



Declaration Owner

Tarkett, Inc.

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Product

Flex-Aire Modular® Cushion w/ Dynex nylon face fiber

(UNSPSC Class Code 30161709/CSI Code 09 68 00)

Functional Unit

The functional unit is one square meter of floor covering installed for use over a 75-year period

EPD Number and Period of Validity

SCS-EPD-10249

EPD Valid September 18, 2024 through September 17, 2029

Product Category Rule

PCR Guidance for Building-Related Products and Services Part A: Life Cycle Assessment Calculation Rules and Report Requirements. UL 10010, UL v.4.0, March 2022.

PCR Guidance for Building-Related Products and Services Part B: Flooring EPD Requirements, v.2.0,[1] validity extended to December 31, 2024.

Program Operator

SCS Global Services

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Declaration Owner:	Tarkett, Inc.
Address:	30000 Aurora Road, Solon, Ohio 44139
Declaration Number:	SCS-EPD-10249
Declaration Validity Period:	September 18, 2024 through September 17, 2029
Program Operator:	SCS Global Services
Declaration URL Link:	https://www.scsglobalservices.com/certified-green-products-guide
LCA Practitioner:	Gerard Mansell, Ph.D., SCS Global Services
LCA Software and LCI database:	SimaPro 9.5 software and the Ecoinvent v3.9 database
Product RSL:	15 years
Markets of Applicability:	North America
EPD Type:	Product-Specific
EPD Scope:	Cradle-to-Grave
LCIA Method and Version:	TRACI 2.1
Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071	☐ internal ☒ external
LCA Reviewer:	 Lindita Bushi, Ph.D., Athena Sustainable Materials Institute
Part A Product Category Rule:	PCR Guidance for Building-Related Products and Services Part A: Life Cycle Assessment Calculation Rules and Report Requirements. UL 10010, UL v.4.0, March 2022.
Part A PCR Review conducted by:	Lindita Bushi, PhD (Chair); Hugues Imbeault-Tétreault, ing., M.Sc.A.; Jack Geibig
Part B Product Category Rule:	PCR Guidance for Building-Related Products and Services Part B: Flooring EPD Requirements, v.2.0,[1] validity extended to December 31, 2024.
Part B PCR Review conducted by:	Jack Geibig (chair), Ecoform; Thomas Gloria, Industrial Ecology Consultants; Thaddeus Owen
Independent verification of the declaration and data, according to ISO 14025 and the PCR	☐ internal ☒ external
EPD Verifier:	 Lindita Bushi, Ph.D., Athena Sustainable Materials Institute
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Disclaimers: This EPD conforms to ISO 14025, 14040, 14044, and 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. In accordance with ISO 21930:2017, EPDs are comparable only if they comply with the core PCR, use the same sub-category PCR where applicable, include all relevant information modules and are based on equivalent scenarios with respect to the context of construction works.	

1. Tarkett

With beautiful flooring surfaces and accessories that perform and inspire, Tarkett has supported the design of great spaces for more than 140 years. Tarkett products and services are centered around the people who use these spaces every day. Tarkett is committed to using healthier materials, supporting better indoor air quality, and providing a full portfolio of responsible solutions. Tarkett's goal is to establish a circular economy by designing out waste and pollution, keeping materials in use, and regenerating natural systems—for the good of people and the planet. Learn more at www.tarkett.com.

2. Product

2.1 PRODUCT DESCRIPTION

Flex-Aire Modular® Cushion - Designed with additional support for softened acoustics and comfort underfoot, Flex-Aire Modular Cushion offers a 0.22 Noise Reduction Coefficient and 68 Impact Insulation Class to help create calmer environments. Install Flex-Aire with TarkettTAPE™ for a floating installation or C-12E pressure-sensitive adhesive, which has a C2C Material Health Certificate™ at the Silver level.

Dynex SD® - Dynex SD is a premium cationic nylon, meaning it's negatively charged to provide permanent stain resistance against most staining agents. For even greater protection, Dynex SD is treated with Eco-Ensure™, a chemistry with a Cradle to Cradle Certified® Material Health Certificate™ at the Platinum level that resists soils from oils and organic materials. This fluorine-free soil protection technology lowers the cost of maintenance and creates healthier spaces by promoting better indoor air quality with low-VOC emissions.

