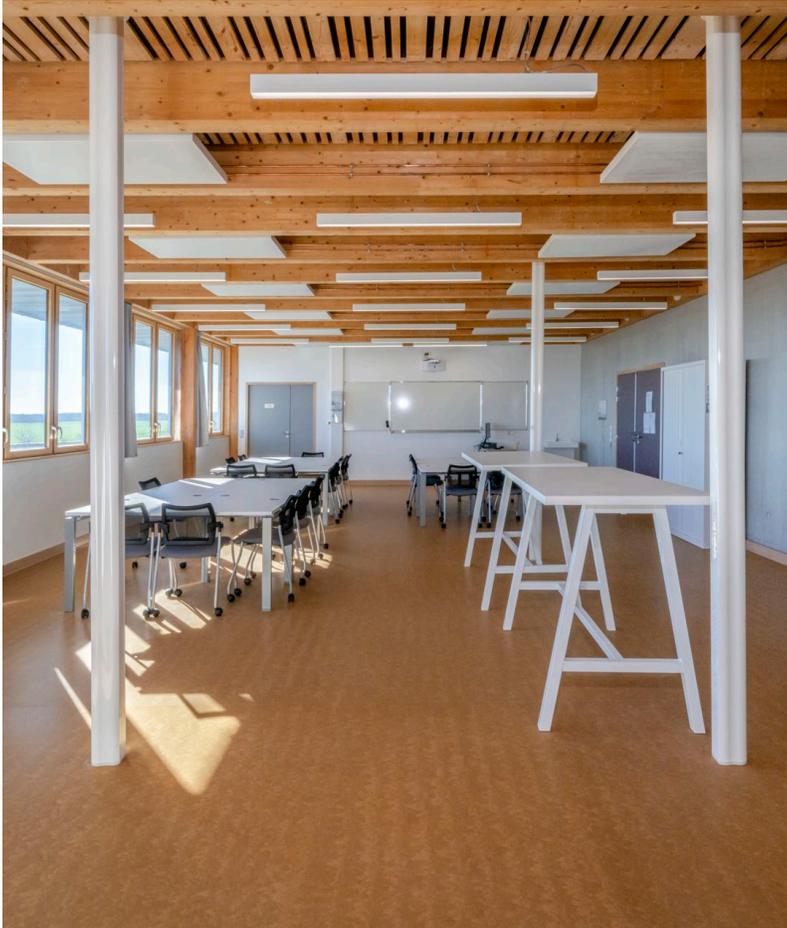


ENVIRONMENTAL PRODUCT DECLARATION

LINOLEUM FLOORING

TARKETT

ENVIRONMENTAL PRODUCT DECLARATION



About Tarkett

With a history of 140 years, Tarkett is a worldwide leader in innovative flooring and sports surface solutions, with net sales of € 2.8 billion in 2021. Offering a wide range of products including vinyl, **linoleum**, rubber, carpet, wood, laminate, artificial turf and athletics tracks, the Group serves customers in over 100 countries across the globe. Tarkett has 12,000 employees and 34 industrial sites, and sells 1.3 million square meters of flooring every day, for hospitals, schools, housing, hotels, offices, stores and sports fields. Committed to change the game with circular economy and to reducing its carbon footprint, the Group has implemented an eco-innovation strategy based on Cradle to Cradle® principles, fully aligned with its Tarkett HumanConscious Design® approach. Tarkett is listed on Euronext Paris (compartment B, ISIN: FR0004188670, ticker: TKTT). www.tarkett-group.com



ENVIRONMENTAL PRODUCT DECLARATION



LINOLEUM FLOORING

According to ISO 14025,
EN 15804, and ISO21930:2017

EPD PROGRAM AND PROGRAM OPERATOR NAME, ADDRESS, LOGO, AND WEBSITE	UL Environment 333 Pfingsten Road Northbrook, IL 60611 https://www.ul.com/ https://spot.ul.com
GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER	General Program Instructions v.2.4 July 2018
MANUFACTURER NAME AND ADDRESS	Tarkett S.P.A Strada Sant'Anna n. 6 05035 Narni Scalo (TR) Italy
DECLARATION NUMBER	4789356590.101.2
DECLARED PRODUCT & FUNCTIONAL UNIT OR DECLARED UNIT	Installed floor covering, 1 m ²
REFERENCE PCR AND VERSION NUMBER	EN 16810: Resilient, textile and laminate floor coverings - Environmental product declarations - Product category rules, August 2017
DESCRIPTION OF PRODUCT APPLICATION/USE	Commercial and residential flooring
PRODUCT RSL DESCRIPTION (IF APPL.)	1 year
MARKETS OF APPLICABILITY	Asia, Europe, North America, South America
DATE OF ISSUE	October 1, 2020
PERIOD OF VALIDITY	5 years
EPD TYPE	Product-specific, single-company
RANGE OF DATASET VARIABILITY	Not applicable
EPD SCOPE	Cradle-to-grave
YEAR(S) OF REPORTED PRIMARY DATA	2018
LCA SOFTWARE & VERSION NUMBER	GaBi 10
LCI DATABASE(S) & VERSION NUMBER	GaBi 2019.3 (service pack 39)
LCIA METHODOLOGY & VERSION NUMBER	CML, April 2016

The PCR review was conducted by:	UL Environment
	PCR Review Panel
	epd@ul.com
This declaration was independently verified in accordance with ISO 14025: 2006. <input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL	<i>Cooper McC</i>
	Cooper McCollum, UL Environment
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	<i>Thomas P. Gloria</i>
	Thomas P. Gloria, Industrial Ecology Consultants

LIMITATIONS

Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc.

Accuracy of Results: EPDs regularly rely on estimations of impacts; the level of accuracy in estimation of effect differs for any particular product line and reported impact.

Comparability: EPDs from different programs may not be comparable. Full conformance with a PCR allows EPD comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible". Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared.

1. Product Definition and Information

1.1. Description of Company/Organization

Tarkett's linoleum plant began its production in **Narni, Italy**, in 1898, when European countries commonly used linoleum for flooring and wall-coverings. In the early 1990s, Tarkett began to invest in the modernization of the entire production system. Today, Narni is accredited with **ISO 9001** and holds important environmental certifications including **ISO 14001**, **ISO 50001**, **ISO 45001 Occupational Health and Safety Management Systems**, **ISO 37001 Anti-Bribery Management Systems**, **SA 8000 Social Accountability**, **SWAN** and **Der Blaue Engel**.

Mindful of the environment, the company made innovative improvements in our production processes to reduce our operational impact. To face the constantly changing scenario, Tarkett has chosen to implement **World Class Manufacturing (WCM)**, an innovation program based on **continuous improvement** that involves the elimination of all types of waste and losses throughout the production process. As a result, **Tarkett Lino is a flooring solution that blends craftsmanship with the most advanced technology.**

1.2. Product Description

Product Identification

Tarkett Lino, manufactured in accordance with standard EN-ISO 24011: Specification for plain and decorative linoleum, is a high performance, resilient floor covering. The company uses materials that contribute positively to people's health and the environment. Closed-loop design starts here, so that good materials become future resources that can be reused.

- **Up to 97%** natural raw materials - linseed oil, pine rosin, wood and cork flour, calcium carbonate and jute.
- **Up to 77%** from abundant renewable resources - including local suppliers. The company support local linen producers to reduce our carbon footprint.
- **100%** of ingredients have been positively assessed according to Cradle to Cradle® framework for health and environment. As such, Tarkett Lino exceeds European REACH regulation requirements.
- **100%** recyclable - Tarkett's Lino offcuts and now even post-use recycling, can be fully reused as raw materials for future products or packaging through our ReStart® Programme

Tarkett Lino is **naturally phthalate free**, has **natural anti-bacterial properties**, grants Optimal indoor air quality: VOC emissions ($\leq 10\mu\text{g}/\text{m}^3$) 100 times lower than the most stringent industry requirements and is awarded Allergy UK Seal of Approval.

