

Environmental Product Declaration



THE INTERNATIONAL EPD® SYSTEM



EPD of multiple products, based on representative product
In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021

Straw Floor

products listed on page 4
from

Koczwarra Vertriebs-GmbH



Programme:

Programme operator:

EPD registration number:

Publication date:

Valid until:

The International EPD® System, www.environdec.com

EPD International AB

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An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com



General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
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Accountabilities for PCR, LCA and independent, third-party verification

Product Category Rules (PCR)

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)

Product Category Rules (PCR): PCR 2019:14 Construction products Version 1.3.4 [valid until: 2025-06-20], and c-PCR-006 Wood and wood-based products for use in construction (EN 16485), Version 2024-04-30.

PCR review was conducted by: The Technical Committee of the International EPD System. See www.environdec.com for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.

Life Cycle Assessment (LCA)

LCA accountability: Si Huang, IVL Swedish Environmental Research Institute

Third-party verification

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:

☒ EPD verification by individual verifier

Third-party individual verifier: Matthew Fishwick, Fishwick Environmental Ltd

Approved by: The International EPD® System

Procedure for follow-up of data during EPD validity involves third party verifier:

☐ Yes ☒ No

[Procedure for follow-up the validity of the EPD is at minimum required once a year with the aim of confirming whether the information in the EPD remains valid or if the EPD needs to be updated during its validity period. The follow-up can be organized entirely by the EPD owner or together with the original verifier via an agreement between the two parties. In both approaches, the EPD owner is responsible for the procedure being carried out. If a change that requires an update is identified, the EPD shall be re-verified by a verifier]

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of

PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

The results of the end-of-life stage (module C) should be considered when using the results of the production stage (modules A1-A3).

Company information

Owner of the EPD: Koczwara Vertriebs-GmbH

Contact: Anne Kandel (akandel@koczwara-vertrieb.de)

Address: Scheuten-Solar-Straße 2; 45881 Gelsenkirchen; GERMANY

Description of the organisation:

The Koczwara Vertriebs-GmbH is a brand owning wholesaler of building and decorative materials who concentrates in detecting market trends, product and material development, as well as in marketing of their own brands.

Product-related or management system-related certifications:

ISO 9001

ISO14001

FSC Chain of Custody Certification Standard

Name and location of production site:

Fujan Province, China.

Product information

Product name:

Straw Floor

Table 1 Product list covered in this EPD

Straw Floor products	Length: 700-1900 mm
	Width: 90-190 mm
	Thickness: 10-13 mm (including top veneer layer 0.6-3.0mm)

Product description:



The Straw Floor in this EPD is a type of three-layered engineered board, with veneer the top layer, straw substrate the middle layer and poplar board the lower layer. The straw layer in the middle makes this product different from other common engineered wood floor. The straw layer primarily uses agricultural residues like rice straw and wheat straw as raw materials, which not only effectively utilizes agricultural waste but also reduces dependence on forest resources. The Straw Floor is free from harmful substances like formaldehyde and meets international environmental standards.

Straw Flooring—CONSTRUCTION



Figure 1 Picture of Straw Floor products

This EPD is an EPD of multiple products, based on representative product, 1 m²*11 mm straw floor product, because it has the largest sales demand among all products in this EPD (over 80%). The performance of all the products included is shown in the table below.

Table 2 Product property indicators

Properties	Standard	Values (4mm)
Moisture Content	/	≤8%
Thickness swelling	EN 13329	≤4%
Dimensional stability	ISO 23999 length /width	0.21mm
Micro-scratch resistance (Procedure A)	EN 16094	MSR-A2
Adhesion of paint film	ISO2409:2020	Grade 2
Wear resistance	ISO 7784-2	≤ 0.07 g / 100 r
Effect of a furniture leg	EN 424:2001	No visible damage
Castor chair resistance	EN 425:2002	≥25000 cycles
Bending Strength	EN 408:2010+A1:2012	≥70 MPa
Modulus of Elasticity	EN 310	≥7000 MPa
Internal bond of the substrate	EN 319	≥1.0 MPa
Locking strength	ISO 24334	L ≥ 2.5 kN/m S ≥ 2.5 kN/m
Hardness of paint film	ISO 15184:2020	2H
Resistance to staining	EN 438-2:2016+A1:2018, Section 26	Grade 5
Residual indentation(mm)	EN ISO 24343-1:2012	0.1
Resistance to burning cigarette	EN 1399:1997, Method B	Rating 5
Resistance to impact by large diameter ball	EN 13329:2006+A1:2008, Annex F	Pass
Colour fastness to artificial light	ISO 105-B02	Grade 6
Phthalate content test	EN 14372	ND
Heavy metal migration	EN 71-3	ND
SVHC	REACH	ND
Slip resistance	DIN 51130	R10
Dynamic coefficient of friction	EN 13893:2002	Class DS
Formaldehyde content test	EN 14041:2004/AC:2006& EN 717-1:2004	Enf
Content of pentachlorophenol (PCP)	EN 14041:2004/AC:2006 Annex B and EN 12673:1999	ND

