ENVIRONMENTAL-PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A1*

Owner of the Declaration	Windmöller GmbH
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-WIN-20220054-CBC1-EN
Issue date	30/03/2022
Valid to	29/03/2027

Polyurethan underlay mats for floor coverings with renewable castor oil

Windmöller

Institut Bauen und Umwelt e.V.

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General Information

Windmöller

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number

EPD-WIN-20220054-CBC1-EN

This declaration is based on the product category rules:

Floor coverings, 01/08/2021
(PCR checked and approved by the SVR)

Issue date

30/03/2022

Valid to

29/03/2027

Dipl.-Ing Hans Peters
(chairman of Institut Bauen und Umwelt e.V.)

Dr. Alexander Röder
(Managing Director Institut Bauen und Umwelt e.V.)

Polyurethan underlay mats for floor coverings with renewable castor oil

Owner of the declaration

Windmöller GmbH
Nord-West-Ring 21
32832 Augustdorf
Germany

Declared product / declared unit

Polyurethane underlayment mats - 1 m^2 polyurethane underlayment mats with renewable plant oil

Scope:

The manufacturer declaration applies to a group of similar products with a minimum weight of 1 kg/m^2 and a maximum total weight of 4 kg/m^2. The product is available as rolls and tiles. It is manufactured at the Windmoller GmbH site in Detmold, Germany. LCA results for product groups having a lower total weight than 4 kg/m^2 can be taken from the corresponding tables of the annexe. Specific data can be calculated by using equation 1 given in the annexe (see annexe chapter: 'General Information on the annexe').
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.

The EPD was created according to the specifications of EN 15804+A1. In the following, the standard will be simplified as *EN 15804 bezeichnet*.

Verification

The standard EN 15804 serves as the core PCR
Independent verification of the declaration and data according to ISO 14025:2011
☐ internally ☒ externally

Angela Schindler,
(Independent verifier)

Product

Product description/Product definition

Underlayment mats based on polyurethane are produced with renewable plant oil and with natural inorganic filler. The mats are available in different weights and thicknesses and are offered as rolls or tiles. The declaration applies to a group of products with a minimum total weight of 1 kg/m^2 and a maximum total weight of 4 kg/m². The mats consist of a laminated polyurethane core.

LCA results for products with lower weights can be taken from the corresponding tables of the annexe. Results for specific products with total weights between 1 kg/m^2 and 4 kg/m^2 can be calculated by using equation 1 given in the annexe (see annexe chapter: 'General Information on the annexe'). For the placing on the market of the product in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) the technical requirements of the underlayment mats are covered by *EN 16354:2019-01*.

Application

The products are applied below floor coverings. They can be used in domestic, commercial and industrial areas.

Technical Data

The technical specifications of the products within the scope of the EPD shall be listed, including the reference to the test methods/test standards for each specification.

For products with CE marking, the technical specifications must be specified in accordance with information in the declaration of performance. The properties relevant to the product should be specified in the table below. If no information is given for properties, an explanation must be given in the background report to the EPD as to why the property is not relevant to the product.

Name	Value	Unit
Product Form	mats	-
Grammage	4000	kg/m^2
Polyurethane layer	3833	g/m²
Lamination	167	g/m²

Performance data of the
product can be found on the manufacturer's technical information section (www.windmoeller.de).

Base materials/Ancillary materials

Name	Value	Unit
Polyurethane including 73 % renewable material	18,4	%
Inorganic Fillers	76,2	%
Organic layers	4,6	%
Additives	0,8	%

This product contains substances listed in the *ECHA candidate list* (19.01.2021) or other carcinogenic, mutagenic or reprotoxic (CMR) substances in categories 1A or 1B which are not on the *candidate list* exceeding 0.1 percentage by mass: no

The main constituents of the product or its components shall be indicated as mass percentages to enable the user of the EPD to understand the composition of the product in delivery status. This information should support safety and efficiency during installation, use, and disposal of the product.

When substances from the “Candidate List of Substances of Very High Concern for Authorisation” (SVHC) are part of the formulation with a mass percentage of > 0,1 of the mass of the construction product, i.e. when they were added to the formulation on purpose, then the substances shall be declared including CAS-number.

If the construction product is a substance or mixture under the chemical law (*REACH*), the concentration limit value refers to the entire product; if it is an article, the partial product or component applies as a unit of reference.

The Candidate list can be found on the ECHA website address: echa.europa.eu/de/home

This declaration is mandatory for all EPDs and must be formulated as follows:

1) “This product/article/at least one partial article contains substances listed in the candidate list (date: dd.mm.yyyy) exceeding 0.1 percentage by mass: yes/no”.

[if yes: List of respective SVHC and their CAS-number]

Statements like “…free of ….” and/or “…does not contain…” may not be used.

Environment and health during use

Reference service life

A calculation of the reference service life according to *ISO 15686* is not possible.
The service life of the underlay mats strongly depends on the correct installation. The service life of the declared underlay mats is mainly dependent on the service life of the covering layer.
A minimum service life of 10 years can be assumed, technical service life can be considerably longer.