2.2 PRODUCT FLOW DIAGRAM

A flow diagram illustrating the production processes and life cycle phases included in the scope of the EPD is provided below.



2.3 APPLICATION

The products provide the primary function of flooring for interior applications. The flooring products are used in various residential and commercial applications including workplace, education, multi-family, hospitality and healthcare.

2.4 DECLARATION OF METHODOLOGICAL FRAMEWORK

The scope of the EPD is cradle-to-grave, including raw material extraction and processing, transportation, product manufacture, product delivery, installation and use, and product disposal. The assessment is conducted following an

attributional LCA approach. Cut-off and allocation procedures are described below and conform to the PCR and ISO standards.

The life cycle phases included in the product system boundary are shown below.

Table 1. Life cycle phases included in the product system boundary.

Product			Construction Process		Use							End-of-life				Benefits and loads beyond the system boundary
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw material extraction and processing	Transport to manufacturer	Manufacturing	Transport	Construction - installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse, recovery and/or recycling potential
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	MND

X = included | MND = Module Not Declared

2.5 TECHNICAL DATA

Technical specifications for the flooring product are summarized in Table 2.

Table 2. Product specifications for the **Flex-Aire Modular® Cushion** carpet product.

Characteristic	Description	
Type of Manufacture	Carpet Tile	
Yarn Type	Nylon 6	
Additional characteristics according to NSF/ANSI 140	NSF 140 Gold	
Sustainable certifications	ISO 14001 Certified	
VOC emissions test method	Green Label Plus®	
CRI TARR rating	3 – 4.5	
Characteristic	Nominal Value	Units
Backing thickness	4.0 (0.156)	mm (inch)
Backing weight	3,361 (99.1)	g/m² (oz/yd²)
Surface pile thickness	2.08 (0.082) - 6.50 (0.256)	mm (inch)
338.9 (10.0) - 915.0 (27.0) Surface pile weight	338.9 (10.0) - 915.0 (27.0)	g/m² (oz/yd²)
Pile fiber composition	Dynex	-
Secondary backing	Fiberglass Reinforced Composite Closed Cell Cushion	-

2.6 MARKET PLACEMENT/APPLICATION RULES

Technical specifications of the flooring products are summarized above. Additional information can be found on the manufacturer's website <https://www.tarkett.com/>.

2.7 PROPERTIES OF DECLARED PRODUCT AS DELIVERED

The flooring products are delivered for installation in the form of carpet tiles including 24"x24", 18"x36", and 9"x36".

2.8 MATERIAL COMPOSITION

The nylon flooring products (UNSPSC Class Code 30161709/CSI Code 09 68 00) are manufactured at Tarkett's production facilities in the United States. The primary materials include nylon 6 pile fiber, polyvinyl chloride (PVC), a secondary backing and scrim containing some recycled materials, and various fillers, adhesives and binders. The products include 6-13% post industrial and 22-26% post consumer recycled content.

Table 3. Material content for the flooring products in kg per square meter and percent of total mass.

Component	Flex-Aire Modular®	
	kg/m ²	%
Yarn	0.678	17%
PVC	0.890	22%
Latex (VAE)	0.240	6%
Fillers	1.06	27%
Plasticizer	0.520	13%
Reinforcement	7.00x10 ⁻²	1.8%
Adhesive	5.00x10 ⁻²	1.3%
Primary Backing	0.110	2.8%
ATH	0.380	9.5%
Product Total	4.00	100%

No substances required to be reported as hazardous are associated with the production of this product.

2.9 MANUFACTURING

The products are manufactured at the production facility in the United States. The manufacturer provided primary data for their annual production, resource use and electricity consumption and waste generation at the facility. Electricity consumption is modeled using Ecoinvent datasets for the regional electricity grid resource mix. No green power sources or CO₂ certificates are included in the present study.

2.10 PACKAGING

The products are packaged for shipment using corrugated boxes.

Table 4. Material content for the flooring product packaging in kg per square meter of flooring.

