# ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

| | |
|---|---|
| Owner of the Declaration | Unilin BV, division flooring |
| Publisher | Institut Bauen und Umwelt e.V. (IBU) |
| Programme holder | Institut Bauen und Umwelt e.V. (IBU) |
| Declaration number | EPD-UNI-20230479-IBC1-EN |
| Issue date | 15.01.2024 |
| Valid to | 14.01.2029 |

## Luxury Vinyl Tiles (LVT)

## Unilin BV, division flooring

www.ibu-epd.com | https://epd-online.com

# 1. General Information

## Unilin BV, division flooring

**Programme holder**

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

**Declaration number**

EPD-UNI-20230479-IBC1-EN

**This declaration is based on the product category rules:**

Floor coverings, 01.08.2021
(PCR checked and approved by the SVR)

**Issue date**

15.01.2024

**Valid to**

14.01.2029

Dipl.-Ing. Hans Peters
(Chairman of Institut Bauen und Umwelt e.V.)

Florian Pronold
(Managing Director Institut Bauen und Umwelt e.V.)

## Luxury Vinyl Tiles (LVT)

**Owner of the declaration**

Unilin BV, division flooring
Ooigemstraat 3
8710 Wielsbeke
Belgium

**Declared product / declared unit**

1m² of Luxury Vinyl Tiles (LVT) floating floor (5 mm thickness without underlay) with mechanical locking.

**Scope:**

In this EPD semi flexible LVT floating floor with mechanical locking according to *EN 16511:2023* Modular mechanical locked floor coverings (MMF) - Specification, requirements and test method for multilayer modular panels for floating installation are declared.

The results are representative of production in UNILIN B.V. Division Flooring, Avelgem site (Belgium).

This EPD covers printed laminate polyvinyl chloride floor coverings produced by Unilin under following brands:

- Quick-Step (Alpha Vinyl, Alpha Vinyl pad, Paso Rigid Click, Lima Rigid Click, Rigid Vinyl, Sens by Quick-Step)
- Quick-Step Howdens (Plank, Hybrid, Rigid Vinyl Pad Plank, Rigid Vinyl Pad Tile)
- Pergo (Rigid Click Pro, Rigid click PAD Pro, Saimaa pro, Vibrance by Pergo)
- Moduleo (Next, LAYRED)
- LOC (Tender, Tender Base)
- Vitality (Amuse, Amuse base)
- Elka (Rigid, Rigid Pad)
- Unilin (Vinyl Rigid, Vinyl Rigid Pad)
- ORIGIN (30 & 55)
- Engineered click acoustic
- Textura acoustic

The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as *EN 15804*.

**Verification**

| | | | |
|---|---|---|---|
| The standard EN 15804 serves as the core PCR | | | |
| Independent verification of the declaration and data according to ISO 14025:2011 | | | |
| ☐ | internally | ☒ | externally |

Dr. Frank Werner,
(Independent verifier)

## 2. Product

### 2.1 Product description/Product definition

Rigid vinyl floorings also called Luxury Vinyl Tiles (LVT) are made up of several layers. On the top side, there is a PVC decor layer (2) with a transparent PVC wear-resistant contact surface coated with a PU lacquer for a mat aspect with an excellent stain and friction resistance (1); in the middle, for extra acoustic and walking comfort an additional soft PVC layer (3) and on the back side, there is a core layer (4) made of 2 rigid PVC layers reinforced with unwoven glass- fibers and separated by a foamed PVC layer for acoustic and comfort reasons to guarantee floor stability and to avoid telegraphing effect from subfloor irregularities. Some references are produced with a 1mm pre-attached underlay to make the installation faster and easier. The decorative PVC layer of LVT floor covering can be printed with any design and gives the floor its individual appearance. The planks have a mechanical and patented connection (Uniclic, Unidrop, Unizip).

For the placing on the market of the product in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) Regulation (EU) No. 305/2011 (CPR) applies. The product needs a declaration of performance taking into consideration *EN 14041:2004 AC 2006 Resilient, textile and laminate floor coverings - Essential characteristics* and the CE-marking.
For the application and use the respective national provisions apply.

### 2.2 Application

According to *EN ISO 10874* the area of application for resilient floor coverings is indicated by use classes. The declared product group covers the use classes between 32 and 33.

### 2.3 Technical Data

**Constructional data**

| Name | Value | Unit |
|---|---|---|
| Product minimum thickness | 4 | mm |
| Product maximum thickness | 5+1 | mm |
| Product minimum mass | 6.7 | kg/m² |
| Product maximum mass | 8.7 | kg/m² |
| Product form | Planks and Tiles | |

- Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *EN 14041:2004 AC 2006 Resilient, textile and laminate floor coverings - Essential characteristics* and the CE marking.
- Voluntary data: The product complies with the requirements of the following standard, too *EN 16511:2023 Modular mechanical locked floor coverings (MMF) - Specification, requirements and test method for multilayer modular panels for floating installation*. For the application and use the respective national provisions apply.

