ENVIRONMENTAL PRODUCT DECLARATION

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

Owner of the Declaration	Vorwerk & Co. Teppichwerke GmbH & Co. KG
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-VOR-20200031-CCC1-EN
Issue date	17.04.2020
Valid to	16.04.2025

Tufted broadloom carpet

pile material polyamide 6.6, aqueous dyeing method,
maximum total pile weight 1500 g/m^2

Vorwerk flooring

Institut Bauen und Umwelt e.V.

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

General Information

Vorwerk flooring

Tufted broadloom carpet

pile material PA 6.6,
aqueous dyeing method,
maximum total pile weight 1500 g/m²

Programme holder
IBU – Institut Bauen und Umwelt e.V.
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10178 Berlin
Germany

Owner of the declaration
Vorwerk & Co. Teppichwerke GmbH & Co. KG.
Kuhlmannstraße 11
31785 Hameln
Germany

Declaration number
EPD-VOR-20200031-CCC1-EN

Declared product / declared unit
1 m² tufted broadloom carpet having a pile material of polyamide 6.6

This declaration is based on the product category rules:
Floor coverings, 02/2018
(PCR checked and approved by the SVR)

Scope:
The manufacturer declaration applies to a group of similar products with a maximum total pile weight of 1500 g/m².
The carpet is manufactured in the Vorwerk production site Hameln, Germany.
LCA results for products having a lower total pile weight can be taken from the corresponding tables of the annexe or can be calculated by using equation 1 given in the annexe (see annexe chapter: 'General Information on the annexe').
The declaration is only valid in conjunction with a valid GUT-*PRODIS* license of the product.

Issue date
17.04.2020

Valid to
16.04.2025

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 14025:2010*
☐ internally ☒ externally

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

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

Angela Schindler
(Independent verifier appointed by SVR)

Product

Product description/Product definition
Tufted broadloom carpet having a pile material of polyamide 6.6 and a woven textile backing made of polyester.
The carpet is coloured by aqueous dyeing methods.
The declaration applies to a group of products with a maximum total pile weight of 1500 g/m².
The LCA results are calculated for products with the maximum total pile weight.
Product descriptions and LCA results for products of this group having a lower total pile weight than 1500 g/m² can be taken from the tables of the public EPD-annexe. The LCA results always refer to the highest total pile weight of the corresponding pile weight category.Results for similar products with any other total pile weight can be calculated by using equation 1 given in the annexe (see annex echapter: '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) Regulation (EU) No. 305/2011 Construction Product Regulation (CPR) applies. The product needs a Declaration of Performance (DoP) taking into consideration *EN 14041* and the CE-marking. The DoP

of the product can be found on the manufacturer's technical information section. For the application and use of the product the respective national provisions apply.

Application
According to the use class as defined in *EN 1307* the products can be used in all professional areas. The use class can be found on the technical data sheet of the product.

Technical Data

Name	Value	Unit
Product Form	broadloom carpet, rolls of 4 m width	-
Type of manufacture	tufted carpet, aqueous dyeing method	-
Yarn type	PA 6.6	-
Secondary backing	Woven textile backing	-
Total pile weight	max. 1500	g/m²
Total carpet weight	max. 2500	g/m²

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *EN 14041.* Additional product properties in accordance with *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 manufacturer's technical information section (www.vorwerk-flooring.de).

Base materials/Ancillary materials

Name	Value	Unit
Polyamide 6.6	60.0	%
Polyester	8.0	%
Polyethylene	11.2	%
Aluminium hydroxide	10.4	%
SBR latex	5.2	%
Ethylene-vinyl acetate	3.5	%
Recycled material	1.3	%
Additives	0.5	%

The products are registered in the GUT-*PRODIS* Information System. The *PRODIS* system ensures the compliance with limitations of various chemicals and Volatile Organic Compound (VOC)-emissions and a ban on the use of all substances that are listed as 'Substances of Very High Concern' (SVHC) under *REACH*.
This product contains substances listed in the *REACH* candidate list (27.06.2018) 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 textile floor coverings strongly 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 10 years can be assumed, technical service life can be considerably longer.

