EPD
INTERNATIONAL EPD SYSTEM

epd-norway
Global Program Operator

EPD® International ref. number
EPD-IES-0024034

Environmental Product Declaration

ECO PLATFORM EPD VERIFIED

In accordance with ISO 14025 and EN 15804

Resilience Floor (LVT2mm, LVT 2.5mm and SPC 4mm)

LZL FLOORS

The Norwegian EPD Foundation

Owner of the declaration:
Changzhou Zhonglong Wood Co., Ltd.

Product name:
Resilience Floor (LVT2mm, LVT 2.5mm and SPC 4mm)

Declared unit:
1m^2

Product category /PCR:
NPCR PART A: Construction products and services Version 2.0

Program holder and publisher:
The Norwegian EPD foundation

Declaration number:
NEPD-11238-11183

Registration Number:
NEPD-11238-11183

Issue date: 27.05.2025

Valid to: 27.05.2030

General information

Product:

Resilience Floor (LVT2mm, LVT 2.5mm and SPC 4mm)

Program holder:

The Norwegian EPD Foundation

Post Box 5250 Majorstuen, 0303 Oslo, Norway

Phone: +47 23 08 80 00

E-mail: post@epd-norge.no

Declaration Number:

NEPD-11238-11183

This declaration is based on Product Category Rules:

NPCR PART A: Construction products and services Version 2.0, 2021-03-24

Statements:

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

Declared unit:

1 m^2 resilience floor (LVT2mm, LVT 2.5mm and SPC 4mm)

Declared unit with option:

A1-A3, A4, A5, B1-B7, C1-C4, D

Verification:

Independent verification of the declaration and data, according to ISO14025:2010

internal ☐ external ☑

Noh-hyun Lim

Noh-hyun Lim, IGSC Inc.

Independent verifier approved by EPD Norway

Owner of the declaration:

Changzhou Zhonglong Wood Co., Ltd.

Contact person: Shen Lijun

Phone: +86 15240503621

e-mail: zlservice@zlongfloor.com

Manufacturer:

Changzhou Zhonglong Wood Co., Ltd.

Place of production:

No.16 Xinhengcui Road, Henglin Town, Wujin District, Changzhou City Jiangsu Province,China.

Management system:

ISO 9001:2015 - Quality Management System

ISO 14001:2015 - Environmental Management System

Organisation no:

913204127280009271

Issue date: 27.05.2025

Valid to: 27.05.2030

Year of study:

05/2024 - 04/2025

Comparability:

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable.

The EPD has been worked out by:

Chao Wang, Ecovane

Approved

Manager of EPD Norway

Product

Product description:

Resilient flooring represents an innovative type of product of flooring, encompassing a wide variety of hard surface flooring products from vinyl and linoleum to rubber and cork. Resilient flooring product claims to be focused on durability (so more resilient), sustainability, affordability and stylish in design, according to the Resilient Floor Covering Institute (RFCI).

LZL LVT floor is very classic in vinyl floor family, which combines beautiful and realistic wood and tile patterns, with different specification and large selection of color. The products are water-proof and perfect in high moisture areas, basements, kitchens and bathrooms. LZL SPC floor is an upgrade and improvement of LVT that is manufactured with a rigid stone plastic composite (SPC) core and easy strengthened locking system. Its' high-density core allows it to have greater indentation resistance and dimensional stability than other luxury vinyl. According to the annual yield, SPC 4mm accounts to the most as the representative product.

Product specification:

Vinyl flooring is made primarily from calcium carbonate (limestone), polyvinyl chloride (PVC), plasticizers, additives (i.e. pigments and stabilizers). The targeted products for this project are two categories of LZL Floors products: LVT and SPC, including SPC 4mm, LVT 2mm and LVT 2.5mm.

