

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A2

Owner of the Declaration	Tapibel NV
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
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Valid to	29.07.2029

TUFTED CARPET TILES with total pile weight between 485 and 1300 g/m², solution-dyed yarn, pile material virgin polyamide 6, modified bitumen backing with 70 % recycled content
Tapibel NV

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1. General Information

Tapibel NV

Programme holder

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

Declaration number

EPD-TAP-20240098-IBA1-EN

This declaration is based on the product category rules:

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

Issue date

30.07.2024

Valid to

29.07.2029

Dipl.-Ing. Hans Peters
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TUFTED CARPET TILES with total pile weight between 485 and 1300 g/m², solution-dyed yarn, pile material virgin polyamide 6, modified bitumen backing with 70 % recycled content

Owner of the declaration

Tapibel NV
Industrielaan 4
3900 Pelt
Belgium

Declared product / declared unit

1 m² installed tufted carpet tiles with a pile of solution-dyed virgin polyamide 6 and a modified bitumen backing with 70 % recycled content

Scope:

The manufacturer declaration applies to a group of similar products with a total pile weight varying between 485 and 1300 g/m². The results given in the EPD correspond to tufted carpet tiles with a pile weight of 525 g/m². LCA results for product groups having a minimum pile weight of 485 g/m², an intermediate pile weight of 800 g/m² or a maximum pile weight of 1300 g/m² can be taken from the corresponding tables of the annex.

The products are manufactured in the production sites at Pelt, Belgium (tufting), and Nijkerk, The Netherlands (back coating).

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	
<input type="checkbox"/>	internally
<input checked="" type="checkbox"/>	externally

Angela Schindler,
(Independent verifier)

2. Product

2.1 Product description/Product definition

Tufted carpet tiles having a pile of solution-dyed virgin polyamide 6, a precoat based on recycled polyvinyl butyral (PVB) and a modified bitumen backing system with recycled filler.

For tufted carpet tiles with a pile weight between 485 and 1300 g/m², the recycled content (i.e. PVB in the precoat and limestone filler in the bitumen backing) varies between 51 % and 43 %, depending on the amount of the virgin polyamide 6 yarns in the pile. The recycled content of the bitumen backing itself is 70 %.

The declaration applies to a group of products with a pile weight varying between 485 and 1300 g/m². The LCA results are calculated for products with a pile weight of 525 g/m². LCA results for product groups having a minimum (485 g/m²), intermediate (800 g/m²) or maximum (1300 g/m²) pile weight can be taken from the corresponding tables of the annexe.

For the placing on the market of the specific 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 14041:2018-05, Resilient, textile and laminate floor coverings - Essential characteristics, and the CE-marking. The DoP of the product can be found on the manufacturer's technical information section (www.tapibel.be). For the application and use of the product, the respective national provisions apply.

2.2 Application

The products can be used as a floor covering in both residential and commercial buildings. According to the use class as defined in EN 1307, the products can be used in all commercial areas which require class 33 or less.



2.3 Technical Data

Technical data are given in the following table:

Constructional data

Name	Value	Unit
Product Form	Modular carpet tiles 50 x 50 cm - also other dimensions possible (e.g. 25 x 100 cm)	-
Type of manufacture	Tufted tiles	-
Yarn type	Virgin PA 6, solution-dyed	-
Secondary backing	Bitumen-based heavy backing with 70 % recycled content	-
Total pile weight	525 Min. 485 Max. 1300	g/m ²
Total carpet weight	4425 Min. 4275 Max. 4925	g/m ²

Performance data of the product are in accordance with the declaration of performance with respect to its essential characteristics according to EN 14041: 2018-05, Resilient, textile and laminate floor coverings - Essential characteristics. Additional product properties can be found on the manufacturer's website (www.tapibel.be).

2.4 Delivery status

Typical dimensions of tufted carpet tiles are 50 x 50 cm, but also other dimensions (25 x 100 cm, 100 x 100 cm, 100 x 200 cm) are possible.

2.5 Base materials/Ancillary materials

Name	Value	Unit
polyamide 6 (low carbon footprint (CFP) grades)	12	%
polyester/polyethylene	2	%
polypropylene	1	%
limestone (partly recycled)	61	%
polyvinyl butyral (recycled)	3	%
bitumen	18	%
glass fiber	1	%
additives	2	%

The recycled content of the tufted carpet tiles with a pile weight between 485 and 1300 g/m² varies between 51 % and 43 %, depending on the amount of the virgin polyamide 6 yarns in the pile. The recycled content of the bitumen backing itself is 70 %.

The PA6 yarn, used in the tufted carpet tiles considered in this LCA study, is a low-impact PA6 carpet yarn that is based on the most recent innovations in polymer production. It only uses low carbon footprint (CFP) polyamide grades from suppliers who calculated their specific carbon footprint.

