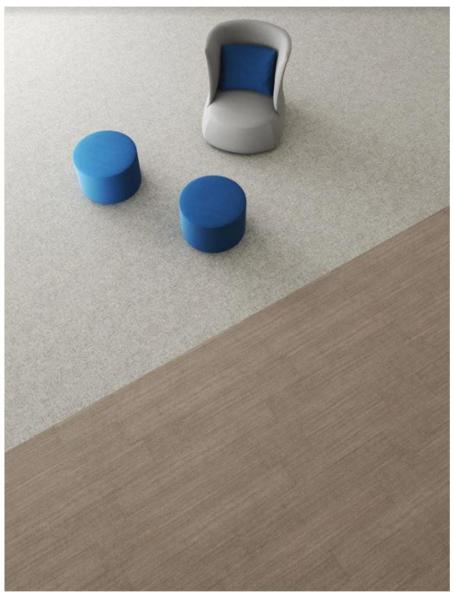
### **ENVIRONMENTAL PRODUCT DECLARATION**

# **COLLECTION ECOSYSTEM**

### COMMERCIAL BIO-BASED POLYURETHANE RESILIENT FLOORING



ECOSYSTEM is Patcraft's first PVC-free resilient engineered for the environment and designed to perform in high demand applications. EcoSystem coordinating tile and sheet products are derived of rapidly renewable resources like rapeseed and castor oil and free of ortho-phthalate plasticizers and solvents.

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Knowing that the items we produce can affect our future, we have a strong commitment to the Cradle to Cradle Certified™ product design, and are continuously improving our processes to ensure that the items we make are both safe for the environment, and people. And because we take pride in being open and transparent about our processes for assessing the raw materials used in our highperforming flooring solutions, we offer Environmental Product Declarations, as well as Health Product Declarations on many of our flooring products; Declare Labels on our ECOSYSTEM resilient and all styles of our EcoWorx® Carpet Tile with EcoSolution Q® Face Fiber; and produce a Global Reporting Initiative compliant sustainability report each year.





Registered under the scope of mutual recognition between UL Environment and Institut Bauen und Umwelt e.V.

## **ENVIRONMENTAL** PRODUCT DECLARATION



patcraft<sub>®</sub> Commercial Bio-Based Polyurethane Resilient Flooring

#### According to EN 15804 and ISO 14025 Dual Recognition by UL Environment and Institut Bauen und Umwelt e.V.

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. <u>Exclusions</u>: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc. <u>Accuracy of Results</u>: EPDs regularly rely on estimations of impacts, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. <u>Comparability</u>: EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.



PROGRAM OPERATOR	UL Environment
DECLARATION HOLDER	Windmöller GmbH
ULE DECLARATION NUMBER	4788977173.101.1
IBU DECLRATION NUMBER	EPD-PAT-20180120-CBC1-EN
DECLARED PRODUCT	Commercial Bio-Based Polyurethane Resilient Flooring
REFERENCE PCR	Product Category Rules Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report, 03.2018 Product Category Rules Part B: Floor coverings, 02.2018

DATE OF ISSUE	April 23, 2019
VALIDITY UNTIL	September 17, 2023

CONTENTS OF THE DECLARATION	General information Product / Product description LCA calculation rules LCA scenarios and further technical information LCA results References						
The PCR review was conducted by	by:	IBU – Institut Bauen und Umwelt e.V.					
		PCR was approved by the Independent Expert Committee (IEC) of IBU					
was independently verified in acc Underwriters Laboratories	-	Grant R. Martin					
		Grant R. Martin, UL Environment					
This life cycle assessment was in accordance with EN 15804 and th		IBU – Institut Bauen und Umwelt e.V.					



# Environment

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### **General Information**

#### patcraft® **Collection Ecosystem Commercial Bio-Based** Polyurethane Resilient Flooring **Programme holder** Owner of the declaration IBU - Institut Bauen und Umwelt e.V. patcraft® Panoramastr. 1 PO Box 2128 10178 Berlin Dalton, GA 30722 Germany United States, Georgia **Declaration number** Declared product / declared unit EPD-PAT-20180120-CBC1-EN 1 m<sup>2</sup> Polyurethane Resilient Flooring 'Collection Ecosystem' This declaration is based on the product Scope: category rules: The manufacturer declaration applies to Commercial Bio-Based Polyurethane Resilient Flooring. Floor coverings, 02/2018 (PCR checked and approved by the SVR) It is manufactured externally in Germany. **Issue date** 18.09.2018 The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not Valid to be liable with respect to manufacturer information, life cycle assessment data and evidences. 17.09.2023 Verification Wermanes The standard /EN 15804/ serves as the core PCR Independent verification of the declaration and data according to /ISO 14025:2010/ Prof. Dr.-Ing. Horst J. Bossenmayer internally externally х (President of Institut Bauen und Umwelt e.V.) Hand Voils chindle Dr. Alexander Röder Angela Schindler (Head of Board IBU) (Independent verifier appointed by SVR)