Fire reaction	EN 13501-1:2018&ASTM E648	Bfl-S1
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Table 3 Product content per declared unit of the representative product

Product components		Weight, kg	Post-consumer material, weight-% of whole product	Biogenic material, kg C/declared unit
Oak veneer		0.728	0.00%	0.310
Straw substrate	Straw	1.068	0.00%	0.453
	Magnesium oxide (MgO)	6.446	0.00%	0.000
	Magnesium sulphate (MgSO ₄)	2.155	0.00%	0.000
	Sulfates	0.077	0.00%	0.000
	Water	0.945	0.00%	0.000
	Citric Acid (CA)	0.052	0.00%	0.000
Poplar back layer		0.7858	0.00%	0.388
Paint		0.1076	0.00%	0.000
Polyurethane adhesive		0.2063	0.00%	0.000
Wax		0.0269	0.00%	0.000
Putty (Epoxy resin)		0.0022	0.00%	0.000
TOTAL		12.60	0.00%	1.151
Packaging materials		Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/declared unit
Corrugated Box		0.231	1.83%	0.096
PE film		0.003	0.02%	0.000
Plastic belt		0.004	0.04%	0.000
EPE Pearl cotton		0.000	0.00%	0.000
Wood pallet		0.209	1.66%	0.123
TOTAL		0.447	3.55%	0.219

Table 4 Content declaration of the rest products in this EPD

Product components	Portion in mass
Oak veneer	3.70%~15.85%
Straw substrate	75.11%~87.61%
Poplar back layer	5.55%~6.34%
Paint	0.85%~0.99%
Polyurethane adhesive	1.62%~1.894%
Wax	0.21%~0.25%
Putty (Epoxy resin)	0.02%~0.02%
TOTAL	100.00%
Packaging Materials	Portion in mass
Corrugated Box	49.58~54.83%
PE film	0.53%~0.64%
Plastic belt	1.04%~1.11%
EPE Pearl cotton	0.02%~0.02%
Wood pallet	43.58%~48.65%

TOTAL	100.00%
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At the time of data collection, no substance included in the Candidate List of Substances of Very High Concern (SVHC) for authorization under the REACH Regulations is present in the products covered by this LCA and EPD either above the threshold for registration with the European Chemicals Agency or above 0.1% (wt/wt).

UN CPC code:

316

Geographical scope:

A1-A3 China, A4 from China to EUR, A5-D EUR.

LCA information

Declared unit:

1 m² of the straw floor product. The thickness of the representative product under the declared unit is 11 mm, and the mass conversion factor is 12.60 kg per m².

Reference service life:

50 years used for interior applications as decorative flooring, and when properly installed in typical residential conditions.

Time representativeness:

January 1st 2023 to December 31st 2023.

Database(s) and LCA software used:

LCA Content 2023.1 Databases (2023.1 Edition) and ecoinvent v3.9.1 (cut-off), using the LCA software Sphera LCA for expert (formerly Gabi).

Description of system boundaries:

The system boundaries are cradle to gate with options (A1-A5, B, C + D), serving for type (b) EPD. Most data used in A1-A3 modules were collected from the production factory and its upstream suppliers. Data relevant to the production are average values for the production situation in the whole calendar year 2023. The production factory treats air emission to meet the requirements of discharging after treatment. No wastewater was generated during the manufacturing processes in the factory.

A4 is included in the system boundary with practical transportation information. The products are 100% shipped to Germany, among which 90% was installed in, used and disposed in Germany, and the other 10% was distributed to Netherlands (2%), the United Kingdom (2%), Latvia (2%), Scandinavia (4%).