### 2.4 Delivery status

LVT floor covering is delivered in planks or tiles.
Typical standard dimensions are as follows (length - width thickness)

- 1251mm x 189mm x 5mm (4+1mm)
- 610mm x 303mm x 5mm (4+1mm)
- 630mm x 126mm x 6mm (5+1mm)
- 1494mm x 209mm x 6mm (5+1mm)
- 856mm x 428mm x 6mm (5+1mm)
- 630mm x 126mm x 6mm (5+1mm)
- 1253mm x 189mm x 6mm (5+1mm)
- 1317mm x 189mm x 6mm (5+1mm)
- 610mm x 303mm x 6mm (5+1mm)
- 1251mm x 189mm x 4mm
- 610mm x 303mm x 4mm

### 2.5 Base materials/Ancillary materials

The product group has the following composition:

- Filler 51%
- Polymers (PVC) 36%
- Plasticizer and stabilizer 8%
- Other 5%

This product contains substances listed in the Candidate List of Substances of Very High Concern for Authorisation *REACH* (date: 16.11.2023) exceeding 0.1 percentage by mass: **NO**

This product contains other CMR substances in categories 1A or 1B which are not on the candidate list, exceeding 0.1 percentage by mass: **NO**

Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) Ordinance on Biocide Products No. 528/2012): **NO**

### 2.6 Manufacture

The material efficiency is 99% as all production waste are internally recycled as raw material.
In production a certified *ISO 9001* quality control system is in place.

### 2.7 Environment and health during manufacturing

The production conditions do not demand any special health protection measures over and beyond the legal requirements.
**Water**
Production is using river water for cooling. The use of water in the LVT flooring production process is negligible. Where water is needed, it is re-used in the internal water loop and eventually reinjected in the river after controlling quality and temperature.
**Air**
The constitutional valid regulations are observed. The emissions to air are far below the legally required thresholds.
**Soil**
There is no impact on soil.

In production a certified *ISO 14001* environmental management system is in place.

### 2.8 Product processing/Installation

UNILIN LVT click floor coverings are generally installed floating. This means that the floor covering is not fixed to the sub-floor using glue, nails etc. The floor covering panels are mainly mechanically assembled glue-less by means of tongue and groove. Underlay material is needed when installing LVT click floor coverings in order to achieve a leveling effect, thermal or acoustical insulation.

### 2.9 Packaging

LVT tiles are packed together. The packs are protected using cardboard 6-sided boxes. The packaging cardoard is fully recyclable.
The packs are palletized on wooden pallets using wood from controlled origin. The pallets can be re-used (Euro pallets) or recycled as wood category 03 01 05 according to the European Waste Catalogue.

### 2.10 Condition of use

A Polyurethan-based lacquer is used for the production of the flooring panels. After exposure to a strong UV light under anaerobicconditions, this coating is 3D crosslinked by an irreversible reaction andcompletely closing the flooring surface. Under normal conditions, the coatingis chemically stable and mechanically firmly bonded to the PVC wearlayer.

### 2.11 Environment and health during use

**Environmental protection**
When the products are used as designated and according the current state of knowledge, there are no hazards for water, air and soil.
**Health protection**
When used normally and in accordance with the designated purpose, no health risks or restrictions are to be anticipated by UNILIN LVT floor coverings. This is in line with the current state of knowledge.

### 2.12 Reference service life

The BBSR gives a general useful life of **20 years** for floor coverings of component group 352.711. Due to the comparatively high resistance of the LVT floorings, Unilin grants an additional **warranty** (based on the floor owner life according to the manufacturer's warranty conditions) for the declared product. In order to increase the life duration of the floor covering, the manufacturer's instructions concerning warranty and care must be observed, available for download at www.unilin.com/en/flooring. The use stage is declared in this EPD for a one year usage.

### 2.13 Extraordinary effects

**Fire**
The reaction to fire is determined according to *EN 13501-1*. The class for LVT floors produced by UNILIN BV division Flooring, in combination with all underlays of the sales program is Bfl-s1.

**Fire protection**

| Name | Value |
|---|---|
| Building material class | Bfl |
| Smoke gas development | s1 |

**Water**
In case of a leak or a flood where the flooring has been soaked the flooring will most probably be OK as no visible damage are expected.
If the water came under the floorcovering (floating installation) it may be necessary to unclick the panels and let dry the subfloor and the underlay. It should be given the time to come to equilibrium moisture content before reinstallation of the dried panels.
Most of the LVT ranges offer a special watertightness between planks/tiles. During the installation, the periphery needs to be treated with a foam strip and a special sealant to avoid infiltration. In case of water spillage on the surface, it will evaporate before having the chance to penetrate between planks/tiles.

