Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

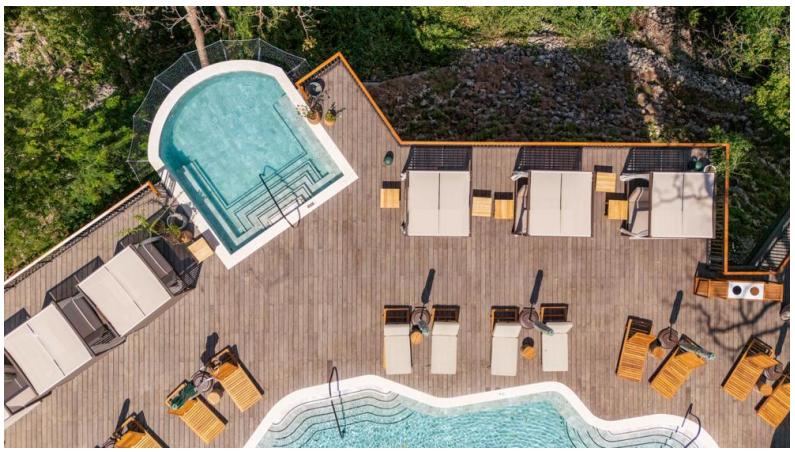
dassoXTR and dassoCTECH bamboo decking

from

Zhejiang Daocheng Bamboo Industry Co., Ltd.

Programme:	The International EPD System, www.environdec.com
Programme operator:	EPD International AB
Type of EPD:	EPD of multiple products, based on the average results of the product groups
EPD registration number:	EPD-IES-0025793:002
Version date:	2025-09-15
Validity date:	2030-09-14
	An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see www.environdec.com

dassoCTECH & dassoXTR (Product)



dassoCTECH (Application)

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
E-mail:	support@environdec.com

Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): ***CONSTRUCTION PRODUCTS, PCR 2019:14, VERSION 2.0.1*** ***UN CPC code: 3145 Plywood, veneer panels and similar laminated wood of bamboo***
PCR review was conducted by: ***The Technical Committee of the International EPD System.*** ***A full list of members is available on www.environdec.com.*** ***The review panel may be contacted via support@environdec.com.*** ***Review Chair: Rob Roewette, Noa Meron***

Third-party Verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ **Individual EPD verification without a pre-verified LCA/EPD tool** Third-party verifier: *Vito D'Incognito* Approved by: International EPD System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

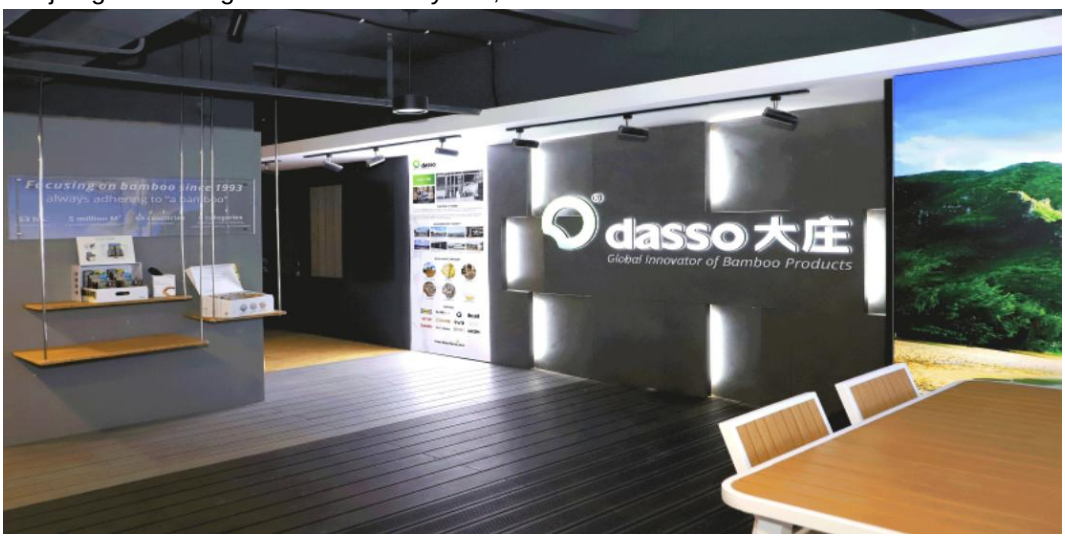
The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit 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 identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison.
For further information about comparability, see EN 15804 and ISO 14025.