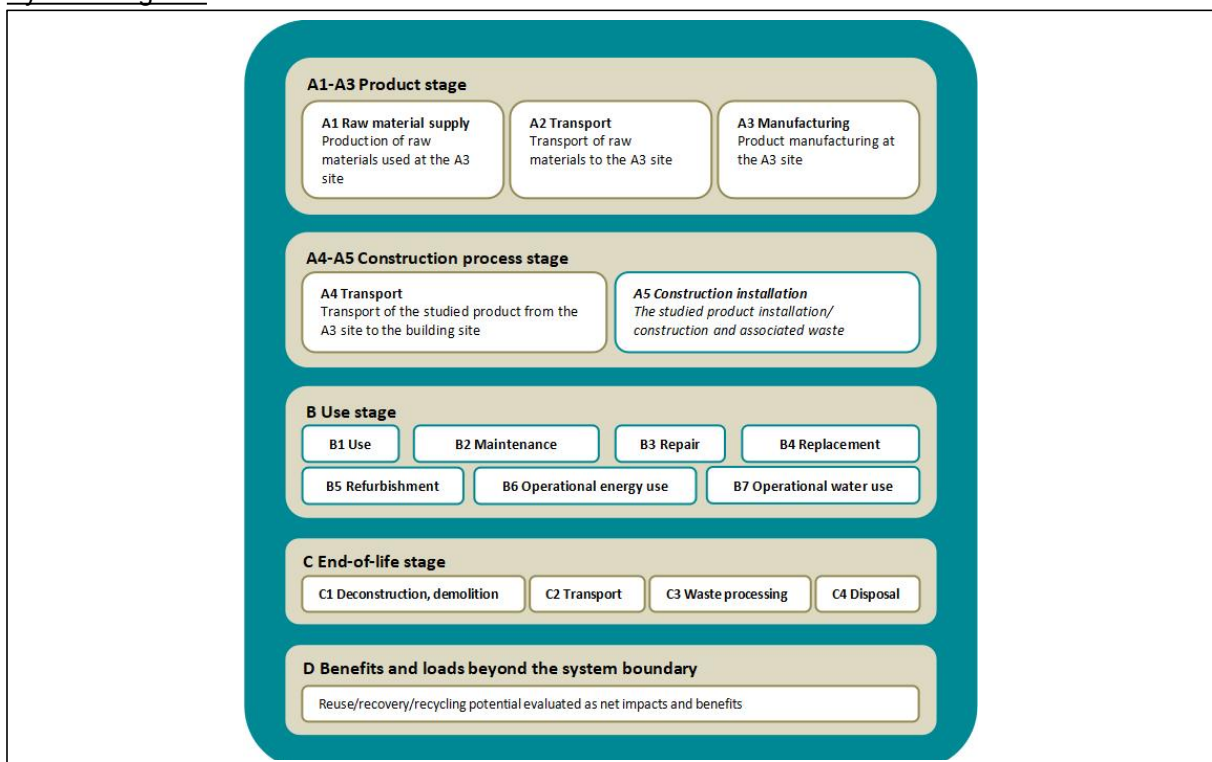
In regard to the A5 phase, the installation of products requires small consumption of PE film, PE foam and electricity. According to Koczwar, usually there is no water use, but there is assumed to be 5% product loss in this stage. Also, according to the information provided by Koczwar, the product packaging is assumed to become waste in this stage and is treated to the end-of-waste state.

In module B, the products in this study consume water, detergent and rag (cotton cloth) for cleaning, and does not generate emission or consume energy during the whole use phase. Therefore, the environmental burdens from the Module B were calculated with primary data provided by the client. According to EN 15804, cleaning activity and waste use for cleaning shall be included in Module B2.

According to Koczwar, the product will be deconstructed manually without consuming any materials or energy, so the environmental burdens from the Module C1 is deemed to be zero. For C2 module, conservative assumptions were made. For the waste processing C3 module, the wasted product is assumed to be separated manually into wood part (oak veneer and poplar back board) which will be sent to incineration plant for energy recovery and inorganic mineral part (straw substrate) which will be sent to landfill according to the client, so the environmental impact of waste processing C3 module and waste disposal C4 accordingly. And the environmental impact of D module was calculated based on electricity and heat recovery from C3. No mass loss is assumed to happen in modules C and D.

