

ENVIRONMENTAL PRODUCT DECLARATION

as per EN ISO 14025 and EN 15804

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|--------------------------|---|
| Owner of the Declaration | ERFMI vzw, European Resilient Flooring Manufacturers' Institute |
| Programme holder | Institut Bauen und Umwelt e.V. (IBU) |
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**Polyvinyl chloride floorcoverings with enhanced slip resistance
(Safety Flooring) according to EN 13845**

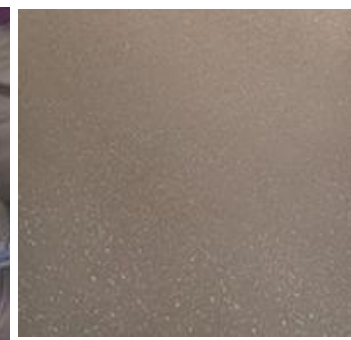
ERFMI

European Resilient Flooring Manufacturers' Institute

www.bau-umwelt.com / <https://epd-online.com>



Institut Bauen
und Umwelt e.V.



General Information

ERFMI - European Resilient Flooring Manufacturers' Institute

Programme holder

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Declaration number

EPD-ERF-2013611-E

This Declaration is based on the Product Category Rules:

Floor coverings, Version 1.1: 29.10.2012
(PCR tested and approved by the independent expert committee)

Issue date

01.04.2013

Valid to

31.03.2018



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Polyvinyl chloride floorcoverings with enhanced slip resistance (Safety Flooring)

Owner of the Declaration

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Declared product / Declared unit

1m² Cushioned Polyvinyl chloride floor coverings, installed

Scope:

In this EPD polyvinyl chloride floorcoverings with enhanced slip resistance (safety flooring) are declared. The application of this EPD is restricted to polyvinyl chloride floorcoverings with enhanced slip resistance (safety flooring) 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 5 companies of ERFMI which represents 100% of ERFMI members. The owner of the declaration shall be liable for the underlying information and evidence.

Verification

The CEN Norm EN 15804 serves as the core PCR

Independent verification of the declaration and data according to EN ISO 14025

internally externally



Prof. Dr. Birgit Grahl
(Independent tester appointed by SVA)

Product

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.

Polyvinyl chloride floorcoverings with enhanced slip resistance (safety flooring) are based on polyvinyl chloride with a wear surface modified to provide sustainable enhanced slip resisting properties under specified conditions. The surface contains various aggregate or identifiable particles of different hardness which are present throughout the normal wear life of the product.

Application

According to EN 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, 32 to 34 and 41 to 43.

Technical Data

Technical construction data for the product group:

| Constructional data | Value | Unit | Test standard |
|---------------------|---------|-------------------|---------------|
| Product thickness * | av. 2.1 | mm | EN ISO 24346 |
| Surface weight * | 2.9 | kg/m ² | EN ISO 23997 |
| Product Form | sheet | | |

* weighted average

Base materials/ Ancilliary materials

The product group has the following composition:

| Component | Value | Unit |
|---------------------------------------|-------|------|
| Additives | 2.9 | % |
| Filler | 17.6 | % |
| Flame Retardant (Aluminium hydroxide) | 4.1 | % |
| Plasticizer | 18.9 | % |
| Pigments | 0.5 | % |

| | | |
|--------------------------|------|---|
| Polymers (PVC) | 44.1 | % |
| Auxiliaries | 2.2 | % |
| Lacquer | 0.7 | % |
| Flooring Recyclate (PVC) | 9 | % |

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

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 one year. For the calculation of the impact of B2 for a different time period the values for B2 have to be multiplied by the estimated service life in years. ERFMI provides an online tool for this calculation on the ERFMI home page (www.erfmi.com) for the end-user.

LCA: Calculation rules

Declared Unit

1m² of installed floor covering.

| Name | Value | Unit |
|---------------------------|-------|----------------|
| Declared unit | 1 | m ² |
| Conversion factor to 1 kg | 1/2.9 | - |

The declaration refers to an average product from 5 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 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 a one year usage.

Module C1 considers electricity supply for the deconstruction 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)

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.

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.

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 |
|---|--------|-------------------------|
| Litres of fuel | 0,0046 | l/m ² *100km |
| Transport distance | 2000 | km |
| Capacity utilisation (including empty runs) | 85 | % |

Installation in the building (A5)

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

Maintenance (B2)

| Name | Value | Unit |
|---|-------|----------|
| Maintenance cycle (vacuum cleaning & wet cleaning) | 156 | number/a |

| | | |
|-------------------------|-------|----------------|
| Water consumption | 0.003 | m ³ |
| Auxiliary (detergent) | 0.04 | kg |
| Electricity consumption | 0.55 | kWh |

End of Life (C1-C4)

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

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.

LCA: Results

The results for module B2 refer to a period of one year.

For the calculation of the impact of B2 for a certain service life the values for B2 have to be multiplied by the estimated service life in years.

ERFMI provides an online tool for this calculation on the ERFMI home page (www.erfmi.com) for the end-user.

