

# ENVIRONMENTAL PRODUCT DECLARATION

as per /ISO 14025/ and /EN 15804/

Owner of the Declaration	Windmüller GmbH
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-WIN-20180120-CBC1-EN
Issue date	18.09.2018
Valid to	17.09.2023

## PURLINE

resilient polyurethane floor covering  
for adhesive bonding,  
maximum total weight 9 kg/m<sup>2</sup>

## Windmüller GmbH

[www.ibu-epd.com](http://www.ibu-epd.com) / <https://epd-online.com>



## General Information

### Windmüller GmbH

#### Programme holder

IBU - Institut Bauen und Umwelt e.V.  
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10178 Berlin  
Germany

#### Declaration number

EPD-WIN-20180120-CBC1-EN

#### This declaration is based on the product category rules:

Floor coverings, 02/2018  
(PCR checked and approved by the SVR)

#### Issue date

18.09.2018

#### Valid to

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



Dipl. Ing. Hans Peters  
(Head of Board IBU)

### PURLINE

resilient polyurethane floor covering  
for adhesive bonding,  
max. total weight 9 kg/m<sup>2</sup>

#### Owner of the declaration

Windmüller GmbH  
Nord-West-Ring 21  
32832 Augustdorf  
Germany

#### Declared product / declared unit

1 m<sup>2</sup> resilient floor covering 'PURLINE'

#### Scope:

The manufacturer declaration applies to a group of similar products with a maximum total weight of 9 kg/m<sup>2</sup>.

The product is available as rolls or planks. It is manufactured at the Windmüller GmbH site in Detmold, Germany. Cutting of planks take place at the Windmüller GmbH site in Augustdorf, Germany.

LCA results for product groups having a lower total weight can be taken from the corresponding tables of the annex. Specific data can be calculated by using equation 1 given in the annex (see annex chapter: 'General Information on the annex').

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 standard /EN 15804/ serves as the core PCR  
Independent verification of the declaration and data  
according to /ISO 14025:2010/

internally  externally



Angela Schindler  
(Independent verifier appointed by SVR)

## Product

### Product description / Product definition

"PURLINE" - resilient floor covering based on polyurethane is produced with the reactive component castor oil as renewable raw material and with natural inorganic filler.

"PURLINE" is available in many different decors and textures and it is offered as rolls or as planks. The declaration applies to a group of products with a maximum total weight of 9 kg/m<sup>2</sup>.

LCA results are calculated for products with the maximum total weight.

LCA results for product groups having a lower total weight can be taken from the corresponding tables of the annex. The LCA results always refer to the highest total weight of the corresponding weight category.

Results for similar products with any other total weight can be calculated by using equation 1 given in the annex (see annex chapter: 'General Information on the annex').

For the placing on the market of the product in the EU/EFTA (with the exception of Switzerland) Regulation (EU) No. 305/2011 /CPR/ applies. The Declaration of Performance of the products taking into consideration /EN 14041/ and the CE-marking of the products can be found on the manufacturer's technical information section.

## Application

According to the use class as defined in ISO 10874 the product can be used

- in all domestic areas, classified as use class 23,
- in all commercial areas, classified as use class 34
- in all industrial areas, classified as use class 43



## Technical Data

Name	Value	Unit
Grammage	max. 9,0	kg/m <sup>2</sup>
Product Form	Rolls of 2 m width or planks of several dimensions	-

Additional product properties in accordance with /EN 16776/ and performance data of the product in accordance with the Declaration of Performance with respect to its Essential Characteristics according to /EN 14041/ can be found on the manufacturer's technical information section ([www.wineo.de](http://www.wineo.de)).

## Base materials / Ancillary materials

Name	Value	Unit
Polyurethane including 64% renewable material	44.4	%
Filler	53.6	%
Paper	0.8	%
Glass fibre	0.3	%
Polyester	0.9	%

The declared recipes are conform with the REACH candidate list from June 27th 2018 and do not contain listed REACH substances.

## Reference service life

A calculation of the reference service life according to /ISO 15686/ is not possible.

The service life of resilient floor coverings depends on the correct installation taking into account the declared use classification and the adherence to cleaning and maintenance instructions.

A minimum service life of 20 years can be assumed /BNB/, technical service life can be considerably longer.