Raw material	SPC 4mm	LVT 2mm	LVT 2.5mm
Stone powder	72.73%	61.40%	62.80%
PVC	27.10%	29.66%	28.39%
Acrylic resin	0.17%	0.32%	0.26%
Carbon black	/	0.18%	0.15%
Processing aids	0.01%	/	/
Lubricant	0.00%	/	/
Stabilizer	0.00%	0.62%	0.51%
DOTP	/	7.82%	7.90%

Technical data:

Product	Thickness (mm)	Length (mm)	Width (mm)	Fire resistance
SPC 4mm	4	600-1800	125-465	Bfl / s1
LVT 2mm	2	590-1219.2	118-474.4	
LVT 2.5mm	2.5	590-1219.2	118-474.4	

Market:

Global

Reference service life:

20 years

LCA: Calculation rules

Declared unit:

The declared unit is 1 m^2 of LVT2mm, LVT 2.5mm and SPC 4mm resilient flooring tile.

Cut-off criteria:

- All inputs and outputs to a (unit) process will be included in the calculation for which data is available. Data gaps may be filled by conservative assumptions with average or generic data. Any assumptions for such choices will be documented;
- In case of insufficient input data or data gaps for a unit process, according to the PCR requirement, the cut-off criteria chosen is 1% of renewable and non-renewable primary energy usage and 1% of the total mass of that unit process. The total neglected input flows of the cradle to grave stage, e.g. per module A1-A3, A4-A5, B1-B5, B6-B7, C1-C4 and module D shall be a maximum of 5% of energy usage and mass.

Allocation:

- For data sets in this study, the allocation of the inputs from coupled processes is generally carried out via the mass. For literature data, the source is generally referred to. Specially in allocating the energy within the production site i.e. electricity, natural gas and etc and some other raw material such as water and etc, allocation is via both mass or size of the product produced on a yearly average. The principle for choosing the mass and size is based on the relationship of the input to the output (of product) to the environmental impacts.
- In this report, in plant recycling for substrate production is assumed as a close loop, meaning all of the environment impact from recycling of substrate scraps, and flooring scraps from cutting and edging treatment and benefit of using recycled material to avoid waste treatment for production are allocated to the process of flooring production.
- In this study, there is no other by-products produced from the production line, hence there is quite little occasion that requires allocation for multi-output processes. One allocation occurs on the environmental emissions allocation, especially in the area of waste treatment. In the end of life stage, the allocation within the disposal scenario follows mass allocation, which applies to waste treatment process inventory adopted from Ecoinvent data.

Data quality:

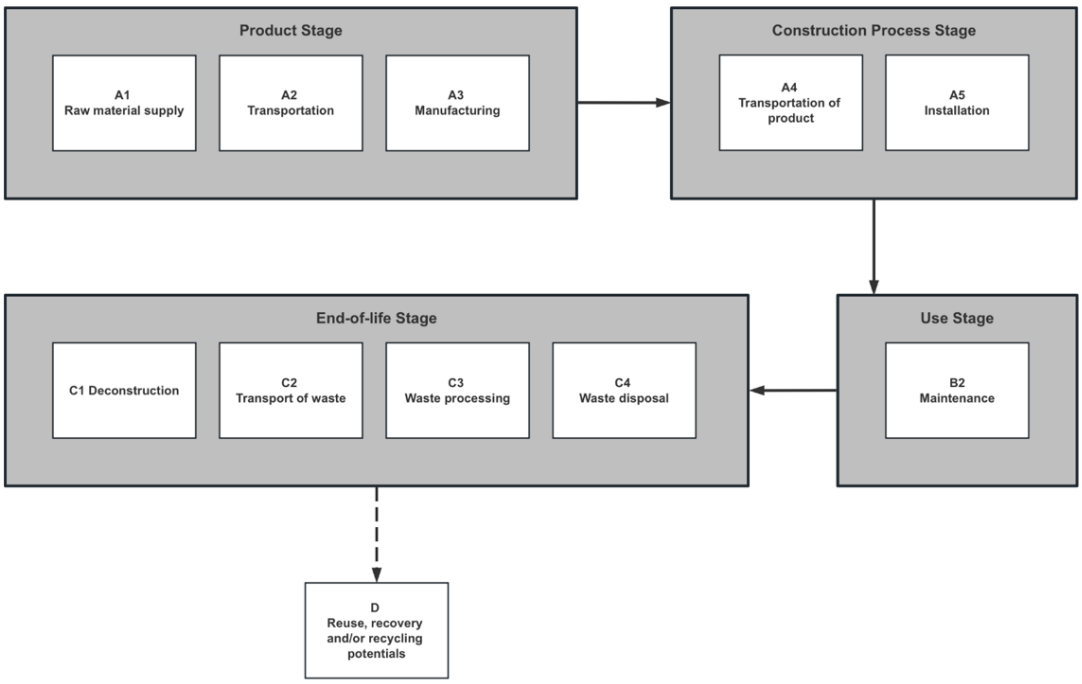
The data quality requirements for this study were as follows:

