

ENVIRONMENTAL PRODUCT DECLARATION

as per /ISO 14025/ and /EN 15804/

Owner of the Declaration	Interface Europe Manufacturing BV
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-INT-20170100-CBC1-EN
Issue date	19.06.2017
Valid to	18.06.2022

Modular carpet tiles

pile material polyamide 6 with 100% recycled content, solution dyed, maximum total pile weight 1000 g/m², precoat based on recycled polyvinyl butyral (PVB), Graphlex® backing system

Interface®

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



General Information

Interface®

Programme holder

IBU - Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Declaration number

EPD-INT-20170100-CBC1-EN

This Declaration is based on the Product Category Rules:

Floor coverings, 07.2016
(PCR tested and approved by the SVR)

Issue date

19.06.2017

Valid to

18.06.2022



Prof. Dr.-Ing. Horst J. Bossenmayer
(President of Institut Bauen und Umwelt e.V.)



Dr. Burkhardt Lehmann
(Managing Director IBU)

Modular carpet tiles

pile material PA 6 with 100% recycled content, solution dyed, PVB-based precoat, maximum total pile weight 1000 g/m², Graphlex® backing system

Owner of the Declaration

Interface Europe Manufacturing BV
Industrielaan 15
3925 ZG Scherpenzeel
The Netherlands

Declared product / Declared unit

1 m² tufted modular carpet tiles having a surface pile of polyamide 6 with recycled content and a Graphlex® backing system

Scope:

The manufacturer declaration applies to a group of similar products with a maximum total pile weight of 1000 g/m².

The products are tufted in Craigavon, Ireland, or in Scherpenzeel, the Netherlands, and they are back coated in Scherpenzeel.

LCA results for product groups having a lower total pile weight can be taken from the corresponding tables of the annex. Specific data can be calculated by using equation 1 given in the annex (see annex chapter: 'General Information on the annex').

The declaration is only valid in conjunction with a valid GUT-/PRODIS/ license of the product.

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.

Verification

The CEN Norm /EN 15804/ serves as the core PCR

Independent verification of the declaration
according to /ISO 14025/

☐ internally ☒ externally



Angela Schindler
(Independent verifier appointed by SVR)

Product

Product description / Product definition

Tufted modular carpet tiles having a surface pile of solution dyed polyamide 6 with 100% recycled content, a precoat based on recycled polyvinyl butyral (PVB) and a Graphlex® backing system.

Graphlex® backing system:

Bitumen backing compound (containing recycled filler), glass-fleece reinforcement and polypropylene covering fleece.

For a total pile weight of 1000 g/m² the recycled content amounts to 74%.

The declaration applies to a group of products with a maximum total pile weight of 1000 g/m².

The LCA results are calculated for products with the maximum total pile weight.

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').

For the placing on the market of the product in the 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 /EN 1307/ the products can be used in all professional area which require class 33 or less.



Technical Data

Constructional data

Name	Value	Unit
Product Form	Modular carpet tiles 50 cm x 50 cm	-
Type of manufacture	Tufted tiles	-
Yarn type	PA 6 with 100% recycled content, solution dyed	-
Secondary backing	Heavy backing bitumen based with textile bottom	-
Total pile weight	max. 1000	g/m ²
Total carpet weight	max. 4760	g/m ²

Additional product properties in accordance with /EN 1307/ 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 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.interface.com).

Base materials / Ancillary materials

Name	Value	Unit
Polyamide 6	21.0	%
Polyester	2.5	%
Polypropylene	1.0	%
Limestone	46.1	%
Aluminium hydroxide	6.3	%
Polyvinyl butyl (PVB)	6.3	%
SBS-copolymer	1.4	%
Bitumen	14.2	%
Glass fibre	0.7	%
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 VOC-emissions and a ban on use of all substances that are listed as 'Substances of Very High Concern' (SVHC) under /REACH/.

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	m ²
Conversion factor to 1 kg	0.21	m ² /kg
Mass reference	4.76	kg/m ²

The declared unit refers to 1 m² produced textile floor covering. 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:

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.

Preparing 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 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 (see annex, chapter 'General information on use stage').

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 need no waste processing.

C3-2: Impact from waste incineration (plant with $R1 > 0.1$), 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:

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 2017/, service pack 33 and from the /ecoinvent 3.3/ 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 indicated values refer to the declared functional unit of all products with a total pile weight up to 1000 g/m².

Transport to the construction site (A4)

Name	Value	Unit
Litres of fuel (truck, EURO 0-5 mix)	0.0095	l/100km
Transport distance	700	km
Capacity utilisation (including empty runs)	85	%

Installation in the building (A5)

Name	Value	Unit
Material loss	0.14	kg

Packaging waste and installation waste are considered to be incinerated in a municipal waste incineration plant.

Preparation of the floor and auxiliaries (adhesives, fixing agents, PET connectors etc.) are not taken into account.

Maintenance (B2)

Indication per m² floor covering and per year (see annex, chapter 'General Information on use stage')

Name	Value	Unit
Maintenance cycle (wet cleaning)	1.5	1/year
Maintenance cycle (vacuum cleaning)	208	1/year
Water consumption (wet cleaning)	0.004	m ³
Cleaning agent (wet cleaning)	0.09	kg
Electricity consumption	0.314	kWh

Further information on cleaning and maintenance see www.interface.com

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)

Name	Value	Unit
Collected as mixed construction waste (scenario 1 and 2)	4.76	kg
Collected separately (scenario 3)	4.76	kg
Landfilling (scenario 1)	4.76	kg
Energy recovery (scenario 2)	4.76	kg
Energy recovery (scenario 3)	2.225	kg
Recycling (scenario 3)	2.535	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 carpet is used as secondary fuel in a cement kiln. It mainly substitutes for lignite (61.9%), hard coal (26.8%) and petrol coke (11.3%).

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

LCA: Results

The results refer to all declared products with a maximum total pile weight of 1000 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 and C4/2 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 April 2015 are applied.

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

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	
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	MND	MND	MND	MND	MND	MND	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 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.]	6.28E+0	2.01E-1	6.69E-1	0.00E+0	3.32E-1	1.11E-2	5.65E+0	2.93E-2	3.41E-1	-1.87E-1	0.00E+0	-2.57E+0	-5.66E-1
ODP	[kg CFC11-Eq.]	6.27E-8	6.75E-14	1.81E-9	0.00E+0	1.26E-8	3.71E-15	1.97E-12	1.30E-12	8.37E-13	-3.50E-12	0.00E+0	-4.79E-11	-1.52E-11
AP	[kg SO ₂ -Eq.]	2.16E-2	8.46E-4	8.12E-4	0.00E+0	1.34E-3	4.65E-5	3.54E-3	8.39E-5	9.42E-4	-2.90E-4	0.00E+0	-3.97E-3	-2.21E-3
EP	[kg (PO ₄) ³ -Eq.]	6.15E-3	2.11E-4	2.21E-4	0.00E+0	3.21E-4	1.16E-5	8.77E-4	7.59E-6	9.34E-4	-3.06E-5	0.00E+0	-4.20E-4	-2.29E-4
POCP	[kg ethene-Eq.]	1.51E-3	-3.45E-4	4.31E-5	6.29E-5	1.62E-4	-1.90E-5	2.27E-4	5.35E-6	1.07E-4	-2.76E-5	0.00E+0	-3.80E-4	-2.79E-4
ADPE	[kg Sb-Eq.]	7.31E-6	1.62E-8	2.23E-7	0.00E+0	1.14E-6	8.89E-10	2.13E-7	1.17E-8	7.05E-8	-3.58E-8	0.00E+0	-4.90E-7	-2.19E-7
ADPF	[MJ]	1.14E+2	2.78E+0	3.54E+0	0.00E+0	6.89E+0	1.53E-1	2.87E+0	3.13E-1	4.89E+0	-2.62E+0	0.00E+0	-3.60E+1	-7.94E+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: 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]	4.29E+1	1.40E-1	1.27E+0	0.00E+0	9.87E-1	7.69E-3	3.99E-1	1.75E-1	3.72E-1	-4.72E-1	0.00E+0	-6.45E+0	-5.56E-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]	4.29E+1	1.40E-1	1.27E+0	0.00E+0	9.87E-1	7.69E-3	3.99E-1	1.75E-1	3.72E-1	-4.72E-1	0.00E+0	-6.45E+0	-5.56E-1
PENRE	[MJ]	8.34E+1	2.79E+0	3.71E+0	0.00E+0	8.05E+0	1.53E-1	3.90E+1	3.63E+1	5.08E+0	-3.16E+0	0.00E+0	-4.34E+1	-7.99E+1
PENRM	[MJ]	3.58E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-3.58E+1	-3.58E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PENRT	[MJ]	1.19E+2	2.79E+0	3.71E+0	0.00E+0	8.05E+0	1.53E-1	3.22E+0	5.15E-1	5.08E+0	-3.16E+0	0.00E+0	-4.34E+1	-7.99E+1
SM	[kg]	3.73E+0	0.00E+0	1.08E-1	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	2.53E+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	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	7.67E+1
FW	[m ³]	1.00E+0	2.59E-4	3.03E-2	0.00E+0	4.25E-3	1.42E-5	1.97E-2	2.50E-4	1.22E-5	-6.74E-4	0.00E+0	-9.21E-3	-7.19E-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: 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]	3.20E-3	1.46E-7	9.23E-5	0.00E+0	1.13E-9	8.05E-9	1.81E-8	2.09E-10	1.97E-8	-7.64E-10	0.00E+0	-1.05E-8	-3.29E-9
NHWD	[kg]	2.74E-1	2.13E-4	4.96E-2	0.00E+0	8.17E-3	1.17E-5	1.17E+0	3.39E-4	4.75E+0	-1.12E-3	0.00E+0	-1.53E-2	-1.43E-1
RWD	[kg]	1.53E-3	3.80E-6	5.33E-5	0.00E+0	3.81E-4	2.09E-7	1.40E-4	8.00E-5	7.70E-5	-2.16E-4	0.00E+0	-2.95E-3	-1.86E-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]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.53E+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	2.23E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EEE	[MJ]	0.00E+0	0.00E+0	6.18E-1	0.00E+0	0.00E+0	0.00E+0	8.44E+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	1.47E+0	0.00E+0	0.00E+0	0.00E+0	2.03E+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													