Tarkett Lino is a **durable product with a lifespan of up to 30 years (Reference Life Span RLS).**

The diagram below shows Tarkett Lino **homogeneous** construction for impact lino in 2mm, 2,5mm, 3,2mm and 4mm:

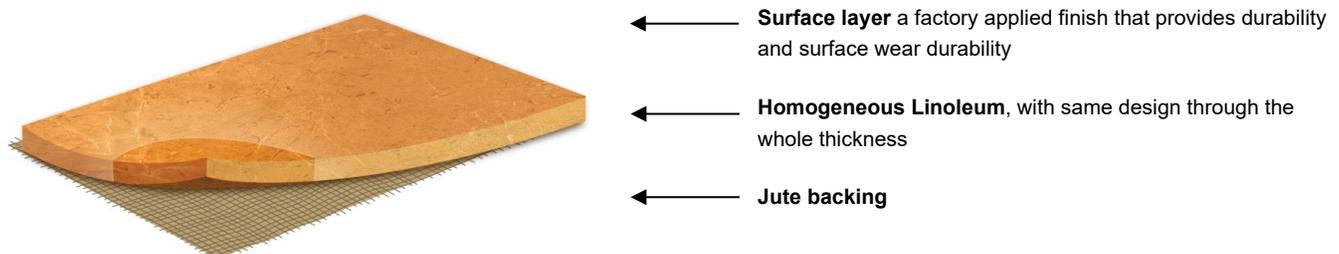


Figure 1: Tarkett Lino homogeneous construction



An additional backing (polyurethane foam or cork based) is added to obtain their products in 3,8mm, 4,4mm and 4,6mm thicknesses.

This Environmental Product Declaration (EPD) covers Tarkett Lino flooring available in a wide range of colors, configurations, and thicknesses. Table 1 provides detail on the products evaluated as part of this declaration.

Table 1: Products evaluated

TECHNICAL DATA NAME	SALES NAME	ADDITIONAL BACKING
Linoleum 2mm	Veneto xf ² 2mm	None
	LinoWall* xf ² 2mm	None
Linoleum 2.5mm	Veneto xf ² 2,5mm	None
	Etrusco xf ² 2,5mm	None
	Style Elle / Lenza xf ² 2,5mm	None
	Style Emme / Tonali xf ² 2,5mm	None
	Trentino xf ² 2,5mm	None
	Veneto Essenza 2,5mm	None
	Veneto Essenza+ 2,5mm	None
	Originale xf ² 2,5mm	None
	Originale Minerale Essenza 2,5mm	None
	Originale Vegetale Essenza 2,5mm	None
	Originale Essenza+ 2,5mm	None
	Linoleum xf ² Bfl 2,5mm	None
	Veneto Sicuro xf ² R10 2,5mm	None
	LinoRail HL3 2,5mm	None
Linosport xf ² 2,5mm	None	
Linoleum 3.2mm	Veneto xf ² 3,2mm	None
	Linosport / Ecopure xf ² 3,2mm	None
Linoleum 3.8 mm	Veneto Silencio/Acoustic/Acoustiflor xf ² 3,8mm	Polyurethane foam
	Style Emme Silencio/Acoustic/Tonali Acoustiflor xf ² 3,8mm	Polyurethane foam
	Style Elle Silencio/Acoustic/ Lenza Acoustiflor xf ² 3,8mm	Polyurethane foam
	Etrusco Silencio/Acoustic/Acoustiflor xf ² 3,8mm	Polyurethane foam



TECHNICAL DATA NAME	SALES NAME	ADDITIONAL BACKING
	Trentino Silencio/Acoustic / Acoustiflor xf ² 3,8mm	Polyurethane foam
	Originale Silencio/Acoustic / Acoustiflor xf ² 3,8mm	Polyurethane foam
Linoleum 4mm	Linospport Classic / Narnidur 4mm	None
Linoleum 4.4mm	Veneto Acoustic Cork xf ² 4,4mm	Cork
Linoleum 4.6mm	Ecopure xf ² 4,6mm	Polyurethane foam

*LinoWall: there is no specific PCR for wall coverings. Our linoleum wall covering is like a 2 mm linoleum floor covering but installed on a wall.

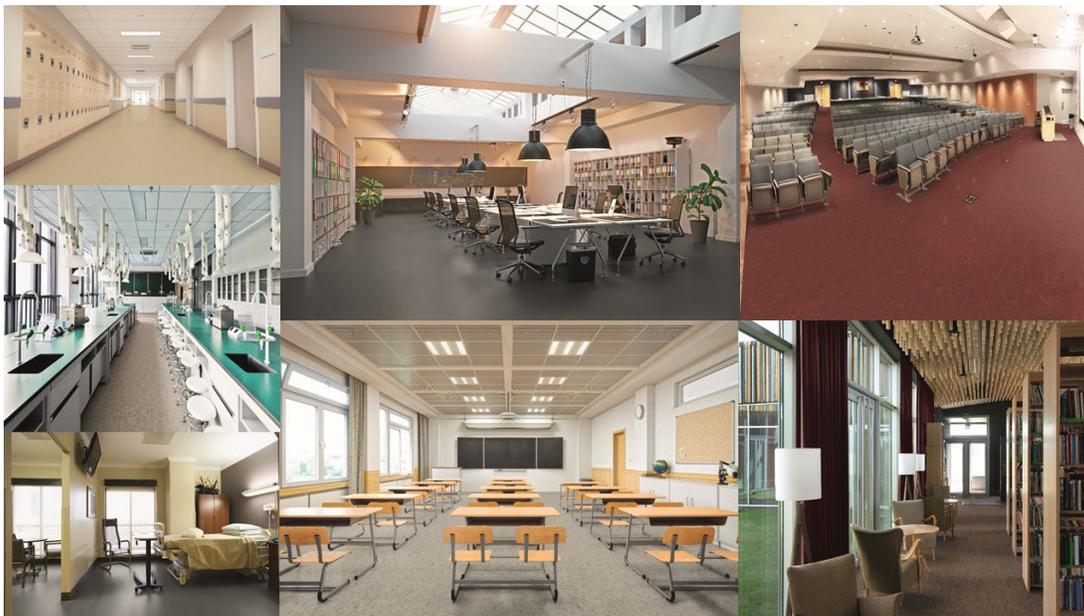


Figure 2: Product image

1.3. Application

Tarkett Lino, manufactured in accordance with ISO 24011, is designed for high traffic commercial areas, such as schools, hospitals, public offices and shops, where hygiene and high endurance standards are required. ISO 10874 defines the areas of use as follows:

Table 2: ISO 10874 areas of use

	ISO 10874	CLASSES:				
		2MM	2.5MM	3.2MM	3.8MM	4.4MM
Classification	Domestic	23	23	23	23	23
	Commercial	32	34	34	33	34
	Light industrial	41	43	43	41	42

Linosport and Ecopure products are used in sport applications. Silencio 3,8 mm is manufactured in accordance with EN 686

Acoustic Cork 4,4 mm is manufactured in accordance with EN 687. LinoWall is classified in accordance with EN 15102 to be installed onto walls in commercial application.

1.4. Declaration of Methodological Framework

The EPD analysis uses a cradle-to-grave system boundary. As such, all relevant life cycle stages and modules are included. The reference service life of the product is one year. Additional details on cut-off and allocation procedures can be found in sections 2.4 and 2.8, respectively.

