ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

EPD OF MUTIPLE PRODUCTS, BASED ON WORST-CASE RESULTS

VINYL FLOORING (LVT, SPC, WPC)

REPUBLIC FLOOR GMBH

Programme: The International EPD® System, www.environdec.com

Programme operator: EPD International AB

EPD registration number: S-P-11665

Publication date: 2024-02-23

Valid until: 2029-02-23

Geographical scope: China and Europe

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com.

GENERAL INFORMATION

COMPANY INFORMATION

Owner of the EPD	Republic Floor GmbH
Address	Lise-Meitner-Str.1, 82152 Krailling, München, Germany
Contact details	heansuh.lee@republicflooreu.com
Website	www.republicflooreu.com

PRODUCT IDENTIFICATION

Product name	Vinyl flooring (LVT, SPC, WPC)
Additional label(s)	None
Product number / reference	None
Place(s) of production	China
CPC code	36910 Floor coverings of plastics, in rolls or in the form of tiles

EPD INFORMATION

EPD programme	The International EPD® System
Address	EPD International AB Box 210 60, SE-100 31 Stockholm, Sweden
E-mail	info@environdec.com
EPD standards	This EPD is in accordance with EN 15804:2012 +A2:2019/AC:2021 and ISO 14025:2010 standards.
Product category rules	The CEN standard EN 15804 serves as the core PCR. In addition, the Int´l EPD System PCR 2019:14 Construction products, version 1.3.2 (2023-12-08) and c-PCR-004 Resilient, textile and laminate floor coverings (EN 16810:2017), version (2019-12-20) is used.
EPD author	Sally Xie, Intertek
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
Verification date	2024-02-23
EPD verifier	Rui Wang, IVL Swedish Environmental Research Institute
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ECO Platform nr.	-
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The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

PRODUCT INFORMATION

PRODUCT DESCRIPTION

Vinyl flooring product is made primarily from polyvinyl chloride (PVC), calcium carbonate (limestone), plasticizers, additives (such as pigments, stabilizers, lubricants, foaming agent, etc.). It is composed of one clear PVC embossed wear layer with a final UV coating, printing film layer for décor, substrate layer for structural strength and stability, and may include a backing (such as IXPE or Cork) to improve acoustic performance and increase comfort underfoot. The product is waterproof, easy to install and maintain.

In this EPD, it covers three types of vinyl flooring, LVT (luxury vinyl tile flooring), SPC (stone plastic composite vinyl flooring), and WPC (wood plastic composite vinyl flooring). All these three types of floorings are belonged to the vinyl flooring family. They were considered as similar products as they were manufactured by the same manufacturing site with the same major steps in the core processes. In this EPD, the result of each declared environmental performance indicator was based on the worst-case result of the included products, for the included modules from A to C.

PRODUCT APPLICATION

The products provide the primary function of flooring for interior applications. The flooring products are used in various residential and commercial applications including retail, healthcare, education, and hospitality.

TECHNICAL SPECIFICATIONS

Characteristics		LVT	SPC	WPC
Product thickness, mm		6.0	8.0	10.5
Wear layer thickness, mm		0.5	0.5	0.5
Backing thickness, mm		None	1.5mm IXPE	1.5mm Cork
Product weight, kg/m^2		11.235	13.8	10.459
Product form, tiles or planks	Width, mm	83~610	83~610	83~610
	Length, mm	100~2000	450~2200	100~2000

PRODUCT STANDARDS

EN ISO 10582:2018, EN ISO 10874:2012, EN 14041:2004/AC:2006(CE), EN 14041:2018, EN 16511:2014+A1:2019

PHYSICAL PROPERTIES OF THE PRODUCT

Characteristics	Test Method	Properties
Wear resistance, IP	EN 13329	≥ 4000 cycles
Wear resistance, IP	EN 15468	≥ 7000 cycles
Impact resistance (big ball)	EN 13329	≥ 1800mm
Castor chair resistance	ISO 4918	25000 cycles
Effect of furniture leg (type 0)	ISO 16581	No visible damage
Residual indentation	EN ISO 24343-1	≤0.3mm
Locking strength	ISO 24334	≥ 1.5 kN/m
Resistance to staining	EN 438-2	Grade 5
Colour fastness to artificial light	ISO 105-B02	≥Grade 6
Dynamic coefficient of friction	EN 13893	> 0.3
Reaction to fire	EN 13501-1	Class B_{fl}