LCA: Calculation rules

Declared Unit

Name	Value	Unit
Declared unit	1	m²
Conversion factor to 1 kg	0.4	-
Mass reference	2.50	kg/m²

The declared unit refers to 1 m² produced textile floor covering. The output of module A5 'Assembly' is 1 m² installed textile floor covering.

System boundary

Type of EPD: Cradle-to-grave

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.

A4 Transport:
Transport of the packed textile floor covering from factory gate to the place of installation.

A5 Installation:
Installation of the textile 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 carpet 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.
Preparation of the floor and auxiliary materials (adhesives, fixing agents, PET connectors) 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 Compound (VOC) emissions are relevant due to known VOC decay curves of the product.

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 by the assumed service life of the floor covering in the building in question.

B3 - 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 carpet 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 carpet waste, waste processing (granulating).

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 at the end-of-life, transport from the reprocessing plant to the cement kiln.

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 2019*, service pack 39. Remaining data gaps are covered by the *ecoinvent 3.5* database 2018..

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 max. total pile weight of 1500 g/m².
Specific information on products having a lower total pile weight can be taken from the annexe.

Transport to the construction site (A4)

Name	Value	Unit
Litres of fuel (truck, EURO 0-6 mix)	0.018	l/100km
Transport distance	700	km
Capacity utilisation (including empty runs)	55	%

Installation in the building (A5)

Name	Value	Unit
Material loss	0.23	kg

Polyethylene packaging waste and installation waste are considered to be incinerated in a municipal waste incineration plant. Cardboard is going to be recycled. Preparation of the floor and auxiliaries (adhesives, fixing agents, PET connectors etc.) are not taken into account.

Maintenance (B2)
The values for cleaning refer to 1 m² floor covering used in commercial areas per year.
Depending on the application based on *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 based on this useful life to obtain the overall environmental impacts.

Name	Value	Unit
Maintenance cycle (wet cleaning)	1.5	1/year
Maintenance cycle (vacuum cleaning)	208	1/year
Water consumption (wet cleaning)	0.004	m³
Cleaning agent (wet cleaning)	0.09	kg
Electricity consumption	0.314	kWh

Further information on cleaning and maintenance see www.vorwerk-flooring.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% 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)	2.5	kg
Collected separately (scenario 3)	2.5	kg
Landfilling (scenario 1)	2.5	kg
Energy recovery (scenario 2)	2.5	kg
Energy recovery (scenario 3)	2.24	kg
Recycling (scenario 3)	0.26	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)

The organic material of the carpet is used as secondary fuel in a cement kiln. It mainly substitutes for lignite (64.5%), hard coal (26.5%) and petrol coke (9.0%). *VDZ e.V.*

The inorganic material is substantially integrated into the cement clinker and substitutes for original material input.

LCA: Results

The results are valid for all declared products with a maximum total pile weight of 1500 g/m².
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 pile weight of the corresponding pile weight category. Results for similar products with any other total pile 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 (see annex, chapter 'General Information on use stage').
Information on un-declared modules: Modules B3 - B7 are not relevant during the service life of the carpet and are therefore not declared. Modules C1, 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, 2 and 3. 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; 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	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	B1	B2	C2	C3/2	C3/3	C4/1	D	D/1	D/2	D/3
GWP	[kg CO_2-Eq.]	2.05E+1	1.48E-1	2.37E+0	0.00E+0	3.02E-1	8.30E-3	5.36E+0	1.45E-2	1.74E-1	-2.34E-1	0.00E+0	-2.47E+0	-4.87E-1
ODP	[kg CFC11-Eq.]	3.55E-8	2.45E-17	3.19E-9	0.00E+0	1.30E-8	1.38E-18	1.11E-15	4.05E-16	5.99E-16	-3.21E-15	0.00E+0	-3.39E-14	-2.22E-15
AP	[kg SO_2-Eq.]	3.06E-2	6.28E-4	3.21E-3	0.00E+0	1.23E-3	3.54E-5	4.33E-3	4.10E-5	4.74E-4	-3.93E-4	0.00E+0	-4.16E-3	-1.82E-3
EP	[kg $(PO_4)^{3-}$-Eq.]	7.22E-3	1.60E-4	7.66E-4	0.00E+0	3.45E-4	8.99E-6	1.12E-3	3.84E-6	4.80E-4	-4.25E-5	0.00E+0	-4.50E-4	-1.91E-4
POCP	[kg ethene-Eq.]	3.73E-3	-2.60E-4	3.34E-4	6.29E-5	1.56E-4	-1.46E-5	2.61E-4	2.60E-6	5.33E-5	-3.11E-5	0.00E+0	-3.30E-4	-2.32E-4
ADPE	[kg Sb-Eq.]	8.56E-6	1.15E-8	7.77E-7	0.00E+0	1.08E-6	6.49E-10	6.18E-8	4.61E-9	3.32E-8	-4.20E-8	0.00E+0	-4.45E-7	-1.70E-7
ADPF	[MJ]	3.46E+2	2.01E+0	3.15E+1	0.00E+0	6.87E+0	1.13E-1	1.98E+0	1.55E-1	2.62E+0	-3.28E+0	0.00E+0	-3.47E+1	-6.37E+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 according to EN 15804+A1: 1 m² floorcovering