1.5. Technical Requirements

Table 3: Flooring technical data

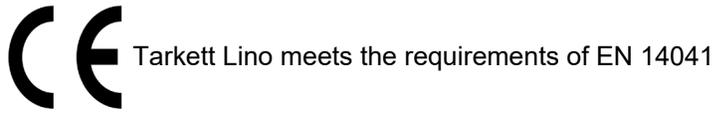
LINOLEUM FLOORING	UNIT	2MM	2.5MM	3.2MM	3.8MM	4MM	4.4MM	4.6MM
Product thickness	mm	2.0	2.5	3.2	3.8	4.0	4.4	4.6
Wear layer / surface layer thickness	mm	2.0	2.5	3.2	2.5	4.0	2.5	2.5
Product weight	g/m ²	2.40	3.00	3.90	3.45	4.80	4.60	3.80
Product form: Sheets	m (width)	2	2	2	2	2	2	2
	m (length)	≤ 32	≤ 32	≤ 32	≤ 32	≤ 28	≤ 32	≤ 32

1.6. Market Placement / Application Rules

The products covered in this EPD meet or exceed the following Technical Specifications:

ISO 24011 Specification for plain and decorative linoleum

ASTM F2034 Standard specification for linoleum sheet



EN 13501-1	Reaction to Fire	Cfl-s1
EN 13893	Slip Resistance	DS ≥ 0.30
EN 1815	Antistatic Performance	< 2kV
EN 12524	Thermal resistance	Approx. 0.015 m2 K/W (for 2,5mm)

Emission Testing

TVOC CEN/TS 16516, ISO 16000-3, ISO 16000-6, ISO 16000-9, ISO 16000-11, EN 13419

French VOC regulations A+

FloorScore CDPH/EHLB Standard Method v1.2-2017 (California Section 01350)

1.7. Material Composition

Table 4: Material composition

COMPONENT	MATERIAL	MASS (WT%)	AVAILABILITY			ORIGIN
			RENEWABLE	NON-RENEWABLE	RECYCLED	
Binder	Linseed oil	21-32	Bio based crop			Europe
	Colophony (gum rosin)	2-4	Bio based crop			Brazil / Europe
Filler	Limestone (calcium carbonate)	9-14		Abundant mineral		Italy
	Wood flour, cork flour	21-29			Bio-based waste from wood industry	Italy, Europe
Recycled linoleum*		9-10				Internal to factory
Pigments	Titanium dioxide	3-4		Limited mineral		Global
	Other pigments	0-0.2		Limited mineral		Global
Backing	Jute	7-10	Bio based crop			India / Bangladesh
	Polyurethane foam	0-15			From waste of plastic industry	Italy
Coating	Lacquer	1		Limited fossil		Italy

* The product is composed of 9-10% recycled process material, which is a combination of one or more of the following: fillers, flours,

linseed oil, pigments and other materials.

Tarkett Lino raw materials

- **Linseed Oil:** it is obtained by squeezing flax seeds. The “crude” oil obtained is then submitted to clarification and filtration treatments.
- **Colophony:** Yellow, solid and transparent remains of vegetable resins, produced by various species of pines and conifers.
- **Calcium Carbonate:** Calcium Carbonate (CaCO_3) occurs in nature, as an element, in whole or in part, of a wide range of rocks, such as marble, limestone rocks and travertine. Abundant Mineral.
- **Wood Powder:** It is obtained by the pulverization of woodworking scraps.
- **Cork Powder:** Cork is an elastic and light material obtained by the external bark of cork oaks that can be removed without any harm to the plant.
- **Linoleum Powder:** It is obtained by the pulverization of linoleum scraps, reintroduced in the productive cycle as “raw material”.
- **Titanium Dioxide:** It is a white crystalline powder whose chemical formula is TiO_2 .
- **Jute:** Jute is a vegetal textile fiber obtained by Corchorus species. It can be spun in large and strong strings thanks to its features. Typically, the length of the fiber can range from 1.2 to 3 m. About the 85% of the global production of jute takes place in Ganges delta.
- **Surface Protection:** It acts as protection of the surface and can be of polyurethane or acrylic type.
- **Foam:** Polyurethane foam that gives sound insulating characteristics to the product.

1.8. Manufacturing

Tarkett Lino is a **natural** flooring with **homogeneous one layer construction**, with design and colors through the whole the thickness and made with natural ingredient such as linseed oil, rosin, cork and wooden powders, re-processed linoleum powder, pigments and jute as support.

The main steps to produce lino are: **Oxidation / Mixing / Calendering / Curing / Finishing / Recycling**

During the **oxidation** step, a **bio-polymer** named **linoleum cement** is produced using linseed oil, rosin and calcium carbonate. The linoleum cement is an elastic and sticky material that is acting as a binder in the following production step.

During the **mixing** process, the linoleum cement is mixed with **cork** and **wooden powders**, **calcium carbonate**, **pigments** and the **recovered linoleum powder** to obtain the coloured linoleum granules.

During the **calendering** step one or more coloured linoleum granules are mixed and pressed onto a jute support, creating so a linoleum sheet.

The **curing** is the necessary process to allow linoleum to reach its mechanical properties to become a resistant flooring.

During the **finishing** step a surface protection is applied to give Tarkett Lino its unique mechanical and chemical properties.

After the final checks, Tarkett Lino is **packed into rolls**.

The **recycling** step is the process that transforms the linoleum scrap via mechanical operations of jute separation and micronisation, in raw material reused back into the production during the mixing step.

Production of linoleum flooring is carried out at Tarkett's Narni, Italy facility. Manufacturing follows the flow diagram shown in Figure 3.

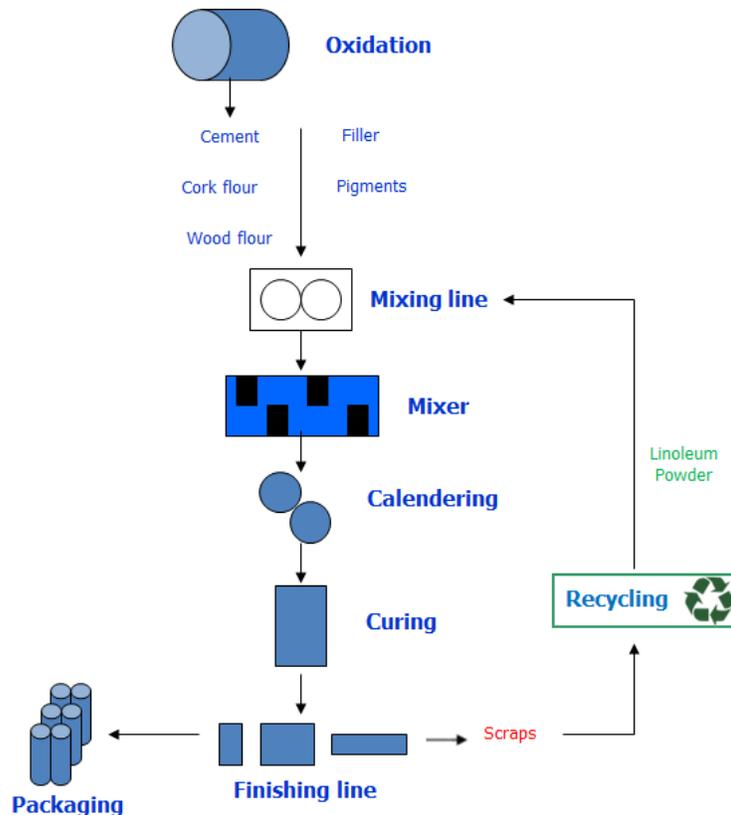


Figure 3: Diagram of production process

1.9. Packaging

Tarkett Lino rolls are wrapped into recycled cardboard cores and packed in recycled paper. The external plastic caps, to facilitate the handling, contain recycled linoleum powder. Tarkett encourages installers to recycle packaging materials in local recycling programs.

1.10. Product Installation

This study includes transportation to the construction site and flooring installation in the building.

During installation, linoleum flooring is trimmed to fit the specific application and is adhered to the subfloor. Installation requires approximately 300 g/m² adhesive. As the product is produced and delivered as a sheet, about 6% of total material is assumed to be trimmed and discarded. Tarkett has established the **ReStart®** recycling program for Lino flooring installation waste and end-of-use flooring.

1.11. Use

The service life of a linoleum flooring will vary depending on the amount of floor traffic and the type and frequency of maintenance. The level of maintenance is also dependent on the actual use and desired appearance of the floor. 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 is presented based on typical installations. This EPD accounts for dust and damp mopping within the use phase, as detailed in Table 9.

1.12. Reference Service Life and Estimated Building Service Life

The reference service life (RSL) for linoleum flooring is 1 year per the PCR (European Standards, 2017).