INFORMATION ABOUT EPD OWNER

Owner of the EPD:

Zhejiang Daocheng Bamboo Industry Co., Ltd.



Address:

No.102 Youcheqiao, Xinhe Village, Linpu Town, Xiaoshan District, Hangzhou, P.R. China

Contact:

Contact person: Tony Wang
Tel: +86-13732291391
E-mail: tonywong@hzdasuo.com

Address and contact information of the LCA practitioner commissioned by the EPD owner, if applicable:

Muyuan Tang & Jiliu Wu, CIRS Group, 11F Building 1, Dongguan Hi-Tech Park, 288 Qiuyi Road, Binjiang District, Hangzhou 310052, China

Description of the organisation:

Zhejiang Daocheng Bamboo Industry Co., Ltd. is a subsidiary company of dasso group, mainly responsible for the market sales of bamboo products.
Jiangxi Zhushang Bamboo Industry Co., Ltd. is also a subsidiary company of dasso group, mainly responsible for the manufacturing of bamboo products.
dasso group, founded in 1993, is one of the global leader and innovator of the bamboo industry. After decades of development, dasso now have 8 manufacturing facilities and over 1000 employees. dasso has always pursued the advanced crafts, technology and automated manufacturing equipment; dasso aimed to united the talented people to develop the efficient management system for production and quality control, which enable dasso to provide the bamboo products with superior quality and become powerful integrated solution provider for bamboo products. dasso offers dassoFLOORING, dassoELEMENTS, dassoXTR, and dassoCTECH as regular product range.

Product-related or management system-related certifications:

The manufacturing factory Jiangxi Zhushang Bamboo Industry Co., Ltd. has obtained ISO 9001, ISO 14001, ISO 50001 certification.

PRODUCT INFORMATION

Product name:

dassoXTR and dassoCTECH, the results declared are the weighted-average results of the included products based on the production volumes.
dassoXTR and dassoCTECH are natural product, it appearance may vary in grains and colours. The XTR boards originally have a dark brown colour and the CTECH in Cognac, both will lighten up over several weeks or months. The product can be applied in scenarios involving building materials such as floors, walls, ceilings, etc.

Product identification:

	dassoCTECH	dassoXTR
Density	1100-1300 kg/m^3	1050-1200 kg/m^3
Thickness	18, 20 mm	20 mm
Moisture Content	8%-12%	10%-14%
Hardness	79.2N/mm^2(DIN EN 1534)	106.8N/mm^2(DIN EN 1534)
Reaction to Fire	Bs1-d0 (DIN EN 13501-1:2019)	Bs1-d0 (DIN EN 13501-1:2019)
Static Bending Strength	73.8 N/mm^2 (DIN EN408)	74.4 N/mm^2 (DIN EN408)
Modulus of Elasticity	16,700 N/mm^2 (DIN EN 408)	19,100 N/mm^2 (DIN EN 408)
Termite Resistance Level	DC D(EN117)	DC M(EN117)
Biological Durability	Class 1 (EN350:2016)	Class 1 (EN350:2016)
Slip Resistance (flat)	19°Classification B (DIN 51097)	23°Classification B (DIN 51097)
Slip Resistance (reed)	22°Classification B (DIN 51097)	25°Classification C (DIN 51097)
Thickness of Swelling Rate	4% (DIN EN 15534-1)	4.6 % (DIN EN 15534-1)
Width of Swelling Rate	0.6 % (DIN EN 15534-1)	0.6 % (DIN EN 15534-1)

Visual representation of the product:

