ENVIRONMENTAL PRODUCT DECLARATION

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

Owner of the Declaration	Torlys Inc.
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-TOR-20250246-ICA1-EN
Issue date	15.01.2024
Valid to	14.01.2029

TORLYS Smart Laminate

TORLYS Inc.

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

TORLYS
smart floors

1. General Information

TORLYS Inc.

Programme holder

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

Declaration number

EPD-TOR-20250246-ICA1-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.)

TORLYS Smart Laminate

Owner of the declaration

Torlys Inc.
Derry Road East 1900
ONL5S Mississauga
Canada

Declared product / declared unit

1 m² of direct pressure laminate (DPL) floor covering of 7 mm thickness .

Scope:

The laminate floor covering described in this EPD has a thickness between 7 mm and 12 mm and meets the requirements of the *EN14041:2006* and the use classes between 31 and 34 according to *EN 13329* and *EN ISO 10874*.

The results are representative of production in Belgium.

The products are available under following brandnames: Torlys Smart Laminate
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

DPL (Direct Pressure Laminate) floor coverings described in this EPD meet the requirements of *EN 13329*. DPL laminate floorings are made up of a number of layers. On the top side, there is a decor with a transparent, wear-resistant contact surface; in the middle, there is a core layer made of high density wood fibre and on the back side, there is a stabilizing layer to guarantee floor stability. The decorative paper of DPL floor covering can be printed with any design and gives the floor its individual appearance. The planks have a mechanical and patented connection.

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 EN14041:2004 AC 2006 Resilient, textile and laminate floor coverings - Essential characteristics and the CE-marking.

2.2 Application

The laminate floor covering as described in this EPD is used as a floating modular flooring system for indoor use and meets the requirements of the use classes: between 31 and 34 according to *EN 13329* and *EN ISO 10874*.

2.3 Technical Data

The technical specifications of the products within the scope of the EPD shall be listed, including the reference to the test methods/test standards for each specification.

For products with CE marking, the technical specifications must be specified in accordance with information in the declaration of performance. The properties relevant to the product should be specified in the table below. If no information is given for properties, an explanation must be given in the background report to the EPD as to why the property is not relevant to the product.

Constructional data

Name	Value	Unit
Product minimum thickness	7	mm
Product maximum thickness	12	mm
Product minimum mass (7 mm thickness)	6.4	kg/m²
Product maximum mass (12 mm thickness)	11.0	kg/m²
Abrasion Class	AC4-AC6	-
Product Form	panel	-
Density	910	kg/m^3

- 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*.

2.4 Delivery status

Typical standard dimensions are as follows (length - width - thickness):

- 1200mm x 190mm x 7mm
- 1200mm x 190mm x 8mm
- 1200mm x 396mm x 8mm
- 1224mm x 408mm x 8mm
- 1380mm x 156mm x 8mm
- 1380mm x 190mm x 8mm
- 1380mm x 190mm x 8mm
- 1380mm x 190mm x 12 mm
- 1380mm x 212mm x 9mm
- 1380mm x 278,5mm x 8mm
- 2050mm x 205mm x 9,5mm
- 2050mm x 240mm x 9,5mm
- 1380mm x 190mm x 9mm

2.5 Base materials/Ancillary materials

The composition of a DPL floor covering in mass % is:

- 90-96 % High Density Wood Fibre board (HDF)
- 2-4 % paper
- 4-6 % resin
- <1 % corundum

HDF (high density wood fibreboard)
The core board is an HDF board >850kg/m³ composed of wood fibers and a thermosetting resin, mainly MUF (melamine-urea-formaldehyde) resin.

Paper
The renewable resource wood is the main raw material for paper production.

Resins
The used amino resins are melamine-formaldehyde (95%) and urea formaldehyde (5%) resins. Amino resins are thermosetting resins that are cured using heat and pressure.

Corundum
Bauxite is the mineral resource of corundum. By using aluminium oxide (Al2O3) the surface layer of a laminate flooring obtains abrasion and scratch resistance.

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

Impregnation & Resin production:
The resin production is included in the LCA. The different components are mixed together and used to impregnate the different paper layers (overlay, décor and backing).

Pressing:
The resin impregnated papers (overlay, décor and backing) are pressed under heat with the HDF core board in a single stage process. In this process the resin cures and the different layers are laminated together. The surface structure, the final gloss and the bevelled edges for some products are applied during the pressing phase.

Cutting and milling:
The pressed boards are cut to size and equipped with a tongue and-groove assembly system. Eventually the boards are provided with a bevelled edge.

Packaging:
The laminate floorings are unit-packed and edge-protected

using cardboard boxes (5 sided) and shrink-wrapped in foil.