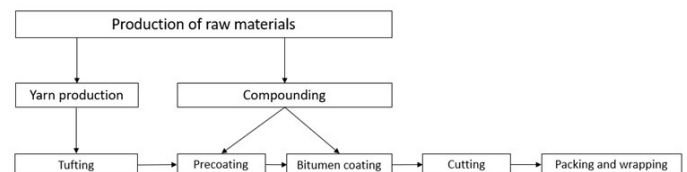
The specific product covered by the EPD contains substances listed in the ECHA candidate list (date: 26.07.2022) exceeding 0.1 percentage by mass: no

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

Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) Ordinance on BiocideProducts No. 528/2012): no

2.6 Manufacture

For manufacturing of the tufted carpet tiles, the PA6 yarns are first tufted on a primary backing and subsequently precoat with a latex-free compound. Then, the modified bitumen backing is applied. Once the backing is cooled down, the material is cut into tiles and prepared for shipment.





2.7 Environment and health during manufacturing

The production conditions do not demand any special health protection measures over and beyond the legal requirements.

2.8 Product processing/Installation

The tufted carpet tiles are either loosely laid upon the screed without any additional fixation or glued onto the underlying screed using a special glue.

2.9 Packaging

The tufted carpet tiles are packed in cardboard boxes, placed on wooden pallets and wrapped in plastic film.

2.10 Condition of use

The substantial composition during the use phase refers to the composition during manufacturing. The conditions of use are described in the producer's documentation.

2.11 Environment and health during use

After the first year, no product-related volatile organic compound (VOC) emissions are relevant due to known VOC decay curves of the product.

2.12 Reference service life

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 calculation of the reference service life according to ISO 15686 is not possible. Alternatively, a minimum service life of 10 years can be assumed, during which the functional and visual quality is guaranteed (based on BNB, Nutzungsdauer von Bauteilen, BBSR table). The technical service life can be significantly longer.

2.13 Extraordinary effects

Fire

The reaction to fire is determined according to EN 13501-1. The class for tufted carpet tiles produced by Tapibel is Bfl-S1.

Water

In case of a leak or a flood where the flooring has been soaked for a longer period of time (days), the flooring will most probably be considered a total loss. In case of short or shorter time of exposure and after drying, no visible damage may be expected, except for some stains.

Mechanical destruction

In case of more severe damage, the damaged carpet tiles can be replaced. The damaged carpet tiles go into the normal end-of-life treatment.

2.14 Re-use phase

Tufted carpet tiles, which are not at the end-of-life stage, may be uninstalled and reused as a floor covering. Post-consumer carpet tiles waste can be (partly) recycled or incinerated with energy recovery at its end-of-life.

2.15 Disposal

Post-installation and post-consumer tufted carpet tiles are considered textile waste. The European Waste Code EWC is 20 01 11. Tufted carpet tiles can be incinerated with energy recovery or landfilled at their end-of-life.

2.16 Further information

All information about the product composition, technical performance, instructions for installation and maintenance, precautionary instructions for use, CE marking and relevant DoP (declaration of performance) documents on tufted carpet tiles, produced by Tapibel NV, can be found on the manufacturer's website (www.tapibel.be).

3. LCA: Calculation rules

3.1 Declared Unit

The declared unit refers to 1 m² textile floor covering consisting of tufted carpet tiles with a pile of 525 g/m² solution-dyed virgin polyamide 6 and a modified bitumen backing with 70 % recycled content.

The recycled content of these tufted carpet tiles is 50 %.

The output of modules A1 to A3 corresponds to 1 m² produced tufted carpet tiles, including production losses.

The output of module A5 corresponds to 1 m² installed tufted carpet tiles. In this module, an extra 3% production and transport of tufted carpet tiles due to losses during installation, as well as final treatment of the installation and packaging waste are considered.

Declared unit and mass reference

Name	Value	Unit
Declared unit	1	m ²
Conversion factor to 1 kg	0.226	
Grammage	4.425	kg/m ²
Layer thickness	0.007	m

Other declared units are allowed if the conversion is shown transparently.

3.2 System boundary

Type of EPD

Cradle-to-gate with options: modules A1-A3, module C1-C4 and module D and additional modules A4, A5, B1, B2.

System boundaries of modules A, B, C, D

Modules C2, C3, C4 and D are indicated separately for three end-of-life scenarios:

- 1 - landfill disposal
- 2 - municipal waste incineration
- 3 - recovery in the cement industry

A1-A3 Production

Energy and water consumption and supply, production of the basic material, processing of secondary material, auxiliary material, packaging material, transport of the material and packaging to the manufacturing site, infrastructure and land use, waste water treatment and waste processing or final waste disposal. For the modelling of the PA6 yarns, verified LCA data from the supplier has been used. Biogenic carbon that is stored in renewable packaging material (cardboard and wooden pallets) is taken into account. Both the associated carbon dioxide uptake from the air during its production and the release of this carbon dioxide into the air during its final waste treatment are considered. Generated electricity and steam due to the incineration of production waste and packaging waste are listed in the result table as exported energy.