- Existing LCI data were, at most, 10 years old. Newly collected LCI data were current or up to 3 years old.
- The LCI data related to the geographical locations in which the processes occurred, e.g. electricity and transportation data from China, disposal in Europe and etc.
- The technology represented the average technologies at the time of data collection.

Others:

The EN 15804 standard covers Environmental Product Declarations (EPDs) of Construction Products. The 2019:A2 revision of this standard has aligned their methodology with the EF 3.1 method.

System boundary:



- Modules A1-A5 are included in the analysis, which include the extraction and production of raw materials, transportation to the factory, the production process itself and transportation and assembly.
- Stage B2 is included in the analysis, which include the use and maintenance Scenario of product.
- C1-C4 are included in the analysis. It includes the end-of-life stage.
- Section D is also included. It describes the Reuse-Recovery-Recycling-potential.

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

Transport from production place to assembly/user (A4)

According to LZL Floors, most of flooring product are consumed in Europe, North America and the Asian-Pacific region.

Market location	Distance (km)	Vehicle
EU	1000	Lorry
	24000	Container via Ship
North America	1000	Lorry
	20000	Container via Ship
the Asian-Pacific region	1000	Lorry
	16000	Container via Ship

Assembly (A5)

According to LZL Floors, the target market of flooring products including North America, Europe and the Asian-Pacific region. The disposal of packaging materials will adopt a rough country and region weighted average disposal mode following literature review.For packaging disposal in North America, the waste disposal scenario from US is set default, and for packaging disposal in the Asian-Pacific region, the waste disposal scenario from Australia is set default, as US and Australia are the main markets in North America and the Asia Pacific region according to LZL Floors.

Nation	Packaging type	Recycle	Landfill	Incineration
EU	paper	81.50%	9.30%	9.20%
	wood	32.00%	39.00%	29%
	plastic	37.60%	23.80%	38.60%
North America	paper	68.00%	26%	6.00%
	wood	17.00%	67%	16.00%
	plastic	8.50%	76%	15.50%
the Asian-Pacific region	paper	55.00%	45%	0%
	wood	80.00%	20%	0%
	plastic	13%	87%	0%

Maintenance (B2)

Very little effort is required in order to use LZL flooring product, hence in the usage stage the focus is put on maintaining the floor tile in terms of protecting its integrity and functionality. In normal condition, routine vacuuming, cleaning and surface conditioning is required.

Parameter	Value	Unit
RSL	20	years
Electricity	0.052	kWh/m2/a
Detergent	0.052	kg/m2/a

End of Life (C1, C2, C3, C4)

According to LZL Floors, most of flooring products are used in Europe, North America, and the Asian-Pacific region. The disposal of the used flooring product will adopt a region average disposal mode following literature review. End of life disposal treatment process (C4) from Ecoinvent will be used in this LCA study. For the waste scenario, 100km of road transportation (C2) from home to waste treatment site is assumed. According to LZL Floors, the flooring tile can be manually removed from the floor, hence input and output is omitted in deconstruction (C1), and waste processing (C3) stage of the tile life cycle.