Note that the scenarios included are currently in use and are representative for one of the most probable alternatives. Additional declaration of representative mixes for the relevant region is permissible.

System diagram:



Manufacturing processes:

The straw floor products are produced in the production factory, Fujian Province, China, with the same production process. The flow chart below introduces the production process briefly.



Figure 2 The main production process of the studied products.

The main raw materials for producing the products in this study include top veneer, straw substrate, poplar back board, adhesive, UV paint, and small amount of putty (epoxy resin) and wax. And the straw substrate bought from upstream supplier is made of straw, Magnesium oxide (MgO), Magnesium sulphate (MgSO₄), sulfates, water, and citric acid (CA). The bought straw substrate and poplar back layer will firstly be cut to the right size after entering the gate of the production factory, and then pasted and cold pressed with the veneer on top. The product will then be sanded and then coated with a protection layer before packaging. The energy source consumed during manufacturing include electricity (for manufacturing machine) and diesel (for forklift). The main waste generated from

the manufacturing process is product scrap and waste abrasive band. The product scrap was sold and the waste abrasive band was sent to landfill.

China is relatively large, and the electricity generation structure varies from province to province, so the electricity data for China requires the use of a sub-national electricity mix according to the PCR requirements. Therefore, the electricity datasets used is from the Sphera Managed LCA Content 2023.1 Databases based on sub-national electricity grid composition from the China electric power yearbook 2022.

The studied products were produced in Fujian province, China. According to the China electric power yearbook 2022, the electricity grid of Fujian province consists of 58.10% electricity from hard coal, 9.35% electricity from hydro power, 26.51% electricity from nuclear power, 5.19% electricity from wind power, and 0.85% electricity from solar power. So in this LCA study, a model was made with datasets CN: Electricity from hard coal, CN: Electricity from hydro power, CN: Electricity from nuclear, CN: Electricity from wind power, and CN: Electricity from photovoltaic (reference year 2019-2025) in Gabi to calculate the environmental impact of the electricity consumed in Fujian Province with specific electricity source portion. Note that the Guarantees of Origin market in China represents an extremely small proportion of production and consumption, and therefore the consumption mix is effectively the same as the residual mix.

Table 5 lists the energy source behind the electricity consumption mix of Fujian Province, China and its climate impact using the indicator of GWP-GHG.

Table 5. Electricity structure of the Fujian province and the datasets chosen for it

Electricity generation sources	Dataset used in the model	GWP-GHG (CO ₂ eq./kWh)	Percentage in Fujian province
Electricity from fossil fuel ⁽¹⁾	CN: Electricity from hard coal Sphera	1.11	58.10%
Electricity from hydro power	CN: Electricity from hydro power Sphera	0.00745	9.35%
Electricity from nuclear power	CN: Electricity from nuclear power Sphera	0.00446	26.51%
Electricity from wind power	CN: Electricity from wind power Sphera	0.0171	5.19%
Electricity from photovoltaic	CN: Electricity from photovoltaic Sphera	0.0288	0.85%

- (1) In the 2022 China Electricity Yearbook, the percentage of electricity from fossil fuel for each province is not specified. A brief description of electricity from fossil fuel for the whole country is given in the yearbook, i.e. it covers coal, gas, oil, biomass, and a small amount of unidentified sources for generating electricity. Based on the information in the yearbook, i.e., electricity from hard coal accounts for more than 80% of the thermal power generation types, and considering that China is a country where coal-fired power generation is the main source of thermal power generation, the LCA practitioner (IVL) decided to use electricity from hard coal as 100% of the dataset selection for electricity from fossil fuel in this study for modelling.

The GWP-GHG of electricity mix is 0.65 kg CO₂ eq./kWh for Fujian province.

The transportation of waste generated in A3 is also considered in the study. The end-of-waste state criteria is correctly applied in waste treatment from A3 stage. The waste from A3 includes product scrap which was sold to third party as co-product and waste abrasive band which was sent to landfill, so the transport and treatment of waste auxiliary materials were considered in this study. For the scrap, sawdust, this study does not consider its burden and treats it as recyclable waste because the allocation portion for sawdust is lower than 1%.