ADDITIONAL TECHNICAL INFORMATION

Further information can be found at www.republicflooreu.com.

PRODUCT RAW MATERIAL AND PACKAGING COMPOSITION

Materials of Product and packaging for 1m^2

Product components		Weight, kg	Post-consumer material, weight- %	Biogenic material, weight % and kg C/kg
UV coating		0.015	0%	0%
Wear layer	PVC	0.457	0%	0%
	DOTP	0.1645	0%	0%
	Additives	0.0285	0%	0%
Printing film	PVC	0.072	0%	0%
	Additives	0.018	0%	0%
Substrate	PVC	1.830-2.680	0%	0%
	Calcium carbonate	5.790-9.676	0%	0%
	Others	0.304-0.792	0%	0%
Adhesive for IXPE		0-0.015	0%	0%
Backing - IXPE		0-0.150	0%	0%
Adhesive for Substrate		0-0.062	0%	0%
Adhesive for Cork		0-0.050	0%	0%
Backing - Cork		0-0.330	0%	100%, 0.5400 kg C/kg
TOTAL		10.459-13.800	0%	0-3.1552%, 0-0.0170 kg C/kg
Packaging materials		**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/kg**
Wood pallet		0.2250	1.6304%	0.3905
Corrugated board box		0.2300	1.6667%	0.3982
Packaging film		0.0036	0.0312%	0
TOTAL		0.4586	3.3283%	0.3913
Dangerous substances from the candidate list of SVHC for Authorisation		**EC No.**	**CAS No.**	**Weight-% per functional unit**
None		None	None	0%

PRODUCT LIFE-CYCLE

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. The study also considers the material losses occurring during the manufacturing processes as well as handling of waste formed in the production processes at the manufacturing facilities.

The product stage of the vinyl flooring is divided into 3 modules: A1 “Raw material and supply”, A2 “Transport to the manufacturer” and A3 “Manufacturer”. The aggregation of the modules A1, A2 and A3 is a possibility considered by the EN 15804 standard. This rule is applied in this EPD.

A1, Raw material supply takes into account the extraction and processing of all raw materials and energy which occur upstream to the studied manufacturing process. Specifically, vinyl flooring raw material supply covers sourcing of PVC resin, calcium carbonate(limestone), plasticizers, additives (such as pigments, stabilizers, lubricants, foaming agent, etc.), wear layer, printing film, and backing (IXPE and Cork). Electricity and Heating is taken account for at least country specific mix.

The raw materials Calcium stearate and Zinc stearate of stabilizer for LVT, SPC, WPC were not in the background database, the stearic acid, zinc oxide and quicklime from Ecoinvent database was used for Stoichiometric calculation.

The raw material CPVC (Chlorinated Polyvinyl Chloride) for WPC product was not in the background database, it was substituted with PVC (Polyvinylchloride) from Ecoinvent database.

Sensitivity analysis is conducted in this study.

A2, Transport to the manufacturer. The transportation of the raw materials to the manufacturing site is studied in this module.

A3, Manufacturing. The manufacturing process of vinyl flooring product mainly includes:

Substrate preparation, the raw materials are first mixed and heated. The mixture is then calendared or extruded into a sheet to create substrate.

Laminating, the substrate is laminated with a printing film and wear layer.

UV coating, the semi-finished product is coated with a lacquer.

Cutting, the semi-finished product is cut into tiles or planks.

Profiling, the edge treatment is processed.