1.13. Reuse, Recycling, and Energy Recovery

Linoleum flooring is not reused or recycled following its removal from a building. Thus, reuse and recycling are not applicable for this product. In Europe, 30% of the product is incinerated with energy recovery at end-of-life. For other regions, the product is disposed of in a landfill.

1.14. Disposal

At end-of-life, 70% the product sold in Europe is assumed to be disposed of in a managed landfill. For other regions, 100% of the product is disposed of in a managed landfill. Further detail on product end-of-life is provided in Table 11.

2. Life Cycle Assessment Background Information

A full life cycle assessment has been carried out according to ISO 14040 (ISO, 2009) and 14044 (ISO, 2006), per the product category rules (PCR) for resilient, textile and laminate floor coverings as published by the European Committee for Standardization (European Standards, 2017).

2.1. Declared Unit

The declaration refers to the functional unit of 1m² installed floor covering. Linoleum flooring is assumed to have a reference service life of 1 year and installation losses of 6%. Installation losses are included in the reference flow.

Table 5: Functional unit information

PRODUCT	FUNCTIONAL UNIT	REFERENCE FLOW [KG]
2mm	1 m ²	2.54
2.5mm	1 m ²	3.18
3.2mm	1 m ²	4.13
3.8mm	1 m ²	3.66
4mm	1 m ²	5.09
4.4mm	1 m ²	4.88
4.6mm	1 m ²	4.03

2.2. System Boundary

The system boundary of the EPD is cradle-to-grave. As such, the analysis includes the following modules:

- Product stage: modules A1 to A3
- Construction stage: modules A4 and A5
- Use stage: modules B1 to B7
- End-of-life stage: modules C1 to C4
- Benefits and loads beyond the system boundary: module D

Each module includes provision of all relevant materials, products and energy. Potential impacts and aspects related to wastage (i.e. production, transport and waste processing and end-of-life stage of lost waste products and materials) are considered in the module in which the wastage occurs.

The use stage modules B1, B3, B4, B5, B6, and B7 are declared as having zero impact as there are no direct emissions from resilient flooring once it is installed nor is any repair or refurbishment requirements expected. The B2 module accounts for cleaning the floor (i.e., maintenance, which consists of dust mopping, damp mopping, and spray buffing). As the RSL is 1 year for the scope of this EPD, no replacements or refurbishments are required.

Module D is considered in the analysis. It represents the benefits/loads beyond the system boundary—in particular, credits from capturing methane gas from landfilling of biodegradable materials which is used for electricity generation.

Per the PCR, capital goods and infrastructure flows are assumed to not significantly affect LCA results or conclusions and thus are excluded from the analysis.

Table 6. Description of the system boundary modules

	PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE						END OF LIFE STAGE				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 supply	Transport	Manufacturing	Transport from gate to site	Assembly/Install	Use	Maintenance	Repair	Replacement	Refurbishment	Building Operational Energy Use During Product Use	Building Operational Water Use During Product Use	Deconstruction	Transport	Waste processing	Disposal	Reuse, Recovery, Recycling Potential
EPD Type: Cradle-to-grave	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

2.3. Estimates and Assumptions

Distribution of the product to the installation site is estimated and varies by the region of use. Distribution takes place via cargo ship and diesel-powered truck and is detailed in Table 7. Product transport from building site to waste processing is assumed to be 161 km (100 miles) by diesel-powered truck. The same assumption is used for transporting deconstructed product at end-of-life.



2.4. Cut-off Criteria

Data were included whenever available. If it was necessary to exclude materials in order to facilitate the analysis, only flows representing less than 1% of the cumulative mass of a unit process were excluded, providing their environmental relevance was not a concern.

Packaging of incoming raw materials (e.g., pallets, totes, super-sacks) are excluded as they represent less than 1% of the product mass and are not expected to contribute significantly to the results per functional unit.

2.5. Data Sources

As a general rule, specific data derived from specific production processes or average data derived from specific production processes were the first choice as a basis for calculating LCA results.

For life cycle modeling of the considered products, the GaBi Software System for Life Cycle Engineering, developed and maintained by Sphera, was used to model the product systems considered in this assessment. All relevant background datasets were taken from the GaBi 2019 software database (service pack 39). The datasets from the GaBi database are documented in the online documentation (Sphera, 2019). To maximize comparability of results within the LCA, GaBi background data were used for energy, transportation, and auxiliary materials.

2.6. Data Quality

A variety of tests and checks were performed throughout the project to ensure high quality of the completed LCA. Checks included an extensive review of project specific LCA models as well as the background data used.

Temporal Coverage

Foreground data represent a continuous 12-month period during the 2018 calendar year. Background datasets are all based on data from the last 8 years, with the majority of datasets based on data from 2016 or later.

Geographical Coverage

This background LCA represents Tarkett products produced in Narni, Italy. Primary data are representative of this country.

Regionally specific datasets were used to represent the manufacturing location's energy consumption. Proxy datasets were used as needed for raw material inputs to address lack of data for a specific material or for a specific geographical region. These proxy datasets were chosen for their technological representativeness of the actual materials.

Technological Coverage

Data on material composition and manufacturing processes are primary data from Tarkett. The raw material inputs in the calculation for this LCA are based on data received from Tarkett. Waste, emissions and energy use are calculated from reported annual production during the reference year.

2.7. Period under Review

Primary data were collected for production during 2018. This analysis is intended to represent production in 2018.

2.8. Allocation

No multi-output (i.e., co-product) allocation was performed in the foreground of this study.

Allocation of background data (energy and materials) taken from the GaBi 2019 database is documented online at

<http://www.gabi-software.com/support/gabi/gabi-database-2019-lci-documentation/>.

2.9. Comparability

No comparisons or benchmarking is included in this EPD.

LCA results across EPDs can be calculated with different background databases, modeling assumptions, geographic scope and time periods, all of which are valid and acceptable according to the Product Category Rules (PCR) and ISO standards. Caution should be used when attempting to compare EPD results

3. Life Cycle Assessment

Assumptions are provided in this section, per PCR requirements (European Standards, 2017).

Table 7 details module A4 transportation inputs for the product.

Table 7: Transport to the building site

PARAMETER		UNIT	EUROPE	ASIA	NORTH AMERICA	SOUTH AMERICA
Truck	Diesel consumption	L(km-kg)	2.09E-5	2.09E-5	2.09E-5	2.09E-5
	Distance	km	2,000	4,000	2,300	2,000
	Volume capacity utilization factor	-	1	1	1	1
Ship	Fuel oil consumption	kg/(km-kg)	2.30E-6	2.30E-6	2.30E-6	2.30E-6
	Distance	km	0	15,000	9,000	9,300
	Volume capacity utilization factor	-	1	1	1	1
Capacity utilization (including empty returns)		%	100	100	100	100

Table 8 details inputs and assumptions for product installation.

Table 8: Installation of the product in the building

PARAMETER	UNIT	VALUE
Adhesive	g/m ²	300
Product loss	%	6%

Table 9 details cleaning process assumptions and cleaning process inputs as calculated based on the assumptions.

Table 9: Use stage related to the building fabric (maintenance stage, B2)

PARAMETER	UNIT	DUST MOP	DAMP MOP / NEUTRAL CLEANER
Cleaning and maintenance cycle	Number/year	104	72
Detergent	kg/(m ² -yr)	-	0,1044
Resulting waste material	kg/(m ² -yr)	-	-
Net fresh water consumption	L/(m ² -yr)	-	1,098
Energy input	kWh/(m ² -yr)	0,12	0,2282

Table 10 describes the product's reference service life.

Table 10: Reference service life

PARAMETER	UNITS	VALUE
Reference service life	years	1
Declared product properties and finishes (use class in accordance with EN ISO 10874)	N/A	See Table 2
Recommended relative humidity in the room	Relative Humidity (%)	35-65%
Usage conditions (e.g. frequency of use, mechanical exposure)	N/A	See Table 2

Table 11 details end-of-life processes for the product.