Nation	Recycle	Landfill	Incineration
EU	50.8%	19%	30.2%
North America	18.5%	65.5%	16%
the Asian-Pacific region	80%	20%	0%

LCA: Results

EPD OF MULTIPLE PRODUCTS, BASED ON REPRESENTATIVE RESULTS (SPC 4mm)

Environmental impacts

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	9.38E+00	3.51E+00	4.45E-01	0	5.58E+00	0	0	0	0	0	0	1.63E-01	0	1.75E+00	-2.96E+00
GWP-fossil	kg CO2 eq.	9.74E+00	3.50E+00	6.54E-03	0	2.61E+00	0	0	0	0	0	0	1.63E-01	0	7.14E-01	-2.96E+00
GWP-biogenic	kg CO2 eq.	-3.74E-01	5.08E-04	4.38E-01	0	1.81E-01	0	0	0	0	0	0	2.56E-05	0	1.04E+00	-1.62E-03
GWP-luluc	kg CO2 eq.	6.32E-03	1.64E-03	1.06E-06	0	2.78E+00	0	0	0	0	0	0	6.56E-05	0	1.29E-04	-3.47E-03
ODP	kg CFC 11 eq.	1.91E-06	5.12E-08	3.49E-11	0	5.41E-08	0	0	0	0	0	0	2.43E-09	0	1.29E-09	-1.69E-08
AP	mol H+ eq.	4.07E-02	6.19E-02	1.80E-05	0	2.48E-02	0	0	0	0	0	0	6.80E-04	0	7.15E-04	-1.60E-02
EP-freshwater	kg PO4 eq.	2.36E-03	1.87E-04	7.52E-07	0	3.11E-02	0	0	0	0	0	0	1.28E-05	0	2.13E-04	-1.21E-03
EP-marine	kg N eq.	8.19E-03	1.62E-02	6.39E-05	0	2.48E-02	0	0	0	0	0	0	2.48E-04	0	3.19E-03	-2.91E-03
EP-terrestrial	mol N eq.	8.37E-02	1.79E-01	6.81E-05	0	8.34E-02	0	0	0	0	0	0	2.70E-03	0	2.76E-03	-2.96E-02
POCP	kg NMVOC eq.	3.47E-02	5.07E-02	3.21E-05	0	1.47E-02	0	0	0	0	0	0	9.42E-04	0	1.13E-03	-8.78E-03
ADPE	kg Sb eq.	7.27E-05	7.08E-06	3.77E-09	0	2.26E-05	0	0	0	0	0	0	5.26E-07	0	1.62E-07	-2.37E-06
ADPF	MJ, net calorific value	1.68E+02	4.59E+01	2.89E-02	0	2.94E+01	0	0	0	0	0	0	2.30E+00	0	1.06E+00	-3.60E+01
WDP	m3 world eq. deprived	1.99E+00	1.56E-01	1.21E-02	0	6.16E+00	0	0	0	0	0	0	1.04E-02	0	2.95E-01	-4.12E-01

GWP-total = Global Warming Potential total; GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment: EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

1. Discouraging the use of the results of modules A1-A3 (A1-A5 for services) without considering the results of module C.
2. The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

Additional environmental impacts

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	Disease incidence	4.63E-07	1.88E-07	2.30E-10	0	3.73E-07	0	0	0	0	0	0	1.33E-08	0	8.32E-09	-1.80E-07
IRP	kBq U235 eq.	4.84E-01	2.93E-02	5.27E-05	0	2.05E-01	0	0	0	0	0	0	1.89E-03	0	2.24E-03	-3.42E-01
ETP-fw	CTUe	6.20E+01	1.00E+01	1.11E+00	0	2.34E+02	0	0	0	0	0	0	6.10E-01	0	2.33E+01	-7.55E+00
HTP-c	CTUh	3.17E-08	1.64E-08	1.69E-11	0	1.64E-08	0	0	0	0	0	0	8.49E-10	0	9.15E-10	-3.68E-09
HTP-nc	CTUh	8.64E-08	1.99E-08	2.55E-10	0	9.37E-08	0	0	0	0	0	0	1.43E-09	0	1.67E-08	-1.69E-08
SQP	dimensionless	3.82E+01	1.55E+01	4.84E-02	0	1.76E+02	0	0	0	0	0	0	1.37E+00	0	1.52E+00	-7.99E+00
GWP-GHG	kg CO2 eq.	9.75E+00	3.51E+00	6.54E-03	0	5.40E+00	0	0	0	0	0	0	1.63E-01	0	7.14E-01	-2.96E+00
PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Potential Soil Quality Index (dimensionless)																