Laminate floor coverings are intended for use as floor covering within a building. According to the area of application floor coverings are classified in use classes.

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 related waste water from the HDF production process is purified in a wastewater treatment plant. The use of water in the DPL flooring production process is negligible. Where water is needed, it either evaporates or is re-used in the internal water loop.
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.

2.8 Product processing/Installation

Laminate 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 laminate floor coverings in order to achieve a levelling effect, thermal or acoustical insulation and/or protection against rising dampness.

2.9 Packaging

Packaging requirements according to *EN 13329: Laminate floor coverings* are delivered in packages designed to protect the corners, edges and surfaces of the product, under normal conditions of transport and handling. Laminate flooring is accordingly unit-packed and edge-protected using ribbed cardboard and shrinkwrapped in foil. Pallets are finally used for the delivery. The pallets can also be reused.

2.10 Condition of use

A thermosetting binding agent and saturating resin are used for the production of the flooring panels. When heat and pressure are applied during the pressing phase, this is 3D crosslinked by an irreversible polycondensation reaction. Under normal conditions, the binding agent and saturating resin are both chemically stable and mechanically firmly bonded to the wood parts.

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 DPL floor coverings. This is in line with the current state of knowledge.

2.12 Reference service life

The BBSR Table gives a general useful life of **20 years** for floor coverings of component group 352.711. Due to the comparatively high resistance of the laminate floorings. The use stage is declared in this EPD for a one year usage.

Influences on ageing when applied in accordance with the rules of technology.

2.13 Extraordinary effects

Fire
The reaction to fire is determined according to *EN 13501-1*. The class for laminate floors in combination with all underlays of the sales program is **Cfl-s1**. **The classes 33 and 34 in the range are usually Bfl-s1.**

Fire protection

Name	Value
Building material class	Cfl or Bfl
Smoke gas development	s1

Water
In case of a leak or a flood where the flooring has been soaked for a longer period of time (days) the flooring will most probably be considered a total loss. In case of short or shorter time of exposure and after drying, no visible damage may be expected. If the water came under the floorcovering (floating installation) it may be necessary to un-click the planks/tiles and let them dry. The subfloor will most probably also be wet and should be given the time to come to equilibrium moisture content before re-installation of the dry panels. Most of the laminate ranges offer a special water resistance and a watertight connection 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. 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 laminate floor covering which is not at the end-of-life stage may be uninstalled and re-used as a floor covering. Post-consumer laminate floor covering waste can be recycled as wood based products. When appropriate recycling facilities do not exist, laminate floor coverings shall be thermally valorized.

2.15 Disposal

Post-installation and post-consumer flooring panels are considered as wood waste. The European Waste Code *EWC* is 030105. It can be disposed in any regulated municipal waste collection point as wood waste.

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.torlys.com.

3. LCA: Calculation rules

3.1 Declared Unit

The declared unit is 1 m² laminate flooring with a thickness of 7 mm and a weight of 6.4 kg. It has the use class 32 as this is the most common product.

Declared unit and mass reference

Name	Value	Unit
Declared unit	1	m^2
Grammage	6.46	kg/m^2
Layer thickness	0.007	m

3.2 System boundary

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

The production stage (A1-A3) includes all relevant processes from "cradle-to-factory gate" within the cutoff rules. This includes for example the extraction and manufacture of all raw materials and their delivery to the production site.
The constructional process stage includes the delivery of the floor covering to the point of installation (A4). A4 data are based on a weighted average distance for worldwide deliveries.

Installation stage (A5) is declared, accounting for electricity consumption, product installation losses, and packaging waste.

The use stage (B2) includes the cleaning of the laminate floor covering for 1 year. The cleaning frequencies are described in chapter 4. Provision of water, cleaning agent and electricity for the cleaning of the floor covering is considered.

Product end-of-life (C1-C3) comprises the product dismantling, transportation, and energy recovery in combined heat and power (CHP) plant. In module C3 the release of biogenic CO2 is declared according to *EN 16485*.

Module D includes benefits from all net flows in the end-of-life stage that leave the product boundary system after having passed the end-of-waste state. It is assumed that post-consumer flooring waste is incinerated as waste in a combined heat and power (CHP) plant. Loads from material incineration and resulted benefits from recovered energy are declared within module D.

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 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	2.49	kg C
Biogenic carbon content in accompanying packaging	0.109	kg C

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

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	724	km
Transport distance by boat	3029	km
Capacity utilisation (including empty runs) for truck	67	%

Installation in the building (A5)

Name	Value	Unit
Electricity consumption	0.04	kWh
Product installation losses	4.0	%
Product packaging waste	0.23	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
Collected separately waste type (wood waste)	6.46	kg
Energy recovery from waste	6.46	kg

100% of floor covering is incinerated in a combined heat and power (CHP) plant.

