EUROPEAN RESILIENT FLOORING MANUFACTURERS' INSTITUTE

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Environmental Product Declaration for:

Polyvinyl chloride floor coverings with foam layer according to EN 651

This EPD was produced on July 19, 2023 and refers to:

Altro Illustra adhesive-free

GENERAL INFORMATION

In this EPD polyvinyl chloride floor coverings with foam layer are declared. The application of this EPD is restricted to polyvinyl chloride floor coverings with foam layer produced by the members of the European Resilient Flooring Manufacturers' Institute (ERFMI). Data are based upon production during 2017 in Europe. Data have been provided by 7 companies of ERFMI which represent 100% of ERFMI members.
The EPD was created according to the specifications as per /EN 16810/ and as per ISO 14025 and EN 15804+A1

PRODUCT

Product description / Product definition
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 plastics, 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.

Polyvinyl chloride floor coverings with foam layer are based on polyvinyl chloride with a polyvinyl chloride foam layer.

Floor covering is covered by the Construction Product Regulation (CPR). In accordance with the CPR a Declaration of Performance (DoP) of its Essential Characteristics according to /EN 14041/ and the related CE mark are mandatory when the product is sold in the EU.

Application
According to /EN ISO 10874/ (EN685) the area of application for resilient floor coverings is indicated by use classes. The declared product group covers the use classes 23, 34, 42.

Technical Data
The following table contains the construction data of the declared product group:

Constructional data

Name	Value	Unit
Product thickness	2.3	mm
Surface weight	2.7	kg/m²
Product Form	sheet	-

The data given in the Declaration of performance apply.

Base Materials / Ancillary materials
The product group has the following composition:

- Additives 2%
- Filler 25%
- Plasticizer 23%
- Pigments <1%
- Polymers (PVC) 42%
- Auxiliaries 2%
- Lacquer <1%
- Flooring Recyclate (PVC) 4%

Reference service life
The service lifetime of a floor covering for a certain application on a floor is too widespread to give one common number. For this EPD model the reference service lifetime (RSL) is set to one year. This means that all impacts for the use phase are based on the cleaning and maintenance model for one year.
Depending on the area of use based on /EN ISO 10874/, the technical lifetime advised by the manufacturer and the estimated time on the floor by the customer, the service lifetime can be determined. The use phase impacts should be calculated with the foreseen service life to arrive at the total environmental impact /EN 16810/.

The use phase impacts of this declaration are calculated with the expected service life entered in the ERFMI online EPD calculator (www.erfmi.com).

LCA: CALCULATION RULES

Declared Unit
1m² of floor covering.

Declared Unit

Name	Value	Unit
Declared unit	1	m2
Declared unit	2.7	kg/m²
Conversion factor to 1 kg	0.3704	-

The declaration refers to an average product from 11 production sites of 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.

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 offcuts and adhesive for the installation of the floor covering, and incineration of offcuts and packaging material.

Module B2 is including provision of cleaning agent, energy and water consumption for the cleaning of the floor covering incl. waste water treatment. The LCA results in this EPD are declared for a 15-year usage.

Module C1 considers electricity supply for the deconstruction of the flooring.

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

End of life scenarios are declared for:

- 100% incineration in a waste incineration plant (WIP) (Scenario 1, C3/1)
- 100% landfilling (Scenario 2, C4/2)
- 100% recycling according to information from AgPR, (Arbeitsgemeinschaft PVC-Bodenbelag Recycling) (Scenario 3 - for the recycling scenario the end of waste state is reached after removal from the building)

Module D includes potential 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.

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.

As background database /GaBi ts/ is used.

LCA: SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

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

Transport to the construction site (A4)

Name	Value	Unit
Transport distance	2000	km
Capacity utilisation (including empty runs)	85	%

Installation in the building (A5)

Name	Value	Unit
Material loss (installation waste)	6	%
Auxiliary (adhesive)	0.3	kg

Biogenic carbon incorporated in the packaging material is released as CO2 emissions in module A5.

Maintenance (B2) per year

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

End of Life (C1-C4)

Name	Value	Unit
Energy recovery [100%, Scenario 1]	2.7	kg
Landfilling [100%, Scenario 2]	2.7	kg
Recycling [100%, Scenario 3]	2.7	kg

Reuse, recovery and/or recycling potentials (D), relevant scenario information
For module D the potential benefits given in module A5 and C3 are declared. For waste incineration combustion in a WIP (R1 > 0.6) with energy recuperation is considered.

LCA: RESULTS

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

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	MND	MND	MND	MND	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 M² POLYVINYL CHLORIDE FLOOR COVERINGS WITH FOAM LAYER (2.7 KG/M²)