## LCA: Calculation rules

### Declared Unit

Name	Value	Unit
Declared unit	1	m <sup>2</sup>
Conversion factor to 1 kg	0.11	-
Mass reference	9.0	kg/m <sup>2</sup>

The declared unit refers to 1 m<sup>2</sup> produced floor covering. Output of module A5 'Assembly' is 1 m<sup>2</sup> installed floor covering.

### System boundary

Type of EPD: Cradle-to-grave

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

#### A1-A3 Production:

Energy supply and production of the basic material, auxiliary material, transport of the material to the manufacturing site, emissions, waste water treatment, packaging material and waste processing up to the landfill disposal of residual waste (except radioactive waste). Benefits for generated electricity and steam due to the incineration of production waste are aggregated.

#### A4 Transport:

Transport of the packed floor covering from factory gate to the place of installation.

#### A5 Installation:

Installation of the floor covering, processing of installation waste and packaging waste up to the landfill disposal of residual waste (except radioactive waste), the production of the amount of floor covering

that occurs as installation waste including its transport to the place of installation.

Generated electricity and steam due to the incineration of waste are listed in the result table as exported energy.

Preparing of the floor and adhesives are beyond the system boundaries and not taken into account.

#### B1 Use:

Indoor emissions during the use stage. After the first year, no product related VOC emissions are relevant due to VOC decay curves of the product.

#### B2 Maintenance:

Cleaning of the floor covering for a period of 1 year: Vacuum cleaning – electricity supply  
Wet cleaning – water consumption, production of the cleaning agent, waste water treatment.  
The declared values in this module have to be multiplied by the assumed service life of the floor covering in the building in question (see annex, chapter 'General information on use stage').

#### B3 - B7:

The modules are not relevant and therefore not declared.

#### C1 De-construction:

Energy consumption of the de-construction machine.

#### C2 Transport:

Transport of the floor covering waste to a landfill or to the municipal waste incineration plant (MWI).



#### C3 Waste processing:

C3-1: Landfill disposal need no waste processing.  
C3-2: Impact from waste incineration (plant with  $R1 > 0.6$ ), generated electricity and steam are listed in the result table as exported energy.

#### C4 Disposal

C4-1: Impact from landfill disposal,  
C4-2: The floor covering waste leaves the system in module C3-2,

#### D Recycling potential:

D-A5: Benefits for generated energy due to incineration of packaging and installation waste (incineration plant with  $R1 > 0.6$ ),

D-1: Benefits for generated energy due to landfill disposal of floor covering waste at the end-of-life,  
D-2: Benefits for generated energy due to incineration of floor covering waste at the end-of-life (incineration plant with  $R1 > 0.6$ ),

#### 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.

Background data are taken from the /GaBi database 2018/, service pack 35 and from the /ecoinvent 3.3/ database.

## 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. The indicated values refer to the declared functional unit of all products with a total weight of 9 kg/m<sup>2</sup>.

Specific information on products having a lower total weight can be taken from the annex.

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

Name	Value	Unit
Litres of fuel , diesel, truck EURO 0-6 mix	0.02	l/100km
Litres of fuel , heavy fuel oil, ship	0.002	l/100km
Transport distance truck	540	km
Transport distance ship	750	km
Capacity utilisation (including empty runs) truck	60	%
Capacity utilisation (including empty runs) ship	48	%

#### Installation in the building (A5)

Name	Value	Unit
Material loss	0.27	kg

Coated packaging paper and installation waste are considered to be incinerated in a municipal waste incineration plant. Pure cardboard packaging waste is going to be recycled.

Preparation of the floor and adhesives are not taken into account.

#### Maintenance (B2)

Indication per m<sup>2</sup> floor covering and per year. Depending on the application based on EN ISO 10874, the technical service life recommended by the manufacturer and the anticipated strain on the floor by customers, the case-specific useful life can be established. The effects of Module B2 need to be calculated on the basis of this useful life in order to obtain the overall environmental impacts.

Name	Value	Unit
Maintenance cycle (wet wiping)	103,2	1/year
Maintenance cycle (vacuum cleaning)	37,4	1/year
Water consumption (wet wiping)	0.026	m <sup>3</sup>
Cleaning agent (wet wiping)	0.05	kg
Electricity consumption	0.09	kWh

Further information on cleaning and maintenance see [www.wineo.de](http://www.wineo.de)

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

Two 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 1: 100% landfill disposal

Scenario 2: 100% municipal waste incineration (MWI) with  $R1 > 0.6$

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

$$\text{EOL-impact} = x\% \text{ impact (Scenario 1)} + y\% \text{ impact (Scenario 2)}$$

Name	Value	Unit
Collected as mixed construction waste (scenario 1 and 2)	9	kg
Landfilling (scenario 1)	9	kg
Energy recovery (scenario 2)	9	kg

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

Recovery potentials due to the two end-of-life scenarios (module C) are indicated separately.