Allocation:

Allocation rules for co-products are mentioned in the PCR. In the studied system, there were co-products produced along with the studied products, which is sawdust from the manufacturing process. The sawdust was then sold for money. According to Koczwar, to produce one declared unit of representative product, 1.448 kg sawdust was generated. The declared unit product accounts for 99.90% of the total revenue of this product system. After communication with the client, no co-product

allocation was applied in this study even though allocation is allowed in EPDs, i.e. all burdens are allocated to the final studied products.

During data collection, allocation according to physical properties were applied. To specify, the energy use, auxiliary materials consumption, and waste generation for per declared unit of the product is calculated by dividing the total amount of these values by the yield amount of all products. For the allocation of waste, this study strictly follows the PCR. Specifically, the waste allocation is based on the polluter pays principle. For environmental burden from the waste generated from the manufacturing process, it is allocated to the studied product. For the environmental burden of the end-of-life stage, it is allocated to the studied product.

Cut-off:

The cut-off criteria established by the PCR is that data for elementary flows to and from the product system contributing to a minimum of 95% of the declared environmental impacts shall be included (not including processes that are explicitly outside the system boundary).

This study strictly follows the cut-off rules. The cut-off rule is only applied to two small amount of auxiliary materials, i.e., saw blade and activated carbon. Because the total amount of those cut-off materials is around 0.003% in mass and no high emission material is used for those materials, the impact of cut-off materials is estimated below 5%.

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X ⁽¹⁾	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	CN	CN	CN	CN to EUR	EUR	EUR	EUR	EUR	EUR	EUR	EUR	EUR	EUR	EUR	EUR	EUR	EUR
Share of specific data	29%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	16%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

(1) Modules included in the EPD (X) and the modules not declared (ND).

For this EPD project, the infrastructure and capital goods are not included since they are used many times for several years for the product manufacturing.

All results in this report are calculated by the EN 15804+A2. The “EN 15804 reference package” is calculated based on EF 3.1.

Results of the environmental performance indicators

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks. In the table below, marked with an asterisk, results of the following environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator: Abiotic depletion potential for non-fossil resources (ADP-minerals & metals), Abiotic depletion potential for fossil resources (ADP-fossil), Water (user) deprivation potential, deprivation-weighted, water consumption (WDP).

Mandatory impact category indicators according to EN 15804

Results per 1 m ² *11 mm of the straw floor product																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	2.38E+01	4.89E+00	4.80E-01	0.00E+00	1.41E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.45E-02	4.86E-02	1.51E-01	-8.16E-01
GWP-biogenic	kg CO ₂ eq.	-7.13E+00	0.00E+00	7.20E-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	7.68E-04	4.41E+00	2.03E+00	-5.35E-03
GWP-luluc	kg CO ₂ eq.	2.45E-01	8.49E-03	3.07E-04	0.00E+00	3.66E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.87E-04	1.12E-05	4.76E-04	-9.53E-05
GWP-total	kg CO ₂ eq.	1.69E+01	4.90E+00	1.20E+00	0.00E+00	1.41E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.60E-02	4.46E+00	2.18E+00	-8.21E-01
ODP	kg CFC 11 eq.	1.78E-07	2.84E-13	4.73E-09	0.00E+00	1.32E-14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.07E-17	2.84E-13	3.90E-13	-6.33E-12
AP	mol H ⁺ eq.	8.93E-02	7.64E-02	2.23E-03	0.00E+00	9.93E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.41E-05	4.70E-04	1.09E-03	-1.53E-03
EP-freshwater	kg P eq.	2.70E-03	3.85E-06	7.94E-05	0.00E+00	8.62E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.49E-07	8.03E-08	3.09E-07	-3.83E-06
EP-marine	kg N eq.	1.86E-02	3.87E-02	4.36E-04	0.00E+00	3.42E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.13E-05	1.35E-04	2.81E-04	-4.53E-04
EP-terrestrial	mol N eq.	1.82E-01	4.24E-01	4.77E-03	0.00E+00	3.41E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.78E-04	1.95E-03	3.09E-03	-4.70E-03
POCP	kg NMVOC eq.	5.86E-02	1.03E-01	2.70E-03	0.00E+00	6.15E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.06E-05	3.71E-04	8.48E-04	-1.18E-03
ADP-minerals&metals*	kg Sb eq.	3.49E-05	1.18E-07	7.06E-07	0.00E+00	1.26E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.42E-09	2.66E-09	7.09E-09	-8.58E-08
ADP-fossil*	MJ	2.17E+02	6.66E+01	1.20E+01	0.00E+00	2.16E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.12E+00	7.19E-01	2.04E+00	-1.28E+01
WDP*	m ³	4.31E+00	1.56E-02	4.77E-01	0.00E+00	1.34E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.29E-04	3.15E-01	1.68E-02	-1.10E-01
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption															