Backing attaching, an acoustic backing (IXPE or Cork) is bonded on the back side of the product if required.

Packaging, the finished product is packed into the corrugated board box, stacked on the wood pallet, and wrapped around with packaging film.

Quality checks are made at each step of the production process.

The environmental profile of these energy carriers (State Grid and Heat Corporation) is modelled for local conditions.

Packaging-related flows in the production process are included in the manufacturing module, i.e., packaging film, wood pallet and corrugated board box. Apart from production of packaging material, the supply and transport of packaging material are also considered in the LCA model.

Manufacturing site: Jiangsu Zhengyoung Flooring Decoration Material Co., Ltd.
Address: No.32 Cuibei, Henglin Town, Wujin District, Changzhou, Jiangsu, China

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

The construction process is divided into 2 modules: A4 “Transport to the building site” and A5 “Installation in the building”.

A4, Transport to the building site. This module includes transport from the production gate to the building site. Transport is calculated on the basis of a scenario with the parameters described. The average transportation distance from production plant to building site is 929 km transported by lorry and 10525 nautical miles (i.e., 19492 km) transported by ship.

A5, Installation in the building occur in this stage. Installation of the vinyl flooring is accomplished using hand tools with no energy consumption and associated emissions. During installation, approximately 5% of the vinyl flooring is lost as off-cuts. The additional production processes to compensate the loss is considered in this study. All flooring losses are collected for landfill disposal.
The impacts associated with packaging disposal are included with the installation phase. The packaging waste includes wood pallet, packaging film, and corrugated board box in A5. The end of life of packaging scenario is followed EU 27 waste management scenario.

Packaging	Recycling	Landfill	Incineration
Wood pallet	31.9%	19%	49.1%
Packaging film	37.6%	19%	43.4%
Corrugated board box	81%	19%	0%

PRODUCT USE AND MAINTENANCE (B1-B7)

This comprises the stages B1 to B7, but for floor coverings only stage B2 is considered as specified in the c-PCR.

The reference service life (RSL) of the vinyl flooring product is 15 years for commercial general use as stated by the manufacturer. The service life of the flooring may vary depending on the amount and nature of flooring traffic and the type and frequency of maintenance. This RSL is applicable as long as the product use complies with that defined by EN ISO 10582:2018 and EN ISO 10874:2012 for commercial general use.

Maintenance stage (B2)

According to the manufacturer, typical maintenance involves regular sweeping and damp mopping. The present assessment is based on a recommended weekly cleaning schedule including sweeping and mopping with a neutral detergent. The B2 scenario is as below, and the impact is studied with RSL of 15 years.

Parameter	Value	Unit
Maintenance process	weekly damp mopping	-
Water consumption	5.2	L/m^2/year
Clean detergent consumption	0.0104	kg/m^2/year

PRODUCT END OF LIFE (C1-C4, D)

The end-of life stage is divided into 4 modules: C1 “De-construction, demolition”, C2 “Transport to waste processing”, C3 “Waste processing for reuse, recovery and/or recycling”, C4 “Disposal”.

C1, De-construction. According to the manufacturer, the vinyl flooring can be manually removed from the floor. Hence no impact is considered during demolition (C1).