Component	Value
Corrugated	0.227 (100%)
Total Packaging	0.227 (100%)

2.11 PRODUCT INSTALLATION

Installation of this product primarily involves hand tools for measuring and cutting floor materials. Approximately 4% of the total material is assumed to be trimmed and discarded as waste. While some of this waste could be recycled, this scrap is modeled as being disposed of in a landfill.

2.12 USE CONDITIONS

No special conditions of use are noted.

2.13 REFERENCE SERVICE LIFE

The Reference Service Life (RSL) of the flooring products varies based on the manufacturer's warranted lifetime.

2.14 RE-USE PHASE

The flooring products are not reused at end-of-life.

2.15 DISPOSAL

At end-of-life, the products are disposed of in a landfill.

2.16 FURTHER INFORMATION

Further information on the product can be found on the manufacturer's website <https://www.tarkett.com/>.

3. LCA: Calculation Rules

3.1 FUNCTIONAL UNIT

The functional unit used in the study is defined as 1 m² of floor covering installed for use over a 75-year period. The corresponding reference flow for the product system is presented in Table 5. For the present assessment, a reference service lifetime (RSL) corresponding to the manufacturer's warranted lifetime is assumed. The total number of required product lifecycles during the 75-year period over which the product system is modeled is also included in Table 5.

Table 5. Reference flow and RSL for the flooring products.

Parameter	Value
Face fiber weight (oz/yd ²)	20
Reference Flow (kg/m ²)	4.00
Packaging weight (kg/m ²)	0.227
Reference Service Lifetime (yr)	15
Replacement Cycle	4
Total # of Life Cycles	5

3.2 SYSTEM BOUNDARY

The scope of the EPD is cradle-to-grave, including raw material extraction and processing, transportation, product manufacture, product delivery, installation and use, and product disposal. The life cycle phases included in the EPD scope are described in Table 6 and illustrated in Figure 1.

Table 6. *The modules and unit processes included in the scope for the flooring product system.*

Module	Module description from the PCR	Unit Processes Included in Scope
A1	Extraction and processing of raw materials; any reuse of products or materials from previous product systems; processing of secondary materials; generation of electricity from primary energy resources; energy, or other, recovery processes from secondary fuels	Extraction and processing of raw materials for the flooring components.
A2	Transport (to the manufacturer)	Transport of component materials to the manufacturing facility
A3	Manufacturing, including ancillary material production	Manufacturing of flooring products and packaging (incl. upstream unit processes)
A4	Transport (to the building site)	Transport of product (including packaging) to the building site
A5	Construction-installation process	The product is installed using the manufacturer's recommended, or similar, adhesives. Impacts from the production, transport and disposal of waste material associated with installation (~4%) are included in this phase in addition to impacts from packaging disposal
B1	Product use	Use of the flooring in a commercial building setting. There are no associated emissions or impacts from the use of the product
B2	Product maintenance	Maintenance of products over the 75-year ESL, including periodic cleaning.
B3	Product repair	The flooring is not expected to require repair over its lifetime.
B4	Product replacement	The materials and energy required for replacement of the product over the 75-year ESL of the assessment are included in this phase
B5	Product refurbishment	The flooring is not expected to require refurbishment over its lifetime.
B6	Operational energy use by technical building systems	There is no operational energy use associated with the use of the product
B7	Operational water use by technical building systems	There is no operational water use associated with the use of the product
C1	Deconstruction, demolition	Demolition of the product is accomplished using hand tools with no associated emissions and negligible impacts
C2	Transport (to waste processing)	Transport of flooring product to waste treatment at end-of-life
C3	Waste processing for reuse, recovery and/or recycling	The product is disposed of by landfilling which require no waste processing
C4	Disposal	Disposal of flooring product in municipal landfill
D	Reuse-recovery-recycling potential	Module Not Declared