### Product

#### **Product description / Product definition**

Bio-Based Polyurethane Resilient Flooring is produced with the reactive component castor oil as renewable raw material and with natural inorganic filler. The total weight of the product is 3.9 kg/m<sup>2</sup>.

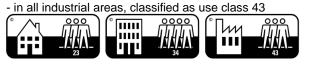
For the placing on the product is 0.0 kg/m<sup>-1</sup> European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) Regulation (EU) No. 305/2011 Construction Producs Regulation /CPR/ applies.

The Declaration of Performance of the products taking into consideration /EN 14041/ and the CE-marking of the products can be found on the manufacturer's technical information section.

#### Application

According to the use class as defined in /ISO 10874/ the product can be used

- in all domestic areas, classified as use class 23,
- in all commercial areas, classified as use class 34



#### **Technical Data**

Name	Value	Unit
Grammage	3.9	kg/m²
Product thickness	2.5	mm
Product Form	several dimensions	-

Additional product properties in accordance with /EN 16776/ and performance data of the product in accordance with the Declaration of Performance with respect to its Essential Characteristics according to /EN 14041/ are available from the manufacturer.

#### **Base materials / Ancillary materials**

Name	Value	Unit
Polyurethane including 64% renewable material	45.2	%
Filler	50.2	%
Paper	1.7	%
Glass fibre	0.8	%
Polyester	2.1	%

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This product contains substances listed in the /REACH/ Candidate List of Substances of Very High Concern for Authorisation" (SVHC) (27.06.2018) exceeding 0.1 percentage by mass: no

#### **Reference service life**

A calculation of the reference service life according to /ISO 15686/ is not possible.

The service life of resilient floor coverings depends on the correct installation taking into account the declared

### LCA: Calculation rules

#### **Declared Unit**

Name	Value	Unit
Declared unit	1	m <sup>2</sup>
Conversion factor to 1 kg	0.26	-
Mass reference	3.9	kg/m²

The declared unit refers to 1 m<sup>2</sup> produced floor covering. Output of module A5 'Assembly' is 1 m<sup>2</sup> installed floor covering.

#### System boundary

#### Type of EPD: Cradle-to-grave

#### System boundaries of modules A, B, C, D:

#### A1-A3 Production:

Energy supply and production of the basic material, auxiliary material, transport of the material to the manufacturing site, emissions, waste water treatment, packaging material and waste processing up to the landfill disposal of residual waste (except radioactive waste). Benefits for generated electricity and steam due to the incineration of production waste are aggregated.

#### A4 Transport:

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

#### A5 Installation:

Installation of the floor covering, processing of installation waste and packaging waste up to the landfill disposal of residual waste (except radioactive waste), the production of the amount of floor covering that occurs as installation waste including its transport to the place of installation.

Generated electricity and steam due to the incineration of waste are listed in the result table as exported energy.

Preparing of the floor and adhesives are beyond the system boundaries and not taken into account.

#### B1 Use:

Indoor emissions during the use stage. After the first year, no product related VOC emissions are relevant due to VOC decay curves of the product.

use classification and the adherence to cleaning and maintenance instructions.

A minimum service life of 20 years can be assumed /BNB/, technical service life can be considerably longer.

#### Cleaning of the floor covering for a period of 1 year: Vacuum cleaning – electricity supply Wet cleaning – water consumption, production of the cleaning agent, waste water treatment. The declared values in this module have to be multiplied by the assumed service life of the floor covering in the building in question.

#### <u>B3 - B7:</u>

The modules are not relevant and therefore not declared.

#### C1 De-construction:

Energy consumption of the de-construction machine.

#### C2 Transport:

Transport of the floor covering waste to a landfill or to the municipal waste incineration plant (MWI).

#### C3 Waste processing:

C3-1: Landfill disposal needs no waste processing. C3-2: Impact from waste incineration (plant with R1>0.6), generated electricity and steam are listed in the result table as exported energy.