**Mechanical destruction**
Small damages in the flooring surface can be repaired by using colored solvent-free melt waxes. Scratches in the transparent wear layer can be repaired with an adapted new coating 1 or 2 compound following the manufacturer instructions. In case of more severe damage the damaged panels can be replaced. Procedures to repair or replace a damaged plank are available on request. The damaged panels go into the normal end-of-life treatment.

### 2.14 Re-use phase

A LVT click floor covering which is not at the end-of-life stage may be un-installed and re-used as a floor covering. Post-consumer LVT click floor covering waste can be recycled as PVC-based products. When appropriate recycling facilities do not exist, LVT click floor coverings shall be thermally valorized.

### 2.15 Disposal

Post-installation and post-consumer flooring panels are considered as PVC waste. The European Waste Code *EWC* is 070213. It can be disposed in any regulated municipal waste collection point in the combustible waste container. Unilin offers a take-back program named Recover to enable circularity of PVC flooring. Please contact your local Unilin dealer to check the availability of this Recover program in your country.

### 2.16 Further information

All information about the product composition, technical performance, instructions for installation and maintenance, precautionary instructions for use, CE marking and relevant DOP (declaration of performance) documents, are available either in the packs or can be found on the homepage www.unilin.com/en/flooring or can be requested at Unilin BV division flooring info@unilin.com.

## 3. LCA: Calculation rules

### 3.1 Declared Unit

1m² of Luxury Vinyl Tiles (LVT) floating floor (5 mm thickness without underlay) with mechanical locking.

**Declared unit and mass reference**

| Name | Value | Unit |
|---|---|---|
| Declared unit | 1 | $m^2$ |
| Layer thickness | 0.005 | m |
| Grammage | 8.6 | $kg/m^2$ |

### 3.2 System boundary

Type of EPD according to *EN 15804*: cradle to grave.

Modules A1-A3 include processes that provide materials and energy input for the system, manufacturing and transport processes up to the factory gate, as well as waste processing.

Module A4 includes transport of the floor covering to the place of installation. A4 data are based on a weighted average distance for worldwide deliveries.

Module A5 includes the production of offcuts for the installation of the floor covering, and incineration of offcuts and packaging material.

Module B2 is including provision of cleaning agent, energy and water consumption for the cleaning of the floor covering. The LCA results in this EPD are declared for a one-year usage.

Module C2 includes transportation of the postconsumer waste to waste processing.

End of life scenarios are declared for:

- 100% landfilling (Scenario 1, C4/1)
- 100% incineration in a waste incineration plant (WIP) (Scenario 2, C4/2)

Module D includes potential benefits from all net flows given in module A5 and C4 that leave the product boundary system after having passed the end-of-waste state in the form of recovery and/or recycling potentials. Module D is declared for each scenario separately (D/1 and D/2).

### 3.3 Estimates and assumptions

No additional estimates or assumptions had to be made beyond the information stated in clauses 3 and 4.

### 3.4 Cut-off criteria

In the assessment, all available data from the production process are considered, i.e. all raw materials used, utilised thermal energy, and electric power consumption using best available LCI datasets. Thus material and energy flows contributing less than 1% of mass or energy are also considered.

No flows were cut-off that are known to have significant environmental impacts.

### 3.5 Background data

Used background data comes from ecoinvent database version 3.8 from 2021. It has been selected to be representative of processes geographic location.

### 3.6 Data quality

Primary data refer to the year 2021. The data of the foreground processes is based on input-output analyses at the Belgian production sites. The primary data collection was done thoroughly, all relevant flows were considered.

### 3.7 Period under review

The period under review for primary data is 2021.

### 3.8 Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product´s lifespan: Global

### 3.9 Allocation

The overall production of UNILIN comprises further products beside the product considered in this study. Data for thermal and electrical energy as well as auxiliary material refer to the declared product. During data collection the allocation is done via mass (kg). Specific information on allocation within the background data is given in the ecoinvent documentation.

### 3.10 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account.
Background database is as described in chapter 3.5.

## 4. LCA: Scenarios and additional technical information

**Characteristic product properties of biogenic carbon**

**Information on describing the biogenic carbon content at factory gate**

| Name | Value | Unit |
|---|---|---|
| Biogenic carbon content in product | - | kg C |
| Biogenic carbon content in accompanying packaging | 0.3 | kg C |

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of $CO_2$.