## LCA: Results

The results are valid for all declared products with a maximum total weight of 9 kg/m<sup>2</sup>.

LCA results for product groups having a lower total pile weight can be taken from the corresponding tables of the annex. The LCA results always refer to the highest total weight of the corresponding weight category.

Results for similar products with any other total weight can be calculated by using equation 1 given in the annex (see annex chapter: 'General Information on the annex').

The declared result figures in module B2 have to be multiplied by the assumed service life (in years) of the floor covering in the building under consideration.

Information on un-declared modules:

Modules B3 - B7 are not relevant during the service life of the floor covering and are therefore not declared.

Modules C3/1, C4/2 and C4/3 cause no additional impact (see "LCA: Calculation rules") and are therefore not declared. Module C2 represents the transport for scenarios 1 and 2. Column D represents module D/A5.

The CML characterisation factors version January 2016 are applied.

### 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	X	X	MNR	MNR	MNR	MND	MND	X	X	X	X	X

### RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 m<sup>2</sup> floorcovering

Parameter	Unit	A1-A3	A4	A5	B1	B2	C1	C2	C3/2	C4/1	D	D/1	D/2
GWP	[kg CO <sub>2</sub> -Eq.]	7.28E+0	4.35E-1	7.77E-1	0.00E+0	2.88E-1	6.55E-3	2.73E-2	1.73E+1	7.58E+0	-1.20E-1	0.00E+0	-3.82E+0
ODP	[kg CFC11-Eq.]	3.15E-7	1.16E-14	9.31E-9	0.00E+0	2.07E-8	2.90E-14	7.48E-16	2.12E-12	1.71E-13	-2.58E-13	0.00E+0	-8.20E-12
AP	[kg SO <sub>2</sub> -Eq.]	1.15E-1	3.48E-3	3.65E-3	0.00E+0	8.50E-4	1.85E-5	1.16E-4	4.82E-3	1.73E-3	-2.00E-4	0.00E+0	-6.36E-3
EP	[kg (PO <sub>4</sub> ) <sup>3-</sup> -Eq.]	8.26E-2	6.09E-4	2.51E-3	0.00E+0	4.99E-4	1.74E-6	2.96E-5	1.19E-3	1.77E-3	-2.17E-5	0.00E+0	-6.88E-4
POCP	[kg ethene-Eq.]	2.50E-3	-5.88E-4	3.50E-5	1.79E-6	1.02E-4	1.16E-6	-4.81E-5	3.17E-4	1.89E-4	-1.57E-5	0.00E+0	-4.99E-4
ADPE	[kg Sb-Eq.]	3.93E-5	3.26E-8	1.17E-6	0.00E+0	8.33E-7	3.47E-9	2.27E-9	3.33E-7	1.37E-7	-3.36E-8	0.00E+0	-1.07E-6
ADPF	[MJ]	2.08E+2	5.84E+0	6.65E+0	0.00E+0	3.58E+0	6.94E-2	3.72E-1	4.86E+0	9.17E+0	-1.65E+0	0.00E+0	-5.24E+1

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 m<sup>2</sup> floorcovering

Parameter	Unit	A1-A3	A4	A5	B1	B2	C1	C2	C3/2	C4/1	D	D/1	D/2
PERE	[MJ]	1.44E+2	2.84E-1	7.15E+0	0.00E+0	6.30E-1	4.48E-2	2.06E-2	9.73E+1	7.08E-1	-4.00E-1	0.00E+0	-1.27E+1
PERM	[MJ]	9.65E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-9.65E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	[MJ]	2.41E+2	2.84E-1	7.15E+0	0.00E+0	6.30E-1	4.48E-2	2.06E-2	7.45E+1	7.08E-1	-4.00E-1	0.00E+0	-1.27E+1
PENRE	[MJ]	2.03E+2	5.86E+0	6.95E+0	0.00E+0	4.07E+0	1.19E-1	3.74E-1	1.97E+1	9.52E+0	-2.09E+0	0.00E+0	-6.65E+1
PENRM	[MJ]	1.42E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-1.42E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PENRT	[MJ]	2.17E+2	5.86E+0	6.95E+0	0.00E+0	4.07E+0	1.19E-1	3.74E-1	5.52E+0	9.52E+0	-2.09E+0	0.00E+0	-6.65E+1
SM	[kg]	1.41E-1	0.00E+0	4.24E-3	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
RSF	[MJ]	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
NRSF	[MJ]	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
FW	[m <sup>3</sup> ]	2.13E+1	5.24E-4	6.30E-1	0.00E+0	7.45E-3	6.10E-5	3.80E-5	3.65E-2	-2.45E-5	-5.46E-4	0.00E+0	-1.73E-2

