accordance with ISO 14025 that describes the environmental characteristics of the aforementioned product. It promotes the development and use of sustainable products. This is a certified declaration and all relevant environmental information is disclosed.



PROGRAM OPERATOR	UL Environment
DECLARATION HOLDER	Tandus Centiva
DECLARATION NUMBER	11CA57235.102.1
DECLARED PRODUCT	Tandus Centiva Powerbond® Medfloor® product line
REFERENCE PCR	NSF PCR for Flooring (Carpet, Resilient, Laminate, Ceramic, and Wood)
DATE OF ISSUE	September 24, 2012
PERIOD OF VALIDITY	5 Years
CONTENTS OF THE DECLARATION	<p>Product definition and information about building physics</p> <p>Information about basic material and the material's origin</p> <p>Description of the product's manufacture</p> <p>Indication of product processing</p> <p>Information about the in-use conditions</p> <p>Life cycle assessment results</p> <p>Testing results and verifications</p>
The PCR review was conducted by:	<p>NSF International</p> <p>Accepted by PCR Review Panel</p> <p>ncss@nsf.org</p>
<p>This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories</p> <p><input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL</p>	<p></p> <p>Loretta Tam</p>
<p>This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:</p>	<p></p> <p>John Jewell</p>



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Product Definition

Product Classification & Description

Tandus Centiva's Powerbond® Medfloor® is a hybrid resilient sheet flooring that combines a nylon wear layer and closed cell cushion in a heterogeneous construction. The nylon and closed-cell cushion are fused together through heat and pressure to form an integral and inseparable construction that provides excellent performance durability and comfort underfoot. The product's molecularly bonded seams provide a monolithic, moisture impermeable floor that allows for innovative design capabilities. As a result, large scale designs, borders and way findings can be created as part of the floor design and inlaid seamlessly within the product.

Engineered to last more than 25 years, Powerbond Medfloor is slip resistant and ergonomic while providing excellent rollability in healthcare settings. Powerbond Medfloor is also fully recyclable in Tandus Centiva's third party certified, closed loop carpet recycling process. The product line consists of a full range of styles composed of nylon 6 or nylon 6,6 which is solution dyed, yarn dyed or a combination of solution and yarn dyed. This product group was assessed for an average yarn weight of 20 oz/yd², with the maximum (30 oz/yd²) and minimum (14 oz/yd²) yarn weights assessed for sensitivity. Unless otherwise noted, data is presented for an average product with 20 oz/yd² yarn weight.



Accreditations

- ISO 14001 Environmental Management System
- Recycled Content Certification
- Recycling Program Certification
- Carpet and Rug Institute (CRI) Green Label Plus Certification
- Carbonfund.org CarbonFree® Certification (optional)
- MAS Certified Green® Program (Adhesives)

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Range of Applications

Powerbond Medfloor is intended for heavy or severe traffic use in commercial buildings.

Product Standards and Approvals

Flammability Radiant Panel ASTM E-648	Class 1 (Mean Avg. CRF ≥ 0.45 watts/cm ²)
Smoke Density ASTM E-662	Maximum Specific Optical Density ≤ 450
Surface Flammability FF 1-70	Pass
Electrostatic Propensity AATCC 134	<3.0kV
Colorfastness to Light AATCC 16E	≥ 4.0 @ 60 AFUs
Noise Reduction Coefficient ASTM C-423	0.18 – 0.20
R-Value ASTM C-177	1.69 R-value/inch
Static Coefficient of Friction ASTM C-1028	Meets ADA requirements
Delamination Strength ASTM D-3936	No Delamination
Tuft Bind ASTM D-1335	≥ 8 pounds
CRI Green Label Plus	Meets criteria GLP ID# 9744
California Specification 01350	Meets criteria