The following technical information is a basis for the declared modules. Scenarios correspond to the worldwide production and consumption.

**Transport to the construction site (A4)**

Product shipping stage A4 represents weighted average based on worldwide sales.

| Name | Value | Unit |
|---|---|---|
| Transport distance by truck | 686 | km |
| Capacity utilisation (including empty runs) by truck | 67 | % |
| transport distance by boat | 1319 | km |

**Installation in the building (A5)**

| Name | Value | Unit |
|---|---|---|
| Product installation losses | 4.0 | % |
| Product packaging waste | 0.66 | kg |

**Maintenance (B2)**

Maintenance scenario is:

- 1 vacuum cleaning per week,
- 1 wet cleaning (water and detergent) per month.

| Name | Value | Unit |
|---|---|---|
| Water consumption | 1.33 | kg/m²/year |
| Detergent | 0.0133 | kg/m²/year |
| Electricity consumption (European mix) | 0.54 | kWh/m²/year |

**Reference service life**

| Name | Value | Unit |
|---|---|---|
| Reference service life according to BBSR | 20 | a |

**End of Life (C1-C4)**

| Name | Value | Unit |
|---|---|---|
| Energy recovery from waste (for EoL scenario 2) | 8.6 | kg |
| Landfilling (for EoL scenario 1) | 8.6 | kg |

Energy recovery from product waste is assumed in a municipal waste incineration plant with energy efficiency < 60%. In line with *EN 15804*, this is therefore declared as part of module C4.

## 5. LCA: Results

The results refer to LVT thickness of 5 mm without underlay (8.6 kg/m²). The information on maintenance is declared per year.

LVT floor coverings are available in thicknesses 4 mm and 5mm, with and without underlay. In order to enable the user of the EPD to calculate the results for different thicknesses and use classes the factors in the following table can be used for the calculation. For A1, A2, A3, A4, A5, B2, C4 and D the LCA results of the declared product (thickness 5 mm without underlay) in following tables have to be multiplied with these factors.

| LVT thickness | 5 mm | 5 mm | 4 mm | 4 mm |
|---|---|---|---|---|
| Underlay | without underlay | with underlay | without underlay | with underlay |
| GWP - total | 1,00 | 1,00 | 0,81 | 0,82 |
| GWP - fossil | 1,00 | 1,00 | 0,81 | 0,82 |
| GWP - biogenic | 1,00 | 1,00 | 0,88 | 0,90 |
| GWP - luluc | 1,00 | 1,05 | 0,96 | 0,95 |
| ODP | 1,00 | 0,99 | 0,81 | 0,81 |
| AP | 1,00 | 0,99 | 0,81 | 0,81 |
| EP - freshwater | 1,00 | 0,99 | 0,81 | 0,82 |
| EP - marine | 1,00 | 1,01 | 0,82 | 0,83 |
| EP - terrestrial | 1,00 | 1,00 | 0,81 | 0,82 |
| POCP | 1,00 | 1,00 | 0,81 | 0,82 |
| ADPE | 1,00 | 0,97 | 0,79 | 0,80 |
| ADPF | 1,00 | 1,01 | 0,81 | 0,83 |
| WDP | 1,00 | 1,00 | 0,82 | 0,82 |
| PM | 1,00 | 1,00 | 0,81 | 0,82 |
| IR | 1,00 | 1,00 | 0,80 | 0,81 |
| ETP - fw | 1,00 | 0,99 | 0,79 | 0,79 |
| HTP - c | 1,00 | 0,98 | 0,80 | 0,80 |
| HTP - nc | 1,00 | 0,98 | 0,80 | 0,81 |
| SQP | 1,00 | 1,00 | 0,80 | 0,81 |
| PERE | 1,00 | 1,02 | 0,83 | 0,84 |
| PERM | 1,00 | 1,01 | -0,10 | -0,23 |
| PERT | 1,00 | 1,02 | 0,83 | 0,84 |
| PENRE | 1,00 | 1,00 | 0,81 | 0,82 |
| PENRM | 1,00 | 1,03 | 0,82 | 0,84 |
| PENRT | 1,00 | 1,01 | 0,81 | 0,83 |
| SM | 1,00 | 1,01 | 0,80 | 0,81 |
| RSF | 1,00 | 1,00 | 1,00 | 1,00 |
| NRSF | 1,00 | 1,00 | 1,00 | 1,00 |
| FW | 1,00 | 1,00 | 0,82 | 0,82 |
| HWD | 1,00 | 0,97 | 0,78 | 0,79 |
| NHWD | 1,00 | 0,92 | 0,74 | 0,74 |
| RWD | 1,00 | 1,00 | 0,80 | 0,81 |
| CRU | 1,00 | 1,00 | 1,00 | 1,00 |
| MFR | 1,00 | 1,00 | 0,80 | 0,81 |
| MER | 1,00 | 1,00 | 1,00 | 1,00 |
| EEE | 1,00 | 1,01 | 0,80 | 0,81 |
| EET | 1,00 | 1,01 | 0,80 | 0,81 |

## DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

| Product stage | | | Construction process stage | | Use stage | | | | | | | End of life stage | | | | Benefits and loads beyond the system boundaries |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Raw material supply | Transport | Manufacturing | Transport from the gate to the site | Assembly | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Reuse-Recovery-Recycling-potential |
| **A1** | **A2** | **A3** | **A4** | **A5** | **B1** | **B2** | **B3** | **B4** | **B5** | **B6** | **B7** | **C1** | **C2** | **C3** | **C4** | **D** |
| X | X | X | X | X | MND | X | MNR | MNR | MNR | MND | MND | X | X | X | X | X |

## RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m² LVT floor covering

| Parameter | Unit | A1 | A2 | A3 | A4 | A5 | B2 | C1 | C2 | C3 | C4/1 | C4/2 | D/1 | D/2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GWP-total | kg $CO_2$ eq | 9.99E+00 | 1.5E-01 | 4.7E+00 | 1.14E+00 | 2.25E+00 | 2.34E-01 | 0 | 3.72E-02 | 0 | 6.01E-01 | 1.09E+01 | -4.87E-02 | -2.87E+00 |
| GWP-fossil | kg $CO_2$ eq | 9.91E+00 | 1.5E-01 | 5.53E+00 | 1.14E+00 | 1.17E+00 | 2.29E-01 | 0 | 3.72E-02 | 0 | 6.01E-01 | 1.09E+01 | -4.82E-02 | -2.86E+00 |
| GWP-biogenic | kg $CO_2$ eq | -8.21E-02 | 4.88E-05 | -8.36E-01 | 3.48E-04 | 1.07E+00 | 1.21E-03 | 0 | 1.21E-05 | 0 | 8.78E-05 | 3.11E-03 | -4.92E-04 | -6.52E-03 |
| GWP-luluc | kg $CO_2$ eq | 1.54E-01 | 5.81E-05 | 1.39E-02 | 5.04E-04 | 6.76E-03 | 3.98E-03 | 0 | 1.44E-05 | 0 | 1.88E-05 | 7.9E-04 | -4.37E-05 | -2.86E-03 |
| ODP | kg CFC11 eq | 3.27E-06 | 3.78E-08 | 7.67E-07 | 2.63E-07 | 1.91E-07 | 1.24E-08 | 0 | 9.35E-09 | 0 | 2.67E-08 | 2.96E-07 | -4.76E-09 | -3.14E-07 |
| AP | mol $H^+$ eq | 4.92E-02 | 4.83E-04 | 1.39E-02 | 6.69E-03 | 3.27E-03 | 1.32E-03 | 0 | 1.19E-04 | 0 | 6.39E-04 | 5.43E-03 | -1.44E-04 | -7.84E-03 |
| EP-freshwater | kg P eq | 4.07E-04 | 1.08E-06 | 1.32E-04 | 7.81E-06 | 2.32E-05 | 2.5E-05 | 0 | 2.67E-07 | 0 | 6.2E-07 | 2.53E-05 | -2.14E-06 | -1.29E-04 |
| EP-marine | kg N eq | 8.89E-03 | 1.06E-04 | 3.5E-03 | 1.51E-03 | 7.13E-04 | 2.23E-04 | 0 | 2.63E-05 | 0 | 4.11E-04 | 1.36E-03 | -2.36E-05 | -1.24E-03 |
| EP-terrestrial | mol N eq | 9E-02 | 1.18E-03 | 3.28E-02 | 1.68E-02 | 7.27E-03 | 2.03E-03 | 0 | 2.92E-04 | 0 | 2.58E-03 | 1.46E-02 | -2.65E-04 | -1.4E-02 |
| POCP | kg NMVOC eq | 3.67E-02 | 4.65E-04 | 9.48E-03 | 5.16E-03 | 2.51E-03 | 5.46E-04 | 0 | 1.15E-04 | 0 | 8.87E-04 | 4.16E-03 | -8.5E-05 | -4.16E-03 |
| ADPE | kg Sb eq | 3.46E-04 | 3.74E-07 | 3.87E-05 | 3.93E-06 | 1.61E-05 | 2.3E-06 | 0 | 9.26E-08 | 0 | 2.52E-07 | 1.16E-05 | -7.37E-08 | -3.1E-06 |
| ADPF | MJ | 2.51E+02 | 2.47E+00 | 1.09E+02 | 1.72E+01 | 1.6E+01 | 4.82E+00 | 0 | 6.1E-01 | 0 | 1.93E+00 | 1.25E+01 | -9.05E-01 | -5.44E+01 |
| WDP | $m^3$ world eq deprived | 1.32E+01 | 8.48E-03 | 2.11E+00 | 5.04E-02 | 6.79E-01 | 7.05E-02 | 0 | 2.1E-03 | 0 | 9.25E-03 | 8.7E-01 | -6.05E-03 | -2.91E-01 |

