

ERFMI - Environmental Product Declaration

Polyvinyl chloride floorcoverings with enhanced slip resistance (Safety Flooring) according to EN 13845

This EPD was produced on 2017/04/04 and refers to:

Altro Safety Flooring - Altro Reliance 25, Altro Classic 25

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.

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.

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.

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, 32 to 34 and 41 to 43.

2.3 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 | | |

2.4 Base materials/ Ancillary 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.

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 25 year(s).

3. LCA: Calculation Rules

3.1 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 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 25 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)

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.

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/m ² *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 | m ³ |
| 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.

5. LCA: Results

The results for module B2 refer to a period of 25 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 ² 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.] | 9.5E+00 | 3.0E-01 | 8.4E-01 | 1.1E+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-eq.] | 1.9E-08 | 5.2E-12 | 2.7E-10 | 6.5E-09 | 1.3E-11 | 4.8E-13 | 4.8E-10 | 0 | 0 | 0 | 1.1E-10 | 0 | -7.2E-10 | -6.6E-11 | -6.6E-11 |
| AP | [kg SO ₂ -eq.] | 2.0E-02 | 1.3E-03 | 1.3E-03 | 4.1E-02 | 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 | 3.2E-03 | 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 Ethene eq.] | 6.9E-03 | -4.4E-04 | 1.6E-04 | 4.3E-03 | 4.0E-06 | -4.1E-05 | 4.1E-04 | 0 | 0 | 0 | 9.6E-05 | 0 | -3.7E-04 | -3.5E-05 | -3.5E-05 |
| ADPE | [kg Sb eq.] | 3.2E-05 | 1.1E-08 | 2.9E-07 | 5.1E-06 | 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 | 2.1E+02 | 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 |
| 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 ² 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] | 1.0E+01 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| PERM | [MJ] | 2.0E+00 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| PERT | [MJ] | 1.2E+01 | 1.6E-01 | 1.6E+00 | 2.1E+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 | 2.1E+02 | 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 | 7.9E+01 | 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 |
| 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: 1m ² 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] | 4.2E-03 | 0 | 6.5E-04 | 4.7E-02 | 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 | 1.5E-01 | 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 | 1.8E-02 | 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] | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| EE [electricity] | [MJ] | - | - | - | - | - | - | - | - | - | - | - | - | 5.7E+00 | 5.3E-01 | 5.3E-01 |
| EE [thermal] | [MJ] | - | - | - | - | - | - | - | - | - | - | - | - | 1.6E+01 | 1.6E+00 | 1.6E+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 ² 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] | 8.2E-01 | 3.7E-02 | 1.0E-01 | 1.1E+00 | 1.4E-03 | 3.4E-03 | 3.8E-02 | 0 | 0 | 0 | 3.2E-02 | 0 | -8.3E-02 | -7.7E-03 | -7.7E-03 |
| TOX Cancer | [CTUh] | 1.7E-08 | 1.5E-10 | 1.6E-09 | 1.3E-08 | 1.2E-11 | 1.4E-11 | 1.3E-09 | 0 | 0 | 0 | 6.6E-10 | 0 | -7.6E-10 | -7.0E-11 | -7.0E-11 |
| TOX Ncancer | [CTUh] | 1.9E-06 | 7.3E-08 | 3.1E-07 | 1.5E-06 | 3.0E-09 | 6.7E-09 | 1.8E-07 | 0 | 0 | 0 | 1.1E-07 | 0 | -1.6E-07 | -1.5E-08 | -1.5E-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.

6. References

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PCR 2011, Part A

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PCR 2012, Part B

Institut Bauen und Umwelt e.V., Königswinter (pub.): Product Category Rules for Construction Products from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part B: Requirements on the EPD for floorcoverings, Version 1.1 Institut Bauen und Umwelt e.V., www.bau-umwelt.com, 10/2012

EN ISO 10874 (previously EN 685)

EN ISO 10874:2009 Resilient, textile and laminate floor coverings - Classification (ISO 10874:2009)

EN ISO 14025

EN ISO 14025:2011-10: Environmental labels and declarations - Type III environmental declarations - Principles and procedures

EN ISO 23997

EN 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 13845

EN 13845:2005 Resilient floor coverings - Polyvinyl chloride floor coverings with particle based enhanced slip resistance - Specification

EN 15804

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

7. Contact

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