Additional mandatory and voluntary impact category indicators

Results per 1 m²*11 mm of the straw floor product

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG ¹	kg CO ₂ eq.	2.37E+01	4.89E+00	5.24E-01	0.00E+00	1.39E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.45E-02	4.85E-02	1.51E-01	-8.18E-01

Resource use indicators

Results per 1 m²*11 mm of the straw floor product

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	1.30E+02	9.87E-01	4.39E-01	0.00E+00	1.70E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.23E-02	1.79E-01	3.33E-01	-8.10E+00
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	0.00E+00	0.00E+00
PERT	MJ	1.30E+02	9.87E-01	4.39E-01	0.00E+00	1.70E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.23E-02	1.79E-01	3.33E-01	-8.10E+00
PENRE	MJ	2.17E+02	6.68E+01	1.20E+01	0.00E+00	2.16E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.12E+00	7.20E-01	2.04E+00	-1.28E+01
PENRM	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	0.00E+00	0.00E+00
PENRT	MJ	2.17E+02	6.68E+01	1.20E+01	0.00E+00	2.16E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.12E+00	7.20E-01	2.04E+00	-1.28E+01
SM	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	0.00E+00	0.00E+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	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	0.00E+00	0.00E+00	0.00E+00
FW	m ³	1.02E-01	1.16E-03	1.10E-02	0.00E+00	3.11E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.14E-05	7.41E-03	5.16E-04	-3.03E-03

Acronyms 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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

Waste indicators

Results per 1 m²*11 mm of the straw floor product

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
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¹ This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO₂ is set to zero.

Hazardous waste disposed	kg	- 7.53E-10	8.19E-10	- 1.19E-10	0.00E+00	6.01E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.64E-11	1.63E-11	4.45E-11	1.25E-10
Non-hazardous waste disposed	kg	3.83E-02	6.86E-03	8.08E-02	0.00E+00	5.37E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.66E-04	5.64E-02	1.02E+01	- 2.50E-02
Radioactive waste disposed	kg	2.98E-03	7.68E-05	1.48E-05	0.00E+00	2.69E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.35E-06	4.07E-05	2.33E-05	- 1.21E-03

Output flow indicators

Results per 1 m ² *11 mm of the straw floor product																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	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	0.00E+00	0.00E+00
Material for recycling	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	0.00E+00	0.00E+00
Materials for energy recovery	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	0.00E+00	0.00E+00
Exported energy, electricity	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	0.00E+00	0.00E+00
Exported energy, thermal	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	0.00E+00	0.00E+00

Additional environmental information

This EPD provides results for the representative product (1 m²*11 mm of the straw floor product), which are used to represent the group of straw floor products. The range of results for all products within this group are provided in the table below.