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 energy and/or material recovery or final disposal, production of the amount of tufted carpet tiles and their packaging that occurs as installation waste including the transport to the place of installation. The tufted carpet tiles are considered to be loosely laid upon the screed without using any additional materials or energy. If attached to the floor instead, the necessary auxiliary materials are not taken into account in this EPD. Furthermore, preparation of the floor is beyond the system boundaries and also not considered. Biogenic carbon that is stored in renewable packaging material (cardboard and wooden pallets) is released as carbon dioxide emissions into the air at the end of life in module A5. Generated electricity and steam due to the incineration of installation and packaging waste are listed in the result table as exported energy.

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-B5

The modules are not relevant within the assumed reference service life of 10 years and are thus not declared.

B6-B7

No energy and water input are required for the operation of the carpet tiles in the use stage. The modules are not relevant and not declared.

C1 Deconstruction

The floor covering is deconstructed manually and no additional environmental impact is caused.

C2 Transport

C2-1: Transport of the tufted carpet tiles waste to a landfill.
C2-2: Transport of the tufted carpet tiles waste to a municipal waste incineration plant (MWI).
C2-3: Transport of the tufted carpet tiles waste to a cement plant for recovery in the cement industry.

C3 Waste processing

C3-1: Landfill disposal needs no waste processing.
C3-2: Impact from waste incineration in a municipal waste incineration plant with $R1 > 0.6$. Generated electricity and steam are listed in the result table as exported energy.
C3-3: Impact from waste incineration in a cement kiln. Generated heat is listed in the result table as exported energy.

C4 Final disposal

C4-1: Impact from landfill disposal.
C4-2: The tufted carpet tiles waste leaves the system in module C3-2.
C4-3: The tufted carpet tiles waste leaves the system in module

C3-3.

D Benefits and loads beyond the system boundaries

Calculated potential benefits result from materials exclusive secondary materials (net primary materials).

D-A5: Potential benefits and loads due to recycling and incineration of waste arising from final product packaging and potential benefits for generated energy due to incineration of installation waste in a municipal waste incineration plant with $R1 > 0.6$.

D-1: No potential benefits nor loads due to landfill disposal of tufted carpet tiles waste at end-of-life.

D-2: Potential benefits for generated energy due to incineration of tufted carpet tiles waste at end-of-life in a municipal waste incineration plant with $R1 > 0.6$.

D-3: Potential benefits for saved fossil fuels and saved inorganic material due to recovery of tufted carpet tiles waste in a cement plant at end-of-life.

3.3 Estimates and assumptions

3.4 Cut-off criteria

In the assessment, all available data from the production process are considered, i.e. all raw materials used, utilised thermal energy and electric power consumption using the best available LCI datasets. Thus, material and energy flows contributing less than 1 % of mass or energy are also considered. Only packaging of ancillary materials in module A3 is not considered due to the very low amounts, as well as accidental pollution and environmental impacts caused by the personnel of the production plants.

3.5 Background data

Background data are taken from the Ecoinvent v3.8 Cut-off and the Industry Data 2.0 databases.

3.6 Data quality

The used data refer to the year 2021. The data for the foreground processes are based on input-output analyses at the Belgian and Dutch production sites of the here considered tufted carpet tiles. The primary data collection was done thoroughly, all flows have been considered. For modelling foreground and background data, the Ecoinvent v3.8 Cut-off and Industry Data 2.0 databases have been used. Data quality of foreground data is good for the most relevant flows, although proxies had to be used for some inputs due to lack of specific data records. Furthermore, for modelling of the PA6 yarns, the results from the verified LCA study provided by the manufacturer of the yarns have been used. These results are partly based on data delivered by the PA6 manufacturers and partly on generic datasets. For background data, relevant Ecoinvent v3.8 data records have been used. The data quality can be considered as good.

3.7 Period under review

The period under review is 2021.

3.8 Geographic Representativeness

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

3.9 Allocation

At Tapibel NV, different types of carpet tiles are produced. Only facility-level data were available for the use of electricity, natural gas, water and ancillary materials. The facility-level data have been allocated to the analysed product using its respective annual production volume, expressed in m^2 .



3.10 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.

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

The tufted carpet tiles do not contain any biogenic carbon. However, the accompanying packaging of both the raw materials and the final product does contain biogenic carbon.

Information on describing the biogenic carbon content at factory gate

1 kg biogenic carbon is equivalent to 44/12 kg of CO₂.