Benefits and loads beyond the product system (D)
As per *IBU* PCR Part A, recovered heat is assumed to substitute to heat generation from natural gas furnace for the calculation of benefits and loads beyond the product system (module D). Produced electricity is assumed to substitute to grid mix.

5. LCA: Results

The results refer to the thickness of 7 mm (6.46 kg/m²) with use class 32. The information on maintenance is declared per year.

DPL laminate floor coverings are available in different thicknesses. 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-A3, A4, A5, B2, C3 and D the LCA results of the declared product (thickness 7 mm) in following tables have to be multiplied with these factors.

Indicator	A1	A2	A3	A4	A5	B2	C2	C3	D
GWP - total	0,96	1,13	1,19	1,13	1,16	1,00	1,13	1,10	1,14
GWP - fossil	1,22	1,13	1,18	1,13	1,17	1,00	1,13	1,13	1,14
GWP - biogenic	1,09	1,13	1,11	1,13	1,14	1,00	1,13	1,10	1,14
GWP - luluc	1,12	1,13	1,13	1,13	1,12	1,00	1,13	1,13	1,14
ODP	1,00	1,13	1,01	1,13	1,00	1,00	1,13	1,13	1,14
AP	1,22	1,12	1,18	1,13	1,19	1,00	1,13	1,13	1,14
EP - freshwater	1,19	1,13	1,16	1,13	1,13	1,00	1,13	1,13	1,14
EP - marine	1,20	1,12	1,17	1,13	1,17	1,00	1,13	1,13	1,14
EP - terrestrial	1,20	1,12	1,17	1,13	1,18	1,00	1,13	1,13	1,14
POCP	1,20	1,12	1,16	1,13	1,17	1,00	1,13	1,13	1,14
ADPE	1,26	1,13	1,23	1,13	1,23	1,00	1,13	1,13	1,14
ADPF	1,22	1,13	1,16	1,13	1,18	1,00	1,13	1,13	1,14
WDP	1,25	1,13	1,22	1,13	1,24	1,00	1,13	1,13	1,14
PM	1,20	1,13	1,18	1,13	1,19	1,00	1,13	1,13	1,14
IR	1,17	1,13	1,14	1,13	1,15	1,00	1,13	1,13	1,14
ETP - fw	1,29	1,13	1,23	1,13	1,23	1,00	1,13	1,13	1,14
HTP - c	1,15	1,13	1,14	1,13	1,14	1,00	1,13	1,13	1,14
HTP - nc	1,21	1,13	1,17	1,13	1,18	1,00	1,13	1,13	1,14
SQP	1,10	1,13	1,11	1,13	1,10	1,00	1,13	1,13	1,14
PERE	1,13	1,13	1,11	1,13	1,11	1,00	1,13	1,09	1,14
PERM	1,09	1,00	1,13	1,00	1,13	1,00	1,00	1,09	1,00
PERT	1,10	1,13	1,12	1,13	1,10	1,00	1,13	1,13	1,14
PENRE	1,17	1,13	1,16	1,13	1,18	1,00	1,13	1,36	1,14
PENRM	1,39	1,00	1,14	1,00	1,13	1,00	1,00	1,39	1,00
PENRT	1,22	1,13	1,16	1,13	1,18	1,00	1,13	1,13	1,14
SM	1,04	1,00	1,13	1,00	1,13	1,00	1,00	1,00	1,00
RSF	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
NRSF	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
FW	1,24	1,13	1,21	1,13	1,23	1,00	1,13	1,13	1,14
HWD	1,20	1,13	1,16	1,13	1,17	1,00	1,13	1,13	1,14
NHWD	1,24	1,13	1,20	1,13	1,21	1,00	1,13	1,13	1,14
RWD	1,18	1,13	1,14	1,13	1,15	1,00	1,13	1,13	1,14
CRU	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
MFR	1,18	1,00	1,13	1,00	1,14	1,00	1,00	1,00	1,00
MER	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
EEE	1,15	1,00	1,14	1,00	1,14	1,00	1,00	1,14	1,00
EET	1,15	1,00	1,14	1,00	1,14	1,00	1,00	1,14	1,00