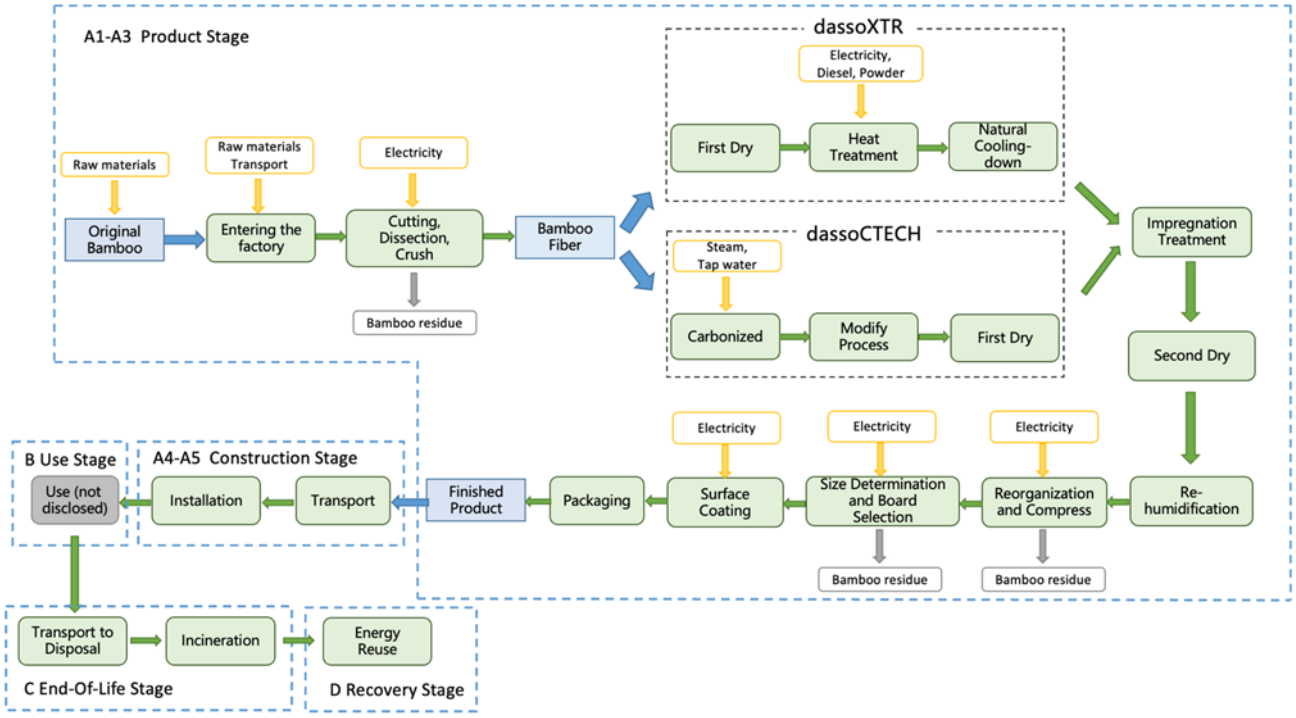
dassoCTECH & dassoXTR

UN CPC code:

3145 Plywood, veneer panels and similar laminated wood of bamboo

Product description:

dassoCTECH is crystalized the fibers with CeramiX particles, impregnated it with phenolic resin, then compressed to form Fused Bamboo.
dassoXTR patented fusion process extracts the sugars and starches from the bamboo fibers and replaces it with phenolic resins. Then the impregnated fibers are compressed to create a very hard, dense and durable Fused Bamboo that prevents bacteria, fungus and other micro-organisms from attacking dassoXTR.



The manufacturing process of dassoXTR and dassoCTECH is shown in the figure. The two products share the same processing flow from original bamboo to bamboo fiber, which including cutting, thickness selection, dissection and crush.
Then dassoXTR will undergo a high-temperature heat treatment and natural cooling-down. Differently, dassoCTECH will undergo a relatively low-temperature heat treatment to be carbonized. The carbonized bamboo fiber will next be crystalized with CeramiX particles.
After different process flows, the modified bamboo fibers will be impregnated with phenolic resin, and then reorganized and compressed. After the bamboo board selection and precision machining, the products will be painted and packed.

Name and location of production site(s):

Jiangxi Zhushang Bamboo Industry Co., Ltd., Zixi County, Fuzhou City, Jiangxi Province, China

References to any relevant websites for more information or explanatory materials, if applicable.

https://www.dassogroup.com/

CONTENT DECLARATION

The mass (weight) of one unit of a product, as purchased or per declared unit:

The declared unit is defined as 1 kg of products (the weighted-average results of dassoXTR and dassoCTECH based on production volumes).
In this study, each 1 kg dassoXTR refers to the products with an area of approximately 0.0435 m2, a density of 1150 kg/m3, and a thickness of 20 mm.
Each 1kg dassoCTECH refers to the products with an area of approximately 0.0417 m2, a density of 1200 kg/m3, a thickness of 20 mm, or an area of approximately 0.0463 m2, a density of 1200 kg/m3, a thickness of 18 mm.
The production volumes ratio of dassoXTR and dassoCTECH is 0.7% vs 99.3%.

The average content of products is shown as a list of materials and substances in the table below. The mass percentage and the declared share of biogenic/recycled materials is also described.

