# ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

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|---|---|
| Owner of the Declaration | Forbo Flooring BV |
| Programme holder | Institut Bauen und Umwelt e.V. (IBU) |
| Publisher | Institut Bauen und Umwelt e.V. (IBU) |
| Declaration number | EPD-FOR-20140225-CAC1-EN |
| Issue date | 12.02.2014 |
| Valid to | 11.02.2019 |

**Forbo Peace**
Woven broadloom carpet ,
*pile material 500-600 g/m² polyamide 6.6*

## Forbo Flooring Systems

Institut Bauen und Umwelt e.V.

**www.bau-umwelt.com / https://epd-online.com**

# General Information

## Forbo Flooring Systems

**Programme holder**
IBU - Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

**Declaration number**
EPD-FOR-20140225-CAC1-EN

**This Declaration is based on the Product Category Rules:**
Floor coverings, 07.2014
(PCR tested and approved by the independent expert committee)

**Issue date**
12.02.2014

**Valid to**
11.02.2019

Prof. Dr.-Ing. Horst J. Bossenmayer
(President of Institut Bauen und Umwelt e.V.)

Dr. Burkhart Lehmann
(Managing Director IBU)

## Forbo Peace
Woven broadloom carpet,
Pile material 500-600 g/m² PA 6.6

**Owner of the Declaration**
Forbo Flooring BV
P.O. Box 13
1560 AA Krommenie
The Netherlands

**Declared product / Declared unit**
1 m² woven broadloom carpet Forbo Peace

**Scope:**
The declaration applies for a group of similar products with a pile material of 500-600 g/m².
It is only valid in conjunction with a valid PRODIS licence.
The carpet is produced in Bording, Denmark.
The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

**Verification**

| |
|---|
| The CEN Norm EN 15804 serves as the core PCR |
| Independent verification of the declaration according to ISO 14025 |
| ☐ internally ☒ externally |

Dr. Eva Schmincke
(Independent tester appointed by SVA)

# Product

**Product description**
Forbo Peace - woven broadloom carpet with a pile material made of polyamide 6.6 and a woven textile backing made of polypropylene.
The woven upper side is continuous dyed.
The declaration applies for a group of products with a total pile material input of 500-600 g/m2.
The calculations refer to the average pile material of 550 g.

**Application**
According to the use class as defined in /EN 1307/ the products can be used in all professional areas which require class 33 or less.

**Technical Data**

of the average product according to /EN 1307/

| Name | Value | Unit |
|---|---|---|
| Product Form | broadloom carpet | - |
| Type of manufacture | Woven loop pile carpet | - |
| Yarn type | PA 6.6 | - |
| Secondary backing | Woven textile backing made of PP | - |
| Total pile weight | 700-800 | g/m² |
| Total carpet weight | 2200 - 2300 | g/m² |

Additional product properties and performance ratings according to /EN 1307/ can be found on the Product Information System (PRODIS) using the PRODIS registration number of the product (www.pro-dis.info) or on the technical information of the declared product by Forbo Flooring Systems (www.forbo-flooring.com)

**Base materials / Ancillary materials**

| Name | Value | Unit |
|---|---|---|
| Polyamide 6.6 | 26.8 | % |
| Polyester | 16.6 | % |
| Polypropylene | 3.9 | % |
| Limestone | 14.4 | % |
| Aluminiumhydroxide | 19.0 | % |
| SBR-latex | 18.3 | % |
| Additives | 1.0 | % |

**Reference service life**
The service life of textile floorcoverings strongly depends on the correct installation taking into account the declared use classification and the adherence of cleaning and maintenance instructions.
A minimum service life of 10 years could be assumed, technical service life can be considerably longer.

## LCA: Calculation rules

**Declared Unit**

| Name | Value | Unit |
|---|---|---|
| Declared unit | 1 | $m^2$ |
| Conversion factor to 1 kg (average product) | 0.49 | - |
| Mass reference (average product) | 2.05 | kg/$m^2$ |

**System boundary**

*Type of the EPD:* Cradle-to-grave

*System boundaries of the modules A, B, C, D:*

A1-A3 Production:
Energy supply and production of the basic material, processing of secondary material, auxiliary material, transport of the material to the manufacturing site, emissions, waste water treatment, packaging material and waste processing up to the landfill of residual waste (except radioactive waste). Credits for electricity and steam from the incineration of production waste are aggregated.