Extrapolation table - 8 mm thickness laminate floor covering

Indicator	A1	A2	A3	A4	A5	B2	C2	C3	D
GWP - total	1,13	1,26	1,31	1,27	1,28	1,00	1,27	1,24	1,27
GWP - fossil	1,33	1,26	1,30	1,27	1,29	1,00	1,27	1,27	1,27
GWP - biogenic	1,23	1,26	1,25	1,27	1,27	1,00	1,27	1,23	1,27
GWP - luluc	1,25	1,25	1,26	1,27	1,24	1,00	1,27	1,27	1,27
ODP	1,12	1,26	1,13	1,27	1,13	1,00	1,27	1,27	1,27
AP	1,34	1,23	1,31	1,27	1,31	1,00	1,27	1,27	1,27
EP - freshwater	1,29	1,26	1,28	1,27	1,22	1,00	1,27	1,27	1,27
EP - marine	1,36	1,23	1,31	1,27	1,32	1,00	1,27	1,27	1,27
EP - terrestrial	1,35	1,23	1,31	1,27	1,32	1,00	1,27	1,27	1,27
POCP	1,35	1,24	1,31	1,27	1,31	1,00	1,27	1,27	1,27
ADPE	1,37	1,26	1,34	1,27	1,33	1,00	1,27	1,27	1,27
ADPF	1,34	1,26	1,29	1,27	1,30	1,00	1,27	1,27	1,27
WDP	1,36	1,26	1,33	1,27	1,35	1,00	1,27	1,27	1,27
PM	1,38	1,26	1,34	1,27	1,36	1,00	1,27	1,27	1,27
IR	1,34	1,26	1,28	1,27	1,29	1,00	1,27	1,27	1,27
ETP - fw	1,35	1,26	1,32	1,27	1,31	1,00	1,27	1,27	1,27
HTP - c	1,27	1,25	1,27	1,27	1,27	1,00	1,27	1,27	1,27
HTP - nc	1,35	1,26	1,31	1,27	1,32	1,00	1,27	1,27	1,27
SQP	1,23	1,26	1,25	1,27	1,24	1,00	1,27	1,27	1,27
PERE	1,28	1,26	1,25	1,27	1,25	1,00	1,27	1,23	1,27
PERM	1,23	1,00	1,26	1,00	1,27	1,00	1,00	1,23	1,00
PERT	1,24	1,26	1,25	1,27	1,24	1,00	1,27	1,27	1,27
PENRE	1,29	1,26	1,29	1,27	1,30	1,00	1,27	1,52	1,27
PENRM	1,55	1,00	1,27	1,00	1,27	1,00	1,00	1,55	1,00
PENRT	1,34	1,26	1,29	1,27	1,30	1,00	1,27	1,27	1,27
SM	1,09	1,00	1,27	1,00	1,26	1,00	1,00	1,00	1,00
RSF	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
NRSF	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
FW	1,35	1,26	1,32	1,27	1,34	1,00	1,27	1,27	1,27
HWD	1,30	1,25	1,28	1,27	1,28	1,00	1,27	1,27	1,27
NHWD	1,35	1,26	1,32	1,27	1,32	1,00	1,27	1,27	1,27
RWD	1,35	1,26	1,29	1,27	1,30	1,00	1,27	1,27	1,27
CRU	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
MFR	1,40	1,00	1,27	1,00	1,28	1,00	1,00	1,00	1,00
MER	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
EEE	1,29	1,00	1,27	1,00	1,27	1,00	1,00	1,27	1,00
EET	1,29	1,00	1,27	1,00	1,27	1,00	1,00	1,27	1,00