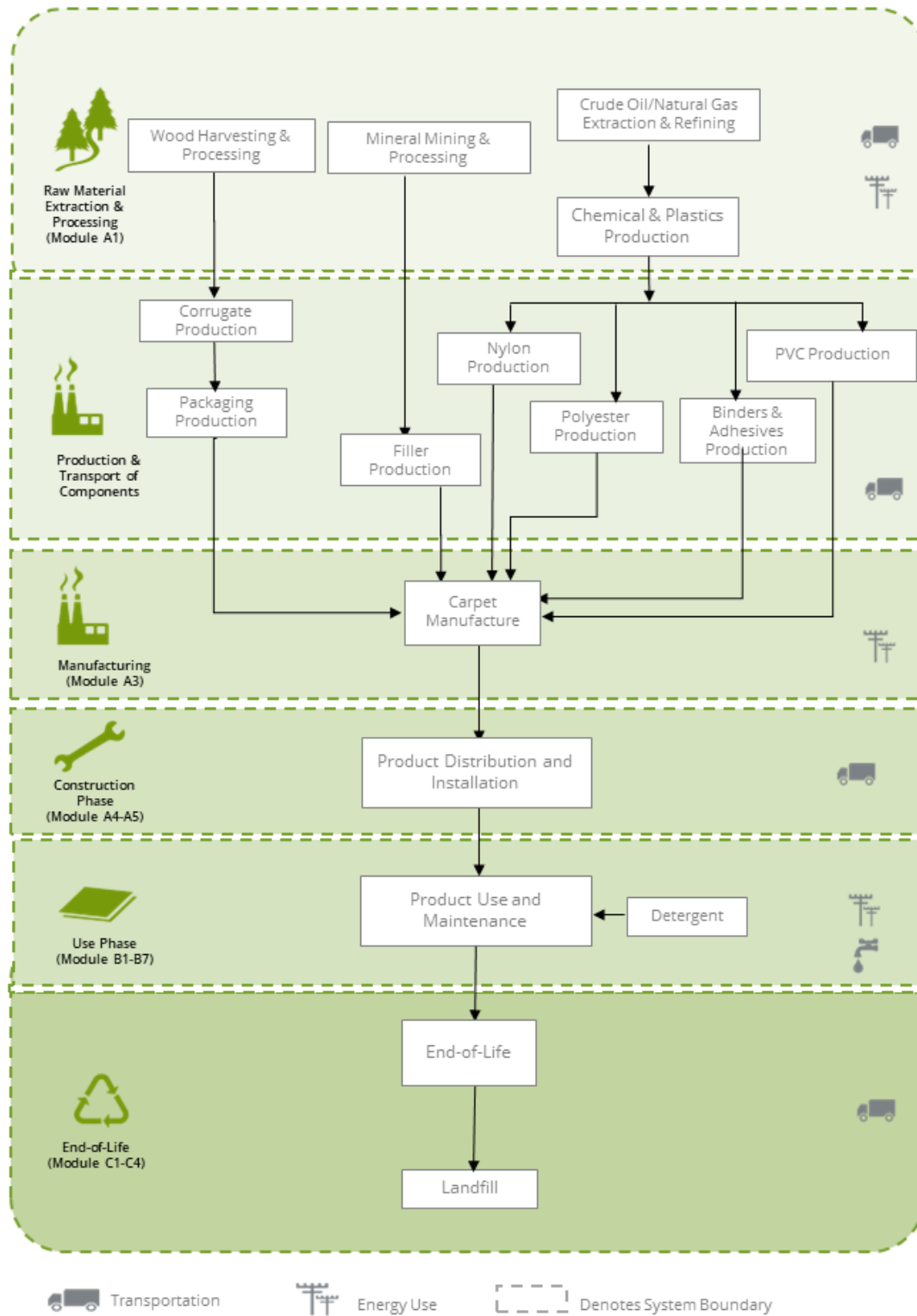


Figure 1. Flow diagram for the life cycle of the Tarkett Flex-Aire Modular® flooring products.

3.3 PRODUCT SPECIFIC CALCULATION FOR USE PHASE

The recommended cleaning regime is highly dependent on the use of the premises where the floor covering is installed. In high traffic areas more frequent cleaning will be needed compared to areas where there is low traffic. For the purposes of this EPD, average maintenance (light traffic levels) is presented based on typical installations.

3.4 UNITS

All data and results are presented using SI units.