Parameter	Unit	A1-A3	A4	A5	B1	B2	C2	C3/2	C3/3	C4/1	D	D/1	D/2	D/3
PERE	[MJ]	3.61E+1	1.17E-1	3.28E+0	0.00E+0	1.16E+0	6.58E-3	2.42E-1	1.05E-1	1.86E-1	-8.35E-1	0.00E+0	-8.84E+0	-5.04E-1
PERM	[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	0.00E+0
PERT	[MJ]	3.61E+1	1.17E-1	3.28E+0	0.00E+0	1.16E+0	6.58E-3	2.42E-1	1.05E-1	1.86E-1	-8.35E-1	0.00E+0	-8.84E+0	-5.04E-1
PENRE	[MJ]	2.96E+2	2.01E+0	3.34E+1	0.00E+0	8.11E+0	1.13E-1	7.30E+1	7.11E+1	2.71E+0	-4.12E+0	0.00E+0	-4.36E+1	-6.41E+1
PENRM	[MJ]	7.09E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-7.09E+1	-7.09E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PENRT	[MJ]	3.67E+2	2.01E+0	3.34E+1	0.00E+0	8.11E+0	1.13E-1	2.17E+0	2.61E-1	2.71E+0	-4.12E+0	0.00E+0	-4.36E+1	-6.41E+1
SM	[kg]	6.16E-2	0.00E+0	5.54E-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	2.59E-1
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	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	7.09E+1
FW	[m^3]	1.19E-2	1.98E-4	2.34E-3	0.00E+0	4.27E-3	1.11E-5	1.34E-2	1.24E-4	4.59E-5	-9.84E-4	0.00E+0	-1.04E-2	-5.45E-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 – OUTPUT FLOWS AND WASTE CATEGORIES according to EN 15804+A1: 1 m² floorcovering

Parameter	Unit	A1-A3	A4	A5	B1	B2	C2	C3/2	C3/3	C4/1	D	D/1	D/2	D/3
HWD	[kg]	8.99E-6	1.13E-7	8.20E-7	0.00E+0	1.19E-9	6.33E-9	3.58E-9	1.25E-10	1.14E-8	-1.70E-9	0.00E+0	-1.79E-8	-7.31E-10
NHWD	[kg]	4.44E-1	1.64E-4	5.48E-2	0.00E+0	5.22E-3	9.22E-6	1.64E-1	1.90E-4	2.49E+0	-1.78E-3	0.00E+0	-1.88E-2	-1.24E-1
RWD	[kg]	8.13E-3	2.73E-6	7.39E-4	0.00E+0	3.81E-4	1.54E-7	7.41E-5	4.21E-5	3.61E-5	-3.33E-4	0.00E+0	-3.53E-3	-1.47E-4
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	0.00E+0
MFR	[kg]	1.97E-2	0.00E+0	3.00E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.59E-1	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	2.24E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EEE	[MJ]	0.00E+0	0.00E+0	9.92E-1	0.00E+0	0.00E+0	0.00E+0	1.05E+1	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	1.78E+0	0.00E+0	0.00E+0	0.00E+0	1.88E+1	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

References

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