Name	Value	Unit
Biogenic carbon content in product	-	kg C
Biogenic carbon content in accompanying packaging	0.106	kg C

Transport to the construction site (A4)

Name	Value	Unit
Litres of fuel truck 16-32 ton EURO 6	0.0057	l/100km
Transport distance	700	km
Capacity utilisation (including empty runs)	85	%

Installation in the building (A5)

The tufted carpet tiles are considered to be loosely laid upon the screed. This action does not require any materials nor energy inputs or outputs. The preparation of the floor is beyond the system boundaries and thus not taken into account.

The installation losses are considered to be incinerated in a municipal waste incineration plant with R1>0.6.

Packaging waste is considered to be treated according to European default scenarios for packaging waste (Eurostat, 2020). This treatment includes landfill, incineration in a municipal waste incineration plant with R1<0.6 and/or recycling.

Name	Value	Unit
Material loss	0.133	kg

Maintenance (B2)

The values for cleaning refer to 1 m² floor covering 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. Based on this useful life, the effects of module B2 need to be calculated in order to obtain the overall environmental impacts.

For further information on cleaning and maintenance, see www.tapibel.be.

Background data are taken from the Ecoinvent v3.8 Cut-off and the Industry Data 2.0 databases.

Name	Value	Unit
Maintenance cycle for vacuum cleaning	208	number/year
Maintenance cycle for wet cleaning	1.5	number/year
Water consumption for wet cleaning	4.000	kg/year
Cleaning agent for wet cleaning	0.090	kg/year
Electricity consumption for vacuum cleaning and wet cleaning	0.314	kWh/year
Waste water treatment for wet cleaning	4.000	kg/year

Reference service life

Name	Value	Unit
Reference service life (according to BBSR table, BNB, 2017)	10	a
Declared product properties (at the gate) and finishes	Corresponds to the specifications of EN 1307	-
An assumed quality of work, when installed in accordance with the manufacturer's instructions	According to the manufacturer's instructions	-
Usage conditions, e.g. frequency of use, mechanical exposure	Use in areas defined by the use class according to EN 1307	-
Maintenance e.g. required frequency, type and quality and replacement of components	According to the manufacturer's instructions	-

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:

EOL impact = x % impact (Scenario 1) + y % impact (Scenario 2) + z % impact (Scenario 3) with x % + y % + z % = 100 %.

Waste transport (C2)

Waste is transported to its waste treatment using a truck, 16-32 tons, EURO 6. The transport distances vary between waste treatment:

- Scenario 1: transport to a landfill: 50 km
- Scenario 2: transport to a waste incineration plant: 150 km
- Scenario 3: transport to a cement plant for recovery in the cement industry: 200 km



Waste processing (C3)

Waste processing varies according to waste treatment scenario:

- Waste incineration (scenario 2): The organic material within the tufted carpet tiles is considered to be incinerated. The ashes of the inorganic material within the tufted carpet tiles are considered to be landfilled.
- Recovery in the cement industry (scenario 3): The organic material within the tufted carpet tiles is considered to be incinerated and to serve as a secondary fuel in the cement kiln. The inorganic material within the tufted carpet tiles is considered to be integrated in the cement clinker and to substitute for the original raw material input.

Name	Value	Unit
Collected as mixed construction waste (scenario 1 and scenario 2)	4.425	kg
Collected separately waste type (scenario 3)	4.425	kg
Landfilling (scenario 1)	4.425	kg
Energy recovery (scenario 2)	4.425	kg
Energy recovery in cement industry (scenario 3 - accounted for in module D3)	1.713	kg
Recycling in cement industry (scenario 3 - accounted for in module D3)	2.712	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.

Here, calculated potential benefits result from materials, exclusive secondary materials (net primary materials).

Recovery in the cement industry (scenario 3): The organic material of the tufted carpet tiles is considered to be 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 %) (VDZ e.V., 2020). The avoided production of these fossil fuels as well as the avoided emissions due to incineration of these fossil fuels are accounted for in module D, taking into account the lower heating values of the fuels and the organic material in the carpet tiles. The inorganic material is considered to be substantially integrated into the cement clinker and to substitute for the original material input. The avoided production of the original primary raw material is accounted for in module D.

Name	Value	Unit
Energy recovery in cement industry	1.573	kg
Recycling in cement industry	0.681	kg

5. LCA: Results

The LCA results are valid for 1 m² tufted carpet tiles with a pile of 525 g/m² solution-dyed virgin polyamide 6 and a modified bitumen backing with 70 % recycled content.

The output of modules A1 to A3 corresponds to 1 m² produced tufted carpet tiles, including production losses. The output of module A5 corresponds to 1 m² installed tufted carpet tiles. In this module, an extra 3% production and transport of tufted carpet tiles due to losses during installation, as well as final treatment of the installation and packaging waste are considered.

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.

The modules C3/1, C4/2 and C4/3 cause no additional impact and are thus set to zero (see chapter "LCA: Calculation rules").