Extrapolation table - 9 mm thickness laminate floor covering

TORLYS
smart floors

ıdicator	A1	A2	A3	A4	A5	B2	C2	C3	D
GWP - total	1,28	1,32	1,34	1,33	1,33	1,00	1,33	1,31	1,34
GWP - fossil	1,34	1,32	1,34	1,33	1,32	1,00	1,33	1,33	1,34
GWP - biogenic	1,31	1,32	1,33	1,33	1,33	1,00	1,33	1,31	1,34
GWP - luluc	1,31	1,31	1,32	1,33	1,30	1,00	1,33	1,33	1,34
ODP	1,06	1,32	1,07	1,33	1,07	1,00	1,33	1,33	1,34
AP	1,37	1,29	1,35	1,33	1,35	1,00	1,33	1,33	1,34
EP - freshwater	1,32	1,32	1,33	1,33	1,24	1,00	1,33	1,33	1,34
EP - marine	1,39	1,29	1,36	1,33	1,36	1,00	1,33	1,33	1,34
EP - terrestrial	1,38	1,29	1,36	1,33	1,36	1,00	1,33	1,33	1,34
POCP	1,39	1,30	1,36	1,33	1,36	1,00	1,33	1,33	1,34
ADPE	1,38	1,32	1,37	1,33	1,35	1,00	1,33	1,33	1,34
ADPF	1,37	1,32	1,34	1,33	1,34	1,00	1,33	1,33	1,34
WDP	1,36	1,32	1,36	1,33	1,36	1,00	1,33	1,33	1,34
PM	1,42	1,32	1,39	1,33	1,41	1,00	1,33	1,33	1,34
IR	1,38	1,32	1,34	1,33	1,34	1,00	1,33	1,33	1,34
ETP - fw	1,36	1,32	1,35	1,33	1,34	1,00	1,33	1,33	1,34
HTP - c	1,30	1,32	1,31	1,33	1,30	1,00	1,33	1,33	1,34
HTP - nc	1,38	1,32	1,36	1,33	1,35	1,00	1,33	1,33	1,34
SQP	1,31	1,32	1,32	1,33	1,31	1,00	1,33	1,33	1,34
PERE	1,35	1,32	1,32	1,33	1,32	1,00	1,33	1,31	1,34
PERM	1,31	1,00	1,33	1,00	1,33	1,00	1,00	1,31	1,00
PERT	1,32	1,32	1,32	1,33	1,32	1,00	1,33	1,33	1,34
PENRE	1,32	1,32	1,34	1,33	1,34	1,00	1,33	1,54	1,34
PENRM	1,57	1,00	1,34	1,00	1,33	1,00	1,00	1,57	1,00
PENRT	1,37	1,32	1,34	1,33	1,34	1,00	1,33	1,33	1,34
SM	1,10	1,00	1,33	1,00	1,33	1,00	1,00	1,00	1,00
RSF	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
NRSF	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
FW	1,36	1,32	1,35	1,33	1,35	1,00	1,33	1,33	1,34
HWD	1,31	1,32	1,32	1,33	1,32	1,00	1,33	1,33	1,34
NHWD	1,37	1,32	1,36	1,33	1,35	1,00	1,33	1,33	1,34
RWD	1,40	1,32	1,35	1,33	1,35	1,00	1,33	1,33	1,34
CRU	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
MFR	1,46	1,00	1,33	1,00	1,34	1,00	1,00	1,00	1,00
MER	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
EEE	1,36	1,00	1,34	1,00	1,34	1,00	1,00	1,34	1,00
EET	1,36	1,00	1,34	1,00	1,34	1,00	1,00	1,34	1,00

Extrapolation table - 9.5 mm thickness laminate floor covering

Indicator	A1	A2	A3	A4	A5	B2	C2	C3	D
GWP - total	1,65	1,64	1,64	1,67	1,63	1,00	1,67	1,64	1,67
GWP - fossil	1,63	1,64	1,65	1,67	1,61	1,00	1,67	1,67	1,67
GWP - biogenic	1,64	1,64	1,69	1,67	1,66	1,00	1,67	1,64	1,67
GWP - luluc	1,63	1,63	1,65	1,67	1,60	1,00	1,67	1,67	1,67
ODP	1,10	1,64	1,13	1,67	1,12	1,00	1,67	1,67	1,67
AP	1,68	1,58	1,67	1,67	1,66	1,00	1,67	1,67	1,67
EP - freshwater	1,61	1,64	1,63	1,67	1,46	1,00	1,67	1,67	1,67
EP - marine	1,74	1,58	1,70	1,67	1,70	1,00	1,67	1,67	1,67
EP - terrestrial	1,72	1,58	1,69	1,67	1,69	1,00	1,67	1,67	1,67
POCP	1,73	1,60	1,70	1,67	1,69	1,00	1,67	1,67	1,67
ADPE	1,69	1,64	1,69	1,67	1,65	1,00	1,67	1,67	1,67
ADPF	1,68	1,64	1,67	1,67	1,64	1,00	1,67	1,67	1,67
WDP	1,67	1,64	1,67	1,67	1,66	1,00	1,67	1,67	1,67
PM	1,79	1,65	1,75	1,67	1,77	1,00	1,67	1,67	1,67
IR	1,72	1,64	1,68	1,67	1,67	1,00	1,67	1,67	1,67
ETP - fw	1,67	1,64	1,67	1,67	1,64	1,00	1,67	1,67	1,67
HTP - c	1,57	1,63	1,59	1,67	1,58	1,00	1,67	1,67	1,67
HTP - nc	1,71	1,65	1,69	1,67	1,67	1,00	1,67	1,67	1,67
SQP	1,64	1,65	1,65	1,67	1,64	1,00	1,67	1,67	1,67
PERE	1,68	1,64	1,66	1,67	1,65	1,00	1,67	1,64	1,67
PERM	1,64	1,00	1,66	1,00	1,67	1,00	1,00	1,64	1,00
PERT	1,65	1,64	1,66	1,67	1,64	1,00	1,67	1,67	1,67
PENRE	1,59	1,64	1,67	1,67	1,64	1,00	1,67	2,00	1,67
PENRM	2,04	1,00	1,65	1,00	1,67	1,00	1,00	2,05	1,00
PENRT	1,68	1,64	1,67	1,67	1,64	1,00	1,67	1,67	1,67
SM	1,19	1,00	1,66	1,00	1,65	1,00	1,00	1,00	1,00
RSF	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
NRSF	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
FW	1,66	1,64	1,66	1,67	1,65	1,00	1,67	1,67	1,67
HWD	1,58	1,64	1,63	1,67	1,61	1,00	1,67	1,67	1,67
NHWD	1,69	1,65	1,68	1,67	1,66	1,00	1,67	1,67	1,67
RWD	1,76	1,64	1,69	1,67	1,68	1,00	1,67	1,67	1,67
CRU	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
MFR	1,86	1,00	1,67	1,00	1,68	1,00	1,00	1,00	1,00
MER	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
EEE	1,72	1,00	1,68	1,00	1,67	1,00	1,00	1,67	1,00
EET	1,72	1,00	1,68	1,00	1,67	1,00	1,00	1,67	1,00