A4 Transport:
Transport of the packed textile floorcovering from manufacturing gate to the place of installation.

A5 Installation:
Installation of the textile floorcovering, production and transport of auxiliary material, waste processing up to the landfill of residual waste (except radioactive waste), the production of the amount of carpet that occurs as installation waste including its transport to the place of installation.
Credits for electricity and steam from the incineration of packaging and installation waste leave the product system.

B1 Use:
Indoor emissions during the use stage. Due to known VOC-decay curves of the product after the first year no product related VOC-emissions are relevant.

B2 Maintenance:
Cleaning of the textile floor covering for a period of 1 year:
Vacuum cleaning – electricity supply
Wet cleaning – electricity, water consumption, production of the cleaning agent, waste water treatment.
The declared values in this module have to be multiplied with the assumed service life of the floor covering in the building considered.

B3 - B7:
The modules are not relevant and therefore not declared.

C1 De-construction:
De-construction of the floorcovering is made by handcraft and causes no additional impacts.

C2 Transport:
Transport of the carpet waste to landfill, to the municipal waste incineration (MWI) or to the waste collection for recycling.

C3 Waste processing:
C3-0, C3-1: Landfill and waste incineration need no waste processing.
C3-2: Collection of the carpet waste, waste processing (granulating).

C4 Disposal
C4-0, C4-1: Impacts from landfill or from waste incineration (credits leave the system boundaries),
C4-2: The processed carpet waste leaves the system and need no disposal.

D Recycling potential:
D-0, D-1: Energy credits from landfill and from waste incineration (processing with < 60% efficiency),
D-2: Transport from the reprocessing plant to the cement plant, substitution of material and fuel input in the cement kiln (substantial and energetic credits).

**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 information refer to the declared modules and are the basis for calculations or can be used for further calculations. All indicated values refer to the declared functional unit.

**Transport to the construction site (A4)**

| Name | Value | Unit |
|---|---|---|
| Litres of fuel (truck, EURO 0-5 mix) | 29.4 | l/100km |
| Transport distance | 700 | km |
| Capacity utilisation (including empty runs) | 85 | % |
| Gross density of products transported | 585 | kg/m³ |

**Installation in the building (A5)**

| Name | Value | Unit |
|---|---|---|
| Auxiliary (adhesive) | 0.4 | kg |
| Material loss | 0.18 | kg |

Polyethylene packaging waste leaves the system for recycling. Carpet installation waste is considered to be incinerated in a municipal waste incineration plant.

**Maintenance (B2)**

| Name | Value | Unit |
|---|---|---|
| Maintenance cycle (wet cleaning) | 1,5 | 1/year |
| Maintenance cycle (vacuum cleaning) | 208 | 1/year |
| Water consumption (wet cleaning) | 0.003 | m³ |
| Cleaning agent (wet cleaning) | 0,06 | kg |
| Electricity consumption | 0.314 | kWh |

Further information on cleaning and maintenance see www.forbo-flooring.com

**End-of-Life (C1-C4)**

Three different end-of-life scenarios are declared and the results are indicated separately in module C.
Each scenario is calculated as a 100% scenario.

Scenario 0: 100% landfill
Scenario 1: 100% municipal waste incineration (MWI)
Scenario 2: 100% recycling in the cement industry

If combinations of these scenarios have to be calculated this should be done according to the following scheme:

EOL-impact = x% impact (Scenario 0)
+ y% impact (Scenario 1)
+ z% impact (Scenario 2)

| Name | Value | Unit |
|---|---|---|
| Collected as mixed construction waste (scenario 0 and 1) | 2.05 | kg |
| Collected separately (scenario 2) | 2.05 | kg |
| Landfilling (scenario 0) | 2.05 | kg |
| Energy recovery (scenario 1) | 2.05 | kg |
| Energy recovery (scenario 2) | 1.35 | kg |
| Recycling (scenario 2) | 0.7 | kg |

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

The recovery or recycling potentials due to the three end-of-life scenarios (module C) are indicated separately.