The values in column D result from module A5.

The EF3.0 characterisation factors from EC-JRC have been applied.

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 installed tufted carpet tiles with a pile of solution-dyed virgin polyamide 6 and a modified bitumen backing with 70 % recycled content

Parameter	Unit	A1-A3	A4	A5	B1	B2	C1	C2/1	C2/2	C2/3	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	4.33E+00	5.26E-01	5.76E-01	0	2.64E-01	0	3.61E-02	1.08E-01	1.44E-01	0	0	4.04E+00	4.02E+00	0	2.52E-01	0	0	-1.55E-01	0	-1.19E+00	-7.83E+00
GWP-fossil	kg CO ₂ eq	4.6E+00	5.25E-01	2.9E-01	0	2.63E-01	0	3.6E-02	1.08E-01	1.44E-01	0	0	4.03E+00	4.01E+00	0	2.45E-01	0	0	-6.24E-02	0	-1.19E+00	-7.83E+00
GWP-biogenic	kg CO ₂ eq	-2.78E-01	1.88E-04	2.86E-01	0	1.12E-03	0	1.29E-05	3.87E-05	5.16E-05	0	0	6.79E-03	6.65E-03	0	6.72E-03	0	0	-9.28E-02	0	-3.09E-03	-2.64E-03
GWP-luluc	kg CO ₂ eq	1.21E-02	2.1E-04	3.77E-04	0	3.78E-04	0	1.44E-05	4.32E-05	5.76E-05	0	0	6.87E-05	6.31E-05	0	1.65E-05	0	0	-1.74E-04	0	-1.23E-03	-1.79E-03
ODP	kg CFC11 eq	2.08E-06	1.22E-07	7.04E-08	0	2.11E-08	0	8.35E-09	2.5E-08	3.34E-08	0	0	3.03E-08	2.19E-08	0	1.38E-08	0	0	-6.97E-09	0	-1.27E-07	-1.05E-07
AP	mol H ⁺ eq	1.94E-02	1.49E-03	7.23E-04	0	1.71E-03	0	1.02E-04	3.07E-04	4.09E-04	0	0	1.23E-03	1.03E-03	0	3.91E-04	0	0	-2.08E-04	0	-3.31E-03	-3.03E-02
EP-freshwater	kg P eq	1.07E-03	3.75E-06	3.25E-05	0	2.08E-05	0	2.57E-07	7.71E-07	1.03E-06	0	0	2.24E-06	2.04E-06	0	4.15E-07	0	0	-3.61E-06	0	-5.56E-05	-9.81E-04
EP-marine	kg N eq	7.73E-03	2.97E-04	2.75E-04	0	3.04E-04	0	2.03E-05	6.1E-05	8.13E-05	0	0	4.67E-04	3.94E-04	0	3.1E-04	0	0	-4.26E-05	0	-5.19E-04	-4.46E-03
EP-terrestrial	mol N eq	4.52E-02	3.31E-03	1.81E-03	0	2.56E-03	0	2.27E-04	6.8E-04	9.07E-04	0	0	5.11E-03	4.3E-03	0	1.36E-03	0	0	-4.74E-04	0	-5.88E-03	-4.93E-02
POCP	kg NMVOC eq	1.4E-02	1.27E-03	5.63E-04	2.23E-04	8.62E-04	0	8.71E-05	2.61E-04	3.48E-04	0	0	1.34E-03	1.11E-03	0	4.41E-04	0	0	-1.61E-04	0	-1.74E-03	-2.62E-02
ADPE	kg Sb eq	1.24E-05	1.42E-06	4.65E-07	0	2.01E-06	0	9.76E-08	2.93E-07	3.9E-07	0	0	3.92E-07	3.43E-07	0	8.73E-08	0	0	-3.77E-08	0	-3.89E-07	-7.84E-07
ADPF	MJ	1.38E+02	7.97E+00	4.64E+00	0	7.31E+00	0	5.46E-01	1.64E+00	2.19E+00	0	0	1.29E+00	6.84E-01	0	1.01E+00	0	0	-1.17E+00	0	-2.26E+01	-5.7E+01
WDP	m ³ world eq deprived	9.48E-01	2.43E-02	3.13E-02	0	1.22E-01	0	1.66E-03	4.99E-03	6.65E-03	0	0	4.08E-02	3.79E-02	0	1.23E-02	0	0	-8.91E-03	0	-1.25E-01	-2.29E-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; WDP = Water (user) deprivation potential



RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m² installed tufted carpet tiles with a pile of solution-dyed virgin polyamide 6 and a modified bitumen backing with 70 % recycled content