Product content	Mass, %	Post-consumer recycled material, mass-% of product	Biogenic material, mass-% of product	Biogenic material, kg C/product or declared unit
Bamboo tubes	87%	0	87%	0.435
Adhesive (phenolic resin)	12-13%	0	0	0
Paint	0-1%	0	0	0
Others	0-1%	0	0	0
TOTAL	100%	0	87%	0.435

According to the test report of dassoCTECH, the test results of SVHC are ≤ 0.1% (w/w) in the articles of the submitted sample. SVHC screening is performed according to 201 substances in Candidate List of Substances of SVHC for authorization published by ECHA regarding Regulation (EC) No 1907/2006 concerning the REACH.

The average mass and the content of distribution and/or consumer packaging:

Packaging materials	Mass, kg	Mass-% (versus the product)	Biogenic material, kg C/product or declared unit
Wrapping film	0.0004425	0.04425%	0
Pallet	0.0059954	0.59954%	0.0029977
Packing paper	0.0031662	0.31662%	0.0015831
TOTAL	0.0096041	0.96041%	0.0045808

1 kg biogenic carbon in the product/packaging is equivalent to the uptake of 44/12 kg of CO_2.

LCA INFORMATION

Declared unit:

The declared unit is defined as 1 kg of products (the weighted-average results of dassoXTR and dassoCTECH based on production volumes).

Reference service life:

25 years.

Time representativeness:

Site production data for the complete year 2024.

Geographical scope:

The main upstream raw materials (i.e. bamboo tubes) for dassoXTR and dassoCTECH are supplied by suppliers from Jiangxi Province and Zhejiang Province, China.
Manufacturing site of dassoXTR and dassoCTECH is located in Zixi County, Fuzhou City, Jiangxi Province, China.
The final product will be transported to Europe for installation and subsequent use.

Database(s) and LCA software used:

ecoinvent Database, Version 3.11
SimaPro Software, Version 10.2.0

Description of system boundaries:

The system boundary considered in this LCA study is “cradle to gate with options, modules C1-C4, module D with optional modules (A1-A3 + C + D + A4-A5)”, except use phase.

Declaration of sources and share of primary data of dassoCTECH:

LCA stage	Source type	Data source	Reference Year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Raw materials	Database	Ecoinvent v3.11	2024	Primary, Proxy *	62.36%
Manufacturing of products	Database	Ecoinvent v3.11	2024	Primary	29.95%
Transportation of raw materials	Database	Ecoinvent v3.11	2024	Primary	7.33%
Total share of primary data, of GWP-GHG results for A1-A3					99.64%

* proxy data is used in raw materials stage for manufacturing of paint and modified reagent (CeramiX) in the study.

Data quality description:

Data Collection	1/1/2024 - 31/12/2024
Site used	Jiangxi Zhushang Bamboo Industry Co., Ltd. in Jiangxi, China owned by dasso Group
Geography	Manufacturing site of dassoXTR and dassoCTECH is located in Zixi County, Fuzhou City, Jiangxi Province, China. The final product will be sold to Europe for installation and subsequent use.
Technology	dassoCTECH is crystalized the fibers with CeramiX particles, impregnated it with phenolic resin, then compressed to form Fused Bamboo. dassoXTR patented fusion process extracts the sugars and starches from the bamboo fibers and replaces it with phenolic resins.
Time	The activity data is from the full year data of 2024, and the emission factors are from the ecoinvent v3.11.
Averaging	Production weighted average covering 100 % of production by the site.
LCA database	ecoinvent Database, Version 3.11
Data Quality Scheme	EN 15804:2012+A2:2019, Annex E, Table E.2
Data quality description	All data is good on the dimension of temporal representativeness since the data are not older than 3 years. All the raw materials and energy consumption data are sufficiently representative for geography stated in the location. Over 90% data are technically fair, they are very similar to what described in the metadata.
Use of poor data	The data for modified reagent used proxies, which is technically poor. It has less than 1% impact of GWP and other indicators.

More information:

Product stage (A1-A3):

- The main raw materials for producing dassoCTECH are bamboo tubes, adhesive, paint and modified reagent. Due to enterprise requirements, the composition of the modified reagent is not disclosed.
- The transport of raw materials (module A2) were considered. EURO3 category diesel vehicles in different lorry sizes and small electric trucks were chosen in this study.
- The production of packaging materials, energy use, waste treatment and the transport of waste are considered in module A3.

