ERFMI
EUROPEAN RESILIENT FLOORING MANUFACTURERS' INSTITUTE

ERFMI - Environmental Product Declaration

Heterogeneous polyvinyl chloride floor coverings according to EN ISO 10582

This EPD was produced on 2018/11/13 and refers to:

PERGO 5mm (CL33) RIGID Optimum Click 10y

1. General Information

In this EPD resilient floor coverings are declared. The EPD follows the European standard EN 15804. The application of this EPD is restricted to floorings produced by the members of the European Resilient Flooring Manufacturers' Institute (ERFMI). Data are based upon production during 2011 in Europe. Data have been provided by members of ERFMI which represents 100% of ERFMI members.

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2. Product Information

2.1 Product description

Resilient floor coverings are an entire product family of flexible flooring solutions available in sheet, tiles and planks. It is classified in heterogeneous or homogeneous composition based on vinyl, linoleum, cork or rubber. Resilient floor coverings can provide different functionalities (acoustic, static control, slip resistance, easy maintenance etc.) to match a wide range of domestic, commercial and industrial applications. It is available in an enormous range of patterns and colours fitting with inspiration and decorative needs.

Heterogeneous polyvinyl chloride floor coverings consist of a wear layer and other compact layers which differ in composition and/or design and can contain reinforcement.

2.2 Application

According to ISO 10874 (EN 685) the area of application for resilient floor coverings is indicated by use classes. The declared product group covers the use classes 23, 34, 43.

2.3 Technical data

Technical construction data for the product group:

Constructional data	Value	Unit	Test standard
Product thickness	2	mm	EN ISO 24346
Surface weight	2.9	kg/m²	EN ISO 23997
Product Form	sheet		

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2.4 Base materials/ Ancillary materials

The product group has the following composition

Component	Value	Unit
Additives	2.4	%
Filler	24.8	%
Plasticizer	19.4	%
Pigments	0.7	%
Polymers (PVC)	39.6	%
Auxiliaries	1.6	%
Lacquer	0.8	%
Flooring Recyclate (PVC)	10.6	%

The declared recipes were checked with the REACH candidate list from June 18th, 2012 and did not contain listed REACH substances.

2.5 Reference service life

This EPD does not indicate RSL. Only module B2 (maintenance) is declared and the use stage scenario is independent on the life time of the product.

The declared modules in the table of results (chapter 5) refer to one life cycle of the floor covering with B2 (cleaning) being declared for a time period of 1 year(s).

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3. LCA: Calculation Rules

3.1 Declared Unit

1m² of installed floor covering.

Name	Value	Unit
Declared Unit	1	m²
Conversion factor to 1 kg	1/2.9	-

The declaration refers to an average product from production sites of all considered ERFMI members. The data have been weighted according to the annual square meters produced by each site. The life cycle impact assessment is conducted based on the vertical average.

3.2 System boundary

Type of EPD: 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.

Module A5 includes the production of adhesive for the installation of the floor covering, and incineration of off-cuts and packaging material.

Module B2 is including provision of cleaning agent, energy and water consumption for the cleaning of the floor covering incl. waste water treatment. The LCA results in this EPD are declared for 1 year(s) usage.

Module C1 considers electricity supply for the de-construction of the flooring.

Module C2 includes transportation of the post-consumer waste to waste processing.

End of life scenarios are declared for:

- 100% incineration in a waste incineration plant (WIP)
- 100% landfilling
- 100% recycling according to information from AgPR, (Arbeitsgemeinschaft PVC-Bodenbelag Recycling)

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Module D includes benefits from all net flows given in module A5 and C3 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.

3.3 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.

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4. LCA: Scenarios and additional technical information

The following technical information is a basis for the declared modules.

4.1 Transport to the construction site (A4)

Name	Value	Unit
Litres of fuel	0,0046	l/m²*100km
Transport distance	2000	km
Capacity utilisation (including empty runs)	85	%

4.2 Installation in the building (A5)

Name	Value	Unit
Auxiliary (adhesive)	0.3	kg
Material loss (installation waste)	6.0	%

4.3 Maintenance (B2)

Name	Value	Unit
Maintenance cycle (vacuum cleaning & wet cleaning)	156	number/a
Water consumption	0.003	m³
Auxiliary (detergent)	0.04	kg
Electricity consumption	0.55	kWh

4.4 End of Life (C1-C4)

Name	Value	Unit
Incineration	2.9	kg
Recycling	2.9	kg
Landfilling	2.9	kg

4.5 Reuse, recovery and/or recycling potentials (D), relevant scenario information

For module D the credits given in module A5 and C3 are declared. For waste incineration combustion in a WIP (R1 < 0.6) with energy recuperation is considered.