Parameter	Unit	A1-A3	A4	A5	B1	B2	C1	C2/1	C2/2	C2/3	C3	C3/1	C3/2	C3/3	C4	C4/1	C4/2	C4/3	D	D/1	D/2	D/3
PERE	MJ	2.35E+01	1.12E-01	2.3E+00	0	6.34E-01	0	7.68E-03	2.3E-02	3.07E-02	0	0	8.36E-02	5.93E-02	0	3.94E-02	0	0	-2.86E+00	0	-1.96E+00	-1.29E+00
PERM	MJ	2.6E+00	0	-1.5E+00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8.51E-01	0	0	0
PERT	MJ	2.61E+01	1.12E-01	7.93E-01	0	6.34E-01	0	7.68E-03	2.3E-02	3.07E-02	0	0	8.36E-02	5.93E-02	0	3.94E-02	0	0	-2.01E+00	0	-1.96E+00	-1.29E+00
PENRE	MJ	1.33E+02	7.97E+00	5.96E+00	0	7.31E+00	0	5.46E-01	1.64E+00	2.19E+00	0	0	4.99E+01	4.93E+01	0	1.01E+00	0	0	-1.17E+00	0	-2.26E+01	-5.7E+01
PENRM	MJ	4.87E+01	0	-3.89E-03	0	0	0	0	0	0	0	0	-4.86E+01	-4.86E+01	0	0	0	0	7.26E-03	0	0	0
PENRT	MJ	1.82E+02	7.97E+00	5.95E+00	0	7.31E+00	0	5.46E-01	1.64E+00	2.19E+00	0	0	1.29E+00	6.84E-01	0	1.01E+00	0	0	-1.17E+00	0	-2.26E+01	-5.7E+01
SM	kg	2.19E+00	0	6.57E-02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.15E-02	0	0	6.81E-01
RSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m ³	2.74E-02	7.93E-04	9.86E-04	0	4.49E-03	0	5.44E-05	1.63E-04	2.18E-04	0	0	2.44E-03	1.69E-03	0	1.22E-03	0	0	-5.26E-04	0	-9.26E-03	-7.17E-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 installed tufted carpet tiles with a pile of solution-dyed virgin polyamide 6 and a modified bitumen backing with 70 % recycled content

Parameter	Unit	A1-A3	A4	A5	B1	B2	C1	C2/1	C2/2	C2/3	C3	C3/1	C3/2	C3/3	C4	C4/1	C4/2	C4/3	D	D/1	D/2	D/3
HWD	kg	4.8E-04	2.08E-05	1.57E-05	0	5.51E-06	0	1.43E-06	4.28E-06	5.7E-06	0	0	2.86E-06	2.13E-06	0	1.28E-06	0	0	-1.19E-06	0	-1.86E-05	-8.91E-06
NHWD	kg	6.57E-01	4.17E-01	2.06E-01	0	2.35E-02	0	2.86E-02	8.58E-02	1.14E-01	0	0	3.01E+00	2.97E-01	0	4.43E+00	0	0	-4.48E-03	0	-4.16E-02	-1.16E-01
RWD	kg	8.78E-04	5.38E-05	2.96E-05	0	2.17E-05	0	3.69E-06	1.11E-05	1.48E-05	0	0	6.3E-06	2.41E-06	0	6.46E-06	0	0	-4.81E-06	0	-8.8E-05	-6.76E-05
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	6.41E-02	0	6.34E-02	0	0	0	0	0	0	0	0	0	2.71E+00	0	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EEE	MJ	3.27E-02	0	2.34E-01	0	0	0	0	0	0	0	0	5.22E+00	0	0	0	0	0	0	0	0	0
EET	MJ	6.54E-02	0	4.68E-01	0	0	0	0	0	0	0	0	1.04E+01	1.04E+01	0	0	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

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 m² installed tufted carpet tiles with a pile of solution-dyed virgin polyamide 6 and a modified bitumen backing with 70 % recycled content

Parameter	Unit	A1-A3	A4	A5	B1	B2	C1	C2/1	C2/2	C2/3	C3	C3/1	C3/2	C3/3	C4	C4/1	C4/2	C4/3	D	D/1	D/2	D/3
PM	Disease incidence	1.73E-07	4.22E-08	8.15E-09	0	1.19E-08	0	2.89E-09	8.68E-09	1.16E-08	0	0	1.16E-08	7.27E-09	0	7.3E-09	0	0	-2.71E-09	0	-8.88E-09	-6.04E-07
IR	kBq U235 eq	3.77E-01	3.46E-02	1.35E-02	0	2.6E-02	0	2.37E-03	7.11E-03	9.49E-03	0	0	5.21E-03	2.47E-03	0	4.54E-03	0	0	-5.45E-03	0	-1.04E-01	-6.92E-02
ETP-fw	CTUe	8.16E+01	6.25E+00	3.03E+00	0	5.93E+00	0	4.29E-01	1.29E+00	1.72E+00	0	0	6.89E+00	6.53E+00	0	1.07E+00	0	0	-4.72E-01	0	-6.07E+00	-1.8E+02
HTP-c	CTUh	2.72E-09	2.01E-10	1.31E-10	0	3.96E-10	0	1.38E-11	4.14E-11	5.52E-11	0	0	7.1E-10	6.93E-10	0	2.99E-11	0	0	-1.8E-11	0	-1.91E-10	-6.02E-09
HTP-nc	CTUh	6.69E-08	6.32E-09	2.59E-09	0	7.64E-09	0	4.33E-10	1.3E-09	1.73E-09	0	0	5.65E-09	5.44E-09	0	4.71E-10	0	0	-4.27E-10	0	-4.86E-09	-3.08E-07
SQP	SQP	5.62E+01	5.55E+00	2.1E+00	0	9.16E-01	0	3.81E-01	1.14E+00	1.52E+00	0	0	1.88E+00	2.96E-01	0	2.59E+00	0	0	-1.12E+01	0	-1.74E+00	-4.7E+00