Delivery Status

Type of Manufacture/Tufting Construction	Textured Loop, Stratatec® Patterned Loop, Accuweave® Patterned Loop, Level Loop, Stratatec® Patterned Symtex®, Accuweave® Patterned Symtex® or Symtex®			
Wear Layer Composition	Nylon 6 or Nylon 6,6 yarn			
Primary Backing	Polyester nonwoven			
Secondary Backing	Powerbond® Medfloor® contains postconsumer recycled calcium carbonate			
Recycled Content	Dependant on style; 8 to 34% overall recycled content; min. 8% postconsumer			
Installation Options	Custom design options; various design inlays and borders			
Cushion Thickness ASTM D-3574	0.085 inch		2.2 mm	
Cushion Density ASTM D-3574	36 lbs/ft ³		577 kg/m ³	
Compression Set ASTM D-3574	Max 10%			
Compression Deflection ASTM D-3574	29 lbs/in ² at 25%		2,039 g/cm ² at 25%	
Product Roll Width (ft)/(m)	6 feet		1.83 meters	
	Range	Unit	Range	Unit
Wear Layer/Yarn Weight	14 to 30	osy	474 to 1,017	gsm
Total Product Weight (+/- 5%)	78.9 to 94.9	osy	2,674 to 3,217	gsm



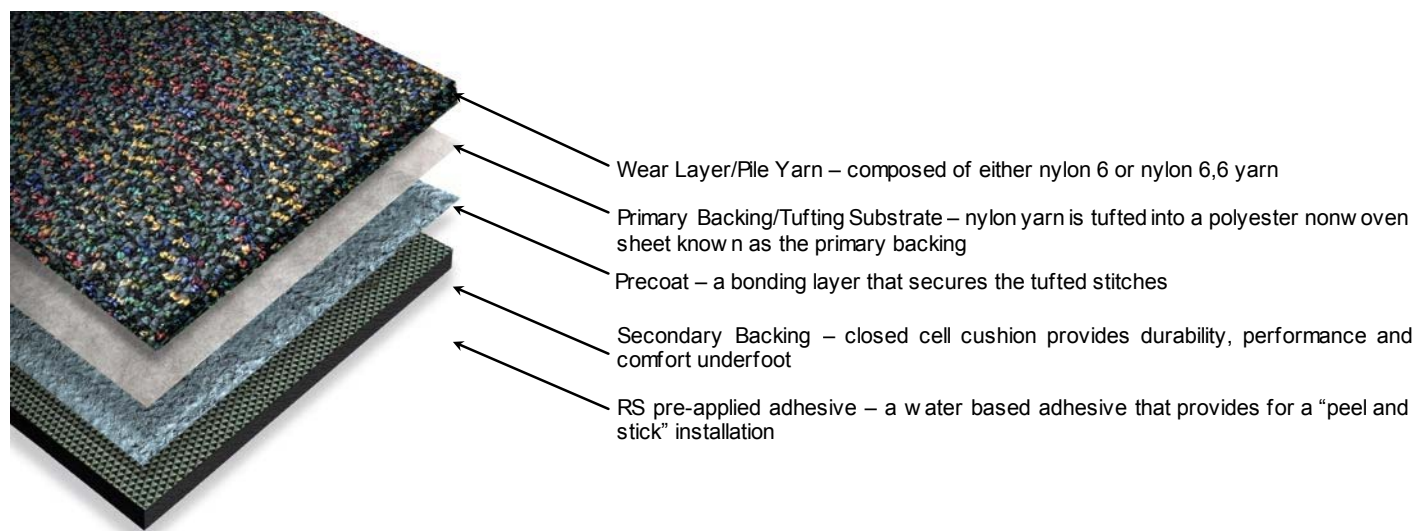
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Material Content



Material Content of the Product

Component	Material	Mass %	Availability	Origin
Wear Layer/Pile Yarn	Nylon 6 or Nylon 6,6	23.5	Non-Renewable Limited	Global
Primary Backing	Polyester	3.8	Non-Renewable Limited	Global
PreCoat Layer	Ethylene vinyl acetate copolymer	25.9	Non-Renewable Limited	Global
	Calcium carbonate		Non-Renewable Abundant	Global
	Aluminum trihydrate		Non-Renewable Abundant	Global
Secondary Backing	Postconsumer calcium carbonate	43.6	Recycled Limited	U.S.
	Polyvinyl chloride polymer		Non-Renewable Limited	Global
	Diocetyl terephthalate/Diisononyl adipate		Non-Renewable Limited	Global
RS Adhesive	Pre-applied acrylic adhesive	3.2	Non-Renewable Limited	Global

Production of Main Materials

Aluminum trihydrate - a mineral filler derived from bauxite that is mined from natural surface deposits

Calcium carbonate - also known as limestone, a mineral filler that is mined from natural surface deposits

Ethylene vinyl acetate - a copolymerization product of ethylene and vinyl acetate

Diisononyl adipate (DINA) - a non ortho-phthalate plasticizer, an ester used to soften rigid polyvinyl chloride (PVC) and help to improve low temperature flexibility.