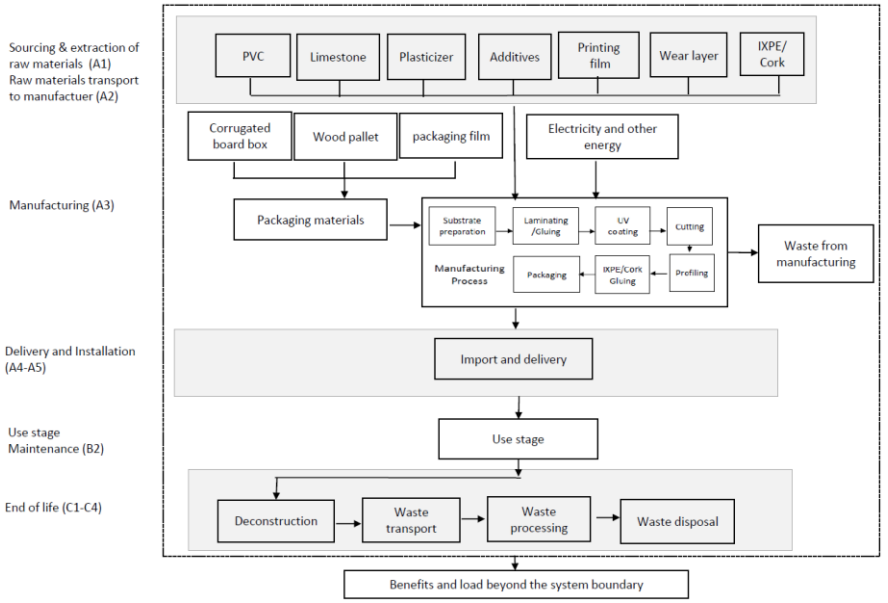
C2, Transport to waste processing. It is estimated that there is no mass loss during the use of the product, therefore the end-of-life product is assumed that it has the same weight with the declared product. All of the end-of-life product is assumed to be transported as separate construction waste to the closest facilities. Transportation distance to the closest disposal area is estimated as 100 km and the transportation method is lorry which is the most common.

C3, Waste processing for reuse, recovery and/or recycling. It is assumed 100% of the deconstructed vinyl flooring products (C1) to be sent to landfill. Hence, no waste processing is required.

C4, Disposal. The 100% of the deconstructed vinyl flooring products are assumed to be sent to landfill.

D, Reuse/recovery/recycling potential.
100% of vinyl flooring products are assumed to be sent to landfill.
No benefit or load resulting from reuse/recovery/recycling beyond the product system boundary.

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	2022

FUNCTIONAL UNIT

Functional unit	1m^2
Mass per functional unit	LVT: 11.235 kg SPC: 13.800 kg WPC: 10.459 kg
Reference service life	15 years

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content	
Biogenic carbon content in product, kg C	0
Biogenic carbon content in packaging, kg C	0.18

SYSTEM BOUNDARY

The system boundary is the cradle to grave and module D (A + B + C + D). All life cycle stages are analysed in the study, including: A1-A3 product stage, A4-A5 construction process stage, B use stage, C1-C4 end-of-life stage, and D benefits and loads beyond the system boundary.

Modules declared, geographical scope, share of specific data (in GWP-GHG indicator) and data variation:

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Geography	CN	CN	CN	CN to EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU
Specific data used	>90%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	-7% to 14%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019 and the applied PCR. The study does not exclude any hazardous materials or substances.

The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation.

In this study, as per EN 15804, allocation is conducted in the following order;

1. Allocation should be avoided.
2. Allocation should be based on physical properties (e.g., mass, volume) when the difference in revenue is small.
3. Allocation should be based on economic values.

Allocation used in Ecoinvent 3.8 environmental data sources follows the methodology 'allocation, cut-off by classification'. This methodology is in line with the requirements of the EN 15804-standard.

For data sets in this study, the allocation of the inputs is generally carried out via the mass. The consumption and transportation of raw materials was allocated by mass ratio.

In this study one allocation occurs on vinyl flooring products production, in allocating the input and output, i.e. energy within the production site such as electricity, natural gas and some other raw material such as water, emission such as off gas and waste water, among the various series of flooring products, allocation is done via total production (floor area with the unit as m^2) of all products produced on a yearly average.

During the production process of vinyl flooring, there are no other by-products produced from the production line, hence there is no occasion that requires allocation for multi-output processes.

For this project, there is only one production site. So, there is no allocation among plants.