Not all of the life cycle inventories applied in this study support the methodological approach for the waste and water indicators. The data are based on publications of industry. The indicators for waste and water of the system are evaluated, but contain a higher degree of uncertainty.

References

Institut Bauen und Umwelt

Institut Bauen und Umwelt e.V., Berlin(pub.):
Generation of Environmental Product Declarations
(EPDs);

General Principles

for the EPD range of Institut Bauen und Umwelt e.V.
(IBU), 2013/04
www.ibu-epd.de

/ISO 14025/

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

/EN 15804/

/EN 15804:2012-04+A1 2013/, Sustainability of
construction works — Environmental Product
Declarations — Core rules for the product category of
construction products

PCR Part A

Institut Bauen und Umwelt e.V., Berlin (pub.):
Product Category Rules for Construction Products
from the range of Environmental Product Declarations
of Institut Bauen und Umwelt (IBU),
Part A: Calculation Rules for the Life Cycle
Assessment and Requirements on the Background
Report, V1.6 August 2016
www.bau-umwelt.de

PCR Part B

Institut Bauen und Umwelt e.V., Berlin (pub.):
Product Category Rules for Construction Products
from the range of Environmental Product Declarations
of Institut Bauen und Umwelt (IBU),
Part B: Requirements on the EPD for floor coverings,
V1.4, September 2016
www.bau-umwelt.de

EN 1307

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

EN 14041

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

ISO 10874

DIN EN ISO 10874: 2012-04: Resilient, textile and
laminate floor coverings - Classification

EN 13501-1

DIN EN 13501-1: 2010-01: Fire classification of
construction products and building elements - Part 1:
Classification using data from reaction to fire tests

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: 2006-03: 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

VDZ e.V.

Umweltdaten der deutschen Zementindustrie 2015

CPR

Construction Products Regulation, Regulation (EU) No
305/2011 of the European Parliament and of the
Council of 9 March 2011

PRODIS

Product Information System (PRODIS) of the
European Carpet Industry, Gemeinschaft
umweltfreundlicher Teppichboden e.V (GUT) and
European Carpet and Rug Association
(ECRA), <http://www.pro-dis.info>

REACH

Regulation concerning the Registration, Evaluation,
Authorisation and Restriction of Chemicals (REACH),
establishing a European Chemicals Agency (ECHA),
European Union Regulation No 1907/2006, June 2017,

GaBi database 2017

GaBi Software-System and Database for Life Cycle
Engineering, thinkstep AG, Leinfelden-Echterdingen,
service pack 33, 2017

ecoinvent 3.3

ecoinvent, Zurich, Switzerland, Database Version 3.3
15th August 2016

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Annex

For products in LC 1 with a max. total pile weight of 800 g/m²

to the

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

Owner of the Declaration	Interface
Declaration number	EPD-INT-20170100-CBC1-EN
Issue date	19.06.2017
Valid to	18.06.2022

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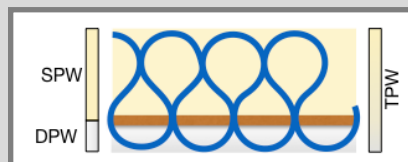
General Information on the annex

The EPD document is valid for all products with a total pile weight lower or equal to the declared maximum pile weight of 1000 g/m².

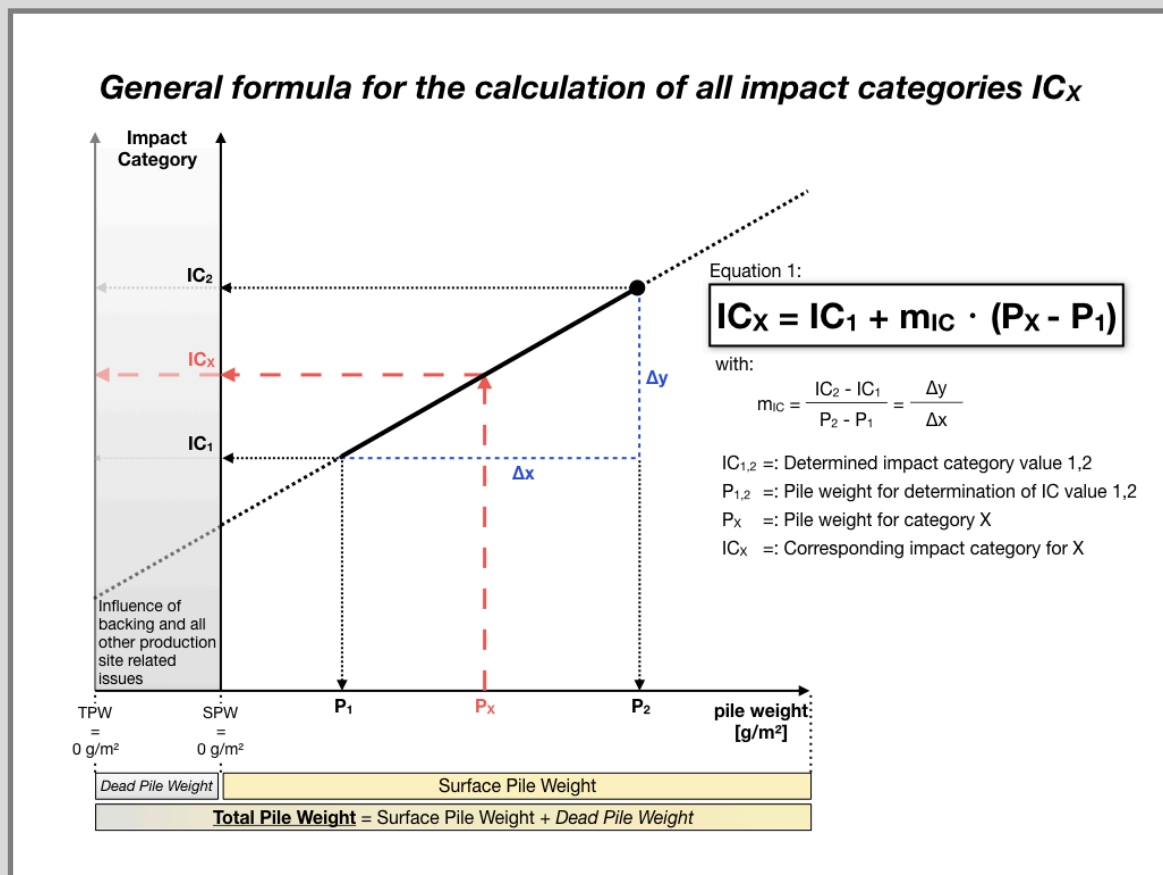
LCA results show a linear correlation with the total pile weight for all impact categories (IC) and all modules (A-D). It is possible to calculate specific LCA results (IC_x) for every carpet (x) within the declared group of products in relation to its total pile weight (P_x).