#### C4 Disposal

C4-1: Impact from landfill disposal, C4-2: The floor covering waste leaves the system in module C3-2,

#### 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 floor covering waste at the end-of-life, D-2: Benefits for generated energy due to incineration of floor covering waste at the end-of-life (incineration plant with R1 > 0.6),

#### 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 2018/, service pack 35 and from the /ecoinvent 3.3/ database

#### B2 Maintenance:

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### 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.

#### Transport to the construction site (A4)

Name	Value	Unit
Litres of fuel , diesel, truck EURO 0-6 mix	0.009	l/100km
Litres of fuel , heavy fuel oil, ship	0.001	l/100km
Transport distance truck	540	km
Transport distance ship	750	km
Capacity utilisation (including empty runs) truck	60	%
Capacity utilisation (including empty runs) ship	48	%

#### Installation in the building (A5)

Name	Value	Unit					
Material loss	0.12	kg					
Coated packaging paper and installation waste are							
considered to be incinerated in a municipal waste							
incineration plant. Pure cardboard	d packaging	g waste is					

incineration plant. Pure cardboard packaging waste is going to be recycled.

Preparation of the floor and adhesives are not taken into account.

#### End of Life (C1-C4)

Two 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

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)

Name	Value	Unit
Collected as mixed construction waste (scenario 1 and 2)	3.9	kg
Landfilling (scenario 1)	3.9	kg
Energy recovery (scenario 2)	3.9	kg

# Reuse, recovery and/or recycling potentials (D), relevant scenario information

Recovery potentials due to the two end-of-life scenarios (module C) are indicated separately.

#### Maintenance (B2)

The values for cleaning refer to  $1 \text{ m}^2$  floor covering used in commercial areas per year. Depending on the application based on /EN ISO 10874/, the technical service life recommended by the manufacturer and the anticipated strain on the floor by customers, the case-specific useful life can be established. The effects of Module B2 need to be calculated on the basis of this useful life in order to obtain the overall environmental impacts.

Name	Value	Unit
Maintenance cycle (wet wiping)	103,2	1/year
Maintenance cycle (vacuum cleaning)	37,4	1/year
Water consumption (wet wiping)	0.026	m <sup>3</sup>
Cleaning agent (wet wiping)	0.05	kg
Electricity consumption	0.09	kWh

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

### LCA: Results

The declared result figures in module B2 have to be multiplied by the assumed service life (in years) of the floor covering in the building under consideration.

Information on un-declared modules:

Modules B3 - B7 are not relevant during the service life of the floor covering and are therefore not declared. Modules C3/1 and C4/2 cause no additional impact (see "LCA: Calculation rules") and are therefore not declared. Module C2 represents the transport for scenarios 1 and 2. Column D represents module D/A5. The /CML/ characterisation factors version January 2016 are applied.

