

Environmental and Health Statement (EHS)

PRODUCT

Linoleum, Narni (Italy)

Issued to

Tarkett

For the Products

Linoleum / Linosom ; Silencio xf²18/ Linosom Silencio xf²18 /Acoustic xf² 18, Ecopure xf² ; Veneto Essenza 100% linen/Natural Clay (Styles: Elafono, Linosom Elafono, Harmonium xf², Veneto xf², Etrusco, Style Elle, Lenza xf², Style Emme, Tonali xf², Linosport xf², Sicuro xf² R10, ; Linoleum xf²SD, Linoleum xf² Bfl, Essenza, Linosport Classic, Narnidur, Acoustic Cork xf² Acoustic Cork Essenza 15)

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The following report (EHS) was prepared with the Environmental Protection and Encouragement Agency (EPEA) which was founded by Professor Dr. Michael Braungart in Hamburg, Germany.

I. QUALITY TARGET

A product is of environmental and health quality when materials involved in sourcing, production, use and post-use handling can serve as technical nutrients for future productions and/or interact beneficially with organisms and ecosystems as biological nutrients. The perspective for Tarkett Linoleum is to be a technical nutrient after use and to contribute to optimal indoor air quality during use.

II. GOOD MATERIALS



Tarkett's linoleum is a high performance, resilient floor covering made from 95% renewable, recycled and abundant materials, approximately 70% of which are rapidly renewable. Available worldwide, Tarkett has produced linoleum for more than 115 years at its manufacturing facility in Narni, Italy.

The manufacturing of Linoleum flooring is generally performed in 6 steps:

1. Linoleum cement is produced by oxidation of linseed oil and pine rosin
2. The cement is then mixed with wood and cork flour, calcium carbonate, recycled linoleum, and various other additives and pigments to produce linoleum paste
3. The paste is calendared to a jute backing
4. The product is cured in drying rooms for 20 to 30 days until the specific hardness is reached
5. A surface finish is applied to the product and
6. The finished rolls are wrapped for shipment

All materials being used for the production of Tarkett Linoleum have gone through an assessment of their (eco)toxicological properties performed by EPEA based on Cradle to Cradle methodology. Materials are presented according to their contribution to the finished product. An overview of the chemical definition and tasks for optimization is given for Linoleum flooring.

Ingredient Function	Ingredient Constituents	CAS No.	Amount (wt %)	Rating	Comment on Rating
Polymer precursor	Linseed oil	8001-26-1	24-32	●	
Binder	Colophony	8050-09-7	3-5	●	Sensitizing upon skin contact only in the oxidized form . No concern in product form due to lack of exposure.
Filler	Wood flour	-	0-21	●	Sources PEFC certified
	Cork flour	61789-98-8	6-35	●	Sources FSC and/or PEFC certified
	Calcium carbonate	471-34-1	13-34	●	
	Cured linoleum scraps (post-industrial material)	-	0-9	●	Composition is the sum of listed ingredients
Whitener	Titanium dioxide	13463-67-7	0-7	●	Potential health issue relating to dust inhalation during titanium dioxide mining/production. No concern in product form.
Pigments (depend on product style)	Various pigment masterbatches with chemically defined composition	Proprietary	0-2.5	▲	Halogenated organic compounds can catalyze dioxin formation when combusted
				●	From this supplier very pure pigment
				●	Contain heavy metal impurities
				●	Impurities (depending on synthesis pathway) possible
Backing	Jute	-	6-17	●	Contains unproblematic additives, the jute batching oil has acceptable heavy metal and PAH concentrations
Additional backing (for Silencio/Acoustic)	PU foam	9009-54-5	0-13	● ●	Non-toxic polymer, additives unknown
Adhesive to fix additional backing	Adhesive			▲	Partly based on components associated with health issues
Coating	Wax xf ²	-	0.5-1	▲	Is based on some components (i.e. these components react to the coating) associated with health issues
Alternative coating (used for Essenza)	Coating	-	0.5	●	Contains ingredients of no/low concern, good off-gassing picture (applied on linoleum)

- The ingredient leads to no concern in the material flow scenario of Tarkett Linoleum (compare “Quality Target” and “Post-Use Handling”).
- The ingredient is expected to be of low concern in the material flow scenario of Tarkett Linoleum (compare “Quality Target” and “Post-Use” Handling).
- ▲ The ingredient is a task for optimization at Tarkett.
- The ingredient is not characterized enough to be classified.