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5. LCA: Results

The results for module B2 refer to a period of 1 year(s).

Description of the system boundary (X=included in LCA; MND= not declared)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARYS
Raw material supply	Transport	Manufacturing	Transport	Construction-installation process	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	MND	X	MND	MND	MND	MND	MND	X	X	X	X	X

5.1 Results of the LCA - 1m² installed

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1m? installed

Parameter	Unit	A1-3	A4	A5	B2	C1	C2	C3/I	C3/L	C3/R	C4/I	C4/L	C4/R	D/I	D/L	D/R
GWP	[kg CO_2-eq.]	7.8E+00	3.0E-01	7.8E-01	4.3E-01	1.4E-02	2.7E-02	5.1E+00	0	0	0	2.1E-01	0	-1.4E+00	-1.5E-01	-1.5E-01
ODP	[kg CFC11-eq.]	1.7E-08	5.2E-12	2.7E-10	2.6E-10	1.3E-11	4.8E-13	7.2E-10	0	0	0	1.1E-10	0	-5.3E-10	-5.4E-11	-5.4E-11
AP	[kg SO_2-eq.]	1.6E-02	1.3E-03	1.2E-03	1.6E-03	6.8E-05	1.2E-04	5.3E-03	0	0	0	6.2E-04	0	-3.4E-03	-3.4E-04	-3.4E-04
EP	[kg PO_4^{3-}-eq.]	2.0E-03	3.1E-04	1.6E-04	1.3E-04	3.6E-06	2.9E-05	3.1E-04	0	0	0	7.6E-04	0	-2.3E-04	-2.4E-05	-2.4E-05
POCP	[kg Ethene eq.]	5.6E-03	-4.4E-04	1.7E-04	1.7E-04	4.0E-06	-4.1E-05	5.4E-04	0	0	0	9.6E-05	0	-2.8E-04	-2.9E-05	-2.9E-05
ADPE	[kg Sb eq.]	2.7E-05	1.1E-08	2.7E-07	2.0E-07	2.0E-09	1.0E-09	1.4E-06	0	0	0	4.0E-08	0	-1.1E-07	-1.1E-08	-1.1E-08
ADPF	[MJ]	1.8E+02	4.1E+00	1.2E+01	8.3E+00	2.5E-01	3.8E-01	2.3E+01	0	0	0	3.2E+00	0	-2.4E+01	-2.5E+00	-2.5E+00

Caption	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

RESULTS OF THE LCA - RESOURCE USE: 1m? installed

Parameter	Unit	A1-3	A4	A5	B2	C1	C2	C3/I	C3/L	C3/R	C4/I	C4/L	C4/R	D/I	D/L	D/R
PERE	[MJ]	7.3E+00	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PERM	[MJ]	1.1E+00	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PERT	[MJ]	8.5E+00	1.6E-01	1.6E+00	8.3E-01	4.2E-02	1.5E-02	1.1E+00	0	0	0	1.4E-01	0	-1.7E+00	-1.7E-01	-1.7E-01
PENRE	[MJ]	1.5E+02	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PENRM	[MJ]	3.7E+01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PENRT	[MJ]	1.8E+02	4.1E+00	1.2E+01	8.3E+00	2.5E-01	3.8E-01	2.3E+01	0	0	0	3.2E+00	0	-2.4E+01	-2.5E+00	-2.5E+00
SM	[kg]	3.5E-01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RSF	[MJ]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NRSF	[MJ]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FW	[kg]	4.4E+01	1.8E-01	2.8E+00	3.2E+00	1.1E-01	1.6E-02	1.4E+01	0	0	0	-1.7E+00	0	-4.9E+00	-4.9E-01	-4.9E-01