3.5 ESTIMATES AND ASSUMPTIONS

- Electricity use at the manufacturing facilities was allocated to the products based on the product area as a fraction of the total production.
- The Tarkett facilities under review are located in Dalton and Calhoun, Georgia. An Ecoinvent inventory dataset representing the SERC eGRID energy mix is used to estimate resource use and emissions from electricity use at the manufacturing facilities.
- The Reference Service Life (RSL) of the products was modeled based on information provided by the manufacturer assuming their products are installed and maintained as recommended and used for the specific application noted.
- Downstream transport was modeled based on information provided by the manufacturer representing distribution to consumer markets in North America.
- The maintenance phase of the product life cycle was modeled based on information provided by the manufacturer including recommended installation and cleaning methods.
- For the product end-of-life, disposal of product and product packaging is modeled based on the PCR guidance regarding recycling rates of product and packaging materials.
- Inventory data for some material components were unavailable and modeled using proxy datasets from the Ecoinvent LCI databases.
- For final disposal of the packaging material and flooring products at end-of-life, all materials are assumed to be transported 161 km by diesel truck to either a landfill or material reclamation facility (for recycling). Datasets representing disposal in a landfill and waste incineration are from Ecoinvent.

The PCR requires the results for several inventory flows related to construction products to be reported including energy and resource use and waste and outflows. These are aggregated inventory flows, and do not characterize any potential impact; results should be interpreted taking into account this limitation.

3.6 CUT-OFF RULES

According to the PCR, processes contributing greater than 1% of the total environmental impact indicator for each impact are included in the inventory. No data gaps were allowed which were expected to significantly affect the outcome of the indicator results. No known flows are deliberately excluded from this EPD.

3.7 DATA SOURCES

Primary data were provided for the manufacturing facility. The sources of secondary LCI data are the Ecoinvent v3.9.1 database and limited suppliers' LCAs.

3.8 DATA QUALITY

The data quality assessment addressed the following parameters: time-related coverage, geographical coverage, technological coverage, precision, completeness, representativeness, consistency, reproducibility, sources of data, and uncertainty.

Table 7. *Data quality assessment for the flooring product system.*

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 5 years old. 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 2022.
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. Electricity use for product manufacture is modeled using representative data for the SERC eGRID regional electricity grid. Surrogate data used in the assessment are representative of global or European operations. Data representative of European operations is considered sufficiently similar to actual processes. Data representing product disposal are based on regional 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.
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 v3.9 data where available. Different portions of the product life cycle are equally considered.
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: Description of all primary and secondary data sources	Data representing energy use at the manufacturing facility represents 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 data, Ecoinvent v3.9 LCI data are used.
Uncertainty of the Information: Uncertainty related to data, models, and assumptions	Uncertainty related to materials in the products and packaging is low. Actual supplier data for upstream operations were not available 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.

3.9 PERIOD UNDER REVIEW

The LCA results are based on annual production data for 2022.

3.10 ALLOCATION

Resource use at the manufacturing facilities (e.g., water and energy) was allocated to the products based on the product area as a fraction of the total facility production volume (i.e., area-based allocation). Area-based allocation was deemed most appropriate for the flooring products as total facility production was available as total square meters of product produced. Electricity use at the manufacturing facilities was modeled using ecoinvent inventory datasets for the region-specific electrical grid.

The product systems include the use of recycled materials. 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, including product distribution to point of sale, were attributed to the products based on the mass of material and distance transported.

3.11 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.

4. LCA: Scenarios and Additional Technical Information

Delivery and Installation stage (A4 - A5)

Distribution of the flooring products to the point of installation is included in the assessment following PCR guidance. Transportation parameters for modeling transport to consumer markets in North America are summarized in Table 8.

Table 8. *Product distribution parameters by transport mode.*

Parameter	Value
Fuel type	Diesel
Liters of fuel (L/100km)	18.7
Vehicle type	Diesel truck
Capacity utilization (%)	76
Transport Distance (km)	800
Gross mass transported (kg)	4.23

Installation and maintenance of the products are based on typical application and intended use. Approximately 4% of the product mass is assumed lost as waste during product installation which is disposed of via landfilling. Impacts from the production, transport and disposal of waste material associated with installation are included in this phase. The VOC emissions associated with the installation, use and maintenance of the products are negligible. The impacts associated with packaging disposal are included with the installation phase as per PCR requirements.

Table 9. Installation parameters for the flooring products, per 1 m².