Diocetyl terephthalate (DOTP) - a non ortho-phthalate plasticizer, a diester of terephthalic acid and the branched-chain 2-ethylhexanol

Nylon 6 - a polymer of caprolactam formed by ring opening polymerization

Environment



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Nylon 6,6 - manufactured by combining adipic acid and hexamethylenediamine, both having six carbon atoms, and polymerizing the resultant monomer by condensation polymerization

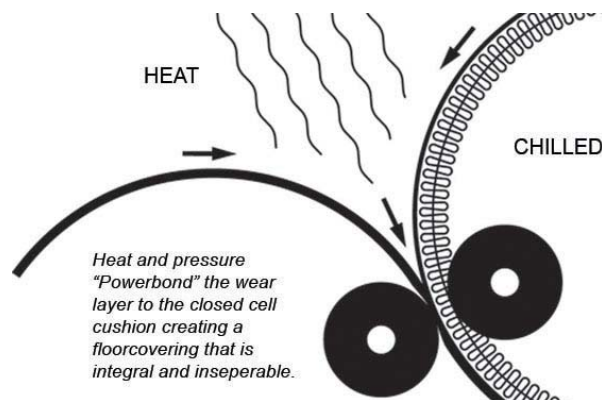
Polyester - most commonly referred to as polyethylene terephthalate, produced by the polymerization of ethylene glycol and terephthalic acid or its derivatives

Polyvinyl Chloride (PVC) - a thermoplastic polymer made by combining ethylene (derived from petroleum, natural gas or coal) and chlorine from common salt

RS “peel and stick” adhesive - a water based, pressure sensitive, acrylic adhesive derived from acrylate based polymers

Production of the Floor Covering

In the manufacturing process, nylon yarn is tufted into a polyester, nonwoven primary backing. The cushion secondary backing is adhered to the tufted primary backing composite through heat and pressure.



Health, Safety, and Environmental Aspects During Production

- ISO 14001 Environmental Management System
- Tandus Centiva is in compliance with all applicable local, state and federal environmental regulations.
- Comprehensive health and safety program focused on continual improvement in worker safety
- Successful supply chain and raw material management program
- World Class Manufacturing (WCM) - a comprehensive Environment, Health and Safety program focused on continual improvement in industrial performance, safety, quality, customer service and the environment

Production Waste

All trimmings and carpet manufacturing waste, along with postconsumer carpet, is recycled into new flooring in Tandus Centiva’s third party, closed-loop carpet recycling process. Non-carpet waste is also recycled in various programs.

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Delivery and Installation of the Floor Covering



Delivery

For the life cycle assessment, product delivery is modeled as shipped 700 km by truck to customers in the U.S. For customers in Europe, modeling consists of transport by truck to a port on the East Coast, transport by ocean freighter to a European port and transport by truck 700 km to the customer.

Installation

Powerbond Medfloor can be installed using RS “peel and stick” adhesive or a Tandus Centiva water-based, acrylic adhesive. A water-based acrylic sealer, such as, Tandus Centiva’s C-XL Universal Seam Sealer, is used to molecularly bond seams to provide a monolithic, moisture impermeable floor. Detailed installation instructions can be found at www.tandus-centiva.com.

Installation Waste

Packaging and flooring installation waste can be recycled in a local recycling program or returned to Tandus Centiva for recycling. Although installation waste is often recycled, to remain conservative in the LCA model, the recycled portion was not taken into account. For U.S. customers, the product waste and packaging was modeled as disposed of in a landfill; for European customers, installation waste was modeled as disposed of in an incineration or waste-to-energy (WTE) plant.

Packaging

Powerbond flooring is placed on a recycled content, cardboard core and wrapped in plastic. Tandus Centiva encourages installers to recycle packaging materials in local recycling programs.