Construction process stage (A4-A5):

- Module A4 includes the transportation of products to the building site. The transportation of products and packaging from the factory to domestic ports, then to European ports and to downstream European clients is included in the calculation.
- The disposal of wasted packaging materials and the transportation from project sites to waste treatment plants are included in module A5.
- There'll be about 4% of wasted products generating during the installation, the disposal of it is considered in module A5.
- The installation of bamboo products and accessories is done using electric screwdrivers, the electricity usage is included in module A5.

End-of-life Stage (C1-C4):

- For the end-of-life stage, due to lack of information regarding demolition/deconstruction operations, the default data for module C1 in PCR section 4.8.4 will be used in the study. The energy carrier of the process of demolition/deconstruction of wood is diesel, and the quantity is set as 1.1 kWh/tonne.
- Due to the lack of actual data on abandoned European bamboo buildings, the end-of-life disposal of buildings is based on reasonable assumptions. All bamboo products are non-recyclable and are processed by direct incineration. And 130 km transportation distance (C2) was assumed according to the PCR. All the steel accessories can be recycled and reused.
- According to the PCR, if the energy efficiency of incineration is higher than 65%, the incineration process is an energy recovery process and shall be assigned to C3. Previous literature has found that the energy loss of bamboo particles during combustion is only about 10%, so the incineration process was assigned to C3, and C4 was set to be zero.

Resource recovery stage beyond the system boundaries (D):

- Assuming that 90% of the energy generated from the incineration of wasted products in C3 is converted into effective energy that can be used for heat or electricity, and the low calorific value of bamboo combustion is defined as 17.68 MJ/kg referring to earlier research.
- Since steel accessories can be recycled, the positive environmental benefits generated by recycling are also considered in module D.

Cut-off rules:

Raw materials that account for less than 1% of the mass of the product were allowed not to be considered in the study, including the transportation of the associated materials. The infrastructure for manufacturing was not included in the LCA, including the machine, either.

Electricity source:

As required in PCR Section 10, “If the electricity in A3 accounts for more than 30% of the total energy in stage A1 to A3, the energy sources behind the electricity grid in module A3 shall be documented in the EPD and given in g CO_2e/kWh”.
LCI data for the generation of electricity used in the manufacturing stage is from ecoinvent v3.11.

Stage	National electricity grid	Unit	Value
Manufacturing	Market group for electricity, low voltage, Central China Grid (ecoinvent v3.11)	kg CO2 eq / kWh	0.865

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	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	CN	CN	CN	EU	EU	-	-	-	-	-	-	-	EU	EU	EU	EU	EU
Specific data used	>90%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	Yes, ±6%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	N/A					-	-	-	-	-	-	-	-	-	-	-	-