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential)

## RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m² LVT floor covering

| Parameter | Unit | A1 | A2 | A3 | A4 | A5 | B2 | C1 | C2 | C3 | C4/1 | C4/2 | D/1 | D/2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PERE | MJ | 1.5E+01 | 3.14E-02 | 1.16E+01 | 2.35E-01 | 2.35E+00 | 1.04E+00 | 0 | 7.76E-03 | 0 | 8.38E-02 | 1.58E+00 | 2.28E-02 | -4.34E+00 |
| PERM | MJ | 1.01E+00 | 0 | 2.63E-01 | 0 | -1.16E+00 | 8.77E-04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PERT | MJ | 1.61E+01 | 3.14E-02 | 1.18E+01 | 2.35E-01 | 1.2E+00 | 1.04E+00 | 0 | 7.76E-03 | 0 | 8.38E-02 | 1.58E+00 | 2.28E-02 | -4.34E+00 |
| PENRE | MJ | 1.44E+02 | 2.47E+00 | 1.08E+02 | 1.72E+01 | 1.65E+01 | 4.46E+00 | 0 | 6.1E-01 | 0 | 1.93E+00 | 1.19E+02 | -9.05E-01 | -5.44E+01 |
| PENRM | MJ | 1.07E+02 | 0 | 3.7E-01 | 0 | -4.76E-01 | 3.64E-01 | 0 | 0 | 0 | 0 | -1.07E+02 | 0 | 0 |
| PENRT | MJ | 2.51E+02 | 2.47E+00 | 1.09E+02 | 1.72E+01 | 1.6E+01 | 4.82E+00 | 0 | 6.1E-01 | 0 | 1.93E+00 | 1.25E+01 | -9.05E-01 | -5.44E+01 |
| SM | kg | 0 | 0 | 4.88E-01 | 0 | 1.95E-02 | 3.28E-04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| RSF | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NRSF | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FW | $m^3$ | 2.18E-01 | 2.87E-04 | 6.23E-02 | 1.83E-03 | 2.32E-02 | 4.34E-03 | 0 | 7.11E-05 | 0 | 2.44E-03 | 2.78E-01 | -3.59E-04 | -2.16E-02 |

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

## RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m² LVT floor covering

| Parameter | Unit | A1 | A2 | A3 | A4 | A5 | B2 | C1 | C2 | C3 | C4/1 | C4/2 | D/1 | D/2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HWD | kg | 4.32E-01 | 1.71E-03 | 6.32E-01 | 1.3E-02 | 1.45E-01 | 6.23E-03 | 0 | 4.22E-04 | 0 | 2.22E-03 | 2.17E+00 | -5.8E-04 | -2.83E-02 |
| NHWD | kg | 6.65E+00 | 2.43E-01 | 1.37E+00 | 9.24E-01 | 4.07E-01 | 9.07E-02 | 0 | 6.01E-02 | 0 | 8.64E+00 | 4.86E-01 | -6.16E-03 | -3.56E-01 |
| RWD | kg | 5.29E-04 | 1.67E-05 | 8.48E-04 | 1.16E-04 | 6.49E-05 | 3.41E-05 | 0 | 4.13E-06 | 0 | 1.25E-05 | 6.72E-05 | -2.23E-06 | -2.02E-04 |
| CRU | kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MFR | kg | 0 | 0 | 1.1E-01 | 0 | 4.42E-03 | 4.25E-04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MER | kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EEE | MJ | 0 | 0 | 6.71E-01 | 0 | 1.48E+00 | 1.48E-03 | 0 | 0 | 0 | 0 | 1.07E+01 | 0 | 0 |
| EET | MJ | 0 | 0 | 1.48E+00 | 0 | 2.99E+00 | 2.86E-03 | 0 | 0 | 0 | 0 | 2.37E+01 | 0 | 0 |