Health, Safety and Environmental Aspects during Installation

Tandus Centiva floor coverings and adhesives meet VOC emission requirements in accordance with the California Department of Public Health Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers, Version 1.1, Feb 2010 (also known as the California 01350 Specification, or referenced as CRI Green Label Plus). Additionally, adhesives have been tested for VOC content, are third party certified in the MAS Certified Green® program and meet the VOC emission requirements of the South Coast Air Quality Management District - Rule 1168. Installation Instructions and Material Safety Data Sheets (MSDS) are available at www.tandus-centiva.com.

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Use Stage

The use stage takes into account environmental impacts during product use. Although floorcoverings may be replaced before the end of their useful life, a reference service life of 25 years is utilized; however, technically the product may last much longer.

Cleaning and Maintenance

Product selection, construction, color, use of entry mats, traffic wear patterns, vacuuming, extraction cleaning and spot removal all play a part in product maintenance. Tandus Centiva's recommended cleaning and maintenance guidelines are available at www.tandus-centiva.com. Cleaning and maintenance was modelled as shown in the table below.

Level of Use	Cleaning Process	Cleaning Frequency	Consumption of Energy and Resources
Commercial Heavy Traffic	Vacuuming	4 times per week	Electrical Energy
	Extraction Cleaning	3 times per 2 years	Electrical Energy
			Water
			Cleaning Agent

Prevention of Structural Damage

Floorcoverings should be installed on dry, structurally sound and adequately prepared floors. Subfloor requirements and installation instructions are available at www.tandus-centiva.com.

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End-of-Life

Recycling or Reuse

Tandus Centiva encourages customers to return and recycle end-of-life carpet through ReStart®, the company's third party certified, closed-loop carpet recycling program located in Dalton, Georgia. Alternative product types returned for recycling are recycled in affiliate recycling programs.

Tandus Centiva's Third Party Certified, Closed Loop Carpet Recycling Process



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Disposal

Although recycling is encouraged and preferred, disposal in municipal landfill or commercial incineration facilities is permissible in compliance with applicable regulations. The end of life model takes into account end of life disposal options (recycling, landfill and waste-to-energy) and transportation of the floor covering to the end of life processes. In terms of the non-recycled portion of the products, for U.S. customers, the product at de-installation was modeled as disposed of in a landfill. In Europe, it was modeled as disposed of in a waste-to-energy (WTE) plant. A diesel-powered truck is assumed to transport the non-recycled products 30 miles to their final destination.

Life Cycle Assessment

A cradle-to-grave Life Cycle Assessment (LCA) was completed on this product in accordance with ISO 14040/ISO 14044, and the study was reviewed per the external peer review requirements set forth in ISO 14044, Section 6.1.

Description of the Declared or Functional Unit

The functional unit, or reference flow, has been defined as one square meter of floor covering in a commercial building for one year of use.

Cut-off Criteria

For mass and energy, a cut-off goal of 99% of energy inputs and total mass inputs was defined. However, an attempt was made to collect all materials and energy involved in the materials systems – despite the defined energy and mass criteria – in order to capture any aspect that may be environmentally relevant.

Allocation

Allocation of the production data for this product was based on a total facility mass basis.

Background Data

The SimaPro LCA software was used to model the life cycle of the product. Tandus Centiva supplied primary data on the product's bill of materials and manufacturing operations. The EcolInvent database was used for all background data.

Data Quality

The data applied to this study represent current products and practices. The most recently available facility data were used and flooring product formulations are current. The use of nylon 6 and nylon 6,6, based on annual production, was taken into account. Data for manufacturing includes all processes to manufacture the carpet, (including facility heating and lighting) and represents the average energy use based on total production.

Data for manufacturing energy are North American-based. Data for transportation, materials and processes are based on a combination of North American and European sources since EcolInvent has some North American-based data. Energy and transportation data are based on mid-2000's, and production data for materials are based on low- to mid-2000's data sets.

The technological coverage for Tandus Centiva operations is current. Technological coverage for the materials and processes upstream and downstream of Tandus Centiva are in most cases industry average, and in some instances, typical.

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System Boundaries

The life cycle stages included in the system boundaries are:

- Production: includes production of the raw materials in the flooring product, transportation of materials to Tandus Centiva and the manufacturing operations at Tandus Centiva facilities. Production of packaging materials is also included in this stage.
- Construction (also called Delivery and Installation): includes delivery of the finished product to the end user and installation of the product.
- Use: takes into account the use of the flooring product in a building, cleaning and maintenance.
- End of Life: includes the fate of the flooring product at the end of its life.