Parameter	Value
Ancillary materials	0.00
Net freshwater consumption (m ³)	0.00
Electricity consumption (kWh)	0.00
Product loss per functional unit (kg)	0.160
Waste materials generated by product installation (kg)	0.227
Output materials from on-site waste processing (kg)	n/a
Mass of packaging waste - Corrugate (kg)	0.227
Biogenic carbon contained in packaging (kg CO ₂)	0.416
Direct emissions (kg)	0.00

Use stage (B1)

No impacts are associated with the use of the product over the Reference Service Lifetime.

Maintenance stage (B2)

According to the manufacturer, typical maintenance involves regular vacuuming and periodic surface steam cleaning, as well as restorative steam cleaning. Based on the level of wear conditions and foot traffic, the manufacturer recommends cleaning methods and frequencies for the product as part of routine maintenance¹. The present assessment is based on a moderate traffic level. The parameters used to model the product maintenance are summarized in Table 10.

Table 10. Maintenance parameters for the flooring products, per 1 m².

Parameter	Unit	Value
Maintenance process	-	Vacuuming
Maintenance cycle	Cycles / RSL	1,560
Maintenance cycle	Cycles / ESL	7,800
Electricity	kWh/m ² /yr	1.08
Maintenance process	-	Extraction Cleaning
Maintenance cycle	Cycles / RSL	30
Maintenance cycle	Cycles / ESL	150
Electricity	kWh/m ² /yr	0.200
Water	L/m ² /yr	12.1
Detergent	kg/m ² /yr	0.016
Further assumptions	-	Moderate traffic

Repair/Refurbishment stage (B3; B5)

Product repair and refurbishment are not relevant during the lifetime of the product.

¹ MD_20231204_EN_SOFT MAINTENANCE MANUAL.pdf

Replacement stage (B4)

The materials and energy required for replacement of the product over the 75-year estimated service lifetime of the assessment are included in this stage. Impacts associated with the production, transport, waste processing, and disposal of all materials required for the replacement of the product over the 75-year assessment period are included. Modeling parameters for the product replacement stage are summarized in Table 11.

Table 11. Product replacement parameters for the flooring products, per 1 m².

Parameter	Units	Value
Reference service life	Years	15
Replacement cycle	-	4
Energy input	kWh	0
Freshwater consumption	m ³	0
Ancillary materials	kg	Negligible
Replacement parts	kg	16.0
Direct emissions	kg	0

Building operation stage (B6 – B7)

There is no operational energy or water use associated with the use of the product.

Disposal stage (C1 - C4)

At end-of-life, the product is assumed to be disposed in a landfill per PCR requirements. For packaging materials, a 10% recycling rate is assumed. Materials not recycled are landfilled (80%) and incinerated (20%).

Transportation of waste materials at end-of-life assumes a 161 km average distance to disposal, as specified by the PCR. The relevant disposal parameters used for the product system are summarized in Table 12.

Table 12. End-of-life disposal scenario parameters for the flooring products.

Parameter		Value
Scenario assumptions		Landfill
Collection process	Collected separately	0
	Collected with mixed waste	4.00
Recovery		n/a
Disposal	Recycling	0
	Landfill	4.00
	Incineration	0
Removals of biogenic carbon (excluding packaging)		n/a

5. LCA: Results

Results of the Life Cycle Assessment are presented below. It is noted that LCA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks. All LCA results are stated to three significant figures in agreement with the PCR for this flooring product and therefore the sum of the total values may not exactly equal 100%.

The following environmental impact category indicators are reported using characterization factors based on the U.S. EPA's Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts – TRACI 2.1. GWP impacts are reported using both the IPCC AR5 and IPCC AR4 characterization factors.

TRACI 2.1 Impact Category	Unit
Global Warming Potential (GWP)	kg CO ₂ eq
Ozone Depletion Potential (ODP)	kg CFC 11 eq
Acidification Potential (AP)	kg SO ₂ eq
Eutrophication Potential (EP)	kg N eq
Smog Formation Potential (SFP)	kg O ₃ eq

These impact categories are globally deemed mature enough to be included in Type III environmental declarations. Other categories are being developed and defined and LCA should continue making advances in their development. However, the EPD users shall not use additional measures for comparative purposes.

The following inventory parameters, specified by the PCR, are also reported.