Variation between the representative product and other products in this EPD

LCA result of one declared unit product (A-C)	Min 1m2*10mm	Representative 1m2*11mm	Max 1m2*13mm	Differ Min	Differ Max
1. Environmental impact indicators					
00 Global warming potential (GWP-GHG) [kg CO ₂ eq.]	2.69E+01	2.95E+01	3.44E+01	9%	15%
01 EN15804+A2 Climate Change - total [kg CO ₂ eq.]	2.73E+01	2.98E+01	3.49E+01	9%	16%
02 EN15804+A2 Climate Change, fossil [kg CO ₂ eq.]	2.70E+01	2.95E+01	3.46E+01	9%	16%
03 EN15804+A2 Climate Change, biogenic [kg CO ₂ eq.]	2.33E-02	2.54E-02	2.95E-02	8%	15%
04 EN15804+A2 Climate Change, land use and land use change [kg CO ₂ eq.]	2.31E-01	2.55E-01	3.01E-01	10%	17%
05 EN15804+A2 Ozone depletion [kg CFC-11 eq.]	1.66E-07	1.82E-07	2.16E-07	10%	17%
06 EN15804+A2 Acidification [Mole of H ⁺ eq.]	1.56E-01	1.71E-01	2.00E-01	9%	16%
07 EN15804+A2 Eutrophication, freshwater [kg P eq.]	2.54E-03	2.79E-03	3.30E-03	10%	17%
08 EN15804+A2 Eutrophication, marine [kg N eq.]	5.33E-02	5.84E-02	6.88E-02	9%	16%
09 EN15804+A2 Eutrophication, terrestrial [Mole of N eq.]	5.65E-01	6.19E-01	7.29E-01	9%	16%
10 EN15804+A2 Photochemical ozone formation, human health [kg NMVOC eq.]	1.51E-01	1.66E-01	1.95E-01	9%	16%
11 EN15804+A2 Resource use, mineral and metals [kg Sb eq.]	3.26E-05	3.59E-05	4.24E-05	10%	17%
12 EN15804+A2 Resource use, fossils [MJ]	2.76E+02	3.01E+02	3.52E+02	9%	15%
13 EN15804+A2 Water use [m ³ world equiv.]	5.93E+00	6.48E+00	7.57E+00	9%	16%
2. Input flows and waste categories					
01 EN15804+A2 Use of renewable primary energy (PERE) [MJ]	1.22E+02	1.34E+02	1.58E+02	9%	16%
02 EN15804+A2 Primary energy resources used as raw materials (PERM) [MJ]	0.00E+00	0.00E+00	0.00E+00		
03 EN15804+A2 Total use of renewable primary energy resources (PERT) [MJ]	1.22E+02	1.34E+02	1.58E+02	9%	16%
04 EN15804+A2 Use of non-renewable primary energy (PENRE) [MJ]	2.77E+02	3.02E+02	3.52E+02	9%	15%
05 EN15804+A2 Non-renewable primary energy resources used as raw materials (PENRM)	0.00E+00	0.00E+00	0.00E+00		
06 EN15804+A2 Total use of non-renewable primary energy resources (PENRT) [MJ]	2.77E+02	3.02E+02	3.52E+02	9%	15%
07 EN15804+A2 Input of secondary material (SM) [kg]	0.00E+00	0.00E+00	0.00E+00		
08 EN15804+A2 Use of renewable secondary fuels (RSF) [MJ]	0.00E+00	0.00E+00	0.00E+00		
09 EN15804+A2 Use of non renewable secondary fuels (NRSF) [MJ]	0.00E+00	0.00E+00	0.00E+00		
10 EN15804+A2 Use of net fresh water (FW) [m ³]	1.40E-01	1.53E-01	1.79E-01	9%	16%
3. Output flows and waste categories					
01 EN15804+A2 Hazardous waste disposed (HWD) [kg]	5.47E-06	6.01E-06	7.11E-06	10%	17%
02 EN15804+A2 Non-hazardous waste disposed (NHWD) [kg]	9.46E+00	1.04E+01	1.23E+01	10%	17%
03 EN15804+A2 Radioactive waste disposed (RWD) [kg]	3.12E-03	3.17E-03	3.25E-03	1%	3%
04 EN15804+A2 Components for re-use (CRU) [kg]	0.00E+00	0.00E+00	0.00E+00		
05 EN15804+A2 Materials for Recycling (MFR) [kg]	0.00E+00	0.00E+00	0.00E+00		
06 EN15804+A2 Material for Energy Recovery (MER) [kg]	0.00E+00	0.00E+00	0.00E+00		
07 EN15804+A2 Exported electrical energy (EEE) [MJ]	0.00E+00	0.00E+00	0.00E+00		
08 EN15804+A2 Exported thermal energy (EET) [MJ]	0.00E+00	0.00E+00	0.00E+00		
4. Summary of environmental impacts					
LCA result of one declared unit product (A1-A3)	Min 1m2*10mm	Representative 1m2*11mm	Max 1m2*13mm	Differ-Min	Differ-Max
00 Global warming potential (GWP-GHG) [kg CO ₂ eq.] (A1-A3)	2.17E+01	2.37E+01	2.77E+01	9%	16%

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