Results of the Assessment

The LCIA categories for the flooring products for the European market are based on the CML 2002 methodology while the flooring products for the North American market are based on TRACI 2.0. The LCA results are documented separately for the following stages: production, construction (delivery and installation), use and end of life.

Life Cycle Inventory Analysis

LCIA data categories and flows are presented in the figures below. The LCIA categories for the North American market are based on TRACI 2.0 while the categories for the European market are based on the CML 2002 methodology. The tables below show the primary energy from renewable and non-renewable resources for an average 20 oz/yd² Powerbond Medfloor product for the U.S. and European markets. In all contribution analyses, the percentages for each data category add to 100%. In the European results, negative percentages are found in the tables when the electricity offset from waste-to-energy at end of life causes a negative number at end of life.

US Market						
Primary Energy						
Non Renewable Resources	270 MJ	2% Lignite	13% Mineral Coal	39% Natural Gas	34% Oil	13% Uranium
Renewable Resources	3.9 MJ	66% Hydro	11% Wind	31% Solar/Biomass		
Secondary Fuels	0 MJ					
Material Resources						
Non-Renewable Resources	14.6 lb					
Water Consumption	245.5 gal					
Output Flows						
Non-Hazardous Waste	5.8 lb					
Hazardous Waste	0.0 lb					

European Market						
Primary Energy						
Non Renewable Resources	229.2 MJ	-1% Lignite	10% Mineral Coal	42% Natural Gas	42% Oil	7% Uranium
Renewable Resources	0.13 MJ	116% Hydro	-17% Wind	112% Solar/Biomass		
Secondary Fuels	0 MJ					
Material Resources						
Non-Renewable Resources	6.6 kg					
Water Consumption	0.84 m ³					
Output Flows						
Non-Hazardous Waste	0.00 kg					
Hazardous Waste	0.00 kg					

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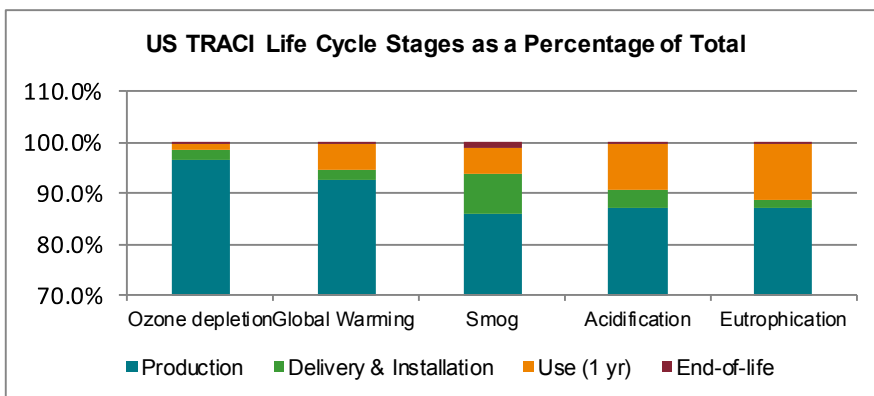
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Life Cycle Impact Assessment

Results are presented on the basis of one square meter of floorcovering in a commercial building for one year of use and for 60 years of use, the reference service life of a building. The LCIA results for an average (20 oz/yd²) product are presented as total cradle-to-grave, with the contribution of each life cycle stage presented relative to the total. LCIA results for low (14 oz/yd²) and high (30 oz/yd²) yarn weight products are also presented. U.S. and European market results are presented in separate tables.

TRACI V2.0 (for 1 year of Use of 20osy)		
Impact Category	Impact	Units
Global warming	13.8	kg CO ₂ eq
Acidification	2.9	mol H ⁺ eq
Eutrophication	0.025	kg N eq
Ozone depletion	3.2 E-06	kg CFC-11 eq
Smog	0.72	kg O ₃ eq

TRACI 2 V2.0 (for 60 years of Use of 20osy)		
Impact Category	Impact	Units
Global warming	75.6	kg CO ₂ eq
Acidification	22.2	mol H ⁺ eq
Eutrophication	0.2	kg N eq
Ozone depletion	1.0 E-05	kg CFC-11 eq
Smog	3.8	kg O ₃ eq