Table 11: End of life

PROCESS	PARAMETER	UNITS	EUROPE	ASIA	NORTH AMERICA	SOUTH AMERICA
Collection	Separated	%	0%	0%	0%	0%
	With mixed construction waste	%	100%	100%	100%	100%
	Re-use	%	0%	0%	0%	0%
Recovery	Recycling	%	0%	0%	0%	0%
	Energy recovery	%	30%	0%	0%	0%
Disposal	Landfill	%	70%	100%	100%	100%

PROCESS	PARAMETER	UNITS	EUROPE	ASIA	NORTH AMERICA	SOUTH AMERICA
	Incineration (no energy recovery)	%	0%	0%	0%	0%
Transportation		km	160	160	160	160

4. Life Cycle Assessment Results

Table 12 through Table 32 contain cradle-to-grave results for 1m² of flooring over the 1-year reference service life. Modules B1, B3, B4, B5, B6, and B7 are declared as zero per the PCR (European Standards, 2017). Furthermore, modules C1 and C3 are likewise not associated with any impact as the floor is manually deconstructed and not recycled. In interest of space and table readability, these modules are not included in the results below. Modules or indicators marked “--” denote an impact of zero in Table 12 through Table 32.

4.1. Life Cycle Impact Assessment Results

2 mm Linoleum

Table 12. Impact assessment results for 1m² of 2mm linoleum

CML, APRIL 2016	UNIT	A1-A3	A4	A5	B2	C2	C4	D
GWP 100, total	[kg CO ₂ -eq.]	2.99E-01	3.74E-01	2.22E-01	2.34E-01	7.26E-03	3.20E+00	-1.06E+00
ODP	[kg CFC-11-eq.]	1.49E-12	7.74E-17	4.93E-13	8.28E-16	7.28E-19	6.81E-16	-2.78E-15
AP	[kg SO ₂ -eq.]	2.19E-02	2.50E-03	1.93E-03	3.42E-04	1.77E-05	1.17E-03	-1.18E-03
EP	[kg PO ₄ ³⁻ -eq.]	9.73E-03	4.73E-04	6.90E-04	4.81E-05	5.06E-06	2.76E-04	-1.65E-04
POCP	[kg ethene-eq.]	9.85E-04	-4.61E-04	1.09E-04	3.95E-05	-1.35E-06	7.72E-05	-1.12E-04
ADP _{elements}	[kg Sb-eq.]	2.61E-06	2.68E-08	2.24E-07	9.72E-08	1.46E-09	4.22E-08	-4.07E-07
ADP _{fossil}	[MJ]	4.73E+01	5.04E+00	1.13E+01	3.37E+00	1.08E-01	1.23E+00	-1.54E+01

2.5 mm Linoleum

Table 13. Impact assessment results for 1m² of 2.5mm linoleum

CML, APRIL 2016	UNIT	A1-A3	A4	A5	B2	C2	C4	D
GWP 100, total	[kg CO ₂ -eq.]	-6.00E-01	4.46E-01	1.72E-01	2.34E-01	9.09E-03	4.00E+00	-1.32E+00
ODP	[kg CFC-11-eq.]	1.86E-12	9.47E-17	5.15E-13	8.28E-16	9.12E-19	8.51E-16	-3.47E-15
AP	[kg SO ₂ -eq.]	2.77E-02	3.04E-03	2.31E-03	3.42E-04	2.22E-05	1.46E-03	-1.47E-03
EP	[kg PO ₄ ³⁻ -eq.]	1.22E-02	5.74E-04	8.45E-04	4.81E-05	6.34E-06	3.45E-04	-2.06E-04
POCP	[kg ethene-eq.]	1.24E-03	-5.07E-04	1.22E-04	3.95E-05	-1.69E-06	9.65E-05	-1.40E-04
ADP _E	[kg Sb-eq.]	3.25E-06	3.83E-08	2.63E-07	9.72E-08	1.83E-09	5.27E-08	-5.07E-07
ADP _F	[MJ]	4.33E+01	6.04E+00	1.12E+01	3.37E+00	1.36E-01	1.54E+00	-1.92E+01

3.2 mm Linoleum

Table 14. Impact assessment results for 1m² of 3.2mm linoleum

CML, APRIL 2016	UNIT	A1-A3	A4	A5	B2	C2	C4	D
GWP 100, total	[kg CO ₂ -eq.]	4.83E-01	4.85E-01	2.39E-01	2.34E-01	1.34E-02	4.96E+00	-1.63E+00
ODP	[kg CFC-11-eq.]	2.41E-12	1.21E-16	5.48E-13	8.28E-16	1.34E-18	1.08E-15	-4.33E-15
AP	[kg SO ₂ -eq.]	3.55E-02	2.07E-03	2.72E-03	3.42E-04	3.27E-05	1.84E-03	-1.82E-03
EP	[kg PO ₄ ³⁻ -eq.]	1.57E-02	5.20E-04	1.05E-03	4.81E-05	9.33E-06	4.32E-04	-2.55E-04
POCP	[kg ethene-eq.]	1.59E-03	-7.50E-04	1.28E-04	3.95E-05	-2.48E-06	1.22E-04	-1.73E-04
ADP _E	[kg Sb-eq.]	4.22E-06	4.29E-08	3.22E-07	9.72E-08	2.70E-09	6.86E-08	-6.28E-07
ADP _F	[MJ]	7.66E+01	6.61E+00	1.32E+01	3.37E+00	2.00E-01	2.04E+00	-2.37E+01

3.8 mm Linoleum

Table 15. Impact assessment results for 1m² of 3.8mm linoleum

CML, APRIL 2016	UNIT	A1-A3	A4	A5	B2	C2	C4	D
GWP 100, total	[kg CO ₂ -eq.]	2.36E+00	4.35E-01	3.49E-01	2.34E-01	1.17E-02	4.41E+00	-1.45E+00
ODP	[kg CFC-11-eq.]	2.64E-12	1.07E-16	5.62E-13	8.28E-16	1.17E-18	9.60E-16	-3.85E-15
AP	[kg SO ₂ -eq.]	3.20E-02	1.99E-03	2.50E-03	3.42E-04	2.85E-05	1.63E-03	-1.62E-03
EP	[kg PO ₄ ³⁻ -eq.]	1.24E-02	4.78E-04	8.51E-04	4.81E-05	8.15E-06	3.83E-04	-2.27E-04
POCP	[kg ethene-eq.]	1.73E-03	-6.50E-04	1.42E-04	3.95E-05	-2.17E-06	1.09E-04	-1.54E-04
ADP _{elements}	[kg Sb-eq.]	5.16E-06	3.88E-08	3.78E-07	9.72E-08	2.36E-09	6.07E-08	-5.59E-07
ADP _{fossil}	[MJ]	1.05E+02	5.93E+00	1.49E+01	3.37E+00	1.74E-01	1.80E+00	-2.11E+01

4 mm Linoleum

Table 16. Impact assessment results for 1m² of 4mm linoleum

CML, APRIL 2016	UNIT	A1-A3	A4	A5	B2	C2	C4	D
GWP 100, total	[kg CO ₂ -eq.]	5.94E-01	5.94E-01	2.53E-01	2.34E-01	1.65E-02	6.10E+00	-2.01E+00
ODP	[kg CFC-11-eq.]	2.96E-12	1.49E-16	5.81E-13	8.28E-16	1.65E-18	1.33E-15	-5.33E-15
AP	[kg SO ₂ -eq.]	4.36E-02	2.51E-03	3.23E-03	3.42E-04	4.03E-05	2.26E-03	-2.24E-03
EP	[kg PO ₄ ³⁻ -eq.]	1.93E-02	6.35E-04	1.28E-03	4.81E-05	1.15E-05	5.31E-04	-3.13E-04
POCP	[kg ethene-eq.]	1.96E-03	-9.22E-04	1.40E-04	3.95E-05	-3.06E-06	1.51E-04	-2.13E-04
ADP _{elements}	[kg Sb-eq.]	5.19E-06	5.28E-08	3.81E-07	9.72E-08	3.33E-09	8.45E-08	-7.72E-07
ADP _{fossil}	[MJ]	9.41E+01	8.10E+00	1.43E+01	3.37E+00	2.46E-01	2.51E+00	-2.92E+01