Caption	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

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RESULTS OF THE LCA - OUTPUT FLOWS AND WASTE CATEGORIES: 1m? installed																
Parameter	Unit	A1-3	A4	A5	B2	C1	C2	C3/I	C3/L	C3/R	C4/I	C4/L	C4/R	D/I	D/L	D/R
HWD	[kg]	3.6E-03	0	6.7E-04	1.9E-03	0	0	1.4E-03	0	0	0	8.2E-04	0	0	0	0
NHWD	[kg]	2.4E-01	5.3E-04	1.3E-01	5.8E-03	1.1E-04	4.9E-05	2.1E+00	0	0	0	2.9E+00	0	-6.2E-03	-6.3E-04	-6.3E-04
RWD	[kg]	6.7E-03	5.7E-06	2.0E-04	7.3E-04	3.7E-05	5.3E-07	6.5E-04	0	0	0	5.7E-05	0	-1.5E-03	-1.5E-04	-1.5E-04
CRU	[kg]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MFR	[kg]	-	-	-	-	-	-	-	-	-	-	-	-	2.1E-01	2.1E-01	3.1E+00
MER	[kg]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EE [electricity]	[MJ]	-	-	-	-	-	-	-	-	-	-	-	-	4.2E+00	4.3E-01	4.3E-01
EE [thermal]	[MJ]	-	-	-	-	-	-	-	-	-	-	-	-	1.2E+01	1.3E+00	1.3E+00
Caption	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; EE = Exported energy per energy carrier															

Scenario "I" = 100% Incineration

Scenario "L" = 100% Landfilling

Scenario "R" = 100% Recycling

The evaluation of best EoL-scenario requires the consideration of further aspects like avoidance of combustion of fossil fuels when incinerated and demand for landfilling when recycled.

Not all of the life cycle inventories applied in this study support the methodological approach for the waste and water indicators. The data are based on publications of industry. The indicators for waste and water of the system are evaluated, but contain a higher degree of uncertainty.

5.2 Toxicity

Toxicity in terms of LCA considers the impact in production processes and end-of-life treatment. The results for the USEtox indicators are displayed. Emissions discussed for indoor air quality during the use stage of the product are not included in this assessment.

RESULTS OF THE LCA - TOXIC IMPACT: 1m? installed																
Parameter	Unit	A1-3	A4	A5	B2	C1	C2	C3/I	C3/L	C3/R	C4/I	C4/L	C4/R	D/I	D/L	D/R
EcoTOX	[CTUe]	6.7E-01	3.7E-02	1.0E-01	4.6E-02	1.4E-03	3.4E-03	4.6E-02	0	0	0	3.2E-02	0	-6.2E-02	-6.2E-03	-6.2E-03
TOX Cancer	[CTUh]	1.7E-08	1.5E-10	1.6E-09	5.2E-10	1.2E-11	1.4E-11	1.2E-09	0	0	0	6.6E-10	0	-5.7E-10	-5.7E-11	-5.7E-11
TOX Ncancer	[CTUh]	1.8E-06	7.2E-08	3.1E-07	5.9E-08	3.0E-09	6.7E-09	1.6E-07	0	0	0	1.1E-07	0	-1.2E-07	-1.2E-08	-1.2E-08
Caption	EcoTOX = USEtox Ecotoxicity; TOX Cancer = USEtox Human toxicity (cancer); TOX Ncancer = USEtox Human toxicity (non-cancer)															

The uncertainties of the results are higher compared to other impact categories commonly used for LCIA like global warming potential or acidification potential. When interpreting the results, factors of 100 - 1000 for human toxicity and 10 - 100 for ecotoxicity need to be kept in mind, especially in case of comparisons of different systems. It is therefore recommended to use toxicity results for the identification of potential hot spots rather than using them as indicators to support decision-making.

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6. References

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EN ISO 10874 (previously EN 685)

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EN ISO 14025

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EN ISO 23997

ISO 23997:2012-04: Resilient floor coverings - Determination of mass per unit area (ISO 23997:2008)

EN ISO 24346

EN ISO 24346:2012: Resilient floor coverings - Determination of overall thickness (ISO 24346:2006)

EN 15804

EN 15804:2012-04: Sustainability of construction works - Environmental Product Declarations - Core rules for the product category of construction products

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7. Contact

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