Extrapolation table - 12 mm thickness laminate floor covering

TORLYS
smart floors

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 direct pressure laminate floor covering

Parameter	Unit	A1	A2	A3	A4	A5	B2	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	-4.42E+00	1.51E-01	9.75E-01	9.74E-01	7.67E-01	2.29E-01	0	4.46E-02	9.26E+00	0	-7.3E+00
GWP-fossil	kg CO_2 eq	4.51E+00	1.51E-01	1.25E+00	9.73E-01	3.71E-01	2.25E-01	0	4.45E-02	1.44E-01	0	-7.29E+00
GWP-biogenic	kg CO_2 eq	-8.94E+00	4.87E-05	-2.82E-01	2.86E-04	3.96E-01	1.19E-03	0	1.45E-05	9.12E+00	0	-5.95E-03
GWP-luluc	kg CO_2 eq	1.01E-02	5.91E-05	2.8E-03	4.59E-04	5.71E-04	2.89E-03	0	1.72E-05	6.89E-05	0	-2.71E-03
ODP	kg CFC11 eq	1.23E-05	3.78E-08	1.73E-06	2.21E-07	5.73E-07	1.63E-08	0	1.12E-08	4.93E-09	0	-1E-06
AP	mol H^+ eq	3.28E-02	5.29E-04	7.74E-03	8.45E-03	2.22E-03	1.29E-03	0	1.43E-04	8.8E-03	0	-1.1E-02
EP-freshwater	kg P eq	1.91E-04	1.08E-06	4.49E-05	6.32E-06	1.33E-05	2.47E-05	0	3.2E-07	1.81E-05	0	-1.19E-04
EP-marine	kg N eq	7.87E-03	1.17E-04	2.23E-03	1.97E-03	5.77E-04	2.08E-04	0	3.15E-05	3.88E-03	0	-2.22E-03
EP-terrestrial	mol N eq	9.87E-02	1.3E-03	2.56E-02	2.19E-02	6.91E-03	1.95E-03	0	3.5E-04	4.57E-02	0	-2.47E-02
POCP	kg NMVOC eq	2.65E-02	4.95E-04	7.15E-03	6.3E-03	1.88E-03	5.35E-04	0	1.38E-04	1.05E-02	0	-7.98E-03
ADPE	kg Sb eq	5.57E-05	3.74E-07	1.02E-05	3.14E-06	3.01E-06	2.24E-06	0	1.11E-07	2.36E-06	0	-3.55E-06
ADPF	MJ	9.34E+01	2.46E+00	3.48E+01	1.44E+01	6.14E+00	4.78E+00	0	7.31E-01	2.31E+00	0	-1.31E+02
WDP	m^3 world eq deprived	5.57E+00	8.44E-03	1.05E+00	4.07E-02	2.74E-01	6.49E-02	0	2.51E-03	3.7E-02	0	-2.88E-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 direct pressure laminate floor covering

Parameter	Unit	A1	A2	A3	A4	A5	B2	C1	C2	C3	C4	D
PERE	MJ	2.8E+01	3.12E-02	2.81E+01	1.88E-01	8.31E+00	9.84E-01	0	9.3E-03	9.56E+01	0	-4.38E+00
PERM	MJ	9.44E+01	0	1.92E+00	0	-2.11E+00	8.77E-04	0	0	-9.39E+01	0	0
PERT	MJ	1.22E+02	3.12E-02	3E+01	1.88E-01	6.21E+00	9.85E-01	0	9.3E-03	1.67E+00	0	-4.38E+00
PENRE	MJ	7.57E+01	2.46E+00	3.4E+01	1.44E+01	6.99E+00	4.42E+00	0	7.31E-01	1.98E+01	0	-1.31E+02
PENRM	MJ	1.77E+01	0	7.87E-01	0	-8.54E-01	3.64E-01	0	0	-1.75E+01	0	0
PENRT	MJ	9.34E+01	2.46E+00	3.48E+01	1.44E+01	6.14E+00	4.78E+00	0	7.31E-01	2.31E+00	0	-1.31E+02
SM	kg	1.77E-03	0	7.86E-02	0	3.21E-03	3.28E-04	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0
FW	m^3	1.46E-01	2.86E-04	2.79E-02	1.46E-03	7.5E-03	4.2E-03	0	8.51E-05	6.12E-03	0	-2.06E-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 direct pressure laminate floor covering