Resources	Unit	Waste and Outflows	Unit
RPR _E : Renewable primary resources used as energy carrier (fuel)	MJ, LHV	HWD: Hazardous waste disposed	kg
RPR _M : Renewable primary resources with energy content used as material	MJ, LHV	NHWD: Non-hazardous waste disposed	kg
NRPR _E : Non-renewable primary resources used as an energy carrier (fuel)	MJ, LHV	HLRW: High-level radioactive waste, conditioned, to final repository	kg
NRPR _M : Non-renewable primary resources with energy content used as material	MJ, LHV	ILLRW: Intermediate- and low-level radioactive waste, conditioned, to final repository	kg
ADPF: Abiotic Depletion Potential (fossil fuels) ¹	MJ, LHV	CRU: Components for re-use	kg
SM: Secondary materials	kg	MR: Materials for recycling	kg
RSF: Renewable secondary fuels	MJ, LHV	MER: Materials for energy recovery	kg
NRSF: Non-renewable secondary fuels	MJ, LHV	EE: Recovered energy exported from the product system	MJ, LHV
RE: Recovered energy	MJ, LHV		
FW: Use of net freshwater resources	m ³		

¹ Estimated using the CML v4.7 (2016) characterization methodology.

Modules B1, B3, B5, B6 and B7 are not associated with any impact and are therefore declared as zero. In addition, module C1 is likewise not associated with any impact as the floor is manually deconstructed. Additionally, as the flooring products do not typically contain significant amounts of bio-based materials, biogenic carbon emissions and removals are not declared. Module D is not declared. In the interest of space and table readability, these modules are not included in the results presented below.

Table 13. Life Cycle Impact Assessment results for the flooring products over a 75-yr time horizon. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits. **(Flex-Aire Modular® Dynex Yarn)**

Impact Category	A1-A3	A4	A5	B2	B4	C2	C4
TRACI							
GWP AR5 (kg CO ₂ eq)	15.4	0.348	0.834	21.1	68.2	0.119	0.358
	14%	0.33%	0.78%	20%	64%	0.11%	0.34%
GWP AR4 (kg CO ₂ eq)	15.4	0.349	0.637	21.1	67.3	0.120	0.358
	15%	0.33%	0.61%	20%	64%	0.11%	0.34%
AP (kg SO ₂ eq)	4.21x10 ⁻²	1.12x10 ⁻³	1.77x10 ⁻³	5.29x10 ⁻²	0.183	3.48x10 ⁻⁴	3.46x10 ⁻⁴
	15%	0.4%	0.63%	19%	65%	0.12%	0.12%
EP (kg N eq)	2.85x10 ⁻²	3.13x10 ⁻⁴	4.41x10 ⁻³	7.97x10 ⁻²	0.341	9.38x10 ⁻⁵	5.19x10 ⁻²
	5.6%	0.062%	0.87%	16%	67%	0.019%	10%
SFP (kg O ₃ eq)	0.608	2.56x10 ⁻²	2.64x10 ⁻²	0.583	2.71	8.25x10 ⁻³	8.13x10 ⁻³
	15%	0.65%	0.66%	15%	68%	0.21%	0.21%
ODP (kg CFC-11 eq)	8.92x10 ⁻⁶	6.24x10 ⁻⁹	3.41x10 ⁻⁷	2.81x10 ⁻⁷	3.71x10 ⁻⁵	2.84x10 ⁻⁹	1.25x10 ⁻⁹
	19%	0.013%	0.73%	0.6%	80%	0.0061%	0.0027%

Table 14. Resource use for the flooring products over a 75-yr time horizon. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits. **(Flex-Aire Modular® Dynex Yarn)**