DESC	RIP		OF THE	SYST	EM B	OUN	DARY (	X = INO	CLUE	)ED I	N LCA	; MND =	MODL	JLE N	ОТ	DECLA	RED)
		STAGE	CONST ON PRO STA	RUCTI				SE STAG					ND OF LIF			BENE L( BEY( SY	FITS AND OADS OND THE 'STEM NDARIES
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	Disnosal	Reuse-	Recovery- Recycling- potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	6 B7	C1	C2	C3	C	4	D
Х	Х	Х	Х	Х	Х	Х	MNR	MNR	MNR	MN	D MN	D X	Х	Х	X	(	Х
RESU	JLTS	OF TH	HE LCA	- EN\	/IROI	MEN	TAL IM	PACT:	1 m <sup>2</sup>	² floo	rcove	ring					
							CN	/IL 2001	– Apri	i 2013	5						
Param eter	ι	Jnit	A1-A3	A4		A5	B1	B2		21	C2	C3/2	C4/1	D	)	D/1	D/2
GWP ODP		O <sub>2</sub> -Eq.] C11-Eq.]	4.26E+0		-	.68E-1 .26E-9	0.00E+0 0.00E+0	2.88E-1 2.07E-8		5E-3 )E-14	1.18E-2 3.24E-16	7.23E+0 8.69E-13	3.01E+0			0.00E+0 0.00E+0	-1.65E+0 -3.55E-12
AP		<u>Ori-Eq.</u> ] O₂-Eq.]	4.80E-2			.20E-9	0.00E+0	2.07E-6 8.50E-4		5E-5	5.01E-5	2.02E-3	7.40E-12 7.48E-4	-	-	0.00E+0	-3.55E-12 -2.75E-3
EP	[kg (P	O <sub>4</sub> ) <sup>3</sup> -Eq.]	3.27E-2		-4 9	.77E-4	0.00E+0	4.99E-4		4E-6	1.28E-5	4.98E-4	7.65E-4			0.00E+0	-2.98E-4
POCP		hene-Eq.]	1.43E-3			41E-5	1.79E-6	1.02E-4		6E-6	-2.09E-5		8.18E-5			0.00E+0	-2.16E-4
ADPE ADPF		Sb-Eq.] MJ]	2.51E-5			.33E-7 42E+0	0.00E+0 0.00E+0	8.33E-7 3.58E+0		7E-9 4E-2	9.83E-10 1.61E-1	1.39E-7 2.03E+0	5.93E-8 3.97E+0			0.00E+0 0.00E+0	-4.63E-7 -2.27E+1
7.0011							0.002.10			1		2100210	0.07270	1100	<u>,                                    </u>	0100210	
			-						CI 2.1			-	1				
Param eter		Jnit	A1-A3	A4		A5	B1	B2		31	C2	C3/2	C4/1	D		D/1	D/2
GWP ODP		C11 eq.]	4,31E+0 1,61E-0	,	,	69E-01 66E-09	0,00E+00 0,00E+00	/		2E-03 )E-14	1,18E-02 3,24E-16			,		0,00E+00 0,00E+00	-1,65E+00 -3,55E-12
AP		50 <sub>2</sub> eq.]	5,48E-0		,	74E-03	0,00E+00	9,46E-0			6,78E-05			,		0,00E+00	-2,88E-03
EP		N eq.]	5,91E-0			72E-03	0,00E+00				5,66E-06					0,00E+00	-2,02E-04
SFP ARDP		O₃ eq.] MJ]	5,47E-0 1,37E+0			01E-02 27E-01	3,29E-05 0,00E+00	1,13E-0		8E-04 9E-03	1,50E-03 2,32E-02					0,00E+00	-4,43E-02 -2,60E+00
ARDP		-	,	,							•	a   2,43⊑-01	5,14E-01			1	,
Captio	n <sup>EP</sup>	= Eutrop non-foss	hication p il resource	otential; f s; ADPF	POCP = = Abiot	Format ic deple Deplet	tion potenti tion potent	ial of tropo ial for fos ial for Nor	ospheri sil reso n-renev	c ozon urces, /able (f	e photocł SMP = S	memical oxio mog Forma ergy ressou	dants; ADF tion Poten	PE = Ab	iotic d	depletion po	otential for
Param	eter	Unit	A1-A3	A4	4	<b>\</b> 5	B1	B2	C	1	C2	C3/2	C4/1	D		D/1	D/2
PER			6.57E+1					6.30E-1	-		8.93E-3	3.80E+1	3.07E-1	-1.84			
PER		[MJ]	3.77E+1	0.00E+				0.00E+0	0.00		0.00E+0	-3.77E+1	0.00E+0	0.00E		0.00E+0	0.00E+0
PER PENF		[MJ] [MJ]	1.03E+2 1.03E+2	1.26E-1 2.59E+1			0.00E+0 0.00E+0	6.30E-1 4.07E+0	4.48		8.93E-3 1.62E-1	3.13E-1 1.50E+1	3.07E-1 4.12E+0	-1.84 -9.61		0.00E+0 0.00E+0	-5.51E+0 -2.88E+1
PENR		[MJ]	1.27E+1	0.00E+				0.00E+0	0.00		0.00E+0	-1.27E+1	0.00E+0	0.00E		0.00E+0	0.00E+0
PENF		[MJ]	1.16E+2	2.59E+				4.07E+0	1.19		1.62E-1	2.31E+0	4.12E+0	-9.61		0.00E+0	-2.88E+1
SM RSF		[kg]	1.41E-1 0.00E+0	0.00E+				0.00E+0	0.00		0.00E+0	0.00E+0 0.00E+0	0.00E+0	0.00E		0.00E+0	0.00E+0 0.00E+0
NRS			0.00E+0	0.00E+				0.00E+0 0.00E+0	0.00		0.00E+0 0.00E+0	0.00E+0	0.00E+0 0.00E+0	0.00E		0.00E+0 0.00E+0	0.00E+0 0.00E+0
FW			8.20E+0	2.32E-4			0.00E+0	7.45E-3	6.10		1.65E-5	1.55E-2	-1.06E-5			0.00E+0	-7.51E-3
Captio	n rene	ewable p non-rene ewable p	orimary en ewable pr primary er	ergy res imary er hergy res	ources ergy ex ources	used a cluding used a	s raw mat 1 non-rene 1s raw mat	erials; PE wable pr terials; Pl	ERT = imary ENRT	Total u energy = Tota SF = U	use of ren resourc l use of r	esources u newable pr es used as non-renewa n-renewab	imary ene raw mate able prima	ergy res erials; P ary ener	ource ENR rgy re	es; PENRE M = Use c sources; \$	E = Use of of non- SM = Use