ENVIRONMENTAL IMPACT DATA PER FUNCTIONAL UNIT (1m²)

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq.	1.90E+01	3.86E+00	2.00E+00	0.00E+00	6.49E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.30E-01	0.00E+00	2.15E+00	0.00E+00
GWP-fossil	kg CO_2 eq.	2.10E+01	3.86E+00	1.23E+00	0.00E+00	6.12E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.30E-01	0.00E+00	7.27E-02	0.00E+00
GWP-biogenic	kg CO_2 eq.	-1.03E+00	0.00E+00	0.00E+00	0.00E+00	1.39E-17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.09E+00	0.00E+00
GWP-Luluc	kg CO_2 eq.	8.88E-02	2.37E-03	4.55E-03	0.00E+00	3.69E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.78E-05	0.00E+00	6.86E-05	0.00E+00
ODP	kg CFC 11 eq.	9.79E-06	8.05E-07	5.28E-07	0.00E+00	7.69E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.98E-08	0.00E+00	2.94E-08	0.00E+00
AP	mol H^+ eq.	1.06E-01	9.03E-02	8.95E-03	0.00E+00	4.02E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.48E-04	0.00E+00	6.83E-04	0.00E+00
EP-freshwater	kg P eq.	9.89E-04	1.95E-05	5.07E-05	0.00E+00	3.70E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.06E-06	0.00E+00	7.62E-07	0.00E+00
EP-marine	kg N eq.	2.18E-02	2.25E-02	2.13E-03	0.00E+00	1.17E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.63E-04	0.00E+00	2.37E-04	0.00E+00
EP-terrestrial	mol N eq.	2.21E-01	2.50E-01	2.21E-02	0.00E+00	8.62E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.80E-03	0.00E+00	2.60E-03	0.00E+00
POCP	kg NMVOC eq.	6.73E-02	6.57E-02	6.21E-03	0.00E+00	2.24E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.75E-04	0.00E+00	7.57E-04	0.00E+00
ADP-minerals & metals*	kg Sb eq.	2.04E-04	6.53E-06	1.06E-05	0.00E+00	1.03E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.04E-07	0.00E+00	1.67E-07	0.00E+00
ADP-fossil*	MJ	3.49E+02	5.15E+01	1.98E+01	0.00E+00	9.31E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.95E+00	0.00E+00	1.99E+00	0.00E+00
WDP*	m^3	8.80E+00	1.81E-01	4.61E-01	0.00E+00	7.95E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.70E-03	0.00E+00	6.32E-03	0.00E+00
Acronyms	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															

**Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

ENVIRONMENTAL IMPACTS – GWP-GHG - THE INTERNATIONAL EPD SYSTEM

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG	kg CO_2 eq.	2.11E+01	3.86E+00	1.23E+00	0.00E+00	6.49E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.30E-01	0.00E+00	7.28E-02	0.00E+00

USE OF RESOURCES

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	6.70E+01	4.36E-01	3.38E+00	0.00E+00	2.07E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.19E-02	0.00E+00	1.73E-02	0.00E+00
PERM	MJ	1.52E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.63E+00	0.00E+00
PERT	MJ	8.22E+01	4.36E-01	3.38E+00	0.00E+00	2.07E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.19E-02	0.00E+00	-1.61E+00	0.00E+00
PENRE	MJ	2.42E+02	5.15E+01	1.45E+01	0.00E+00	8.35E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.95E+00	0.00E+00	1.99E+00	0.00E+00
PENRM	MJ	1.07E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-8.54E+01	0.00E+00
PENRT	MJ	3.49E+02	5.15E+01	1.45E+01	0.00E+00	8.35E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.95E+00	0.00E+00	-8.38E+01	0.00E+00
SM	kg	4.04E-01	2.02E-02	2.13E-02	0.00E+00	5.04E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.40E-04	0.00E+00	4.19E-04	0.00E+00
RSF	MJ	1.32E-01	9.25E-05	6.59E-03	0.00E+00	7.37E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.45E-06	0.00E+00	1.09E-05	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m3	2.18E-01	4.51E-03	1.12E-02	0.00E+00	9.69E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.52E-04	0.00E+00	2.18E-03	0.00E+00
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water															