4.4 mm Linoleum

Table 17. Impact assessment results for 1m² of 4.4mm linoleum

CML, APRIL 2016	UNIT	A1-A3	A4	A5	B2	C2	C4	D
GWP 100, total	[kg CO ₂ -eq.]	-4.13E-01	4.96E-01	1.86E-01	2.34E-01	1.37E-02	5.09E+00	-1.67E+00
ODP	[kg CFC-11-eq.]	1.72E-12	1.24E-16	5.07E-13	8.28E-16	1.38E-18	1.11E-15	-4.44E-15
AP	[kg SO ₂ -eq.]	2.86E-02	2.09E-03	2.31E-03	3.42E-04	3.36E-05	1.88E-03	-1.87E-03
EP	[kg PO ₄ ³⁻ -eq.]	1.17E-02	5.30E-04	8.09E-04	4.81E-05	9.59E-06	4.42E-04	-2.61E-04
POCP	[kg ethene-eq.]	1.37E-03	-7.69E-04	1.14E-04	3.95E-05	-2.55E-06	1.25E-04	-1.77E-04
ADP _{elements}	[kg Sb-eq.]	3.23E-06	4.40E-08	2.63E-07	9.72E-08	2.77E-09	7.04E-08	-6.44E-07
ADP _{fossil}	[MJ]	6.85E+01	6.76E+00	1.27E+01	3.37E+00	2.05E-01	2.09E+00	-2.43E+01

4.6 mm Linoleum

Table 18. Impact assessment results for 1m² of 4.6mm linoleum

CML, APRIL 2016	UNIT	A1-A3	A4	A5	B2	C2	C4	D
GWP 100, total	[kg CO ₂ -eq.]	2.59E+00	1.10E+00	4.03E-01	2.34E-01	4.35E-02	1.68E-01	-2.18E-02
ODP	[kg CFC-11-eq.]	2.90E-12	1.19E-16	5.78E-13	8.28E-16	4.36E-18	6.09E-16	-7.46E-16
AP	[kg SO ₂ -eq.]	3.52E-02	1.73E-02	3.61E-03	3.42E-04	1.06E-04	7.05E-04	-4.23E-05
EP	[kg PO ₄ ³⁻ -eq.]	1.37E-02	2.30E-03	1.04E-03	4.81E-05	3.04E-05	9.26E-05	-4.61E-06
POCP	[kg ethene-eq.]	1.90E-03	6.01E-04	2.28E-04	3.95E-05	-8.08E-06	5.97E-05	-3.05E-06
ADP _{elements}	[kg Sb-eq.]	5.68E-06	1.38E-07	4.15E-07	9.72E-08	8.78E-09	6.90E-08	-8.86E-09
ADP _{fossil}	[MJ]	1.16E+02	1.50E+01	1.61E+01	3.37E+00	6.50E-01	2.60E+00	-2.92E-01

4.2. Life Cycle Inventory Results

2 mm Linoleum

Table 19. Resource use for 1m² of 2mm linoleum

PARAMETER	UNIT	A1-A3	A4	A5	B2	C2	C4	D
RPR _E	MJ, LHV	8.90E+00	2.20E-01	6.45E-02	5.08E-01	3.37E-03	1.68E-01	-1.52E+00
RPR _M	MJ, LHV	3.02E+01	0.00E+00	1.81E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RPR _{total}	MJ, LHV	3.91E+01	2.20E-01	1.88E+00	5.08E-01	3.37E-03	1.68E-01	-1.52E+00
NRPR _E	MJ, LHV	4.40E+01	5.06E+00	1.10E+01	4.11E+00	1.09E-01	1.36E+00	-1.75E+01
NRPR _M	MJ, LHV	5.41E+00	0.00E+00	3.25E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, LHV	4.94E+01	5.06E+00	1.13E+01	4.11E+00	1.09E-01	1.36E+00	-1.75E+01
SM	kg	--	--	--	--	--	--	--
RSF	MJ, LHV	--	--	--	--	--	--	--
NRSF	MJ, LHV	--	--	--	--	--	--	--
FW	m ³	5.50E-02	3.83E-04	4.58E-03	1.32E-03	1.31E-05	7.29E-03	-3.42E-03

Table 20. Output flows and waste categories for 1m² of 2mm linoleum

PARAMETER	UNIT	A1-A3	A4	A5	B2	C2	C4	D
HWD	kg	1.62E-07	2.00E-07	3.57E-08	1.78E-09	8.83E-10	2.22E-09	-7.00E-09
NHWD	kg	3.75E-01	3.15E-04	3.76E-02	2.51E-03	4.11E-06	6.58E-01	-4.46E-03
RW	kg	--	--	--	--	--	--	--
CRU	kg	--	--	--	--	--	--	--
MFR	kg	0.00E+00	0.00E+00	1.29E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	kg	--	--	--	--	--	--	--
EE	MJ, LHV	1.00E-01	0.00E+00	4.59E-02	0.00E+00	0.00E+00	1.00E+01	0.00E+00

2.5 mm Linoleum

Table 21. Resource use for 1m² of 2.5mm linoleum

PARAMETER	UNIT	A1-A3	A4	A5	B2	C2	C4	D
RPR _E	MJ, LHV	1.68E+01	2.88E-01	9.46E-02	5.08E-01	4.22E-03	2.10E-01	-1.89E+00
RPR _M	MJ, LHV	3.77E+01	0.00E+00	2.26E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RPR _{total}	MJ, LHV	5.45E+01	2.88E-01	2.36E+00	5.08E-01	4.22E-03	2.10E-01	-1.89E+00
NRPR _E	MJ, LHV	3.91E+01	6.07E+00	1.07E+01	4.11E+00	1.36E-01	1.70E+00	-2.18E+01
NRPR _M	MJ, LHV	6.75E+00	0.00E+00	4.05E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, LHV	4.59E+01	6.07E+00	1.11E+01	4.11E+00	1.36E-01	1.70E+00	-2.18E+01
SM	kg	--	--	--	--	--	--	--
RSF	MJ, LHV	--	--	--	--	--	--	--
NRSF	MJ, LHV	--	--	--	--	--	--	--
FW	m ³	6.97E-02	5.24E-04	5.47E-03	1.32E-03	1.64E-05	9.11E-03	-4.26E-03

Table 22. Output flows and waste categories for 1m² of 2.5mm linoleum

PARAMETER	UNIT	A1-A3	A4	A5	B2	C2	C4	D
HWD	kg	2.13E-07	2.54E-07	4.20E-08	1.78E-09	1.11E-09	2.77E-09	-8.74E-09
NHWD	kg	4.71E-01	4.06E-04	4.33E-02	2.51E-03	5.14E-06	8.24E-01	-5.57E-03
RW	kg	--	--	--	--	--	--	--
CRU	kg	--	--	--	--	--	--	--
MFR	kg	0.00E+00	0.00E+00	1.29E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	kg	--	--	--	--	--	--	--
EE	MJ, LHV	1.25E-01	0.00E+00	4.74E-02	0.00E+00	0.00E+00	1.25E+01	0.00E+00

3.2 mm Linoleum

Table 23. Resource use for 1m² of 3.2mm linoleum

PARAMETER	UNIT	A1-A3	A4	A5	B2	C2	C4	D
RPR _E	MJ, LHV	1.44E+01	3.93E-01	-7.15E-01	5.08E-01	6.21E-03	2.70E-01	-2.35E+00
RPR _M	MJ, LHV	4.89E+01	0.00E+00	2.93E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RPR _{total}	MJ, LHV	6.33E+01	3.93E-01	2.22E+00	5.08E-01	6.21E-03	2.70E-01	-2.35E+00
NRPR _E	MJ, LHV	7.11E+01	6.64E+00	1.25E+01	4.11E+00	2.01E-01	2.24E+00	-2.70E+01
NRPR _M	MJ, LHV	8.75E+00	0.00E+00	5.25E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, LHV	7.98E+01	6.64E+00	1.30E+01	4.11E+00	2.01E-01	2.24E+00	-2.70E+01
SM	kg	--	--	--	--	--	--	--
RSF	MJ, LHV	--	--	--	--	--	--	--
NRSF	MJ, LHV	--	--	--	--	--	--	--
FW	m ³	8.90E-02	6.62E-04	6.63E-03	1.32E-03	2.41E-05	1.13E-02	-5.28E-03