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

Footnote: For the calculation of PERM and PENRM, both the incinerated and the recycled packaging material of the final product is debooked in module A5, while in module D, only the recycled proportion is declared. Furthermore, 3% losses are considered in module A5.

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.

6. LCA: Interpretation

All environmental impact categories are mainly determined by the PA6 yarns, the bitumen and the non-woven tuft cloth in module A1 and by the energy use, the infrastructure and the internal transport in module A3. For the modelling of the PA6 yarns, verified LCA data from the supplier has been used. The impact of module A4 (transport to installation site) is mainly due to the rather large transport distance. The impact of module B2 (maintenance) with the cleaning agent and electricity consumption as the most impacting processes is comparable to the impact of module A5 (installation with 3 % losses). Attention

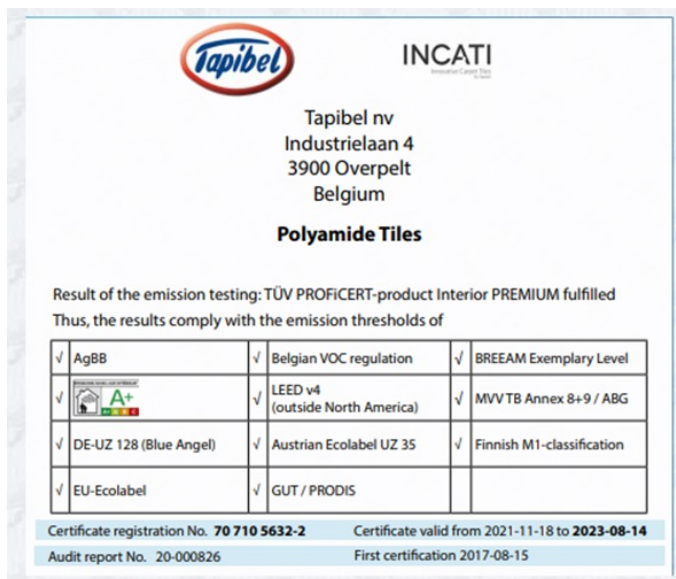
has to be paid that the results for module B2 are only valid for one year of use of the tufted carpet tiles. In practice, the results should be multiplied by the assumed service life (in years) of the floor covering in the building under consideration. Incineration of the tufted carpet tiles in a municipal waste incineration plant (scenario 2) or in a cement kiln (scenario 3) at their end-of-life has a large impact on the GWP-fossil and GWP-total indicators, while the impact of landfilling (scenario 1) is limited.

7. Requisite evidence

7.1 VOC emissions

TÜV PROFICERT certification for VOC emissions and formaldehyde

The tufted carpet tiles, produced by Tapibel NV, fulfil the criteria V1.2 of the TÜV PROFICERT-product Interior certification.



Determination of the VOC and formaldehyde emissions of tufted carpet tiles according to/compliance with AgBB-Scheme, French VOC label (A+), DE-UZ 128 (Blue Angel), EU Ecolabel, Belgian VOC regulation, LEED v4 (outside North America), Austrian Ecolabel UZ 35, GUT / PRODIS, BREEAM Exemplary level, MVV TB Annex 8+9 / ABG and Finnish M1 classification. Testing was done by TFI Aachen GmbH, Charlottenburger Allee 41, 52068 Aachen, Germany, www.tfi-aachen.de. Testing reports: 21-001249-01 (2021) and 22-000301-02 (2022).

AgBB 2018 evaluation on day 3

Name	Value	Unit
TVOC	0.089	mg/m ³
ΣSVOC	0.000	mg/m ³
R value	0.257	
ΣVOC w/o LCI	0.000	mg/m ³
Σcarcinogenic	0.000	mg/m ³
DIBt parameter formaldehyde	0.000	mg/m ³

7.2 CE marking

CE labelling according to EN 14041: DOP 000553T-003.