END OF LIFE – WASTE

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste disposed	kg	1.71E+00	6.96E-02	8.91E-02	0.00E+00	5.24E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.58E-03	0.00E+00	0.00E+00	0.00E+00
Non-hazardous waste disposed	kg	2.26E+01	7.71E-01	1.98E+00	0.00E+00	9.36E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.24E-02	0.00E+00	1.38E+01	0.00E+00
Radioactive waste disposed	kg	4.39E-04	3.57E-04	3.79E-05	0.00E+00	2.11E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.30E-05	0.00E+00	0.00E+00	0.00E+00

END OF LIFE – OUTPUT FLOWS

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

SCENARIO DOCUMENTATION

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source and quality	LCA study for Reference product: electricity, medium voltage, China, Ecoinvent, year: 2021
Electricity CO_2e / kWh	1.06
District heating data source and quality	LCA study for Reference product: heat, district or industrial, natural gas, World, Ecoinvent, year: 2021
District heating CO_2e / kWh	0.1393

BIBLIOGRAPHY

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

ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.

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

Ecoinvent 3.8 (Allocation, cut-off, EN 15804) and One Click LCA database.

EN 15804:2012+A2:2019/AC:2021 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.

Int'l EPD System PCR 2019:14 Construction products, version 1.3.2 (2023-12-08) and c-PCR-004 Resilient, textile and laminate floor coverings (EN 16810:2017), version: 2019-12-20

Zhengyoung LCA background report 2024-01-04

ABOUT THE COMPANY

Republic Floor GmbH specializes in the distribution across Europe of innovative flooring solutions, focusing on cutting-edge materials such as SPC, LVT and WPC. The company offers a diverse range of high-quality flooring products, including imitation wood grain and stone grain options.

With state-of-the-art manufacturing facilities, Republic Floor GmbH operates multiple modern production lines. The company boasts an impressive monthly production capacity, capable of reaching 800 standard containers. This translates to nearly 1.6 million square meters of flooring produced each month, showcasing their commitment to meeting market demands.

Through continuous and steady development over recent years, Republic Floor GmbH has achieved remarkable success, consistently setting new performance records. The company's dedication to quality and innovation has contributed to its growing reputation as a leading player in the flooring industry.

EPD AUTHOR AND CONTRIBUTORS

Owner of the EPD	Republic Floor GmbH
EPD author	Sally Xie, Intertek
EPD verifier	Rui Wang, IVL Swedish Environmental Research Institute
EPD program operator	EPD International AB
Background data	This EPD is based on Ecoinvent 3.8 (Allocation, cut-off, EN 15804) and One Click LCA databases.
LCA software	The LCA and EPD have been created using One Click LCA Pre-Verified EPD Generator for Construction products

VERIFICATION STATEMENT

VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with EN 15804, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The background report (project report) for this EPD

Why does verification transparency matter? Read more online.

VERIFICATION OVERVIEW

Following independent third party has verified this specific EPD:

EPD verification information	Answer
Independent EPD verifier	Rui Wang, IVL Swedish Environmental Research Institute
EPD verification started on	2024-01-08
EPD verification completed on	2024-02-23
Approver of the EPD verifier	The International EPD System

Author & tool verification	Answer
EPD author	Sally Xie, Intertek
EPD author training completion	2022-11-04
EPD Generator module	Construction products
Independent software verifier	Ugo Pretato, Studio Fieschi & soci
Software verification date	2021-05-11

THIRD-PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of

- the data collected and used in the LCA calculations,
- the way the LCA-based calculations have been carried out,
- the presentation of environmental data in the EPD, and
- other additional environmental information, as present

with respect to the procedural and methodological requirements in ISO 14025:2010 and EN 15804:2012+A2:2019/AC:2021.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.

Rui Wang, IVL Swedish Environmental Research Institute