Parameter	A1-A3	A4	A5	B2	B4	C2	C4
Resources							
RPR _E (MJ)	11.5	6.56x10 ⁻²	0.462	29.9	48.1	2.67x10 ⁻²	2.18x10 ⁻²
	13%	0.073%	0.51%	33%	53%	0.03%	0.024%
RPR _M (MJ)	3.80	0.00	0.152	0.338	15.8	0.00	0.00
	19%	0%	0.76%	1.7%	79%	0%	0%
NRPR _E (MJ)	279	5.19	11.2	415	1,190	1.72	1.05
	15%	0.27%	0.59%	22%	63%	0.09%	0.055%
NRPR _M (MJ)	27.2	0.00	1.04	1.90	113	0.00	0.00
	19%	0%	0.72%	1.3%	79%	0%	0%
ADPF (MJ)	150	5.11	6.28	272	657	1.68	1.02
	14%	0.47%	0.57%	25%	60%	0.15%	0.093%
SM (kg)	1.73x10 ⁻²	0.00	6.60x10 ⁻⁴	0.00	7.19x10 ⁻²	0.00	0.00
	19%	0%	0.73%	0%	80%	0%	0%
RSF (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0%	0%	0%	0%	0%	0%	0%
NRSF (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0%	0%	0%	0%	0%	0%	0%
RE (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0%	0%	0%	0%	0%	0%	0%
FW (m ³)	0.125	8.16x10 ⁻⁴	4.97x10 ⁻³	7.04x10 ⁻²	0.527	2.44x10 ⁻⁴	1.06x10 ⁻³
	17%	0.11%	0.68%	9.7%	72%	0.034%	0.15%

Table 15. Waste and outflows for the flooring products over a 75-yr time horizon. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits. **(Flex-Aire Modular® Dynex Yarn)**

Parameter	A1-A3	A4	A5	B2	B4	C2	C4
Wastes and Outflows							
HWD (kg)	0.588	5.94x10 ⁻³	2.40x10 ⁻²	0.426	2.48	1.64x10 ⁻³	1.51x10 ⁻³
	17%	0.17%	0.68%	12%	70%	0.046%	0.043%
NHWD (kg)	4.50	0.497	0.529	12.7	38.6	9.76x10 ⁻²	4.02
	7.4%	0.82%	0.87%	21%	63%	0.16%	6.6%
HLRW (kg)	7.65x10 ⁻⁵	3.30x10 ⁻⁷	3.08x10 ⁻⁶	4.07x10 ⁻⁴	3.21x10 ⁻⁴	1.36x10 ⁻⁷	1.13x10 ⁻⁷
	9.5%	0.041%	0.38%	50%	40%	0.017%	0.014%
ILLRW (kg)	1.12x10 ⁻³	8.03x10 ⁻⁷	4.35x10 ⁻⁵	1.67x10 ⁻³	4.68x10 ⁻³	4.22x10 ⁻⁷	2.86x10 ⁻⁷
	15%	0.011%	0.58%	22%	62%	0.0056%	0.0038%
CRU (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0%	0%	0%	0%	0%	0%	0%
MR (kg)	0.122	0.00	4.88x10 ⁻³	0.00	0.508	0.00	0.00
	19%	0%	0.77%	0%	80%	0%	0%
MER (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0%	0%	0%	0%	0%	0%	0%
EE (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0%	0%	0%	0%	0%	0%	0%

Global Warming Potential (GWP) results for the flooring products from cradle-to-gate (stages A1-A3) are presented below for additional product face fiber weights. Results are presented in kg CO₂e/m² of flooring using the TRACI characterization methodology.

Table 16. GWP results for the Tarkett flooring products by face fiber weight.

Face fiber weight (oz/yd ²)	Flex-Aire Modular® Dynex Yarn
	GWP (kg CO ₂ e/m ²)
10	13.33
11	13.54
12	13.74
13	13.95
14	14.15
15	14.36
16	14.56
17	14.77
18	14.97
19	15.17
20	15.38
21	15.58
22	15.79
23	15.99
24	16.20
25	16.40
26	16.61
27	16.81
28	17.02
29	17.22
30	17.43

6. LCA: Interpretation

The contributions to total impact indicator results are dominated by the product replacement phase (B4) of the assessment. Of the remaining life cycle phases, with few exceptions, the product maintenance phase (B2) is the largest contributor to the total life cycle impacts of the products. Product manufacture (A3) and raw material extraction and processing (A1) phases are generally the next highest contributors to overall impacts. Other life cycle phase contributions are minimal. Exceptions include the Ozone Depletion Potential, dominated by the raw material extraction phase, and the Eutrophication Potential with significant contributions from the product disposal phase (C4).

7. References

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