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#### **RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES:**

1 m <sup>2</sup> floc	l m² floorcovering												
Parameter	Unit	A1-A3	A4	A5	B1	B2	C1	C2	C3/2	C4/1	D	D/1	D/2
HWD	[kg]	3.23E-7	1.31E-7	1.93E-8	0.00E+0	1.33E-9	5.59E-11	9.36E-9	1.31E-8	1.76E-8	-3.91E-10	0.00E+0	-1.17E-8
NHWD	[kg]	1.69E-1	1.91E-4	3.05E-2	0.00E+0	3.84E-2	8.40E-5	1.36E-5	8.42E-1	3.89E+0	-4.10E-4	0.00E+0	-1.23E-2
RWD	[kg]	1.94E-3	3.49E-6	6.00E-5	0.00E+0	1.29E-4	1.97E-5	2.22E-7	1.11E-4	5.85E-5	-8.09E-5	0.00E+0	-2.42E-3
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
MFR	[kg]	0.00E+0	0.00E+0	1.29E-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
MER	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EEE	[MJ]	0.00E+0	0.00E+0	2.32E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.93E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EET	[MJ]	0.00E+0	0.00E+0	4.26E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.28E+1	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												

The  $CO_2$  uptake during the growth phase of renewable materials in the product is 2.74 kg. This amount is stored in the material as biogenic carbon. At the end of life the stored carbon is released into the air again as 2.74 kg  $CO_2$  emissions.

#### References

#### /IBU 2016/

IBU (2016): General Programme Instructions for the Preparation of EPDs at the Institut Bauen und Umwelt e.V., Version 1.1 Institut Bauen und Umwelt e.V., Berlin.

#### /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

#### /EN 16810/

DIN EN 16810: 2017-08: Resilient, textile and laminate floor coverings – Environmental product declarations – Product category rules

#### /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, V1.7, March 2018 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, V1.2, Febuary 2018 www.bau-umwelt.de

#### /EN 16776/

DIN EN 16776: 2016-09: Resilient floor coverings -Heterogeneous polyurethane floor coverings -Specification

#### /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

#### /CPR/

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

#### /BNB/

Bundesministerium des Innern, für Bau und Heimat, "Nutzungsdauern von Bauteilen zur Lebenszyklusanalyse nach BNB, 2017" des Bundesinstitut für Bau-, Stadt- und Raumforschung (BBSR)

#### /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 2018/

GaBi Software-System and Database for Life Cycle Engeneering, thinkstep AG, Leinfelden-Echterdingen, service pack 35, 2018

#### /ecoinvent 3.3/

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

Institut Bauen und Umwelt e.V.	<b>Publisher</b> Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany	Tel Fax Mail Web	+49 (0)30 3087748- 0 +49 (0)30 3087748- 29 info@ibu-epd.com www.ibu-epd.com
Institut Bauen und Umwelt e.V.	<b>Programme holder</b> Institut Bauen und Umwelt e.V. Panoramastr 1 10178 Berlin Germany	Tel Fax Mail Web	+49 (0)30 - 3087748- 0 +49 (0)30 – 3087748 - 29 info@ibu-epd.com www.ibu-epd.com
AND	Author of the Life Cycle Assessment Gemeinschaft umweltfreundlicher Teppichboden (GUT) e.V. Schönebergstraße 2 52068 Aachen Germany	Tel Fax Mail Web	+45 (0)241 96843 410 +45 (0)241 96843 400 mail@gut-ev.de www.gut-ev.org
patcraft。	Owner of the Declaration Patcraft PO Box 2128 30722 Dalton, GA United States	Tel Fax Mail Web	+1 800 241 4014 no info@patcraft.com www.patcraft.com