The total pile weight (TPW) is the sum of surface pile weight (SPW) and dead pile weight (DPW):

$$\text{TPW} = \text{SPW} + \text{DPW}$$



The surface pile weight is the technical relevant value according to EN 1307 and has to be mentioned in technical specification. As shown in the figure below alternatively to the total pile weight the surface pile weight can be used to calculate LCA results (ICx).



Graph 1: General formula for the calculation of all impact categories IC_X .

In this annex, the products are divided into luxury classes (LCs) by their surface pile weight as shown in the table below.

Luxury Class	LC 1	LC 2	LC 3	LC 4	LC 5
SPW [g/m ²]	< 400	400-600	600-800	800-1000	> 1000

General Information on use stages B1 to B7

LCA results indicate environmental impacts resulting from use stage B1 to B7.

For textile floor coverings only modules B1 (use) and B2 (maintenance) are taken into account. Modules B3 (repair), B4 (replacement), B5 (refurbishment), B6 (operational energy use) and B7 (operational water use) are not relevant during the service life of textile floor coverings.

Module B1 'use' includes emissions to the indoor air during the use stage. Relevant emissions only occur in the first year of life (see LCA: Calculation rules).

Module B2 'maintenance' includes cleaning procedures.

Reference service life (RSL)

The actual service life of textile floor coverings depends on a wide range of various impact factors such as the allocation of the application area to the use class, maintenance, intensity of use and most often fashion and building related aspects. Therefore, technical service life cannot be defined for textile floor coverings.

Total environmental impacts from module B2

Total environmental impacts have to be calculated by taking into account the service life of textile floor coverings. Therefore, the assumed real life (ARSL) has to be used for the calculation of total environmental impacts taking into account the expected use conditions (see RSL).

Module B2 (maintenance) is depending on the service life.

Values for module B2 given in the result tables are indicated for the period of one year. They have to be multiplied by the ARSL of the textile floor covering taking into account building related aspects.

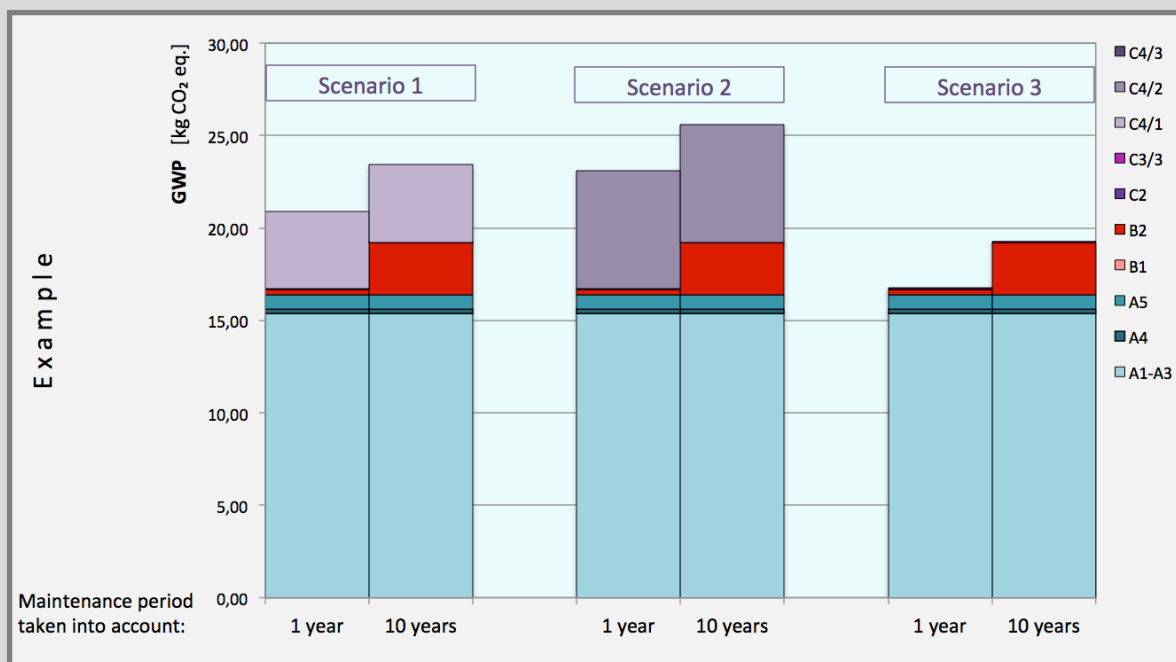
The influence of the maintenance period on the Global Warming Potential (GWP) of the whole life cycle of a textile floor covering - differentiated for 3 end-of-life scenarios - is illustrated in the graph below.

3 end-of-life scenarios:

Scenario 1: 100 % Landfill disposal

Scenario 2: 100 % Municipal waste incineration

Scenario 3: 100 % Recycling in the cement industry



Graph 2: Global Warming Potential (GWP) - aggregation of module A to module C - taking into account a maintenance period of 1 year compared to a maintenance period of 10 years - for the three declared end-of-life scenarios.

1. Information on products in LC 1 with a total pile weight of max. 800 g/m²

Complementary technical data

Base materials / Ancillary materials

Name	Value for category	Unit
Polyamide 6	17,5	%
Polyester	2,6	%
Polypropylene	1,1	%
Limestone	48,1	%
Aluminiumhydroxide	6,6	%
Polyvinyl butyl (PVB)	6,6	%
SBS-Copolymer	1,5	%
Bitumen	14,8	%
Glass fibre	0,7	%
Additives	0,5	%
Recycled content out of total weight	73	%

LCA: Declared Unit

Name	Value for category	Unit
Declared unit	1,0	m ²
Conversion factor to 1 kg	0,22	m ² /kg
Mass reference	4,56	kg/m ²

LCA: Scenarios and additional technical information

All indicated values refer to the declared functional unit

Transport to the construction site (A4)

Name	Value for category	Unit
Litres of fuel (truck, EURO 0-5 mix)	0,0091	m ²
Transport distance	700	m ² /kg
Capacity utilisation (including empty runs)	85	kg/m ²

Installation in the building (A5)

Name	Value for category	Unit
Material lost	0,14	kg

Maintenance (B2)

Indication per m² and year

Name	Value for category	Unit
Maintenance cycle (wet cleaning)	1,5	1/year
Maintenance cycle (vacuum cleaning)	208	1/year
Water consumption (wet cleaning)	0,004	m ³
Cleaning agent (wet cleaning)	0,09	kg
Electricity consumption	0,314	kWh

End of Life (C1-C4)

Name	Value for category	Unit
Collected as mixed construction waste (scenario 1 and 2)	4,56	kg/m ²
Collected separately (scenario 3)	4,56	kg/m ²
Landfilling (scenario 1)	4,56	kg/m ²
Energy recovery (scenario 2)	4,56	kg/m ²
Energy recovery (scenario 3)	2,03	kg/m ²
Recycling (scenario 3)	2,54	kg/m ²

LCA: Results for products in LC 1 with a maximum total pile weight of 800 g/m²

The declared result figures in module B2 have to be multiplied by the assumed service time (in years) of the floor covering in the building considered (see chapter: 'General Information on use stages B1 to B7').

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 and are therefore not declared.

Module C2 represents the transport for scenarios 1, 2 and 3.