Relative Contribution to TRACI V2.0 Life Cycle Impacts for 1 year of Use of 20osy				
Impact Category	Production	Delivery & Installation	Use (1yr)	End-of-Life
Global warming	92.4%	2.0%	5.3%	0.3%
Acidification	87.0%	3.6%	8.9%	0.5%
Eutrophication	87.1%	1.5%	11.2%	0.2%
Ozone depletion	96.7%	1.8%	1.2%	0.3%
Smog	86.0%	7.8%	5.1%	1.1%

Relative Contribution to TRACI V2.0 Life Cycle Impacts for 60 years of Use of 20osy				
Impact Category	Production	Delivery & Installation	Use (60yrs)	End-of-Life
Global warming	40.5%	0.9%	58.5%	0.1%
Acidification	27.7%	1.1%	71.0%	0.2%
Eutrophication	23.6%	0.4%	75.9%	0.1%
Ozone depletion	75.6%	1.4%	27.7%	0.3%
Smog	38.5%	3.5%	57.5%	0.5%

Relative Contribution to TRACI V2.0 Life Cycle Impacts for 1 year of Use of Different Yarn Weights of Powerbond Medfloor				
Impact Category	Units	Low (14osy)	Average (20osy)	High (30osy)
Global warming	kg CO ₂ eq	12.0	13.8	16.8
Acidification	mol H ⁺ eq	2.6	2.9	3.5
Eutrophication	kg N eq	0.023	0.025	0.028
Ozone depletion	kg CFC-11 eq	3.2 E-06	3.2 E-06	3.2 E-06
Smog	kg O ₃ eq	0.63	0.72	0.85

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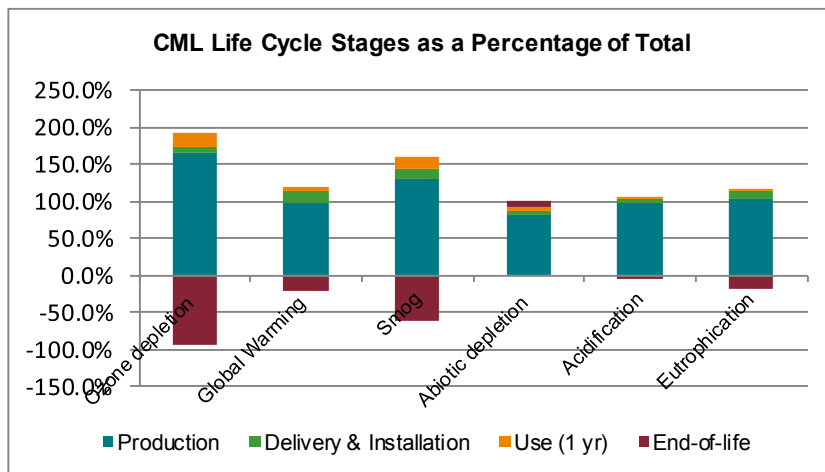
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In the European results based on CML 2002 methodology, negative percentages are found in the tables when the electricity offset from waste-to-energy at end of life causes a negative number at end of life (thereby causing the contribution analysis percentages to be less intuitive).

CML 2002 (for 1 years of Use of 20osy)		
Impact Category	Impact	Units
Global w arming	15.3	kg CO ₂ eq
Acidification	0.049	kg SO ₂ eq
Eutrophication	0.009	kg PO ₄ ³⁻ eq
Ozone depletion	2.9 E-06	kg CFC-11 eq
POCP (Smog)	0.0023	kg C ₂ H ₄ eq
Abiotic Depletion	1.1 E-04	kg Sb eq

CML 2002 (for 60 year of Use of 20osy)		
Impact Category	Impact	Units
Global w arming	64.4	kg CO ₂ eq
Acidification	0.2	kg SO ₂ eq
Eutrophication	0.1	kg PO ₄ ³⁻ eq
Ozone depletion	8.2 E-06	kg CFC-11 eq
POCP (Smog)	0.01	kg C ₂ H ₄ eq
Abiotic Depletion	0.001	kg Sb eq