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

**RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 m² LVT floor covering**

| Parameter | Unit | A1 | A2 | A3 | A4 | A5 | B2 | C1 | C2 | C3 | C4/1 | C4/2 | D/1 | D/2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PM | Disease incidence | 3.95E-07 | 1.76E-08 | 1.27E-07 | 8.69E-08 | 2.93E-08 | 4.46E-09 | 0 | 4.34E-09 | 0 | 1.39E-08 | 3.92E-08 | -3.39E-10 | -2.11E-08 |
| IR | kBq U235 eq | 5.46E-01 | 1.07E-02 | 9.78E-01 | 7.46E-02 | 6.8E-02 | 4.11E-02 | 0 | 2.65E-03 | 0 | 8.85E-03 | 6.04E-02 | -3.05E-03 | -2.35E-01 |
| ETP-fw | CTUe | 9.22E+01 | 8.17E-01 | 8.1E+01 | 5.91E+00 | 2.99E+01 | 8.82E-01 | 0 | 2.02E-01 | 0 | 3.21E+01 | 5.41E+02 | -6.55E-02 | -3.53E+00 |
| HTP-c | CTUh | 8.01E-09 | 5.25E-11 | 2.83E-09 | 4.66E-10 | 5.99E-10 | 1.12E-10 | 0 | 1.3E-11 | 0 | 6.02E-11 | 1.49E-09 | -6.09E-12 | -4.81E-10 |
| HTP-nc | CTUh | 1.95E-07 | 1.68E-09 | 3.88E-08 | 1.05E-08 | 1.38E-08 | 3.04E-09 | 0 | 4.15E-10 | 0 | 1.45E-09 | 4.67E-08 | -1.92E-10 | -1.1E-08 |
| SQP | SQP | 4.72E+01 | 2.82E+00 | 6.26E+01 | 1.12E+01 | 5.39E+00 | 1.13E+00 | 0 | 6.98E-01 | 0 | 5.02E+00 | 6.07E+00 | 4.4E-01 | -3.57E+00 |

PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index

Disclaimer 1 – for the indicator "Potential Human exposure efficiency relative to U235". This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators "abiotic depletion potential for non-fossil resources", "abiotic depletion potential for fossil resources", "water (user) deprivation potential, deprivation-weighted water consumption", "potential comparative toxic unit for ecosystems", "potential comparative toxic unit for humans – cancerogenic", "Potential comparative toxic unit for humans - not cancerogenic", "potential soil quality index". The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.

## 6. LCA: Interpretation

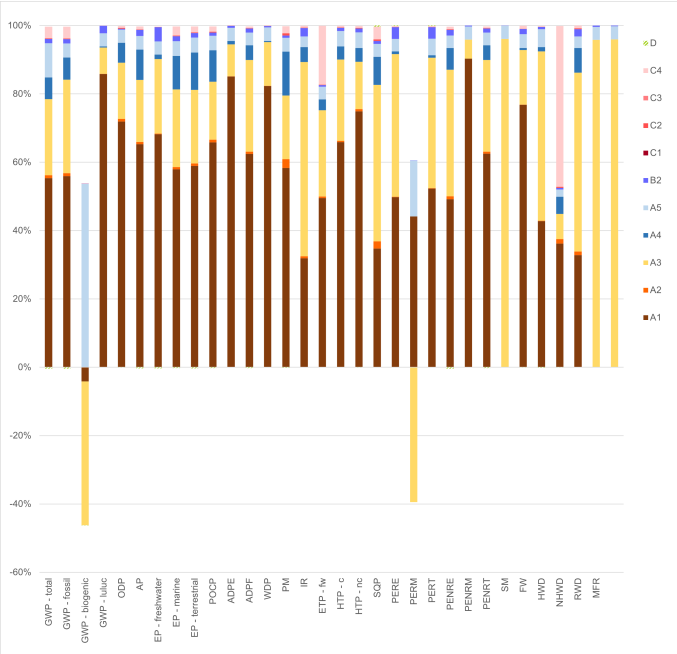


**Figure : Indicator results of LVT floor covering over its life cycle (landfilling end-of-life)**

The largest part of environmental impacts is caused during production
(modules A1-A3) and at waste processing for incineration end-of-life (module C4); comparably small impacts are caused during the transport of the product to the construction site.

Maintenance (module B2) is
presented for 1 year of product use, so its impact can be significant over the reference service life depending on the considered indicator.