Table 24. Output flows and waste categories for 1m² of 3.2mm linoleum

PARAMETER	UNIT	A1-A3	A4	A5	B2	C2	C4	D
HWD	kg	2.63E-07	3.67E-07	5.18E-08	1.78E-09	1.63E-09	3.89E-09	-1.08E-08
NHWD	kg	6.06E-01	5.57E-04	5.15E-02	2.51E-03	7.57E-06	1.21E+00	-6.90E-03
RW	kg	--	--	--	--	--	--	--
CRU	kg	--	--	--	--	--	--	--
MFR	kg	0.00E+00	0.00E+00	1.29E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	kg	--	--	--	--	--	--	--
EE	MJ, LHV	1.62E-01	0.00E+00	4.96E-02	0.00E+00	0.00E+00	1.55E+01	0.00E+00

3.8 mm Linoleum

Table 25. Resource use for 1m² of 3.8mm linoleum

PARAMETER	UNIT	A1-A3	A4	A5	B2	C2	C4	D
RPR _E	MJ, LHV	1.45E+01	3.48E-01	2.11E-02	5.08E-01	5.42E-03	2.39E-01	-2.09E+00
RPR _M	MJ, LHV	3.67E+01	0.00E+00	2.20E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RPR _{total}	MJ, LHV	5.11E+01	3.48E-01	2.22E+00	5.08E-01	5.42E-03	2.39E-01	-2.09E+00
NRPR _E	MJ, LHV	8.29E+01	5.96E+00	1.21E+01	4.11E+00	1.75E-01	1.98E+00	-2.40E+01
NRPR _M	MJ, LHV	2.72E+01	0.00E+00	1.63E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, LHV	1.10E+02	5.96E+00	1.37E+01	4.11E+00	1.75E-01	1.98E+00	-2.40E+01
SM	kg	--	--	--	--	--	--	--
RSF	MJ, LHV	--	--	--	--	--	--	--
NRSF	MJ, LHV	--	--	--	--	--	--	--
FW	m ³	8.04E-02	5.90E-04	6.12E-03	1.32E-03	2.10E-05	1.00E-02	-4.70E-03

Table 26. Output flows and waste categories for 1m² of 3.8mm linoleum

PARAMETER	UNIT	A1-A3	A4	A5	B2	C2	C4	D
HWD	kg	2.22E-07	3.22E-07	4.66E-08	1.78E-09	1.42E-09	3.41E-09	-9.63E-09
NHWD	kg	5.16E-01	4.91E-04	4.60E-02	2.51E-03	6.61E-06	1.05E+00	-6.14E-03
RW	kg	--	--	--	--	--	--	--
CRU	kg	--	--	--	--	--	--	--
MFR	kg	0.00E+00	0.00E+00	1.29E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	kg	--	--	--	--	--	--	--
EE	MJ, LHV	1.43E-01	0.00E+00	4.85E-02	0.00E+00	0.00E+00	1.38E+01	0.00E+00

4 mm Linoleum

Table 27. Resource use for 1m² of 4mm linoleum

PARAMETER	UNIT	A1-A3	A4	A5	B2	C2	C4	D
RPR _E	MJ, LHV	1.77E+01	4.84E-01	-1.18E+00	5.08E-01	7.66E-03	3.32E-01	-2.89E+00
RPR _M	MJ, LHV	6.01E+01	0.00E+00	3.61E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RPR _{total}	MJ, LHV	7.78E+01	4.84E-01	2.42E+00	5.08E-01	7.66E-03	3.32E-01	-2.89E+00
NRPR _E	MJ, LHV	8.74E+01	8.14E+00	1.34E+01	4.11E+00	2.48E-01	2.75E+00	-3.32E+01
NRPR _M	MJ, LHV	1.08E+01	0.00E+00	6.45E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, LHV	9.82E+01	8.14E+00	1.41E+01	4.11E+00	2.48E-01	2.75E+00	-3.32E+01
SM	kg	--	--	--	--	--	--	--
RSF	MJ, LHV	--	--	--	--	--	--	--
NRSF	MJ, LHV	--	--	--	--	--	--	--
FW	m ³	1.09E-01	8.15E-04	7.87E-03	1.32E-03	2.97E-05	1.39E-02	-6.50E-03

Table 28. Output flows and waste categories for 1m² of 4mm linoleum

PARAMETER	UNIT	A1-A3	A4	A5	B2	C2	C4	D
HWD	kg	3.23E-07	4.52E-07	6.05E-08	1.78E-09	2.01E-09	4.79E-09	-1.33E-08
NHWD	kg	7.46E-01	6.86E-04	5.98E-02	2.51E-03	9.33E-06	1.49E+00	-8.49E-03
RW	kg	--	--	--	--	--	--	--
CRU	kg	--	--	--	--	--	--	--
MFR	kg	0.00E+00	0.00E+00	1.29E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	kg	--	--	--	--	--	--	--
EE	MJ, LHV	1.99E-01	0.00E+00	5.18E-02	0.00E+00	0.00E+00	1.91E+01	0.00E+00

4.4 mm Linoleum

Table 29. Resource use for 1m² of 4.4mm linoleum

PARAMETER	UNIT	A1-A3	A4	A5	B2	C2	C4	D
RPR _E	MJ, LHV	4.29E+01	4.04E-01	1.94E+00	5.08E-01	6.38E-03	2.77E-01	-2.41E+00
RPR _M	MJ, LHV	3.32E+01	0.00E+00	1.99E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RPR _{total}	MJ, LHV	7.60E+01	4.04E-01	3.93E+00	5.08E-01	6.38E-03	2.77E-01	-2.41E+00
NRPR _E	MJ, LHV	6.49E+01	6.79E+00	1.23E+01	4.11E+00	2.06E-01	2.29E+00	-2.76E+01
NRPR _M	MJ, LHV	6.29E+00	0.00E+00	3.77E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, LHV	7.12E+01	6.79E+00	1.27E+01	4.11E+00	2.06E-01	2.29E+00	-2.76E+01
SM	kg	--	--	--	--	--	--	--
RSF	MJ, LHV	--	--	--	--	--	--	--
NRSF	MJ, LHV	--	--	--	--	--	--	--
FW	m ³	8.07E-02	6.80E-04	6.14E-03	1.32E-03	2.47E-05	1.16E-02	-5.42E-03

Table 30. Output flows and waste categories for 1m² of 4.4mm linoleum

PARAMETER	UNIT	A1-A3	A4	A5	B2	C2	C4	D
HWD	kg	1.97E-07	3.77E-07	4.84E-08	1.78E-09	1.67E-09	3.99E-09	-1.11E-08
NHWD	kg	4.79E-01	5.72E-04	4.38E-02	2.51E-03	7.78E-06	1.24E+00	-7.08E-03
RW	kg	--	--	--	--	--	--	--
CRU	kg	--	--	--	--	--	--	--
MFR	kg	0.00E+00	0.00E+00	1.29E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	kg	--	--	--	--	--	--	--
EE	MJ, LHV	1.66E-01	0.00E+00	4.99E-02	0.00E+00	0.00E+00	1.59E+01	0.00E+00