Description of the system boundary

(X = Included in LCA; MDN = Module not declared)

State of production	State of construction phase	State of use	End of life state	Credits and loads after life												
raw material supply A1 X	transport A2 X	manufacturing A3 X	delivery A4 X	installation A5 X	use B1 X	maintenance B2 X	repair B3 MN D	replacement B4 MN D	renewal B5 MN D	energy use B6 MN D	water use B7 MN D	stop of use / demolition C1 MN D	transport C2 X	waste management C3 X	disposal C4 X	reuse, recovery and recycling potential D X

Results of the LCA - Environmental impact: 1 m² floor covering

Parameter	Unit	A1-A3	A4	A5	B1	B2	C2	C3/2	C3/3	C4/1	D/A5	D/1	D/2	D/3
GWP	[kg CO2-eq]	5,31E+00	1,93E-01	6,27E-01	0,00E+00	3,32E-01	1,06E-02	5,19E+00	2,81E-02	3,27E-01	-1,80E-01	0,00E+00	-2,33E+00	-5,27E-01
ODP	[kg CFC11-eq]	5,44E-08	6,48E-14	1,57E-09	0,00E+00	1,26E-08	3,55E-15	1,88E-12	1,25E-12	8,02E-13	-3,36E-12	0,00E+00	-4,32E-11	-1,50E-11
AP	[kg SO2-eq]	1,88E-02	8,12E-04	7,11E-04	0,00E+00	1,34E-03	4,45E-05	2,99E-03	8,04E-05	9,02E-04	-2,78E-04	0,00E+00	-3,59E-03	-2,07E-03
EP	[kg PO4]3-eq]	5,23E-03	2,02E-04	1,90E-04	0,00E+00	3,21E-04	1,11E-05	7,34E-04	7,27E-06	8,95E-04	-2,94E-05	0,00E+00	-3,80E-04	-2,14E-04
POCP	[kg ethen-eq]	1,32E-03	-3,31E-04	3,69E-05	6,29E-05	1,62E-04	-1,82E-05	1,94E-04	5,13E-06	1,03E-04	-2,65E-05	0,00E+00	-3,44E-04	-2,61E-04
ADPE	[kg Sb-eq]	6,75E-06	1,55E-08	2,06E-07	0,00E+00	1,14E-06	8,52E-10	2,08E-07	1,12E-08	6,75E-08	-3,44E-08	0,00E+00	-4,43E-07	-2,15E-07
ADPF	[MJ]	1,03E+02	2,67E+00	3,22E+00	0,00E+00	6,89E+00	1,47E-01	2,66E+00	3,00E-01	4,68E+00	-2,52E+00	0,00E+00	-3,26E+01	-7,29E+01

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: 1 m² floor covering

Parameter	Unit	A1-A3	A4	A5	B1	B2	C2	C3/2	C3/3	C4/1	D/A5	D/1	D/2	D/3
PERE	[MJ]	3,88E+01	1,34E-01	1,15E+00	0,00E+00	9,87E-01	7,37E-03	3,81E-01	1,68E-01	3,57E-01	-4,53E-01	0,00E+00	-5,82E+00	-5,24E-01
PERM	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	[MJ]	3,88E+01	1,34E-01	1,15E+00	0,00E+00	9,87E-01	7,37E-03	3,81E-01	1,68E-01	3,57E-01	-4,53E-01	0,00E+00	-5,82E+00	-5,24E-01
PENRE	[MJ]	7,23E+01	2,68E+00	3,38E+00	0,00E+00	8,05E+00	1,47E-01	3,88E+01	3,63E+01	4,87E+00	-3,04E+00	0,00E+00	-3,93E+01	-7,33E+01
PENRM	[MJ]	3,58E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-3,58E+01	-3,58E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	[MJ]	1,08E+02	2,68E+00	3,38E+00	0,00E+00	8,05E+00	1,47E-01	3,00E+00	4,93E-01	4,87E+00	-3,04E+00	0,00E+00	-3,93E+01	-7,33E+01
SM	[kg]	3,53E+00	0,00E+00	1,02E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,53E+00
RSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,03E+01
FW	[m ³]	8,04E-01	2,49E-04	2,46E-02	0,00E+00	4,25E-03	1,36E-05	1,86E-02	2,40E-04	1,17E-05	-6,47E-04	0,00E+00	-8,32E-03	-6,62E-03

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
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Results of the LCA - Output flows and waste categories: 1 m² floor covering

Parameter	Unit	A1-A3	A4	A5	B1	B2	C2	C3/2	C3/3	C4/1	D/A5	D/1	D/2	D/3
HWD	[kg]	2,60E-03	1,40E-07	7,48E-05	0,00E+00	1,13E-09	7,71E-09	1,80E-08	2,00E-10	1,89E-08	-7,34E-10	0,00E+00	-9,49E-09	-2,76E-09
NHWD	[kg]	2,66E-01	2,04E-04	4,93E-02	0,00E+00	8,17E-03	1,12E-05	1,17E+00	3,25E-04	4,55E+00	-1,08E-03	0,00E+00	-1,38E-02	-1,43E-01
RWD	[kg]	1,46E-03	3,65E-06	5,09E-05	0,00E+00	3,81E-04	2,00E-07	1,34E-04	7,66E-05	7,38E-05	-2,07E-04	0,00E+00	-2,66E-03	-1,76E-04
CRU	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,53E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MER	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,03E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	[MJ]	0,00E+00	0,00E+00	5,93E-01	0,00E+00	0,00E+00	0,00E+00	7,62E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	[MJ]	0,00E+00	0,00E+00	1,41E+00	0,00E+00	0,00E+00	0,00E+00	1,84E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

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; EET = Exported thermal energy
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Annex

For products in LC 2 with a max. total pile weight of 1000 g/m²

to the

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

Owner of the Declaration	Interface
Declaration number	EPD-INT-20170100-CBC1-EN
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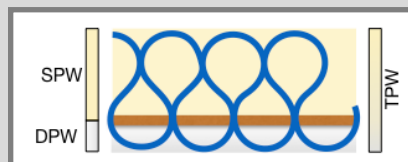
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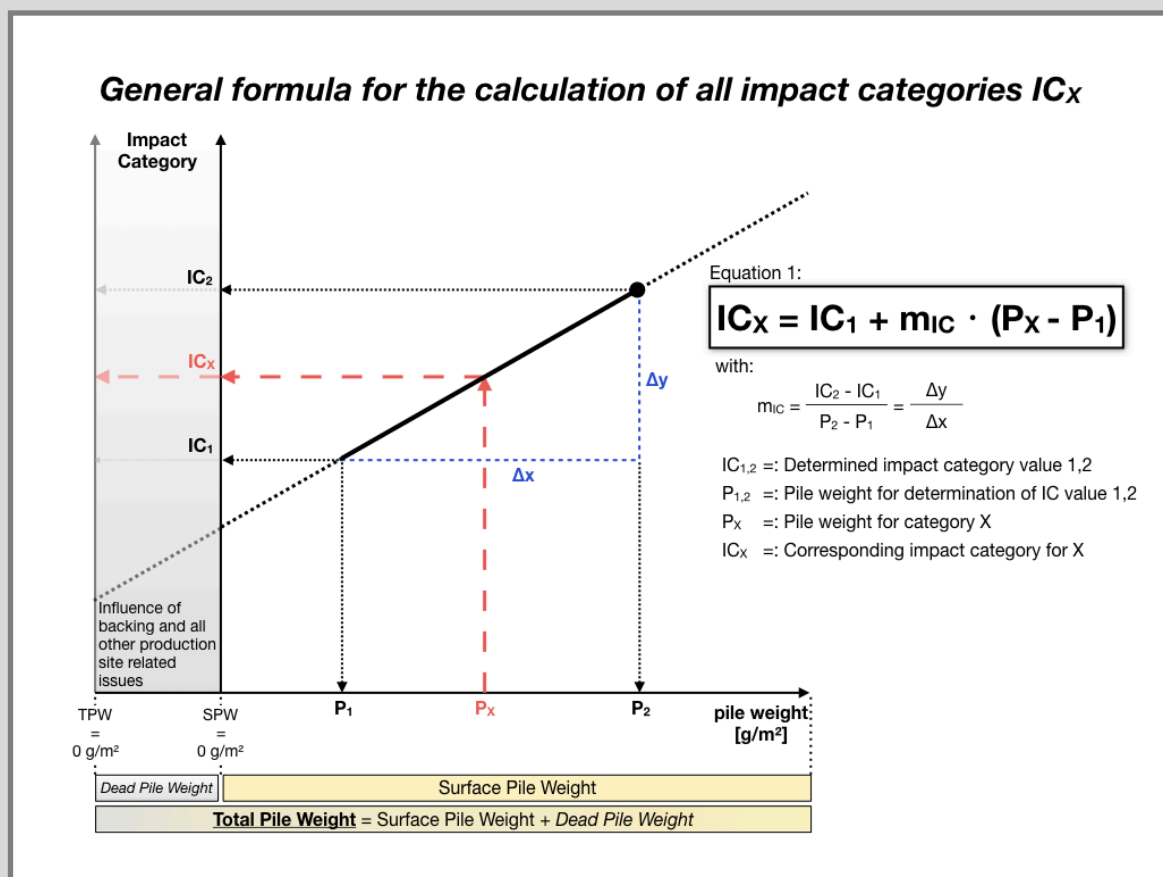
LCA results show a linear correlation with the total pile weight for all impact categories (IC) and all modules (A-D). It is possible to calculate specific LCA results (IC_x) for every carpet (x) within the declared group of products in relation to its total pile weight (P_x).

