ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

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-20230577-CBA1-EN
Issue date	04.04.2024
Valid to	03.04.2029

Resilient polyurethane floor covering for adhesive bonding, maximum total weight 3,4 kg/m²

Windmöller GmbH

Institut Bauen und Umwelt e.V.

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ECO PLATFORM EPD VERIFIED



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General Information

Windmöller GmbH

Programme holder

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

Declaration number

EPD-WIN-20230577-CBA1-EN

This declaration is based on the product category rules:

Floor coverings, 01.08.2021
(PCR checked and approved by the SVR)

Issue date

04.04.2024

Valid to

03.04.2029



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



Florian Pronold
(Managing Director Institut Bauen und Umwelt e.V.)

Resilient polyurethane floor covering for adhesive bonding, maximum total weight 3,4 kg/m²

Owner of the declaration

Windmöller GmbH
Nord-West-Ring 21
32832 Augustdorf
Germany

Declared product / declared unit

1 m² resilient floor covering 'PURLINE'

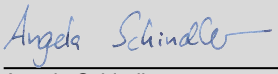
Scope:

The manufacturer declaration applies to products with a maximum total weight of 3,4 kg/m².
The product is available as rolls or planks. It is manufactured at the Windmöller GmbH site in Detmold, Germany. Cutting of planks takes place at the Windmöller GmbH site in Augustdorf, 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+A2. 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

The resilient floor covering based on polyurethane is produced with the reactive component castor oil as renewable raw material and with natural inorganic filler. Products are available in many different decors and textures and it is offered as rolls or as planks. The declaration applies to a product with a maximum total weight of 3,4 kg/m². For the placing on the market of the product in the European Union/European Free Trade Association (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 domestic areas, classified as use class 23,
- in commercial areas, classified as use class 33 and 43

Technical Data

Constructional data

Name	Value	Unit
Grammage	3,4	kg/m²
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)

Base materials/Ancillary materials

Name	Value	Unit
Polyurethane including 53% renewable material	31,4	%
Inorganic Filler	62,8	%
Paper	1,4	%
Glass fibre	1,7	%
Organic materials	2,4	%
Additives	0,4	%

The specific product coverd by the EPD contains substances listed in the *ECHA candidate list* (14.06.2023) 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 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^2
Grammage	3.4	kg/m^2
Layer thickness	0.002	m
Gross density	1700	kg/m^3

The declared unit refers to 1 m^2 produced floor covering. The output of module A5 'Assembly' is 1 m^2 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 volatile organic compoun (VOC) emissions are relevant due to the VOC decay curves of the product.

B2 Maintenance:
Cleaning of the floor covering for a period of 1 year:
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 annexe, 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 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 carpet waste for recovery in the cement industry, waste processing (granulating), transport to the cement plant, emissions from the incineration.

C4 Disposal:
C4-1: Impact from landfill disposal,
C4-2: The carpet waste leaves the system in module C3-2,
C4-3: The pre-processed carpet 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 carpet waste at the end of life,
D-2: Benefits for generated energy due to incineration of carpet 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 carpet in a cement plant. (incineration plant with R1 > 0.6),

Geographic Representativeness

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

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 Sphera Manged LCA content database 2023.2. Remaining data gaps are filled with ecoinvent 3.9 database

LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

Information on describing the biogenic Carbon Content at factury gate

Name	Value	Unit
Biogenic carbon content in product	0.424	kg C
Biogenic carbon content in accompanying packaging	0.011	kg C

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO_2.

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 3,4 kg/m^2.

Transport to the construction site (A4)

Name	Value	Unit
Litres of fuel , diesel, truck EURO 0-6 mix	0.0094	l/100km
Litres of fuel , heavy fuel oil, ship	0.0009	l/100km
Transport distance truck	540	km
Transport distance ship	1600	km
Capacity utilisation (including empty runs) truck	55	%
Capacity utilisation (including empty runs) ship	70	%

Installation in the building (A5)

Name	Value	Unit
Material loss	0.102	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^2 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)	130	1/year
Water consumption (wet wiping)	0.0325	m^3
Cleaning agent (wet wiping)	0.325	kg

Further information on cleaning and maintenance see www.wineo.de

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 % recovery in the cement industry

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

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)	3.4	kg
Collected separately waste type (scenario 3)	3.4	kg
Landfilling (scenario 1)	3.4	kg
Energy recovery (scenario 2)	3.4	kg
Energy recocery (scenario 3)	1,208	kg
Recycling (scenario 3)	2.192	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.