Parameter	Unit	A1-A3	A4	A5	B2	C1	C2	C3/1	C4/2	D/1	D/2	D/3
GWP	[kg CO2-Eq.]	6.28	0.25	0.97	4.2	0.01	0.02	4.13	0.19	-1.15	-0.08	-0.08
ODP	[kg CFC11-Eq.]	5.39E-10	6.92E-15	3.54E-11	1.545E-11	5.53E-14	6.77E-16	1.65E-12	5.08E-14	-2.15E-12	-1.53E-13	-1.53E-13
AP	[kg SO2-Eq.]	9.64E-3	5.53E-4	1.44E-3	1.092E-2	3.53E-5	5.41E-5	3.50E-3	5.14E-4	-1.75E-3	-1.24E-4	-1.24E-4
EP	[kg (PO4)3--Eq.]	1.75E-3	1.40E-4	2.65E-4	1.407E-3	3.31E-6	1.37E-5	1.76E-4	5.25E-4	-1.96E-4	-1.37E-5	-1.37E-5
POCP	[kg ethene-Eq.]	8.38E-3	-1.81E-4	6.14E-4	8.895E-4	2.21E-6	-1.77E-5	8.93E-5	5.62E-5	-1.45E-4	-1.01E-5	-1.01E-5
ADPE	[kg Sb-Eq.]	2.47E-5	2.08E-8	1.77E-6	2.46E-6	6.61E-9	2.03E-9	1.17E-6	4.12E-8	-2.87E-7	-2.03E-8	-2.03E-8
ADPF	[MJ]	141.92	3.45	18.70	5.04E1	0.13	0.34	4.98	2.73	-16.38	-1.13	-1.13
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: 1 M² POLYVINYL CHLORIDE FLOOR COVERINGS WITH FOAM LAYER (2.7 KG/M²)

Parameter	Unit	A1-A3	A4	A5	B2	C1	C2	C3/1	C4/2	D/1	D/2	D/3
PERE	[MJ]	13.53	0.19	4.24	2.385E1	0.09	0.02	2.32	0.21	-3.33	-0.24	-0.24
PERM	[MJ]	1.40	0.00	-0.81	0	0.00	0.00	-1.40	0.00	0.00	0.00	0.00
PERT	[MJ]	14.93	0.19	3.43	2.385E1	0.09	0.02	0.92	0.21	-3.33	-0.24	-0.24
PENRE	[MJ]	109.37	3.46	19.89	7.695E1	0.23	0.34	49.94	2.83	-20.06	-1.39	-1.39
PENRM	[MJ]	44.40	0.00	-0.15	0	0.00	0.00	-44.40	0.00	0.00	0.00	0.00
PENRT	[MJ]	153.77	3.46	19.74	7.695E1	0.23	0.34	5.54	2.83	-20.06	-1.39	-1.39
SM	[kg]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.70
RSF	[MJ]	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
NRSF	[MJ]	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
FW	[m³]	3.30E-2	3.52E-4	4.44E-3	3.705E-2	1.16E-4	3.44E-5	1.15E-2	-7.28E-6	-4.54E-3	-3.23E-4	-3.23E-4
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											

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES:

1 M² POLYVINYL CHLORIDE FLOOR COVERINGS WITH FOAM LAYER (2.7 KG/M²)

Parameter	Unit	A1-A3	A4	A5	B2	C1	C2	C3/1	C4/2	D/1	D/2	D/3
HWD	[kg]	3.33E-6	2.00E-7	2.52E-7	3.645E-8	1.07E-10	1.96E-8	3.65E-8	1.21E-8	-7.99E-9	-5.57E-10	-5.57E-10
NHWD	[kg]	3.19E-1	2.90E-4	1.48E-1	1.257E-1	1.60E-4	2.83E-5	2.04E+0	2.67E+0	-7.79E-3	-5.49E-4	-5.49E-4
RWD	[kg]	4.68E-3	4.74E-6	4.13E-4	1.053E-2	3.77E-5	4.63E-7	2.22E-4	4.02E-5	-1.46E-3	-1.04E-4	-1.04E-4
CRU	[kg]	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
MFR	[kg]	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	2.70
MER	[kg]	IND	IND	IND	IND	IND	IND	IND	IND	2.70	IND	IND
EEE	[MJ]	IND	IND	0.24	IND	IND	IND	4.08	IND	IND	IND	IND
EET	[MJ]	IND	IND	0.59	IND	IND	IND	9.88	IND	IND	IND	IND
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; EEE = Exported electrical energy; EEE = Exported thermal energy											

TOXICITY

For the calculation the USEtox model (Version 2.1) is used.

USEtox is officially endorsed by the UNEP/SETAC Life Cycle Initiative, and recommended as assessment method by the European Commission (EC) in the Recommendations on the Use of Common Methods to Measure and Communicate the Life Cycle Environmental Performance of Products and Organisations, 2013/179/EU, by the European Commission's Joint Research Centre – Institute for Environment and Sustainability (JRC-IES) in the International Reference Life Cycle Data System (ILCD) Handbook / USEtox® Documentation/. The amendment to EN 15804 will consider USEtox as an additional optional indicator /EN 15804+A2/.

RESULTS OF THE LCA - TOXIC IMPACT: 1M² INSTALLED

		Manu-facturing	Installation		Use stage	End-of-Life				Potential benefits		
Parameter	**Unit**	**A1-3**	**A4**	**A5**	**B2**	**C1**	**C2**	**C3/1**	**C4/2**	**D/1**	**D/2**	**D/3**
ETP-fw	CTUe	1.95E-02	8.11E-04	2.65E-03	9.225E-3	2.12E-05	7.93E-05	6.14E-04	2.61E-04	-9.13E-04	-6.46E-05	-6.46E-05
HTP-c	CTUh	2.23E-09	7.94E-13	1.62E-10	1.785E-10	5.61E-13	7.76E-14	1.21E-11	1.29E-11	-7.67E-11	-5.29E-12	-5.29E-12
HTP-nc	CTUh	7.58E-10	3.86E-13	5.29E-11	9.075E-12	2.94E-14	3.77E-14	4.99E-13	3.20E-12	-2.00E-12	-1.40E-13	-1.40E-13
Caption	ETP-fw = Ecotoxicity; HTP-c = Human toxicity, cancer effects; HTP-nc = Human toxicity, non-cancer effects											

The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator /EN 15804+A2/.

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