4.6 mm Linoleum

Table 31. Resource use for 1m² of 4.6mm linoleum

PARAMETER	UNIT	A1-A3	A4	A5	B2	C2	C4	D
RPR _E	MJ, LHV	1.59E+01	3.08E-01	-1.15E-01	5.08E-01	2.02E-02	2.03E-01	-1.55E-01
RPR _M	MJ, LHV	4.04E+01	0.00E+00	2.42E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RPR _{total}	MJ, LHV	5.63E+01	3.08E-01	2.31E+00	5.08E-01	2.02E-02	2.03E-01	-1.55E-01
NRPR _E	MJ, LHV	9.13E+01	1.51E+01	1.29E+01	4.11E+00	6.53E-01	2.67E+00	-3.28E-01
NRPR _M	MJ, LHV	2.99E+01	0.00E+00	1.79E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, LHV	1.21E+02	1.51E+01	1.47E+01	4.11E+00	6.53E-01	2.67E+00	-3.28E-01
SM	kg	--	--	--	--	--	--	--
RSF	MJ, LHV	--	--	--	--	--	--	--
NRSF	MJ, LHV	--	--	--	--	--	--	--
FW	m ³	8.85E-02	1.16E-03	6.64E-03	1.32E-03	7.84E-05	3.17E-04	-1.52E-04

Table 32. Output flows and waste categories for 1m² of 4.6mm linoleum

PARAMETER	UNIT	A1-A3	A4	A5	B2	C2	C4	D
HWD	kg	2.45E-07	7.68E-08	3.32E-08	1.78E-09	5.30E-09	9.34E-09	-2.15E-10
NHWD	kg	5.68E-01	3.90E-04	4.91E-02	2.51E-03	2.46E-05	3.81E+00	-2.89E-04
RW	kg	--	--	--	--	--	--	--
CRU	kg	--	--	--	--	--	--	--
MFR	kg	0.00E+00	0.00E+00	1.29E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	kg	--	--	--	--	--	--	--
EE	MJ, LHV	1.58E-01	0.00E+00	4.94E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00

5. LCA Interpretation

The results, represent the cradle-to-grave environmental performance of 1 m² of installed linoleum flooring products over a 1-year RSL. These results are consistent with resilient linoleum flooring characteristics. Linoleum products tend to see raw material sourcing (A1) as a significant contributor to impact in most categories, which is primarily driven by the production of linseed oil. Manufacturing (A3) tends to be the second greatest contributor to impact in most categories, and is primarily driven by the consumption of natural gas at the facility site. Tarkett's 2.5mm product has a lower manufacturing impact than Tarkett's other products because it is dried in biomass-heated ovens where the other products are dried in natural gas-heated ovens. The use stage (B2) has observed a notable contribution to most impact categories. This is due to maintenance and cleaning of floor which consists of dust mopping, damp mopping, and spray buffing. Disposal (C4) also has a significant contribution to GWP. This is due to the embodied biogenic carbon within the product being released upon incineration. Products that are sold predominantly outside of Europe, such as the 4.6mm thickness, are not incinerated and therefore do not release their biogenic carbon content at end-of-life.

Despite large travel distances of some raw materials, the inbound transportation module (A2) has a modest contribution to overall impact. Other transportation modules representing transport to installation site (A4) and transport to end-of-life (C2) show negligible contributions to impact category indicator results.

6. Additional Environmental Information

6.1. Mandatory Environmental Information

This product contains no substances listed in the Candidate List of Substances of Very High Concern at levels that exceed the limits required for registration with the European Chemicals Agency (European Chemicals Agency, 2019).

6.2. Extraordinary Effects

Prevention of Structural Damage

If other building activities are still in progress, newly laid floor covering should be covered and protected with a suitable non-staining protective covering.

Clean the floorcovering regularly, as this is more cost-effective and hygienic than occasional heavy-duty cleaning.

Remove immediately sand from the surface as it will have an abrasive effect on the surface of the flooring.

Always follow dosage instructions carefully.

Wipe up any grease and spilt oil immediately, as they may damage the surface.

Resilient floors are damaged by solvents.

A prolonged contact with black rubber wheels and rubber feet can discolour the floorcovering.

Furniture should be fitted with soft pads. The feet of the chairs must be not abrasive or have sharp edges and has to be covered with soft or polyurethane pads and they must be regularly cleaned, checked and replaced.

Chair castors of type "W" must be used in accordance with EN 12529.

The slipperiness of the floor covering is affected by the quantity of dirt and by the frequency and the materials used for



According to ISO 14025,
EN 15804 and ISO 21930:2017

cleaning. Safety and Hygiene issues can arise if the cleaning activity is reduced.
Remember that light colours need more frequent cleaning.

6.3. Environmental Activities and Certifications

Driven by the standards of our **World Class Manufacturing** program for continuous improvement of processes, we reduce our operational impact and preserve the environment.

- 100% recycled /recirculated industrial water (closed-loop).
- Rainwater collection and re-use.
- Green House Gases (GHG) emission reduction by 60% vs 2010 (the equivalent of 1000 trips around the world in a passenger car).
- Producing electricity, heating and cooling power from a single device (a gas engine) to increase energy efficiency in a profitable and sustainable way (34% self-produced energy).
- Increasing renewable energy use through photovoltaic panels, a biomass boiler and a geothermal system (internal production) and the purchase of 100% renewable electricity.

Accreditations

ISO 9001 Quality Management System

ISO 14001 Environmental Management System

ISO 50001 Energy Management System

ISO 45001 Occupational Health and Safety Management System

SA 8000 Social Accountability

ISO 37001 Anti-Bribery Management Systems

C2C Cradle to Cradle Silver and Gold levels

Declare

Der Blaue Engel

Umweltzeichen

Nordic Ecolabel SWAN

Allergy UK Seal of Approval

MHS Material Health Statement

100% Carbon Biobased ASTM D 6866:2020-02

76% Biobased EN 16785-1:2016-03



According to ISO 14025,
EN 15804 and ISO 21930:2017

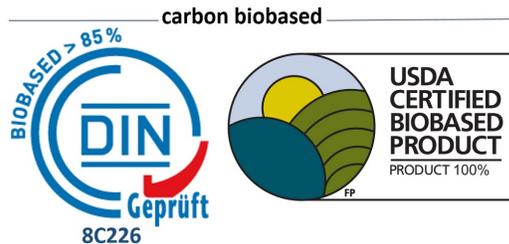
All our linoleum products are eligible for LEED v4 credits. For more information:
<http://www.c2ccertified.org/products/registry>



*Information sur le niveau d'émission de substances volatiles dans l'air intérieur, présentant un risque de toxicité par inhalation, sur une échelle de classe allant de A+ (très faibles émissions) à C (fortes émissions).



Declare.



7. References

European Chemicals Agency. (2019). Candidate List of substances of very high concern for Authorisation. Retrieved from ECHA: <https://echa.europa.eu/candidate-list-table>

European Standards. (2013). EN 15804+A1 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products.

European Standards. (2017). EN 16810: Resilient, textile and laminate floor coverings - Environmental product declarations - Product category rules. Brussels: European Committee for Standardization.

Guinée, J. B., Gorée, M., Heijungs, R., Huppes, G., Kleijn, R., de Koning, A., . . . Huijbregts, M. (2002). Handbook on life cycle assessment. Operational guide to the ISO standards. Dordrecht: Kluwer.

ISO. (2006). ISO 14044: Environmental management - Life cycle assessment - Requirements and guidelines.

ISO. (2009). ISO 14040: Environmental management - Life cycle assessment - principles and frameworks.

ISO. (2011). ISO 14025: Environmental labels and declarations - Type III environmental declarations - principles and procedures.

Sphera. (). GaBi: Software system and database for life cycle engineering. Stuttgart, Echterdingen, Germany.

UL Environment. (2020). Program Operator Rules v 2.5.



LINOLEUM FLOORING



According to ISO 14025,
EN 15804 and ISO 21930:2017

8. Contact Information

8.1. Study Commissioner



Tarkett S.P.A.
Strada Sant'Anna n. 6
05035 Narni Scalo (TR) Italy
+39 0744 755 271
<https://www.tarkett.com/>

8.2. LCA Practitioner



130 East Randolph St,
Suite 1900
Chicago, IL 60601 USA
(312) 796-7160
www.sphera.com