LCA: Calculation rules

Declared Unit

The declared unit and the mass reference must be indicated in the appropriate table as declared. If there are several units to choose from, a suitable one must be selected. If averages are declared across various products, the average breakdown must be explained.

1m² of floor covering with specified construction/composition parameters. The mass reference should be indicated.

Name	Value	Unit
Declared unit	1	m^2
conversion factor	4	-

The declared unit refers to 1 m^2 produced underlay mat. The output of module A5 'Assembly' is 1 m^2 installed underlay mat.

For IBU core EPDs (where clause 3.6 is part of the EPD): for average EPDs, an estimate of the robustness of the LCA

values must be made, e.g. concerning variability of the production process, geographical representativeness and the influence of background data and preliminary products compared to the environmental impacts caused by actual production.

System boundary

Type of EPD: Cradle-to-gate with options

System boundaries of modules A, B, C, D:
Modules C3, C4 and D are indicated separately for three end-of-life scenarios:
1 - landfill disposal
2 - municipal waste incineration
3 - recovery in a cement plant
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 disposal of residual waste
(except radioactive waste). Benefits for generated electricity and steam
due to the incineration of production waste are aggregated.
Biogenic carbon that is stored in renewable material (plant oil, packaging paper) is taken into account as well as the associated carbon dioxide uptake from the air during the growth of the plants

A4 Transport:
Transport of the packed product 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 underlay mat 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.
Biogenic carbon that is stored in renewable materials the polyurethane layer and in packaging paper is released as carbon dioxide emissions into the air at the end of life in module A5.

B1 - B7:
The modules are not relevant and therefore not declared.

C1 De-construction:
The floor covering is de-constructed manually and no additional environmental impact is caused.

C2 Transport:
Transport
of the underlay mat waste to a landfill, to the municipal waste incineration
plant (MWI) or to the waste collection facility for recycling.

C3 Waste processing:
C3-1: Landfill disposal needs 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.
C3-3: Collection of the underlay mat waste for recovery in the cement industry, waste processing (granulating), transport to the cement plant, emissions from the incineration. The biogenic carbon that is stored in the renewable materials of the floor covering is released into the air as carbon dioxide emissions.

C4 Disposal
C4-1: Impact from landfill disposal,
C4-2: The underlay mat waste leaves the system in module C3-2,
C4-3: The pre-processed underlay mat waste leaves the system in module C3-3.

D Recycling potential:
Calculated benefits result from materials exclusive secondary materials (net materials).
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 underlay mat waste at the end-of-life,
D-2: Benefits for generated energy due to incineration of underlay mat waste at the end-of-life (incineration plant with R1 > 0.6),
D-3: Benefits for saved fossil energy and saved inorganic material due to recovery of the underlay mat in a cement plant.

Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product´s lifespan: Unknown

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.

Transport to the construction site (A4)

Name	Value	Unit
Litres of fuel (truck, EURO 0-6 mix)	0.0094	l/100km
Transport distance	270	km
Capacity utilisation (including empty runs)	55	%

Installation in the building (A5)

Name	Value	Unit
Material loss	0.36	kg

Polyethylene packaging waste and installation waste are considered to be incinerated in a municipal waste incineration plant. Cardboard is going to be recycled.

In case a **reference service life** according to applicable ISO standards is declared then the assumptions and in-use conditions underlying the determined RSL shall be declared. In addition, it shall be stated that the RSL applies for the reference

conditions only.

The same holds for a service life declared by the manufacturer. Corresponding information related to in-use conditions needs not be provided if a service life taken from the list on service life by BNB is declared.

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 1: 100 % landfill disposal
Scenario 2: 100 % municipal waste incineration (MWI) with R1>0.6
Scenario 3: 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 1)
+ y % impact (Scenario 2)
+ z % impact (Scenario 3)
with x % + y % + z % = 100 %

Name	Value	Unit
Collected as mixed construction waste (scenario 1 and 2)	4	kg
Landfilling (scenario 1)	4	kg
Energy recovery (scenario 2)	4	kg
Collected separately waste type (scenario 3)	4	kg
Energy recovery (scenario 3)	0,941	kg
Recycling (scenario 3)	3.059	kg

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

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

Recycling in the cement industry (scenario 3)
VDZ e.V.
The organic material of the underlay mat is used as secondary fuel in a cement kiln. It mainly substitutes for lignite (65.5 %), hard coal (26.2 %) and petrol coke (8.6 %).
The inorganic material is substantially integrated into the cement clinker and substitutes for original material input.

LCA: Results

The LCA results refer to all declared products with a maximum weight of 4000 g/m^2. LCA results for products with lower weights can be taken from the corresponding tables of the annexe. Results for specific products with weights between 1 kg/m^2 and 4 kg/m^2 can be calculated by using equation 1 given in the annexe (see annexe chapter: 'General Information on the annexe'). Information on non-relevant modules: Modules B1 - B7 are not relevant during the service life of the underlay mat. Modules C1, C3/1, C4/2 and C4/3 cause no additional impact (see chapter "LCA: Calculation rules" in this document). All these modules are declared and marked as 'modules not relevant/declared'. Module C2 represents the transport for scenarios 1, 2 and 3. Column D represents module D/A5. The calculations are based on the CML characterization factors (version August 2016).