Recycling in the cement industry (scenario 3):
The organic material of the floor covering is used as an alternative fuel in a cement kiln. It mainly substitutes for lignite (68.8 %), hard coal (23.6 %) and petrol coke (7.6 %). The inorganic material is substantially integrated into the cement clinker and substitutes for the original material input. VDZ e.

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LCA: Results

The results are valid for the declared product with a maximum total weight of 3,4 kg/m².

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.

Version number of the characterisation factors used : EN 15804+A2 (based on EF 3.1)

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR 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	X	X	MNR	MNR	MNR	MND	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m² floorcovering

Parameter	Unit	A1-A3	A4	A5	B1	B2	C1	C2	C3	C3/1	C3/2	C3/3	C4	C4/1	C4/2	C4/3	D	D/1	D/2	D/3
GWP-total	kg CO_2 eq	2.76E+00	2.56E-01	2.5E-01	0	1.51E+00	0	1.39E-02	ND	ND	3.6E+00	3.65E+00	ND	1.79E+00	ND	ND	-2.44E-02	0	-8.15E-01	-2.43E-01
GWP-fossil	kg CO_2 eq	4.33E+00	2.53E-01	1.97E-01	0	7.82E-01	0	1.38E-02	ND	ND	1.98E+00	2.03E+00	ND	2.31E-01	ND	ND	-2.43E-02	0	-8.11E-01	-2.43E-01
GWP-biogenic	kg CO_2 eq	-1.7E+00	5.11E-04	4.87E-02	0	1.75E-02	0	3.23E-05	ND	ND	1.62E+00	1.62E+00	ND	1.56E+00	ND	ND	-1.09E-04	0	-3.64E-03	1.81E-04
GWP-luluc	kg CO_2 eq	1.37E-01	1.84E-03	4.19E-03	0	7.09E-01	0	1.31E-04	ND	ND	2.14E-04	5.42E-04	ND	1.93E-04	ND	ND	-1.56E-06	0	-5.21E-05	-1.63E-04
ODP	kg CFC11 eq	7.15E-08	2.14E-14	2.14E-09	0	1.23E-07	0	1.23E-15	ND	ND	2.14E-13	4.98E-13	ND	3.93E-13	ND	ND	-1.86E-13	0	-6.19E-12	-5.91E-13
AP	mol H^+ eq	3.87E-02	3.2E-03	1.31E-03	0	2.11E-03	0	8.67E-05	ND	ND	1.87E-03	2.11E-03	ND	7.01E-04	ND	ND	-3E-05	0	-1E-03	-8.15E-04
EP-freshwater	kg P eq	1.21E-03	7.39E-07	3.63E-05	0	2.68E-05	0	5.14E-08	ND	ND	7.08E-07	8.93E-07	ND	4.5E-05	ND	ND	-3.84E-08	0	-1.28E-06	-3.61E-07
EP-marine	kg N eq	1.51E-02	1.09E-03	5.13E-04	0	5.46E-04	0	4.25E-05	ND	ND	8.65E-04	9.79E-04	ND	1.61E-04	ND	ND	-8.83E-06	0	-2.94E-04	-2.76E-04
EP-terrestrial	mol N eq	1.53E-01	1.2E-02	5.26E-03	0	8.13E-03	0	4.71E-04	ND	ND	9.86E-03	1.11E-02	ND	1.76E-03	ND	ND	-9.46E-05	0	-3.15E-03	-3.03E-03
POCP	kg NMVOC eq	1.33E-02	2.51E-03	5.43E-04	1.19E-05	3.01E-03	0	8.03E-05	ND	ND	2.24E-03	2.46E-03	ND	5.1E-04	ND	ND	-2.46E-05	0	-8.21E-04	-8.4E-04
ADPE	kg Sb eq	4.75E-06	1.35E-08	1.43E-07	0	7.17E-07	0	9.15E-10	ND	ND	1.55E-08	2.01E-08	ND	6.18E-09	ND	ND	-1.71E-09	0	-5.68E-08	-1.03E-08
ADPF	MJ	7.76E+01	3.42E+00	2.5E+00	0	1.38E+01	0	1.92E-01	ND	ND	2.1E+00	2.9E+00	ND	3.49E+00	ND	ND	-4.48E-01	0	-1.49E+01	-4.04E+01
WDP	m^3 world eq deprived	6.9E+01	2.39E-03	2.09E+00	0	3.38E-01	0	1.62E-04	ND	ND	5.14E-01	5.17E-01	ND	-3.3E-03	ND	ND	-2.25E-03	0	-7.5E-02	-2.93E-02