The total pile weight (TPW) is the sum of surface pile weight (SPW) and dead pile weight (DPW):

$$TPW = SPW + DPW$$



The surface pile weight is the technical relevant value according to EN 1307 and has to be mentioned in technical specification. As shown in the figure below alternatively to the total pile weight the surface pile weight can be used to calculate LCA results (IC_x).



Graph 1: General formula for the calculation of all impact categories IC_x.

In this annex, the products are divided into luxury classes (LCs) by their surface pile weight as shown in the table below.

Luxury Class	LC 1	LC 2	LC 3	LC 4	LC 5
SPW [g/m ²]	< 400	400-600	600-800	800-1000	> 1000

General Information on use stages B1 to B7

LCA results indicate environmental impacts resulting from use stage B1 to B7.

For textile floor coverings only modules B1 (use) and B2 (maintenance) are taken into account. Modules B3 (repair), B4 (replacement), B5 (refurbishment), B6 (operational energy use) and B7 (operational water use) are not relevant during the service life of textile floor coverings.

Module B1 'use' includes emissions to the indoor air during the use stage. Relevant emissions only occur in the first year of life (see LCA: Calculation rules).

Module B2 'maintenance' includes cleaning procedures.

Reference service life (RSL)

The actual service life of textile floor coverings depends on a wide range of various impact factors such as the allocation of the application area to the use class, maintenance, intensity of use and most often fashion and building related aspects. Therefore, technical service life cannot be defined for textile floor coverings.

Total environmental impacts from module B2

Total environmental impacts have to be calculated by taking into account the service life of textile floor coverings. Therefore, the assumed real life (ARSL) has to be used for the calculation of total environmental impacts taking into account the expected use conditions (see RSL).

Module B2 (maintenance) is depending on the service life.

Values for module B2 given in the result tables are indicated for the period of one year. They have to be multiplied by the ARSL of the textile floor covering taking into account building related aspects.

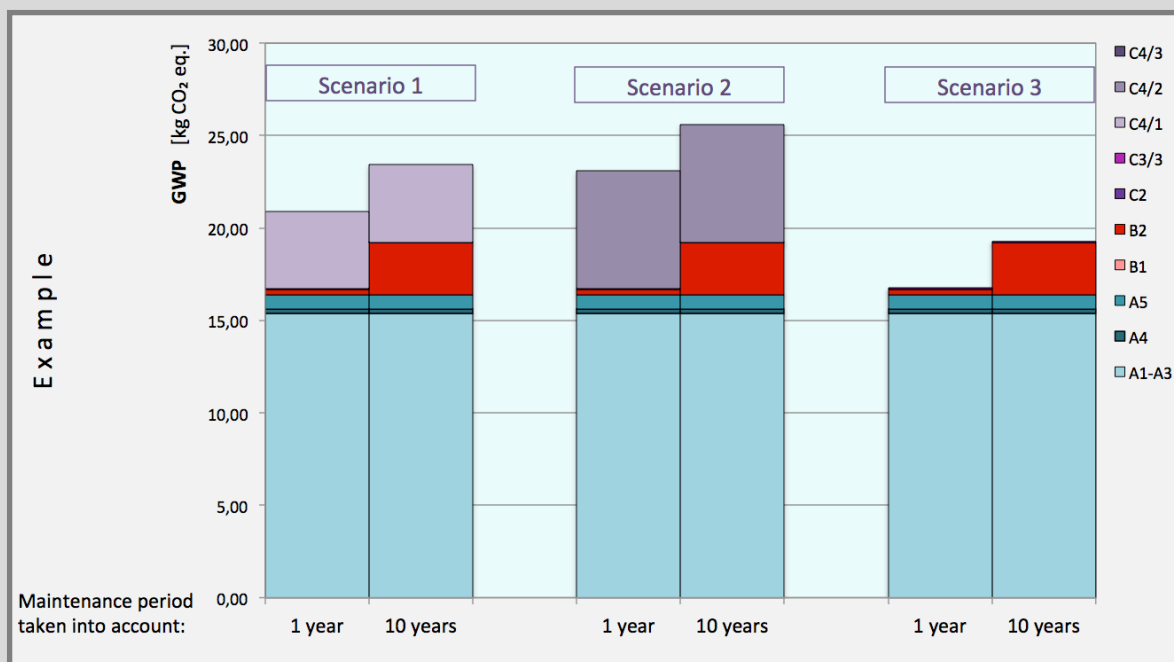
The influence of the maintenance period on the Global Warming Potential (GWP) of the whole life cycle of a textile floor covering - differentiated for 3 end-of-life scenarios - is illustrated in the graph below.

3 end-of-life scenarios:

Scenario 1: 100 % Landfill disposal

Scenario 2: 100 % Municipal waste incineration

Scenario 3: 100 % Recycling in the cement industry



Graph 2: Global Warming Potential (GWP) - aggregation of module A to module C - taking into account a maintenance period of 1 year compared to a maintenance period of 10 years - for the three declared end-of-life scenarios.

1. Information on products in LC 2 with a total pile weight of max. 1000 g/m²

Complementary technical data

Base materials / Ancillary materials

Name	Value for category	Unit
Polyamide 6	21,0	%
Polyester	2,5	%
Polypropylene	1,1	%
Limestone	46,1	%
Aluminiumhydroxide	6,3	%
Polyvinyl butyl (PVB)	6,3	%
SBS-Copolymer	1,4	%
Bitumen	14,2	%
Glass fibre	0,7	%
Additives	0,5	%
Recycled content out of total weight	74	%

LCA: Declared Unit

Name	Value for category	Unit
Declared unit	1,0	m ²
Conversion factor to 1 kg	0,21	m ² /kg
Mass reference	4,76	kg/m ²

LCA: Scenarios and additional technical information

All indicated values refer to the declared functional unit

Transport to the construction site (A4)

Name	Value for category	Unit
Litres of fuel (truck, EURO 0-5 mix)	0,0095	m ²
Transport distance	700	m ² /kg
Capacity utilisation (including empty runs)	85	kg/m ²

Installation in the building (A5)

Name	Value for category	Unit
Material lost	0,14	kg

Maintenance (B2)

Indication per m² and year

Name	Value for category	Unit
Maintenance cycle (wet cleaning)	1,5	1/year
Maintenance cycle (vacuum cleaning)	208	1/year
Water consumption (wet cleaning)	0,004	m ³
Cleaning agent (wet cleaning)	0,09	kg
Electricity consumption	0,314	kWh

End of Life (C1-C4)

Name	Value for category	Unit
Collected as mixed construction waste (scenario 1 and 2)	4,76	kg/m ²
Collected separately (scenario 3)	4,76	kg/m ²
Landfilling (scenario 1)	4,76	kg/m ²
Energy recovery (scenario 2)	4,76	kg/m ²
Energy recovery (scenario 3)	2,23	kg/m ²
Recycling (scenario 3)	2,54	kg/m ²

LCA: Results for products in LC 2 with a maximum total pile weight of 1000 g/m²

The declared result figures in module B2 have to be multiplied by the assumed service time (in years) of the floor covering in the building considered (see chapter: 'General Information on use stages B1 to B7').

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 and are therefore not declared.

Module C2 represents the transport for scenarios 1, 2 and 3.

Description of the system boundary

(X = Included in LCA; MDN = Module not declared)

State of production	State of construction phase	State of use	End of life state	Credits and loads after life												
raw material supply A1 X	transport A2 X	manufacturing A3 X	delivery A4 X	installation A5 X	use B1 X	maintenance B2 X	repair B3 MN D	replacement B4 MN D	renewal B5 MN D	energy use B6 MN D	water use B7 MN D	stop of use / demolition C1 MN D	transport C2 X	waste management C3 X	disposal C4 X	reuse, recovery and recycling potential D X