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

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	MND	MNR	MNR	MNR	MND	MND	MND	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A1: 1 m² floorcovering

Parameter	Unit	A1-A3	A4	A5	C2	C3/2	C3/3	C4/1	D	D/1	D/2	D/3
GWP	kg CO_2 eq	8.42E-01	9.03E-02	4.78E-01	1.33E-02	4.1E+00	4.15E+00	1.79E+00	-6.52E-02	0	-6.23E-01	-2.41E-01
ODP	kg CFC11 eq	1.59E-08	1.58E-17	1.43E-09	2.32E-18	1.83E-15	2.54E-15	9.22E-16	-9.56E-16	0	-9.05E-15	-1.12E-15
AP	kg SO_2 eq	1.86E-02	3.73E-04	1.82E-03	5.49E-05	1.17E-03	1.35E-03	7.05E-04	-7.36E-05	0	-6.99E-04	-5.29E-04
EP	kg PO_4^3 eq	1.63E-02	9.51E-05	1.5E-03	1.4E-05	2.73E-04	3.13E-04	7.65E-04	-1.02E-05	0	-9.71E-05	-9.45E-05
POCP	kg Ethen eq	2.89E-04	-1.6E-04	1.68E-05	-2.35E-05	7.96E-05	2.39E-05	6.34E-05	-6.84E-06	0	-6.52E-05	-6.99E-05
ADPE	kg Sb eq	4.12E-06	8E-09	3.88E-07	1.18E-09	1.85E-07	1.95E-07	5.21E-08	-1.19E-08	0	-1.13E-07	-2.85E-08
ADPF	MJ	4.37E+01	1.23E+00	4.27E+00	1.81E-01	2.28E+00	2.97E+00	4.06E+00	-9.44E-01	0	-9.04E+00	-2.47E+01

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 - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A1: 1 m² floorcovering

Parameter	Unit	A1-A3	A4	A5	C2	C3/2	C3/3	C4/1	D	D/1	D/2	D/3
PERE	MJ	2.69E+01	6.87E-02	2.55E+00	1.01E-02	4.43E-01	6.49E-01	3.03E-01	-2.47E-01	0	-2.33E+00	-2.57E-01
PERM	MJ	7.4E-02	0	-7.4E-02	0	0	0	0	0	0	0	0
PERT	MJ	2.7E+01	6.87E-02	2.47E+00	1.01E-02	4.43E-01	6.49E-01	3.03E-01	-2.47E-01	0	-2.33E+00	-2.57E-01
PENRE	MJ	1.84E+01	1.23E+00	4.65E+00	1.81E-01	2.87E+01	2.96E+01	4.18E+00	-1.14E+00	0	-1.09E+01	-2.48E+01
PENRM	MJ	2.64E+01	0	-2.58E-01	0	-2.62E+01	-2.62E+01	0	0	0	0	0
PENRT	MJ	4.49E+01	1.23E+00	4.39E+00	1.81E-01	2.53E+00	3.38E+00	4.18E+00	-1.14E+00	0	-1.09E+01	-2.48E+01
SM	kg	2.15E-02	0	1.94E-03	0	0	0	0	0	0	0	2.67E+00
RSF	MJ	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0
FW	m^3	2.19E+00	7.87E-05	1.98E-01	1.16E-05	1.33E-02	1.35E-02	3.85E-05	-2.41E-04	0	-2.28E-03	-1.95E-03

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 – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A1: 1 m² floorcovering

Parameter	Unit	A1-A3	A4	A5	C2	C3/2	C3/3	C4/1	D	D/1	D/2	D/3
HWD	kg	2.77E-05	6.22E-11	2.5E-06	9.14E-12	4.19E-10	5.46E-10	7.52E-10	-2.55E-10	0	-2.43E-09	-5.22E-10
NHWD	kg	9.76E-02	1.83E-04	1.35E-01	2.69E-05	1.41E+00	1.41E+00	3.98E+00	-5.24E-04	0	-4.99E-03	-1.06E-03
RWD	kg	4.26E-04	1.49E-06	4.77E-05	2.19E-07	1.01E-04	1.6E-04	4.85E-05	-7.93E-05	0	-7.5E-04	-4.8E-05
CRU	kg	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	2.47E-02	0	0	2.67E+00	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	2.7E-01	0	2.56E+00	0	0	0	0	0	0

EET	MJ	0	0	5.36E-01	0	5.17E+00	0	0	0	0	0	0

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

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Association of German Cement Works, Ed. Environmental Data of the German Cement Industry 2019

The literature referred to in the Environmental Product Declaration must be listed in full.Standards already fully quoted in the EPD do not need to be listed here again.
The current version of PCR Part A and PCR Part B of the PCR document on which they are based must be referenced.

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