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; WDP = Water (user) deprivation potential)

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m² floorcovering

Parameter	Unit	A1-A3	A4	A5	B1	B2	C1	C2	C3	C3/1	C3/2	C3/3	C4	C4/1	C4/2	C4/3	D	D/1	D/2	D/3
PERE	MJ	1.62E+01	1.95E-01	1.22E+00	0	9.15E+00	0	1.36E-02	ND	ND	2.18E+01	2.2E+01	ND	3.15E-01	ND	ND	-1.27E-01	0	-4.23E+00	-3.87E-01
PERM	MJ	2.15E+01	0	-7E-02	0	0	0	0	ND	ND	-2.14E+01	-2.14E+01	ND	0	ND	ND	0	0	0	0
PERT	MJ	3.77E+01	1.95E-01	1.15E+00	0	9.15E+00	0	1.36E-02	ND	ND	3.89E-01	6.15E-01	ND	3.15E-01	ND	ND	-1.27E-01	0	-4.23E+00	-3.87E-01
PENRE	MJ	6.14E+01	3.43E+00	2.75E+00	0	1.38E+01	0	1.92E-01	ND	ND	1.8E+01	1.88E+01	ND	3.49E+00	ND	ND	-4.48E-01	0	-1.49E+01	-4.04E+01

PENRM	MJ	1.62E+01	0	-2.52E-01	0	0	0	0	ND	ND	-1.59E+01	-1.59E+01	ND	0	ND	ND	0	0	0	0
PENRT	MJ	7.76E+01	3.43E+00	2.5E+00	0	1.38E+01	0	1.92E-01	ND	ND	2.1E+00	2.9E+00	ND	3.49E+00	ND	ND	-4.48E-01	0	-1.49E+01	-4.04E+01
SM	kg	2.15E-02	0	6.44E-04	0	0	0	0	ND	ND	0	0	ND	0	ND	ND	0	0	0	1.29E+00
RSF	MJ	0	0	0	0	0	0	0	ND	ND	0	0	ND	0	ND	ND	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	ND	ND	0	0	ND	0	ND	ND	0	0	0	0
FW	m^3	2.35E+00	2.15E-04	7.09E-02	0	9.78E-03	0	1.49E-05	ND	ND	1.22E-02	1.24E-02	ND	3.44E-05	ND	ND	-1.03E-04	0	-3.43E-03	-3.51E-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+A2:
1 m² floorcovering

