

ENVIRONMENTAL PRODUCT DECLARATION

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

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-20220119-CBC1-EN
Issue date	06.05.2022
Valid to	05.05.2027

Polyurethane underlay materials with a total weight of 4 kg/m²

Windmüller GmbH

www.ibu-epd.com | <https://epd-online.com>



General Information

Windmüller GmbH

Programme holder

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

Declaration number

EPD-WIN-20220119-CBC1-EN

This declaration is based on the product category rules:

Floor coverings, 02.2018
(PCR checked and approved by the SVR)

Issue date

06.05.2022

Valid to

05.05.2027



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



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

Polyurethane underlay materials with a total weight of 4 kg/m²

Owner of the declaration

Windmüller GmbH
Nord-West-Ring 21
32832 Augustdorf
Germany

Declared product / declared unit

Polyurethane underlayment mats - 1 m² polyurethane underlayment mats with renewable plant oil

Scope:

The manufacturer declaration applies to a product with total weight of 4 kg/m².

The product is available as rolls and tiles. It is manufactured at the Windmüller GmbH site in Detmold, Germany.

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*.

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 offered as rolls or tiles. The declaration applies to a product with a total weight of 4 kg/m². The mats consist of a laminated polyurethane core.

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: Laminated floor coverings - Underlays - Specifications, requirements and test methods*.

Application

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

Technical Data

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

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	%
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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

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

Name	Value	Unit
Declared unit	1	m ²
conversion factor [Mass/Declared Unit]	4	-

The declared unit refers to 1 m² produced underlay mat. The output of module A5 'Assembly' is 1 m² installed underlay mat.

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 and 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.

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 2021*. Remaining data gaps are covered by the *ecoinvent 3.7* 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 cement clinker and substitutes for original material input.

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.

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 (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

LCA: Results

The LCA results refer to all declared products with a total weight of 4000 g/m². 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-1	9.03E-2	4.78E-1	1.33E-2	4.10E+0	4.15E+0	1.79E+0	-6.52E-2	0.00E+0	-6.23E-1	-2.41E-1
ODP	[kg CFC11-Eq.]	1.59E-8	1.58E-17	1.43E-9	2.32E-18	1.83E-15	2.54E-15	9.22E-16	-9.56E-16	0.00E+0	-9.05E-15	-1.12E-15
AP	[kg SO ₂ -Eq.]	1.86E-2	3.73E-4	1.82E-3	5.49E-5	1.17E-3	1.35E-3	7.05E-4	-7.36E-5	0.00E+0	-6.99E-4	-5.29E-4
EP	[kg (PO ₄) ³ -Eq.]	1.63E-2	9.51E-5	1.50E-3	1.40E-5	2.73E-4	3.13E-4	7.65E-4	-1.02E-5	0.00E+0	-9.71E-5	-9.45E-5
POCP	[kg ethene-Eq.]	2.89E-4	-1.60E-4	1.68E-5	-2.35E-5	7.96E-5	2.39E-5	6.34E-5	-6.84E-6	0.00E+0	-6.52E-5	-6.99E-5
ADPE	[kg Sb-Eq.]	4.12E-6	8.00E-9	3.88E-7	1.18E-9	1.85E-7	1.95E-7	5.21E-8	-1.19E-8	0.00E+0	-1.13E-7	-2.85E-8
ADPF	[MJ]	4.37E+1	1.23E+0	4.27E+0	1.81E-1	2.28E+0	2.97E+0	4.06E+0	-9.44E-1	0.00E+0	-9.04E+0	-2.47E+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 - 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+1	6.87E-2	2.55E+0	1.01E-2	4.43E-1	6.49E-1	3.03E-1	-2.47E-1	0.00E+0	-2.33E+0	-2.57E-1
PERM	[MJ]	7.40E-2	0.00E+0	-7.40E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	[MJ]	2.70E+1	6.87E-2	2.47E+0	1.01E-2	4.43E-1	6.49E-1	3.03E-1	-2.47E-1	0.00E+0	-2.33E+0	-2.57E-1
PENRE	[MJ]	1.84E+1	1.23E+0	4.65E+0	1.81E-1	2.87E+1	2.96E+1	4.18E+0	-1.14E+0	0.00E+0	-1.09E+1	-2.48E+1
PENRM	[MJ]	2.64E+1	0.00E+0	-2.58E-1	0.00E+0	-2.62E+1	-2.62E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PENRT	[MJ]	4.49E+1	1.23E+0	4.39E+0	1.81E-1	2.53E+0	3.38E+0	4.18E+0	-1.14E+0	0.00E+0	-1.09E+1	-2.48E+1
SM	[kg]	2.15E-2	0.00E+0	1.94E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.67E+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
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
FW	[m ³]	2.19E+0	7.87E-5	1.98E-1	1.16E-5	1.33E-2	1.35E-2	3.85E-5	-2.41E-4	0.00E+0	-2.28E-3	-1.95E-3
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 – 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-5	6.22E-11	2.50E-6	9.14E-12	4.19E-10	5.46E-10	7.52E-10	-2.55E-10	0.00E+0	-2.43E-9	-5.22E-10
NHWD	[kg]	9.76E-2	1.83E-4	1.35E-1	2.69E-5	1.41E+0	1.41E+0	3.98E+0	-5.24E-4	0.00E+0	-4.99E-3	-1.06E-3
RWD	[kg]	4.26E-4	1.49E-6	4.77E-5	2.19E-7	1.01E-4	1.60E-4	4.85E-5	-7.93E-5	0.00E+0	-7.50E-4	-4.80E-5
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
MFR	[kg]	0.00E+0	0.00E+0	2.47E-2	0.00E+0	0.00E+0	2.67E+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
EEE	[MJ]	0.00E+0	0.00E+0	2.70E-1	0.00E+0	2.56E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EET	[MJ]	0.00E+0	0.00E+0	5.36E-1	0.00E+0	5.17E+0	0.00E+0	0.00E+0	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											

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VDZ e.V.

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

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