III. RESOURCE STEWARDSHIP

The following section describes the product's resource use as it relates to energy, water and lost resources.

III. 1 Production process

Manufacturing energy (kWh/m ²)	9,2
Water consumption (l/m ²)	4
Lost resources going to landfill (kg/m ²)	0,1
Internal recycling (kg/m ²)*	0,3
External recycling (kg/m ²)**	0,1

* Leftovers from cutting / ** Packaging of supplier products and consumables of staff

The Narni plant where Linoleum flooring is produced is certified according to ISO 9001, ISO 14001 and OHSAS 18001.

III. 2 Renewable energy

Share of renewable energy	20%
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The total share of renewable energy is 20%. Grid electricity contains 35% of renewable energy. Hot water for the ovens is partly produced by a biomass boiler being fed with compressed jute from post production and wood chips.

Tarkett has developed a strategy to further increase its use of renewable energy.

III. 3 Water stewardship

By installing three closed cooling systems in three different departments, Tarkett Narni could reduce the water consumption of 88%.

They have further adopted the following water stewardship principles:

- Water use is carefully accounted for throughout the entire design process.
- Water sources are protected from contamination and careful consideration is given to efficiency techniques at every step.
- A cyclical concept for water from aquifers, rain water, surface run-off water, gray water, or any water use for sewage transport or processing systems is in place or in planning
- Waste water:
 - For the sanitary and civil water we have a small biological depurator
 - For the cooling water we have not a treatment system but the cooling water is never contaminated by raw materials or process chemicals. Checks are done each 4 months. We further have a closed cooling systems in each department.
- No ground water contamination should result from any use of water resources related to the construction or operation of the production facilities.
- Rain water and surface run-off water is used or such a use is in planning.
- Impermeable ground cover/soil sealing should be minimized.
- Gray water should be treated and applied to practical or natural purposes suitable to its characteristics.
- The aim for all discharges of process-related water is to meet drinking water standards.
- Employees are educated and empowered to continuously improve their use of water resources.



IV. PEOPLE FRIENDLY SPACES

Tarkett linoleum has very low emissions with TVOC < 100 µg/m³ and is FloorScore certified by SCS Global Services for Indoor Air Quality Performance.



V. POST-USE HANDLING

Linoleum can be ground and reused as a raw material in the manufacture of new linoleum. This is already done with post-industrial linoleum and post-installation cut-offs which are taken back in the frame of the ReStart program. Most of Tarkett's linoleum products currently contain an average of nine percent recycled post-industrial material. Post use linoleum can also be used as an ingredient for new linoleum products.



Silencio/Acoustic/Ecopure products can also be ground after use. Already today granules of post-installation Silencio/Acoustic/Ecopure are involved in a product used in foundation wall construction. Their good mechanical properties make it a valuable substitute for virgin resources.