*Recycling in the cement industry (scenario 2)*
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The organic material of the carpet is used as secondary fuel in a cement kiln. It substitutes mainly lignite (62,7%), hard coal (27,3%) and petrol coke (10,0%).
The inorganic material is substantially integrated in the cement clinker and substitutes original material input.

# LCA: Results

**Information on not declared modules:**
The modules B3 - B7 are not relevant during the service life of the carpet and are therefore not declared.
Module C1 causes no additional impact (see "LCA: Calculation rules", "C1 De-construction") and is therefore not declared.
Module C2 represents the transport for scenario 0, 1 and 2.

## 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 BOUNDARYS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Raw material supply | Transport | Manufacturing | Transport from the gate to the site | Assembly | Use | Maintenance | Repair | Replacement[1)] | Refurbishment[1)] | 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 | X | X | MND | MND | MND | MND | MND | MND | X | X | X | X |

## RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 m² floorcovering

| Parameter | Unit | A1-A3 | A4 | A5 | B1 | B2 | C2 | C3 | C3/1 | C3/2 | C4 | C4/1 | C4/2 | D | D/1 | D/2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GWP | [kg $CO_2$-Eq.] | 11.00 | 0.09 | 1.55 | 0.00 | 0.29 | 0.00 | 0.00 | 0.00 | 0.01 | 4.58 | 3.86 | 0.00 | -0.12 | -1.19 | -0.28 |
| ODP | [kg CFC11-Eq.] | 4.10E-8 | 1.50E-12 | 2.95E-8 | 0.00E+0 | 6.45E-9 | 1.00E-13 | 0.00E+0 | 0.00E+0 | 1.20E-11 | 5.60E-11 | 1.90E-10 | 0.00E+0 | -1.00E-10 | -2.50E-10 | -6.97E-8 |
| AP | [kg $SO_2$-Eq.] | 2.24E-2 | 3.90E-4 | 3.55E-3 | 0.00E+0 | 1.37E-3 | 2.18E-5 | 0.00E+0 | 0.00E+0 | 6.49E-5 | 5.62E-4 | 2.55E-3 | 0.00E+0 | -5.47E-4 | -1.95E-3 | -2.08E-3 |
| EP | [kg $(PO_4)^{3-}$ Eq.] | 3.65E-3 | 9.02E-5 | 9.63E-4 | 0.00E+0 | 1.99E-4 | 5.04E-6 | 0.00E+0 | 0.00E+0 | 3.42E-6 | 2.63E-3 | 6.69E-4 | 0.00E+0 | -2.88E-5 | -1.61E-4 | -4.11E-4 |
| POCP | [kg Ethen Eq.] | 4.31E-3 | -1.41E-4 | 5.92E-4 | 1.11E-4 | 1.79E-4 | -7.88E-6 | 0.00E+0 | 0.00E+0 | 3.82E-6 | 6.75E-4 | 1.81E-4 | 0.00E+0 | -3.23E-5 | -2.05E-4 | -2.52E-4 |
| ADPE | [kg Sb Eq.] | 4.63E-6 | 3.19E-9 | 1.62E-6 | 0.00E+0 | 5.44E-7 | 1.80E-10 | 0.00E+0 | 0.00E+0 | 1.89E-9 | 2.12E-8 | 7.33E-7 | 0.00E+0 | -1.59E-8 | -7.05E-8 | -4.70E-8 |
| ADPF | [MJ] | 220.00 | 1.19 | 26.40 | 0.00 | 6.55 | 0.07 | 0.00 | 0.00 | 0.24 | 1.57 | 3.19 | 0.00 | -2.04 | -19.80 | -46.10 |