Results of the LCA - Environmental impact: 1 m² floor covering

Parameter	Unit	A1-A3	A4	A5	B1	B2	C2	C3/2	C3/3	C4/1	D/A5	D/1	D/2	D/3
GWP	[kg CO2-eq]	6,28E+00	2,01E-01	6,69E-01	0,00E+00	3,32E-01	1,11E-02	5,65E+00	2,93E-02	3,41E-01	-1,87E-01	0,00E+00	-2,57E+00	-5,66E-01
ODP	[kg CFC11-eq]	6,27E-08	6,75E-14	1,81E-09	0,00E+00	1,26E-08	3,71E-15	1,97E-12	1,30E-12	8,37E-13	-3,50E-12	0,00E+00	-4,79E-11	-1,52E-11
AP	[kg SO2-eq]	2,16E-02	8,46E-04	8,12E-04	0,00E+00	1,34E-03	4,65E-05	3,54E-03	8,39E-05	9,42E-04	-2,90E-04	0,00E+00	-3,97E-03	-2,21E-03
EP	[kg PO4]3-eq]	6,15E-03	2,11E-04	2,21E-04	0,00E+00	3,21E-04	1,16E-05	8,77E-04	7,59E-06	9,34E-04	-3,06E-05	0,00E+00	-4,20E-04	-2,29E-04
POCP	[kg ethen-eq]	1,51E-03	-3,45E-04	4,31E-05	6,29E-05	1,62E-04	-1,90E-05	2,27E-04	5,35E-06	1,07E-04	-2,76E-05	0,00E+00	-3,80E-04	-2,79E-04
ADPE	[kg Sb-eq]	7,31E-06	1,62E-08	2,23E-07	0,00E+00	1,14E-06	8,89E-10	2,13E-07	1,17E-08	7,05E-08	-3,58E-08	0,00E+00	-4,90E-07	-2,19E-07
ADPF	[MJ]	1,14E+02	2,78E+00	3,54E+00	0,00E+00	6,89E+00	1,53E-01	2,87E+00	3,13E-01	4,89E+00	-2,62E+00	0,00E+00	-3,60E+01	-7,94E+01

GWP = Global warming potential; **ODP** = Depletion potential of the stratospheric ozone layer; **AP** = Acidification potential of land and water; **EP** = Eutrophication potential; **POCP** = Formation potential of tropospheric ozone photochemical oxidants; **ADPE** = Abiotic depletion potential for non-fossil resources; **ADPF** = Abiotic depletion potential for fossil resources

Results of the LCA - Resource use: 1 m² floor covering

Parameter	Unit	A1-A3	A4	A5	B1	B2	C2	C3/2	C3/3	C4/1	D/A5	D/1	D/2	D/3
PERE	[MJ]	4,29E+01	1,40E-01	1,27E+00	0,00E+00	9,87E-01	7,69E-03	3,99E-01	1,75E-01	3,72E-01	-4,72E-01	0,00E+00	-6,45E+00	-5,56E-01
PERM	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	[MJ]	4,29E+01	1,40E-01	1,27E+00	0,00E+00	9,87E-01	7,69E-03	3,99E-01	1,75E-01	3,72E-01	-4,72E-01	0,00E+00	-6,45E+00	-5,56E-01
PENRE	[MJ]	8,34E+01	2,79E+00	3,71E+00	0,00E+00	8,05E+00	1,53E-01	3,90E+01	3,63E+01	5,08E+00	-3,16E+00	0,00E+00	-4,34E+01	-7,99E+01
PENRM	[MJ]	3,58E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-3,58E+01	-3,58E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	[MJ]	1,19E+02	2,79E+00	3,71E+00	0,00E+00	8,05E+00	1,53E-01	3,22E+00	5,15E-01	5,08E+00	-3,16E+00	0,00E+00	-4,34E+01	-7,99E+01
SM	[kg]	3,73E+00	0,00E+00	1,08E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,53E+00
RSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,67E+01
FW	[m ³]	1,00E+00	2,59E-04	3,03E-02	0,00E+00	4,25E-03	1,42E-05	1,97E-02	2,50E-04	1,22E-05	-6,74E-04	0,00E+00	-9,21E-03	-7,19E-03

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
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Results of the LCA - Output flows and waste categories: 1 m² floor covering

Parameter	Unit	A1-A3	A4	A5	B1	B2	C2	C3/2	C3/3	C4/1	D/A5	D/1	D/2	D/3
HWD	[kg]	3,20E-03	1,46E-07	9,23E-05	0,00E+00	1,13E-09	8,05E-09	1,81E-08	2,09E-10	1,97E-08	-7,64E-10	0,00E+00	-1,05E-08	-3,29E-09
NHWD	[kg]	2,74E-01	2,13E-04	4,96E-02	0,00E+00	8,17E-03	1,17E-05	1,17E+00	3,39E-04	4,75E+00	-1,12E-03	0,00E+00	-1,53E-02	-1,43E-01
RWD	[kg]	1,53E-03	3,80E-06	5,33E-05	0,00E+00	3,81E-04	2,09E-07	1,40E-04	8,00E-05	7,70E-05	-2,16E-04	0,00E+00	-2,95E-03	-1,86E-04
CRU	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,53E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MER	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,23E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	[MJ]	0,00E+00	0,00E+00	6,18E-01	0,00E+00	0,00E+00	0,00E+00	8,44E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	[MJ]	0,00E+00	0,00E+00	1,47E+00	0,00E+00	0,00E+00	0,00E+00	2,03E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

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; EET = Exported thermal energy
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EPD

Environmental Product Declaration

Interface

Twist & Shine Micro

surface pile weight: 145 g/m²

pile material: polyamide 6 with 100% recycled content

backing: Graphlex® backing system



GUT/Prodis ID:

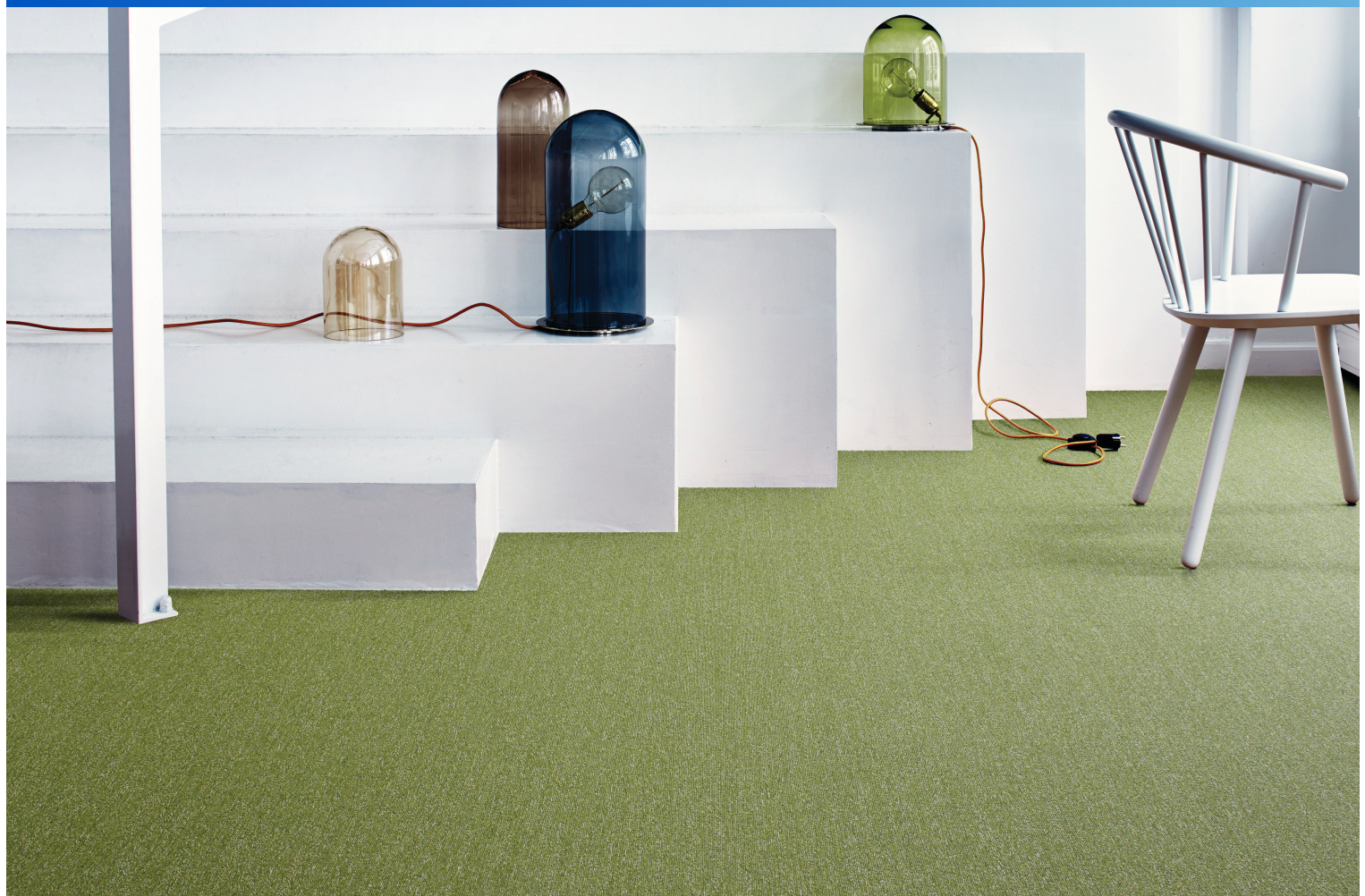
6AF89D47

These EPD data are only valid in combination with

the environmental product declaration EPD-INT-20170100-CBC1-EN published by Institut Bauen und Umwelt e.V. (IBU) and a GUT/Prodis license

This data set gives product specific LCA results

based on the calculation procedure described in the above mentioned EPD.