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 | 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 | |

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1m² installed

| Parameter | Unit | A1 - A3 | A4 | A5 | B2 | C1 | C2 | C3 ¹ | C3/L ² | C3/R ³ | C4/I | C4/L | C4/R | D/I | D/L | D/R |
|-----------|---|---------|----------|---------|---------|---------|----------|-----------------|-------------------|-------------------|------|---------|------|----------|-----------|-----------|
| GWP | [kg CO ₂ -Eq.] | 9,5E+00 | 3,0E-01 | 8,4E-01 | 4,3E-01 | 1,4E-02 | 2,7E-02 | 6,0E+00 | 0 | 0 | 0 | 2,1E-01 | 0 | -1,9E+00 | -1,8E-01 | -1,8E-01 |
| ODP | [kg CFC11-Aq.] | 1,9E-08 | 5,2E-12 | 2,7E-10 | 2,6E-10 | 1,3E-11 | 4,8E-13 | 4,8E-10 | 0 | 0 | 0 | 1,1E-10 | 0 | -7,2E-10 | -6,61E-11 | -6,61E-11 |
| AP | [kg SO ₂ -Eq.] | 2,0E-02 | 1,3E-03 | 1,3E-03 | 1,6E-03 | 6,8E-05 | 1,2E-04 | 6,0E-03 | 0 | 0 | 0 | 6,3E-04 | 0 | -4,5E-03 | -4,2E-04 | -4,2E-04 |
| EP | [kg PO ₄ ³⁻ -Eq.] | 2,7E-03 | 3,1E-04 | 1,6E-04 | 1,3E-04 | 3,6E-06 | 2,9E-05 | 2,9E-04 | 0 | 0 | 0 | 7,7E-04 | 0 | -3,1E-04 | -2,9E-05 | -2,9E-05 |
| POCP | [kg Ethen-Aq.] | 6,9E-03 | -4,4E-04 | 1,6E-04 | 1,7E-04 | 4,0E-06 | -4,1E-05 | 4,1E-04 | 0 | 0 | 0 | 9,6E-05 | 0 | -3,7E-04 | -3,50E-05 | -3,5E-05 |
| ADPE | [kg Sb-Aq.] | 3,2E-05 | 1,1E-08 | 2,9E-07 | 2,0E-07 | 2,0E-09 | 1,0E-09 | 1,7E-06 | 0 | 0 | 0 | 4,0E-08 | 0 | -1,5E-07 | -1,4E-08 | -1,4E-08 |
| ADPF | [MJ] | 2,1E+02 | 4,1E+00 | 1,2E+01 | 8,3E+00 | 2,5E-01 | 3,8E-01 | 1,9E+01 | 0 | 0 | 0 | 3,2E+00 | 0 | -3,2E+01 | -3,0E+00 | -3,0E+00 |

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: 1m² installed

| Parameter | Unit | A1 - A3 | 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] | 1,0E+01 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| PERM | [MJ] | 2,0E+00 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| PERT | [MJ] | 1,2E+01 | 1,6E-01 | 1,6E+00 | 8,3E-01 | 4,2E-02 | 1,5E-02 | 9,2E-01 | 0 | 0 | 0 | 1,4E-01 | 0 | -2,3E+00 | -2,2E-01 | -2,2E-01 |
| PENRE | [MJ] | 1,7E+02 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| PENRM | [MJ] | 4,7E+01 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| PENRT | [MJ] | 2,1E+02 | 4,1E+00 | 1,2E+01 | 8,3E+00 | 2,5E-01 | 3,8E-01 | 1,9E+01 | 0 | 0 | 0 | 3,2E+00 | 0 | -3,2E+01 | -3,0E+00 | -3,0E+00 |
| SM | [kg] | 3,2E-01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| RSF | [MJ] | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| NRSF | [MJ] | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| FW | [kg] | 6,2E+01 | 1,8E-01 | 2,9E+00 | 3,2E+00 | 1,1E-01 | 1,6E-02 | 1,4E+01 | 0 | 0 | 0 | -1,7E+00 | 0 | -6,5E+00 | -6,1E-01 | -6,1E-01 |

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of non 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: 1m² installed

| Parameter | Unit | A1 - A3 | 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] | 4,2E-03 | 0 | 6,5E-04 | 1,9E-03 | 0 | 0 | 9,7E-04 | 0 | 0 | 0 | 8,2E-04 | 0 | 0 | 0 | 0 |
| NHWD | [kg] | 2,9E-01 | 5,3E-04 | 1,5E-01 | 5,8E-03 | 1,1E-04 | 4,9E-05 | 2,5E+00 | 0 | 0 | 0 | 2,9E+00 | 0 | -8,3E-03 | -7,7E-04 | -7,7E-04 |
| RWD | [kg] | 7,8E-03 | 5,7E-06 | 2,0E-04 | 7,3E-04 | 3,7E-05 | 5,3E-07 | 5,4E-04 | 0 | 0 | 0 | 5,7E-05 | 0 | -2,1E-03 | -1,9E-04 | -1,9E-04 |
| CRU | [kg] | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| MFR | [kg] | - | - | - | - | - | - | - | - | - | - | - | - | 2,4E-01 | 2,4E-01 | 3,1E+00 |
| MER | [kg] | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| EEE | [MJ] | - | - | - | - | - | - | - | - | - | - | - | - | 5,7E+00 | 5,3E-01 | 5,3E-01 |
| EET | [MJ] | - | - | - | - | - | - | - | - | - | - | - | - | 1,6E+01 | 1,6E+00 | 1,6E+00 |

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

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.

¹ Scenario "I" = 100% Incineration¹

² Scenario "L" = 100% Landfilling

³ 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.

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EN ISO 24346

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