Resource use

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PENRE	MJ	4.78E+01	3.27E+00	4.81E-03	0	1.51E+01	0	0	0	0	0	0	2.23E-01	0	2.18E-01	-2.52E+01
PERE	MJ	6.51E+00	4.74E-01	7.75E-04	0	9.05E+01	0	0	0	0	0	0	3.03E-02	0	3.41E-02	-4.42E+00
PENRM	MJ	3.07E-01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERM	MJ	3.06E+00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	MJ	4.81E+01	3.27E+00	4.81E-03	0	1.51E+01	0	0	0	0	0	0	2.23E-01	0	2.18E-01	-2.52E+01
PERT	MJ	9.57E+00	4.74E-01	7.75E-04	0	9.05E+01	0	0	0	0	0	0	3.03E-02	0	3.41E-02	-4.42E+00
FW	m3	5.37E-02	4.80E-03	-2.73E-04	0	2.17E-01	0	0	0	0	0	0	3.12E-04	0	6.62E-03	-1.58E-02
SM	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RSF	MJ	0	0	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	0	0

End of life – Waste

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	2.86E-03	2.77E-04	2.03E-07	0	2.27E-04	0	0	0	0	0	0	1.59E-05	0	7.85E-06	-5.71E-05
NHWD	kg	5.87E-01	1.12E+00	7.97E-02	0	5.76E-01	0	0	0	0	0	0	1.08E-01	0	2.14E+00	-5.40E-02
RWD	kg	1.21E-04	7.16E-06	1.30E-08	0	5.05E-05	0	0	0	0	0	0	4.62E-07	0	5.52E-07	-8.35E-05

End of life – output flow

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
MER	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	1.17E+00	0
MFR	kg	0	0	0	0	0	0	0	0	0	0	0	0	1.98E+00	0	0
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Biogenic carbon content

Biogenic carbon content	Value	Unit
Biogenic carbon content in product	0	kg C
Biogenic carbon content in accompanying packaging (SPC 4mm)	0.110	kg C
Biogenic carbon content in accompanying packaging (LVT 2mm)	0.055	kg C
Biogenic carbon content in accompanying packaging (LVT 2.5mm)	0.061	kg C
NOTE 1 kg biogenic carbon is equivalent to 44/12 kg of CO2.		

Additional requirements

Greenhous gas emission from the use of electricity in the manufacturing phase

National production mix from import, medium voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing prosess(A3).

Electricity mix	Source	Amount	Unit
Electricity, ECGC (kWh)	Ecoinvent 3.10	0,884	kg CO2-eq/kWh
Electricity, Solar, JS (kWh)	Ecoinvent 3.10	0,091	kg CO2-eq/kWh

Dangerous substances

The product contains substances given by the REACH Candidate list that are less than 0,1 % by weight.

Variability of the LCIA results for EPD of multiple products

Indicator	Unit	A1-A3 variation
GWP-total	kg CO2 eq.	7.20%

Bibliography

ISO 14025:2010 Environmental labels and declarations - Type III environmental declarations - Principles and procedures.

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

EN 15804:2012+A2:2019 Environmental product declaration - Core rules for the product category of construction products.

NPCR PART A: Construction products and services Version 2.0

China Statistical Yearbook, 2021. National Bureau of Statistics of China.

epd-norge Global program operator	**Program Operator and publisher** The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo, Norway	Phone: +47 977 22 020 e-mail: post@epd-norge.no web: www.epd-norge.no
LZL FLOORS	**Owner of the declaration** Changzhou Zhonglong Wood Co., Ltd. No.16 Xinhengcui Road, Henglin Town, Wujin District, Changzhou City Jiangsu Province	Phone: +86 15240503621 e-mail: zlservice@zlongfloor.com Web: https://www.zlongfloor.com
EcoVane Knowledge for sustainable value	**Author of the life cycle assessment** Chao Wang, Ecovane	Phone: +86 17702120412 e-mail: wangchao@1mi1.cn
ECO PLATFORM EPD VERIFIED	ECO Platform ECO Portal	web: www.eco-platform.org web: ECO Portal