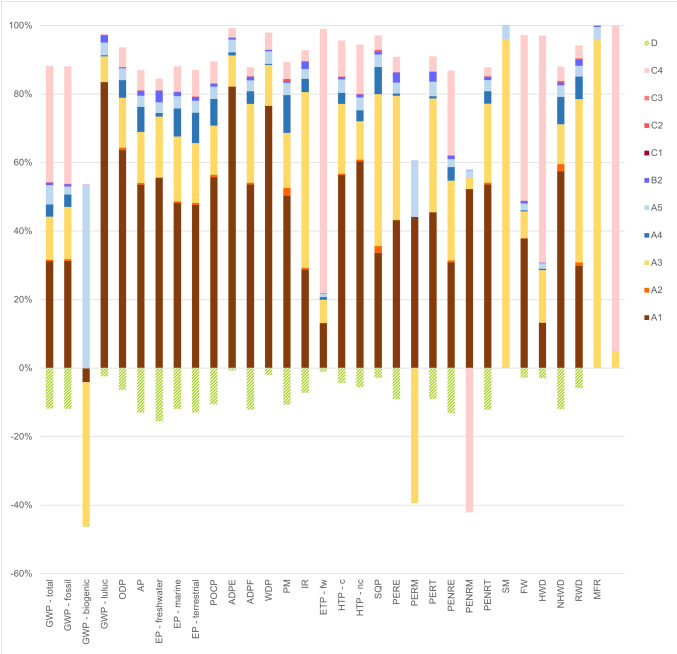


**Figure : Indicator results of LVT floor covering over its life cycle (incineration end-of-life)**

All the other modules related to the product life cycle are not significant.

For incineration end-of-life, benefits and burdens beyond the system boundary (module D) is about 5 to 15% of the impacts over the product life cycle (modules A-C) and relate to the energy recovery from waste processing in a waste incineration plant that is considered to substitute natural gas (heat) and electricity grid mix.

## 7. Requisite evidence

### 7.1 formaldehyde emissions

Determination of the formaldehyde emissions of a rigid LVT flooring according to according to *EN 16516* and evaluation according to different labels. – EPH Laboratory Chemical Testing – Zellescher Weg 24 – 01217 Dresden – Germany. - Test Report nr 2522498/3 on 'Unilin Vinyl Rigid 5 mm CL33'.

| Name | Value | Unit |
|---|---|---|
| Formaldehyde CAS nr 50-00-0 | < 5 | µg/m3 |

### 7.2 VOC emissions on 5mm rigid LVT flooring

Determination of the VOC emissions of a rigid LVT flooring according to *EN 16516* and evaluation according to different labels. – EPH Laboratory Chemical Testing – Zellescher Weg 24 – 01217 Dresden – Germany. - Test Report nr 2522498/3 on 'Unilin Vinyl Rigid 5 mm CL33'.

- Compliant with AgBB-Scheme 2018 and 2021
- Compliant with M1 Emission Classification of Building Materials (Testing protocol 15.11.2017)
- Compliant with the French VOC-Regulation: A+

**VOC EMISSION RESULTS (AgBB) AFTER 3 DAYS**

Measurements are not available.

**VOC EMISSION RESULTS (AgBB) AFTER 28 DAYS**

| Name | Value | Unit |
|---|---|---|
| TVOC | < 5 | µg/m3 |
| R (dimensionless) | 0 | |
| VOC without LCI | < 5 | µg/m3 |
| Carcinogens | < 1 | µg/m3 |

### 7.2 VOC emissions on 5+1mm rigid LVT flooring

Determination of the VOC emissions of a LVT flooring according to according to *EN 16516* and evaluation according to different labels. – Eurofins Product Testing A/S – Smedeskovvej 38 – 8464 Galten - Denmark. - Test Report nr 392-2020-00452501_A_EN from November 24th 2020 on 'Layred 55'.

- Compliant with AgBB-Scheme 2018 and 2019
- Compliant with the French VOC-Regulation: A+

**VOC EMISSION RESULTS (AgBB) AFTER 3 DAYS**

| Name | Value | Unit |
|---|---|---|
| TVOC | 5,7 | µg/m3 |
| R (dimensionless) | 0,082 | |
| VOC wihout LCI | < 5 | µg/m3 |
| Carcinogens | < 1 | µg/m3 |

**VOC EMISSION RESULTS (AgBB) AFTER 28 DAYS**

| Name | Value | Unit |
|---|---|---|
| TVOC | < 5 | µg/m3 |
| R (dimensionless) | 0,000 | |
| VOC without LCI | < 5 | µg/m3 |
| Carcinogens | <3 | µg/m3 |

## 8. References


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**EN 15804**
EN 15804:2012+A2:2019+AC:2021, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.

**EN ISO 14044**
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**ISO 14025**
EN ISO 14025:2011, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.

**ISO 14040**
ISO 14040:2006, Environmental management - Life cycle assessment - Principles and framework (ISO 14040); German and English version EN ISO 14040

**CEN/TR 15941**
Sustainability of construction works - Environmental product declarations - Methodology for selection and use of generic data; German version CEN/TR 15941

**ISO 16000-3:2011**
ISO 16000-3:2011 – Indoor air – part3: Determination of formaldehyde and other carbonyl compounds in indoor air and test chamber air – Active sampling method.

**ISO 16000-6:2011**
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