Parameter	Unit	A1	A2	A3	A4	A5	B2	C1	C2	C3	C4	D
HWD	kg	1.9E-01	1.72E-03	5.99E-02	1.12E-02	1.73E-02	5.89E-03	0	5.06E-04	4.51E-02	0	-3.32E-02
NHWD	kg	3.35E+00	2.41E-01	6.85E-01	7.13E-01	2.15E-01	8.9E-02	0	7.21E-02	1.12E-01	0	-3.81E-01
RWD	kg	4.1E-04	1.67E-05	2.3E-04	9.79E-05	3.07E-05	3.39E-05	0	4.95E-06	2.44E-05	0	-2.31E-04
CRU	kg	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	1.37E-03	0	1.7E-02	0	7.36E-04	4.25E-04	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0	0	0	0
EEE	MJ	3.6E-01	0	1.82E+00	0	1.09E+00	1.48E-03	0	0	9.29E+00	0	0
EET	MJ	6.95E-01	0	3.5E+00	0	2.11E+00	2.86E-03	0	0	8.91E+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 direct pressure laminate floor covering

Parameter	Unit	A1	A2	A3	A4	A5	B2	C1	C2	C3	C4	D
PM	Disease incidence	9.26E-07	1.74E-08	1.82E-07	6.94E-08	4.98E-08	4.19E-09	0	5.2E-09	1.72E-07	0	-3.34E-08
IR	kBq U235 eq	3.29E-01	1.07E-02	2.51E-01	6.25E-02	2.66E-02	4.1E-02	0	3.17E-03	4.56E-02	0	-2.43E-01
ETP-fw	CTUe	2.7E+01	8.15E-01	5.83E+00	4.89E+00	1.85E+00	8.04E-01	0	2.42E-01	3.42E+00	0	-4.84E+00
HTP-c	CTUh	2.47E-08	5.32E-11	4.15E-09	4.17E-10	1.32E-09	1.1E-10	0	1.56E-11	1.69E-09	0	-8.6E-10
HTP-nc	CTUh	8.42E-08	1.67E-09	1.95E-08	8.35E-09	5.39E-09	2.98E-09	0	4.98E-10	4.8E-08	0	-1.24E-08
SQP	SQP	5.24E+02	2.8E+00	1.11E+02	8.68E+00	2.6E+01	1.05E+00	0	8.36E-01	6.8E-01	0	-6.02E+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

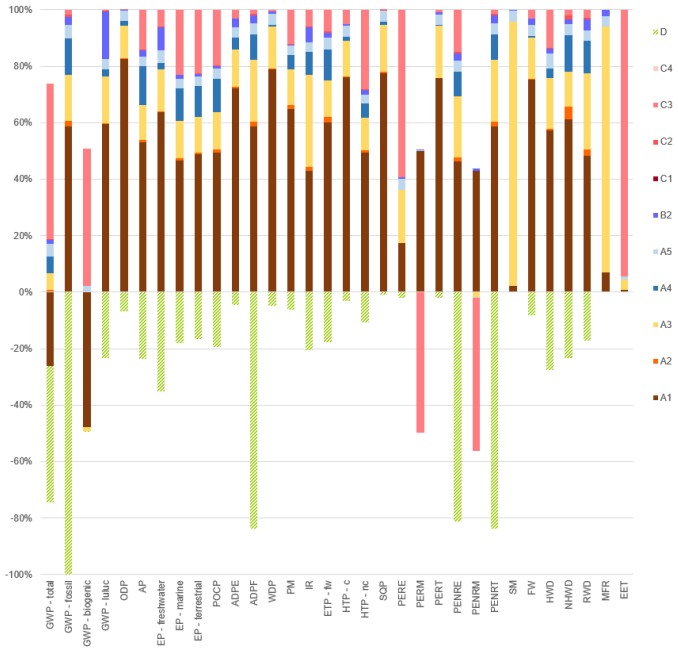

Figure : Indicator results of direct pressure laminate floor covering over its life cycle

The largest part of environmental impacts is caused during production (modules A1-A3) and at waste processing (module C3); 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.