8. References

EN 1307

DIN EN 1307: 2014+A1:2016+A2:2018-05: Textile floor coverings - Classification

EN 13501-1

DIN EN 13501-1:2019-05: Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests

EN 14041

DIN EN 14041: 2018-05 and DIN EN 14041: 2008-05: Resilient, textile and laminate floor coverings - Essential characteristics

EN 15804

DIN EN 15804:2012+A2:2019 + AC:2021, 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

ISO 10874

DIN EN ISO 10874: 2012+A1:2021-04: Resilient, textile and



laminated floor coverings - Classification

ISO 14025

DIN EN /ISO 14025:2011-10/, Environmental labels and declarations — Type III environmental declarations — Principles and procedures

ISO 14040

DIN EN ISO 14040:2006+A1:2020 Environmental management - Life cycle assessment - Principles and framework

ISO 14044

DIN EN ISO 14044:2006+A1:2018+A2:2020 Environmental management - Life cycle assessment - Requirements and guideline

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: 2017-04: 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 Regulation (EU) No. 305/2011

AgBB Scheme

AgBB Scheme, Eco Institut, <https://www.eco-institut.de/en/portfolio/agbb-schema/>

Austrian Ecolabel

Austrian Ecolabel for Products, www.umweltzeichen.at/en/products/start

BBSR

Bundesinstitut für Bau-, Stadt- und Raumforschung (BBSR) im Bundesamt für Bauwesen und Raumordnung (BBR), Bonn

Belgian VOC regulation

FOD Volksgezondheid, Veiligheid van de voedselketen en Leefmilieu, 2014, Koninklijk besluit tot vaststelling van de drempelniveaus voor de emissies naar het binnenmilieu van bouwproducten voor bepaalde beoogde gebruiken

Blue Angel / Blauer Engel

Blue Angel, www.blauer-engel.de/en

BNB

Nutzungsdauer von Bauteilen, Bewertungssystem Nachhaltiges Bauen (BNB), Nutzungsdauer von Bauteilen, Bundesministerium des Inneren, für Bau und Heimat, 24.02.2017

B-PCR

FPS Health, Food chain safety and Environment, 2022, B-EPD – Construction product category rules, Complementary to NBN EN 15804+A2, Version 18.10.2022

BREEAM

BRE certification system for a sustainable built environment, <https://bregroup.com/products/breeam/>

ECHA candidate list

Candidate List of substances of very high concern (SVHCs) for authorisation, last update 26.07.2022, European Chemicals Agency (ECHA), Helsinki, Finland

Ecoinvent LCI database

Wernet, G., Bauer, C., Steubing, B., Reinhard, J., Moreno-Ruiz, E., and Weidema, B., 2016, The ecoinvent database version 3 (part I): overview and methodology. The International Journal of Life Cycle Assessment, [online] 21(9), pp.1218–1230. Available at: <http://link.springer.com/10.1007/s11367-016-1087-8>

European Ecolabel

European Commission, https://environment.ec.europa.eu/topics/circular-economy/eu-ecolabel-home_en

European Waste Code

Commission of the European Communities, 2010, Guidance on classification of waste according to EWC-Stat categories

Eurostat

Packaging waste treatment statistics 2020

Finnish M1 classification

Emission classification of building materials in Finland, <https://cer.rts.fi/en/m1-emission-class-for-building-material/>

French VOC label

Ministère Français de l'écologie, du développement durable, des transports et du logement, 2013

GUT / PRODIS

Product passport for carpets and rugs, <https://gut-prodis.eu/en/>

Industry Data 2.0 database

SimaPro, Industry data LCA library, <https://simapro.com/databases/industry-data-lca-library/>

LEED

LEED rating system, www.usgbc.org/leed

MVV TB Annex 8+9 / ABG

Technical building rules, Deutsche Institut für Bautechnik, www.dibt.de/en/we-offer/technical-building-rules/

PCR Part A

Product Category Rules for Building-Related Products and Services Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report according to EN 15804+A2:2019, V1.3, Berlin: Institut Bauen und Umwelt e.V. (IBU), August 2022

PCR Part B

Product Category Rules for Building-Related Products and Services Part B: Requirements on the EPD for floor coverings, V1.2, Berlin: Institut Bauen und Umwelt e.V. (IBU), September 2022

REACH

Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), June 2017

Regulation No. 305/2011

Construction Products Regulation (CPR) of the European Council and of the European Parliament, April 2011

SimaPro LCA software

Pré Consultants, 2023, SimaPro 9.5.0.1 [Computer Software]. Amersfoort, The Netherlands

TÜV PROFICERT certification

TÜV PROFICERT certification, <https://www.proficert.de>



VDZ e.V.

Association of German Cement Works, Ed. Environmental Data
of the German Cement Industry 2020



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