Calculation method for similar Products of the EPD document

The EPD document is valid for all products with a surface pile weight lower or equal to the declared maximum pile weight of 1000 g/m².

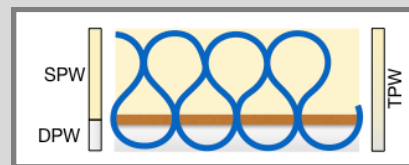
The respective declaration number is EPD-INT-20170100-CBC1-EN .

This document indicates more specific LCA results for (a) product(s) with identical material compositions and production parameters. The product(s) belong(s) to the same family of products and only differ in its/their pile weight(s).

LCA results show a linear correlation with the total pile weight, for all impact categories (IC) and all modules (A-D). It is possible to calculate specific LCA results (IC_x) for every carpet (x) within the declared group of products in relation to its total pile weight (P_x).

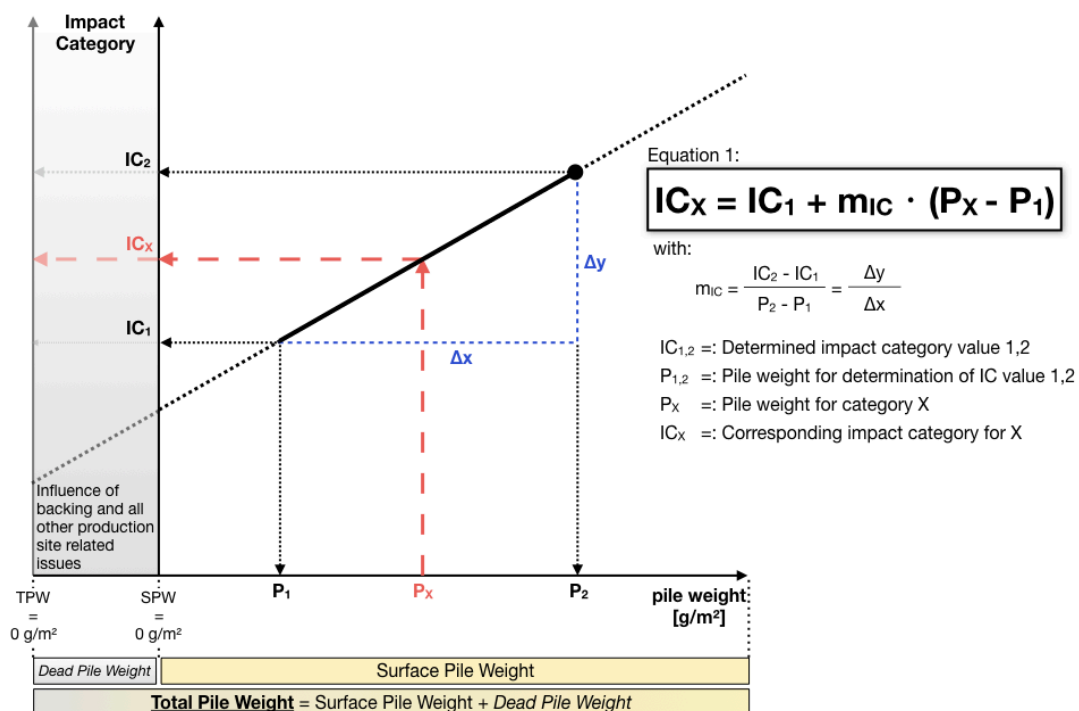
The total pile weight (TPW) is the sum of surface pile weight (SPW) and dead pile weight (DPW):

$$TPW = SPW + DPW$$



The surface pile weight is the technical relevant value according to EN 1307 and has to be mentioned in technical specification. As shown in the figure below alternatively to the total pile weight the surface pile weight can be used to calculate LCA results (IC_x).

General formula for the calculation of all impact categories IC_x



Graph 1: General formula for the calculation of all impact categories IC_x.

General Information on use stages B1 to B7

LCA results indicate environmental impacts resulting from use stage B1 to B7.

For textile floor coverings only modules B1 (use) and B2 (maintenance) are taken into account. Modules B3 (repair), B4 (replacement), B5 (refurbishment), B6 (operational energy use) and B7 (operational water use) are not relevant during the service life of textile floor coverings.

Module B1 'use' includes emissions to the indoor air during the use stage. Relevant emissions only occur in the first year of life (see LCA: Calculation rules).

Module B2 'maintenance' includes cleaning procedures.

Reference service life (RSL)

The actual service life of textile floor coverings depends on a wide range of various impact factors such as the allocation of the application area to the use class, maintenance, intensity of use and most often fashion and building related aspects. Therefore, technical service life cannot be defined for textile floor coverings.

Total environmental impacts from module B2

Total environmental impacts have to be calculated by taking into account the service life of textile floor coverings. Therefore, the assumed real life (ARSL) has to be used for the calculation of total environmental impacts taking into account the expected use conditions (see RSL). Module B2 (maintenance) is depending on the service life.

Values for module B2 given in the result tables are indicated for the period of one year. They have to be multiplied by the ARSL of the textile floor covering taking into account building related aspects.

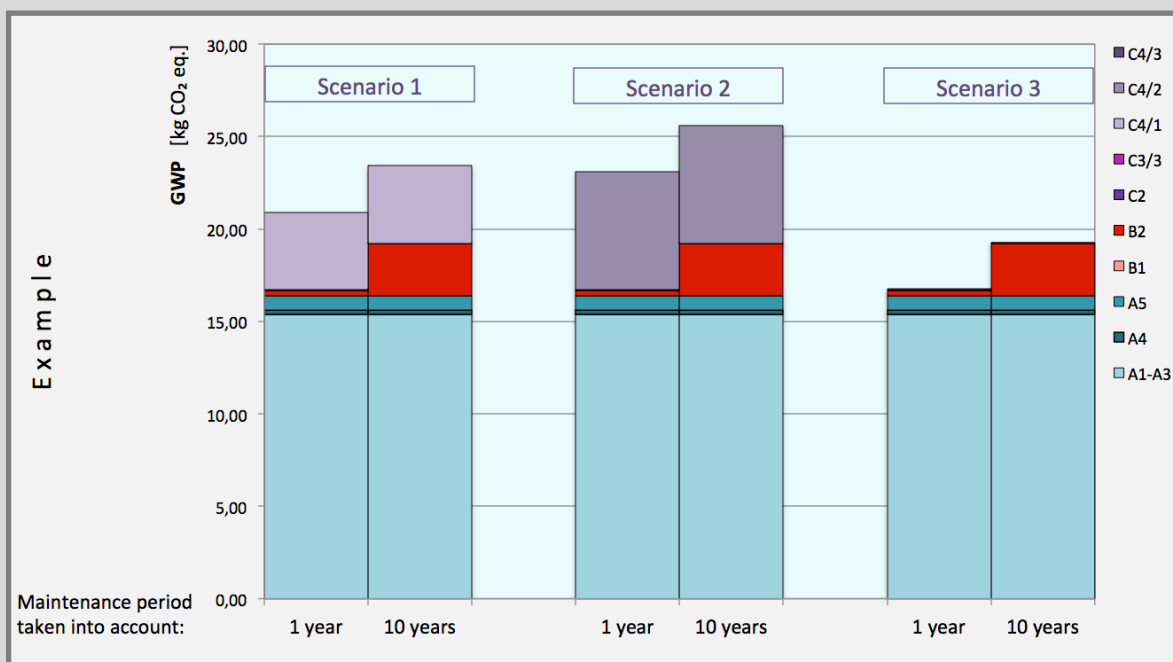
The influence of the maintenance period on the Global Warming Potential (GWP) of the whole life cycle of a textile floor covering - differentiated for 3 end-of-life scenarios - is illustrated in the graph below.