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 m<sup>2</sup> floorcovering

Parameter	Unit	A1-A3	A4	A5	B1	B2	C1	C2	C3/2	C4/1	D	D/1	D/2
HWD	[kg]	6.16E-7	2.96E-7	4.08E-8	0.00E+0	1.33E-9	5.59E-11	2.16E-8	3.20E-8	4.06E-8	-8.52E-10	0.00E+0	-2.71E-8
NHWD	[kg]	2.81E-1	4.33E-4	7.04E-2	0.00E+0	3.84E-2	8.40E-5	3.13E-5	2.06E+0	8.98E+0	-8.92E-4	0.00E+0	-2.83E-2
RWD	[kg]	2.95E-3	7.89E-6	9.60E-5	0.00E+0	1.29E-4	1.97E-5	5.11E-7	2.65E-4	1.35E-4	-1.76E-4	0.00E+0	-5.59E-3
CRU	[kg]	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
MFR	[kg]	0.00E+0	0.00E+0	1.29E-1	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
MER	[kg]	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
EEE	[MJ]	0.00E+0	0.00E+0	5.04E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.60E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EET	[MJ]	0.00E+0	0.00E+0	9.28E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.95E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0

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 CO<sub>2</sub> uptake during the growth phase of renewable materials in the product is 6,94 kg. This amount is stored in the material as biogenic carbon. At the end of life the stored carbon is released into the air again as 6,94 kg CO<sub>2</sub> emissions.

## References

### **/IBU 2016/**

IBU (2016): General Programme Instructions for the Preparation of EPDs at the Institut Bauen und Umwelt e.V., Version 1.1 Institut Bauen und Umwelt e.V., Berlin.  
[www.ibu-epd.de](http://www.ibu-epd.de)

### **/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

### **EN 16810**

DIN EN 16810: 2017-08: Resilient, textile and laminate floor coverings – Environmental product declarations – Product category rules

### **PCR Part A**

Institut Bauen und Umwelt e.V., Berlin (pub.): Product Category Rules for Construction Products from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report, V1.7, March 2018  
[www.bau-umwelt.de](http://www.bau-umwelt.de)

### **PCR Part B**

Institut Bauen und Umwelt e.V., Berlin (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 floor coverings, V1.2, February 2018  
[www.bau-umwelt.de](http://www.bau-umwelt.de)

### **EN 16776**

DIN EN 16776: 2016-09: Resilient floor coverings - Heterogeneous polyurethane floor coverings - Specification

### **EN 14041**

DIN EN 14041: 2008-05: Resilient, textile and laminate floor coverings - Essential characteristics

### **ISO 10874**

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

### **EN 13501-1**

DIN EN 13501-1:2010-01: Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests

### **ISO 15686**

ISO 15686: Buildings and constructed assets - Service life planning

ISO 15686-1: 2011-05: Part 1: General principles and framework

ISO 15686-2: 2012-05: Part 2: Service life prediction procedures

ISO 15686-7: 2006-03: Part 7: Performance evaluation for feedback of service life data from practice

ISO 15686-8: 2008-06: Part 8: Reference service life and service-life estimation

### **CPR**

Construction Products Regulation, Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011

### **BNB**

Bundesministerium des Innern, für Bau und Heimat, „Nutzungsdauern von Bauteilen zur Lebenszyklusanalyse nach BNB, 2017“ des Bundesinstitut für Bau-, Stadt- und Raumforschung (BBSR)

### **REACH**

Regulation concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency (ECHA), European Union Regulation No 1907/2006, June 2017,

### **GaBi database 2018**

GaBi Software-System and Database for Life Cycle Engineering, thinkstep AG, Leinfelden-Echterdingen, service pack 35, 2018

### **ecoinvent 3.3**

ecoinvent, Zurich, Switzerland, Database Version 3.3, August 2016

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