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

Benefits and burdens beyond the system boundary (module D) vary from a few percent to about 100% (GWP - fossil) of the impacts over the product life cycle (modules A-C) and relate basically to the energy recovery from waste processing in a combined heat and power plant that is considered to substitute natural gas (heat) and electricity grid mix.

7. Requisite evidence

7.1 PEFC certificate

The product fulfills the requirements according to *PEFC ST 2002: 2010: Chain of Custody of Forest Based Products - Requirements,* second edition. CTIB - TCHN- Hof ter Vleest dreef 3 - 1070 Brussel - Belgium.

7.2 CE marking

CE-labelling according to *EN 14041*, type 3 – notified body: 0380-1161.

7.3 Formaldehyde emissions

Determination of the formaldehyde emission of a 12mm laminate flooring according to AgBB-Scheme, *ISO 16000* part 3, 6 and 9. by Servaco/Normec Product Testing - Honderweg 13 - 9230 Wetteren - Belgium. Emission test report of Unilin sample 'Unilin group laminate 12mm thickness' nr SPT2021-R190 from November 8th 2021.

Name	Value	Unit
Formaldehyde CAS nr 50-00-0	79	µg/m3

7.4 VOC emissions

Determination of the VOC emissions of a 12mm laminate flooring according to AgBB-Scheme, *ISO 16000* part 3, 6 and 9. by Servaco/Normec Product Testing - Honderweg 13 - 9230 Wetteren - Belgium. Emission test report of Unilin sample 'Unilin group laminate 12mm thickness' nr SPT2021-R190 from November 8th 2021.

- 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

Name	Value	Unit
TVOC	550	µg/m3
R (dimensionless)	0,104	
TVOC without LCI	< 5	µg/m3
Carcinogenous	< 1	µg/m3

VOC EMISSION RESULTS (AgBB) AFTER 28 DAYS

Name	Value	Unit
TVOC	110	µg/m3
R (dimensionless)	0.245	
VOC without LCI	6	µg/m3
Carcinogens	< 1	µg/m3

8. References

IBU 2021
Institut Bauen und Umwelt e.V.: General Instructions for the EPD programme of Institut Bauen und Umwelt e.V., Version 2.0, Berlin: Institut Bauen und Umwelt e.V., 2021 www.ibu-epd.com

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
Environmental management - Life cycle assessment - Requirements and guidelines (ISO 14044:2006); German and English version EN ISO 14044

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

EN/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
ISO 16000-6:2011 – Indoor air – part 6: Determination of volatile organic compounds in indoor and test chamber air by active sampling on Tenax A sorbent, thermal desorption an gas chromatography using MS of MS-FID

ISO 16000-9:2006
ISO 16000-9:20006 – Indoor air – part 9: Determination of the emissions of volatile organic compounds from building products and furnishing – Emission test chamber method.

EN ISO 10874:2012
EN ISO 10874:2012/A1:2021Resilient, textile and laminate floor coverings - Classification

EN 14041:2004
EN 14041:2004 AC 2006 – Resilient, textile, laminate and modular multilayer floor coverings - Essential characteristics Resilient, textile and laminate floor coverings

EN 13329:2016
EN 13329:2016+A2:2021
Laminate floor coverings - Elements with a surface layer based on aminoplastic thermosetting resins - Specifications, requirements and test methods

prEN 13329:2023
Laminate floor coverings - Specifications, requirements and test methods
Bundesinsitut für Bau-, Stadt- und Raumforschung.

EWC-94/3/EC
Commission Decision of 20 December 1993 establishing a list of wastes pursuant to Article 1a of Counsil Directive 74/442/EEC on waste, 1993 - European Waste Catalogue and Hazardous Waste List valid from 1 January 2002.

ecoinvent
ecoinvent, Allocation, cut-off by classification, ecoinvent database version 3.8 (2021)

PCR Guidance – Texts for Building-Related Products and

Services – Part B: Requirements on the EPD for floor coverings - IBU Published v6 dated 19.10.2023
The literature referred to in the Environmental Product Declaration must be listed in full.Standards already fully quoted in the EPD do not need to be listed here again.
The current version of PCR Part A and PCR Part B of the PCR document on which they are based must be referenced.

Publisher

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

+49 (0)30 3087748- 0
info@ibu-epd.com
www.ibu-epd.com

Programme holder

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

+49 (0)30 3087748- 0
info@ibu-epd.com
www.ibu-epd.com

Author of the Life Cycle Assessment

EVEA
rue Arthur III, 11
44200 Nantes
France

+33 2 28 07 87 00
contact@evea-conseil.com
www.evea-conseil.com/en

Owner of the Declaration

Torlys Inc.
Derry Road East 1900
ONL5S Mississauga
Canada

1-800-461-2573
customerservice@torlys.com
www.torlys.com