3 end-of-life scenarios:

Scenario 1: 100 % Landfill disposal

Scenario 2: 100 % Municipal waste incineration

Scenario 3: 100 % Recycling in the cement industry



Graph 2: Global Warming Potential (GWP) - aggregation of module A to module C - taking into account a maintenance period of 1 year compared to a maintenance period of 10 years - for the three declared end-of-life scenarios.

1. Information on the product Twist & Shine Micro

Product description

Name	Value	Unit
Type of manufacture	tufted tiles	-
Yarn type	polyamide 6 with 100% recycled content	-
Total pile weight	534	g/m ²
Surface pile weight	145	g/m ²
Dead pile weight	389	g/m ²
Secondary backing	Graphlex® backing system	-
Product Form	tiles 50 cm x 50 cm	-
Max. total carpet weight	4238	g/m ²

Base materials / Ancillary materials

Name	Value for category	Unit
Polyamide 6	12,4	%
Polyester	2,8	%
Polypropylene	1,2	%
Limestone	51,0	%
Aluminiumhydroxide	7,0	%
Polyvinyl butyl (PVB)	7,0	%
SBS-Copolymer	1,6	%
Bitumen	15,7	%
Glass fibre	0,8	%
Additives	0,6	%
Recycled content out of total weight	71 %	%

LCA: Declared Unit

Name	Value for category	Unit
Declared unit	1,0	m ²
Conversion factor to 1 kg	0,24	m ² /kg
Mass reference	4,2	kg/m ²

LCA: Scenarios and additional technical information

All indicated values refer to the declared functional unit

Transport to the construction site (A4)

Name	Value for category	Unit
Litres of fuel (truck, EURO 0-5 mix)	0,0085	m ²
Transport distance	700	m ² /kg
Capacity utilisation (including empty runs)	85	kg/m ²

Installation in the building (A5)

Name	Value for category	Unit
Material lost	0,13	kg

Maintenance (B2)

Indication per m² and year

Name	Value for category	Unit
Maintenance cycle (wet cleaning)	1,5	1/year
Maintenance cycle (vacuum cleaning)	208	1/year
Water consumption (wet cleaning)	0,004	m ³
Cleaning agent (wet cleaning)	0,09	kg
Electricity consumption	0,314	kWh

End of Life (C1-C4)

Name	Value for category	Unit
Collected as mixed construction waste (scenario 1 and 2)	4,24	kg/m ²
Collected separately (scenario 3)	4,24	kg/m ²
Landfilling (scenario 1)	4,24	kg/m ²
Energy recovery (scenario 2)	4,24	kg/m ²
Energy recovery (scenario 3)	1,77	kg/m ²
Recycling (scenario 3)	2,53	kg/m ²

LCA: Results for Twist & Shine Micro

(calculated with a total pile weight of 534 g/m²)

The declared result figures in module B2 have to be multiplied by the assumed service time (in years) of the floor covering in the building considered (see chapter: 'General Information on use stages B1 to B7').

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 and are therefore not declared.

Module C2 represents the transport for scenarios 1, 2 and 3.

Description of the system boundary

(X = Included in LCA; MDN = Module not declared)

State of production	State of construction phase	State of use	End of life state	Credits and loads after life
raw material supply transport manufacturing A1 A2 A3 X X X	delivery installation A4 A5 X X	use maintenance repair replacement renewal energy use water use B1 B2 B3 B4 B5 B6 B7 X X MDN MDN MDN MDN MDN	stop of use / demolition transport waste management disposal C1 C2 C3 C4 MDN X X X	reuse, recovery and recycling potential D X

Results for the LCA - Environmental impact: 1 m² floor covering

Parameter	Unit	A1-A3	A4	A5	B1	B2	C2	C3/2	C3/3	C4/1	D/A5	D/1	D/2	D/3
GWP	[kg CO ₂ -eq]	4,03E+00	1,82E-01	5,71E-01	0,00E+00	3,32E-01	9,98E-03	4,59E+00	2,64E-02	3,08E-01	-1,70E-01	0,00E+00	-2,00E+00	-4,74E-01
ODP	[kg CFC11-eq]	4,33E-08	6,11E-14	1,24E-09	0,00E+00	1,26E-08	3,34E-15	1,77E-12	1,18E-12	7,55E-13	-3,18E-12	0,00E+00	-3,70E-11	-1,48E-11
AP	[kg SO ₂ -eq]	1,50E-02	7,66E-04	5,77E-04	0,00E+00	1,34E-03	4,19E-05	2,27E-03	7,57E-05	8,50E-04	-2,63E-04	0,00E+00	-3,08E-03	-1,88E-03
EP	[kg PO ₄) ₃ -eq]	4,00E-03	1,91E-04	1,48E-04	0,00E+00	3,21E-04	1,04E-05	5,44E-04	6,84E-06	8,42E-04	-2,78E-05	0,00E+00	-3,26E-04	-1,95E-04
POCP	[kg ethen-eq]	1,06E-03	-3,12E-04	2,87E-05	6,29E-05	1,62E-04	-1,71E-05	1,51E-04	4,83E-06	9,68E-05	-2,51E-05	0,00E+00	-2,95E-04	-2,37E-04
ADPE	[kg Sb-eq]	6,01E-06	1,46E-08	1,84E-07	0,00E+00	1,14E-06	8,02E-10	2,02E-07	1,06E-08	6,36E-08	-3,25E-08	0,00E+00	-3,80E-07	-2,09E-07
ADPF	[MJ]	8,93E+01	2,52E+00	2,79E+00	0,00E+00	6,89E+00	1,38E-01	2,39E+00	2,83E-01	4,41E+00	-2,38E+00	0,00E+00	-2,82E+01	-6,42E+01

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 for the LCA - Resource use: 1 m² floor covering

Parameter	Unit	A1-A3	A4	A5	B1	B2	C2	C3/2	C3/3	C4/1	D/A5	D/1	D/2	D/3
PERE	[MJ]	3,34E+01	1,27E-01	9,90E-01	0,00E+00	9,87E-01	6,94E-03	3,58E-01	1,58E-01	3,36E-01	-4,29E-01	0,00E+00	-4,99E+00	-4,81E-01
PERM	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	[MJ]	3,34E+01	1,27E-01	9,90E-01	0,00E+00	9,87E-01	6,94E-03	3,58E-01	1,58E-01	3,36E-01	-4,29E-01	0,00E+00	-4,99E+00	-4,81E-01
PENRE	[MJ]	5,76E+01	2,53E+00	2,93E+00	0,00E+00	8,05E+00	1,38E-01	3,85E+01	3,62E+01	4,58E+00	-2,87E+00	0,00E+00	-3,38E+01	-6,45E+01
PENRM	[MJ]	3,58E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-3,58E+01	-3,58E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	[MJ]	9,34E+01	2,53E+00	2,93E+00	0,00E+00	8,05E+00	1,38E-01	2,70E+00	4,65E-01	4,58E+00	-2,87E+00	0,00E+00	-3,38E+01	-6,45E+01
SM	[kg]	3,26E+00	0,00E+00	9,37E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,53E+00
RSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,18E+01
FW	[m ³]	5,44E-01	2,35E-04	1,69E-02	0,00E+00	4,25E-03	1,28E-05	1,71E-02	2,26E-04	1,10E-05	-6,12E-04	0,00E+00	-7,13E-03	-5,86E-03

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
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Results for the LCA - Output flows and waste categories: 1 m² floor covering

Parameter	Unit	A1-A3	A4	A5	B1	B2	C2	C3/2	C3/3	C4/1	D/A5	D/1	D/2	D/3
HWD	[kg]	1,79E-03	1,33E-07	5,15E-05	0,00E+00	1,13E-09	7,26E-09	1,79E-08	1,88E-10	1,78E-08	-6,94E-10	0,00E+00	-8,14E-09	-2,05E-09
NHWD	[kg]	2,55E-01	1,93E-04	4,90E-02	0,00E+00	8,17E-03	1,05E-05	1,17E+00	3,06E-04	4,28E+00	-1,02E-03	0,00E+00	-1,19E-02	-1,43E-01
RWD	[kg]	1,36E-03	3,44E-06	4,77E-05	0,00E+00	3,81E-04	1,89E-07	1,25E-04	7,22E-05	6,95E-05	-1,96E-04	0,00E+00	-2,28E-03	-1,63E-04
CRU	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,53E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MER	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,76E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	[MJ]	0,00E+00	0,00E+00	5,61E-01	0,00E+00	0,00E+00	0,00E+00	6,53E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	[MJ]	0,00E+00	0,00E+00	1,34E+00	0,00E+00	0,00E+00	0,00E+00	1,59E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

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; EET = Exported thermal energy
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