VI. CERTIFICATIONS



For Silencio/Acoustic/Ecopure



For the other linoleum types



Veneto Essenza 100% linen/
Natural Clay



a) Scope

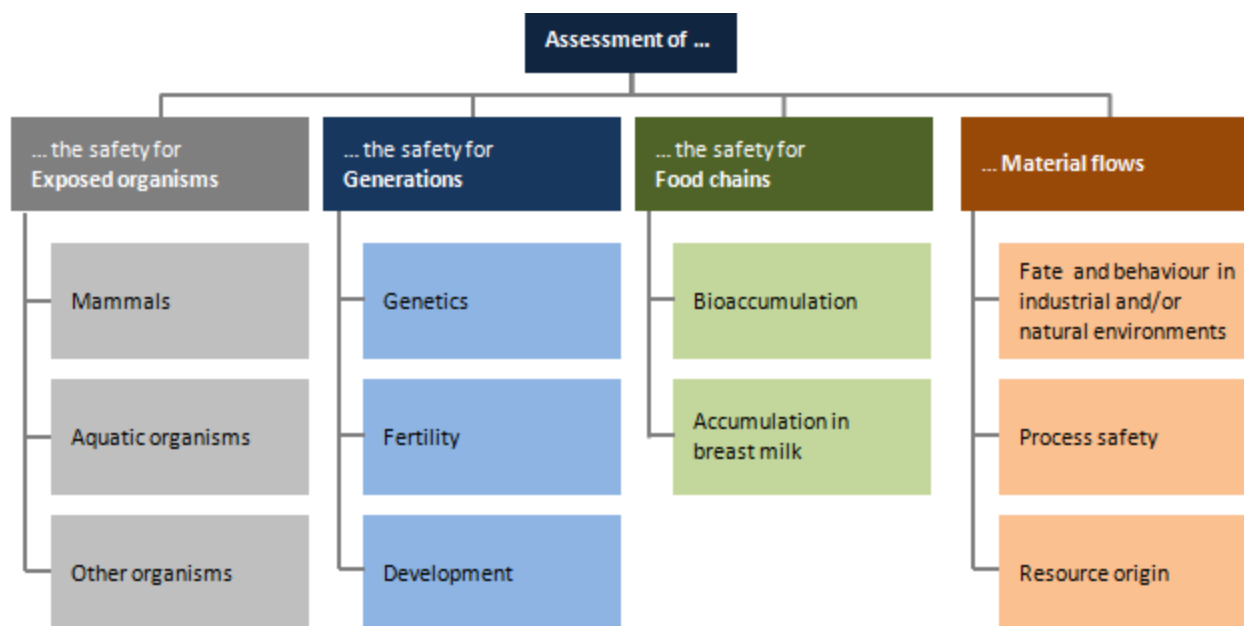
Material flows as they relate to the product's production, installation, functional use and anticipated/planned and unintended but possible post-use handling are inventoried and evaluated. Where applicable, alternatives are investigated for material ingredient optimization.

Particular emphasis is given to post-production materials since they determine the safety of the product during use and its reusability as defined resources after use. Production processes are inventoried and assessed as they relate to the composition and behaviour of a product. If it is ensured that the product can be reused as a defined resource after use, further production aspects are addressed, for example social and environmental aspects of resource mining, quality and fate of by-products, etc.

b) Procedure

Product ingredients are inventoried with information from Tarkett, its suppliers and analytical testing in order to understand the product composition and its behaviour.

Involved chemicals are profiled for their safety using (eco)toxicological information published in scientific literature, obtained from testing, provided by chemical hazard lists, chemical suppliers (e.g. material safety data sheets) and derived from quantitative structure activity relationships (QSAR, [1]).



The data obtained about a chemical's intrinsic safety is then classified/rated according to a traffic light system (see the outline of the Cradle to Cradle certification [2]). The rating shows to which extent an ingredient contributes to the target environmental and health quality of a product.

A dark green circle indicates no concern, a light green circle indicates low concern, a red triangle indicates an alternative should be sought and a grey circle indicates that not enough information is available to characterize/classify the ingredient (see legend of the material table).

If a chemical is found to be hazardous, it is determined if it can be substituted. If no alternative can be identified, the exposure is analyzed and, if needed, measures to keep it to a minimum are investigated.

1 QSAR uses the relationship between the structure of a molecule and its chemical/physical/biological/pharmacological properties to provide indication of a chemical's properties by looking at other chemicals with a similar structure. This can be helpful when no/not enough experimental data are available.

2 Material Health Assessment Methodology. Cradle to Cradle Certified^{CM} Product Standard Version 3.0. http://c2ccertified.org/images/uploads/C2CCertified_Material_Health_Methodology_121112.pdf

Extract of used sources:

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