Parameter	Unit	A1-A3	A4	A5	B1	B2	C1	C2	C3	C3/1	C3/2	C3/3	C4	C4/1	C4/2	C4/3	D	D/1	D/2	D/3
HWD	kg	1.66E-08	1.23E-11	5.07E-10	0	1.51E-04	0	7.11E-13	ND	ND	2.73E-10	2.5E-10	ND	2.94E-10	ND	ND	-2.54E-11	0	-8.46E-10	-2.16E-12
NHWD	kg	1.79E-01	4.57E-04	3.55E-02	0	3.55E-02	0	2.77E-05	ND	ND	1E+00	1E+00	ND	3.39E+00	ND	ND	-2.19E-04	0	-7.29E-03	-2.16E-02
RWD	kg	1.3E-03	4.35E-06	4.17E-05	0	1.56E-04	0	2.48E-07	ND	ND	8.55E-05	1.37E-04	ND	4.13E-05	ND	ND	-3.37E-05	0	-1.12E-03	-6.86E-05
CRU	kg	0	0	0	0	0	0	0	ND	ND	0	0	ND	0	ND	ND	0	0	0	0
MFR	kg	0	0	0	0	0	0	0	ND	ND	0	1.29E+00	ND	0	ND	ND	0	0	0	0
MER	kg	0	0	0	0	0	0	0	ND	ND	0	0	ND	0	ND	ND	0	0	0	0
EEE	MJ	0	0	1.12E-01	0	0	0	0	ND	ND	3.73E+00	0	ND	0	ND	ND	0	0	0	0
EET	MJ	0	0	2.13E-01	0	0	0	0	ND	ND	7.1E+00	3.73E+01	ND	0	ND	ND	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

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional:
1 m² floorcovering

Parameter	Unit	A1-A3	A4	A5	B1	B2	C1	C2	C3	C3/1	C3/2	C3/3	C4	C4/1	C4/2	C4/3	D	D/1	D/2	D/3
PM	Disease incidence	3.51E-07	4.31E-08	1.22E-08	0	2.4E-07	0	5.45E-10	ND	ND	1.37E-08	1.53E-08	ND	6.8E-09	ND	ND	-2.55E-10	0	-8.48E-09	-2.59E-08
IR	kBq U235 eq	5.04E-01	6.27E-04	1.55E-02	0	4.14E-02	0	3.58E-05	ND	ND	1.3E-02	2.16E-02	ND	6.11E-03	ND	ND	-5.6E-03	0	-1.87E-01	-6.59E-03
ETP-fw	CTUe	3.32E+01	2.41E+00	1.11E+00	1.02E-04	5.72E+00	0	1.35E-01	ND	ND	1.08E+00	1.51E+00	ND	2.98E+00	ND	ND	-6.09E-02	0	-2.03E+00	-1.52E+01
HTP-c	CTUh	2.82E-09	4.78E-11	8.77E-11	0	2.19E-09	0	2.73E-12	ND	ND	5.24E-11	6.39E-11	ND	1.53E-10	ND	ND	-4.92E-12	0	-1.64E-10	-6.78E-11
HTP-nc	CTUh	1.5E-07	1.99E-09	4.65E-09	7.4E-13	2.47E-08	0	1.2E-10	ND	ND	2.82E-09	3.19E-09	ND	1.22E-08	ND	ND	-1.22E-10	0	-4.08E-09	-2.55E-09
SQP	SQP	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index

No substantiated values can be given for the SQP indicator with the existing database.

The result figures given in module B2 refer to a period of 1 year because a reference service life is not declared. They have to be multiplied by the assumed service life (in years) of the floor covering
in the building under consideration.

Disclaimer 1 – for the indicator 'Potential Human exposure efficiency relative to U235'. This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators 'abiotic depletion potential for non-fossil resources', 'abiotic depletion potential for fossil resources', 'water (user) deprivation potential, deprivation-weighted water consumption', 'potential comparative toxic unit for ecosystems', 'potential comparative toxic unit for humans – cancerogenic', 'Potential comparative toxic unit for humans - not cancerogenic', 'potential soil quality index'. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.

The CO_2 uptake during the growth phase of renewable materials in the product is 1,55 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 1,55 kg CO_2 emissions.

References

ISO 10874
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Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

+49 (0)30 3087748- 0
info@ibu-epd.com
www.ibu-epd.com

Programme holder

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

+49 (0)30 3087748- 0
info@ibu-epd.com
www.ibu-epd.com

Author of the Life Cycle Assessment

Gemeinschaft umweltfreundlicher Teppichboden (GUT) e.V.
Schönebergstraße 2
52068 Aachen
Germany

+45 (0)241 96843 410
mail@gut-ev.de
www.gut-ev.org

Owner of the Declaration

Windmöller GmbH
Nord-West-Ring 21
32832 Augustdorf
Germany

+49 (0)5237 609 0
info@windmoeller.de
www.windmoeller.de