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 floorcovering

| Parameter | Unit | A1-A3 | A4 | A5 | B1 | B2 | C2 | C3 | C3/1 | C3/2 | C4 | C4/1 | C4/2 | D | D/1 | D/2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PERE | [MJ] | 10.30 | 0.05 | 3.25 | 0.00 | 0.50 | 0.00 | 0.00 | 0.00 | 0.04 | 0.08 | 0.16 | 0.00 | -0.34 | -0.80 | -0.11 |
| PERM | [MJ] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| PERT | [MJ] | 10.30 | 0.05 | 3.25 | 0.00 | 0.50 | 0.00 | 0.00 | 0.00 | 0.04 | 0.08 | 0.16 | 0.00 | -0.34 | -0.80 | -0.11 |
| PENRE | [MJ] | 187.02 | 1.19 | 26.40 | 0.00 | 6.55 | 0.07 | 0.00 | 0.00 | 0.24 | 1.57 | 3.19 | 0.00 | -2.04 | -19.80 | -46.10 |
| PENRM | [MJ] | 32.98 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| PENRT | [MJ] | 220.00 | 1.19 | 26.40 | 0.00 | 6.55 | 0.07 | 0.00 | 0.00 | 0.24 | 1.57 | 3.19 | 0.00 | -2.04 | -19.80 | -46.10 |
| SM | [kg] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| RSF | [MJ] | 4.54E-3 | 7.49E-6 | 5.02E-4 | 0.00E+0 | 2.03E-4 | 4.18E-7 | 0.00E+0 | 0.00E+0 | 4.94E-6 | 1.25E-3 | 9.06E-5 | 0.00E+0 | -4.16E-5 | -2.30E-4 | -1.65E-5 |
| NRSF | [MJ] | 4.75E-2 | 7.85E-5 | 5.24E-3 | 0.00E+0 | 2.13E-3 | 4.38E-6 | 0.00E+0 | 0.00E+0 | 5.17E-5 | 2.99E-3 | 9.40E-4 | 0.00E+0 | -4.36E-4 | -2.41E-3 | -1.73E-4 |
| FW | [m³] | 8.18E+0 | 4.63E-3 | 1.55E+0 | 0.00E+0 | 8.49E-1 | 2.59E-4 | 0.00E+0 | 0.00E+0 | 5.24E-2 | 5.80E-2 | 1.59E-1 | 0.00E+0 | -4.42E-1 | -1.03E+0 | -2.13E-1 |

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 floorcovering

| Parameter | Unit | A1-A3 | A4 | A5 | B1 | B2 | C2 | C3 | C3/1 | C3/2 | C4 | C4/1 | C4/2 | D | D/1 | D/2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HWD | [kg] | 6.80E-6 | 0.00E+0 | 5.98E-7 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| NHWD | [kg] | 1.01E+1 | 4.22E-3 | 1.23E+0 | 0.00E+0 | 6.20E-1 | 2.36E-4 | 0.00E+0 | 0.00E+0 | 5.47E-2 | 1.56E+0 | 7.12E-1 | 0.00E+0 | -4.61E-1 | -1.08E+0 | -3.57E+1 |
| RWD | [kg] | 3.51E-3 | 1.65E-6 | 4.45E-4 | 0.00E+0 | 3.95E-4 | 9.21E-8 | 0.00E+0 | 0.00E+0 | 3.56E-5 | 2.87E-5 | 9.87E-5 | 0.00E+0 | -3.00E-4 | -7.00E-4 | -7.02E-5 |
| CRU | [kg] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| MFR | [kg] | 0.02 | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.69 | 0.00 | 0.00 | 0.00 |
| MER | [kg] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| EEE | [MJ] | 0.00 | 0.00 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.86 | 1.83 | 0.00 | 0.00 | 0.00 | 0.00 |
| EET | [MJ] | 0.00 | 0.00 | 1.13 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 12.50 | 0.00 | 0.00 | 0.00 | 0.00 |

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; EEE = Exported electrical energy; EEE = Exported thermal energy

The declared values in module B2 have to be multiplied with the assumed service time (in years) of the floor covering in the building considered.

## References


**Institut Bauen und Umwelt**
Institut Bauen und Umwelt e.V., Berlin (pub.):
Generation of Environmental Product Declarations (EPDs);

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

**EN 15804**
EN 15804:2012-04+A1 2013: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

**General Principles**
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www.bau-umwelt.de

**PCR Part A**
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**EN 1307**
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**EN 14041**
DIN EN 14041:2008-05:Resilient, textile and laminate floor coverings

**ISO 10874**
DIN EN ISO 10874:2012-04:Resilient, textile and laminate floor coverings - Classification

**EN 13501-1:**
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**VDZ e.V.:**
Umweltdaten der deutschen Zementindustrie 2010

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