Relative Contribution to CML 2002 Life Cycle Impacts for 1 year of Use of 20osy				
Impact Category	Production	Delivery & Installation	Use (1yr)	End-of-Life
Global w arming	82.7%	5.7%	3.1%	8.5%
Acidification	99.0%	16.4%	4.4%	-19.9%
Eutrophication	129.1%	16.0%	15.1%	-60.2%
Ozone depletion	97.8%	4.6%	0.8%	-3.2%
POCP (Smog)	102.3%	10.8%	3.7%	-16.8%
Abiotic Depletion	165.0%	9.3%	18.6%	-93.0%

Relative Contribution to CML 2002 Life Cycle Impacts for 60 year of Use of 20osy				
Impact Category	Production	Delivery & Installation	Use (60yrs)	End-of-Life
Global w arming	47.3%	3.3%	44.6%	4.9%
Acidification	48.0%	7.9%	53.7%	-9.6%
Eutrophication	27.9%	3.5%	81.7%	-13.0%
Ozone depletion	81.7%	3.8%	17.1%	-2.6%
POCP (Smog)	54.3%	5.7%	48.9%	-8.9%
Abiotic Depletion	30.2%	1.7%	85.1%	-17.0%

CML 2002 Life Cycle Impacts for 1 year of Use of Different Yarn Weights of Powerbond Medfloor				
Impact Category	Units	Low (14osy)	Average (20osy)	High (30osy)
Global w arming	kg CO ₂ eq	14.5	15.3	18.3
Acidification	kg SO ₂ eq	0.043	0.049	0.060
Eutrophication	kg PO ₄ ³⁻ eq	0.008	0.009	0.011
Ozone depletion	kg CFC-11 eq	2.9 E-06	2.9 E-06	2.9 E-06
POCP (Smog)	kg C ₂ H ₄ eq	0.0020	0.0023	0.0028
Abiotic Depletion	kg Sb eq	9.3 E-05	1.1 E-04	1.3 E-04

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Interpretation

When evaluating one square meter of flooring for one year of use, the majority of environmental impacts occur during the production stage (e.g. the extraction and processing of raw materials and product manufacture). The US TRACI life cycle stage data shows that 85% or more of the environmental impacts result from the production stage. The CML life cycle stage data also show that the majority of environmental impacts result from the production stage. However, electricity offsets that occur due to waste-to-energy conversion in the end of life stage result in negative numbers at the end of life. As shown in the table below, environmental impacts increase in the use stage and decrease in the production stage when the product is evaluated over 60 years of use.

Relative Contribution to Life Cycle Impacts from Production and Use					
Impact Category	Global Warming	Acidification	Eutrophication	Ozone Depletion	Smog
Production Stage Impacts					
1 Year	92.4%	87.0%	87.1%	96.7%	86.0%
60 Years	40.5%	27.7%	23.6%	75.6%	38.5%
Use Stage Impacts					
1 Year	5.3%	8.9%	11.2%	1.2%	5.1 %
60 Years	58.5%	71.0%	75.9%	22.7%	57.5%

Comparisons of different floor coverings should not be made unless similar background data, calculation methods, building context, service life and assumptions for use and end of life are utilized.

Additional Information, Evidence, and Test Results

Carbon foot printing enables Tandus Centiva to offer its customers the option to purchase products that are “carbon free” or “climate neutral” through the Carbonfund.org, a leading, nonprofit organization dedicated to combating climate change. Claiming a product is carbon free means that the greenhouse gas emissions related to the entire life cycle of the product have been offset. For a nominal cost, Tandus Centiva customers can purchase carbon free Powerbond or modular flooring products through a registered and credible program.



Powerbond Medfloor has a Class I fire rating and meets flammability requirements of the 2012 NFPA 101 Life Safety Code and the 2012 International Fire Code.

Emissions

Product and adhesives have low VOC emissions and are tested at Air Quality Sciences per the criteria defined in CRI's Green Label Plus program. Additionally, adhesive VOC content is tested by Materials Analytical Services, LLC and certified in the MAS Certified Green® Program. Adhesives meet the requirements of the South Coast Air Quality Management District - Rule 1168.

References

/1/ PCR – Floor Coverings, Environmental Product Declarations, *Harmonized Rules for Textile, Laminate and Resilient Floor Coverings*, IBU Institut für Bauen und Umwelt 2008, <http://bau-umwelt.de/hp1/Startseite.htm>

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