ENVIRONMENTAL PERFORMANCE

LCA results of the product(s) - main environmental performance results

Mandatory impact category indicators according to EN 15804

	Results per functional or declared unit											
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	1.50E+00	1.76E-01	7.19E-01	2.40E+00	9.76E-01	4.61E-03	1.42E-04	7.13E-02	1.47E-02	0.00E+00	-1.28E-01
GWP-biogenic	kg CO_2 eq.	-2.78E+00	5.79E-05	1.14E+00	-1.64E+00	6.99E-04	7.19E-02	2.10E-08	3.32E-05	1.57E+00	0.00E+00	0.00E+00
GWP-luluc	kg CO_2 eq.	3.88E-03	7.91E-05	6.91E-04	4.65E-03	4.58E-04	1.29E-06	1.09E-08	2.66E-05	4.09E-06	0.00E+00	-1.48E-04
GWP-total	kg CO_2 eq.	-1.27E+00	1.76E-01	1.86E+00	7.68E-01	9.77E-01	7.65E-02	1.42E-04	7.14E-02	1.58E+00	0.00E+00	-1.28E-01
ODP	kg CFC 11 eq.	2.55E-08	2.34E-09	6.93E-09	3.48E-08	1.65E-08	7.02E-11	1.94E-12	1.56E-09	1.66E-10	0.00E+00	-1.09E-09
AP	mol H^+ eq.	6.31E-03	1.01E-03	4.11E-03	1.14E-02	1.11E-02	2.28E-05	3.33E-07	3.72E-04	1.55E-04	0.00E+00	-6.96E-04
EP-freshwater	kg P eq.	4.15E-04	1.92E-05	2.10E-04	6.44E-04	8.74E-05	5.82E-07	3.58E-09	5.83E-06	6.66E-06	0.00E+00	-1.14E-04
EP-marine	kg N eq.	1.15E-03	4.03E-04	1.03E-03	2.58E-03	3.69E-03	1.02E-05	6.36E-08	1.50E-04	8.23E-05	0.00E+00	-1.33E-04
EP-terrestrial	mol N eq.	1.29E-02	4.40E-03	9.75E-03	2.70E-02	4.05E-02	1.06E-04	7.20E-07	1.64E-03	7.90E-04	0.00E+00	-1.36E-03
POCP	kg NMVOC eq.	5.80E-03	1.42E-03	2.56E-03	9.78E-03	1.17E-02	3.16E-05	4.60E-07	5.38E-04	1.98E-04	0.00E+00	-4.29E-04
ADP-minerals&metals*	kg Sb eq.	1.44E-05	5.17E-07	3.31E-06	1.82E-05	3.94E-06	1.44E-08	8.11E-11	3.30E-07	2.59E-08	0.00E+00	-3.00E-06
ADP-fossil*	MJ	2.91E+01	2.51E+00	7.17E+00	3.87E+01	1.28E+01	4.67E-02	1.83E-03	1.01E+00	1.32E-01	0.00E+00	-1.51E+00
WDP*	m^3	3.00E-01	1.25E-02	3.30E-01	6.42E-01	5.00E-02	5.09E-04	1.11E-05	3.98E-03	6.19E-03	0.00E+00	-3.02E-02
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 functional or declared unit												
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq.	1.51E+00	1.76E-01	7.20E-01	2.40E+00	9.76E-01	4.61E-03	1.42E-04	7.13E-02	1.47E-02	0.00E+00	-1.28E-01
PM	Disease incidence	8.63E-08	2.02E-08	6.06E-08	1.67E-07	5.54E-08	3.14E-10	2.75E-12	5.69E-09	1.75E-09	0.00E+00	-1.07E-08
IRP	kBq U235 eq.	4.38E-02	2.10E-03	5.69E-03	5.16E-02	1.16E-02	8.54E-05	5.33E-07	1.82E-03	1.51E-04	0.00E+00	-9.45E-03
ETP-fw	CTUe	4.69E+01	8.54E-01	1.19E+01	5.96E+01	4.54E+00	2.90E-02	1.88E-04	3.62E-01	2.07E-01	0.00E+00	-3.04E+00
HTP-c	CTUh	6.11E-09	1.20E-10	3.15E-10	6.55E-09	5.27E-10	4.97E-12	1.55E-14	4.94E-11	5.56E-11	0.00E+00	-3.07E-10
HTP-nc	CTUh	2.76E-08	3.86E-09	1.47E-08	4.62E-08	1.42E-08	2.56E-10	4.38E-13	1.47E-09	3.74E-09	0.00E+00	-4.76E-09
SQP	Dimension less	4.02E+01	2.11E+00	3.38E+00	4.57E+01	3.56E+00	1.82E-02	1.24E-04	4.12E-01	3.73E-02	0.00E+00	-7.09E-01

Resource use indicators

Results per functional or declared unit												
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	0.00E+00	3.32E-02	1.05E+00	1.09E+00	1.96E-01	6.70E-01	8.39E-06	2.20E-02	0.00E+00	0.00E+00	0.00E+00
PERM	MJ	2.62E+01	0.00E+00	3.07E-01	2.65E+01	0.00E+00	-6.69E-01	0.00E+00	0.00E+00	3.32E-03	0.00E+00	-3.42E-01
PERT	MJ	2.62E+01	3.32E-02	1.36E+00	2.76E+01	1.96E-01	1.10E-03	8.39E-06	2.20E-02	3.32E-03	0.00E+00	-3.42E-01
PENRE	MJ	0.00E+00	2.51E+00	6.95E+00	9.46E+00	1.28E+01	2.82E-01	1.83E-03	1.01E+00	0.00E+00	0.00E+00	0.00E+00
PENRM	MJ	2.91E+01	0.00E+00	2.20E-01	2.93E+01	0.00E+00	-2.36E-01	0.00E+00	0.00E+00	1.32E-01	0.00E+00	-1.51E+00
PENRT	MJ	2.91E+01	2.51E+00	7.17E+00	3.87E+01	1.28E+01	4.67E-02	1.83E-03	1.01E+00	1.32E-01	0.00E+00	-1.51E+00
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
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
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
FW	m^3	0.00E+00	0.00E+00	2.12E-02	2.12E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

[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 CO_2 is set to zero.

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 functional or declared unit												
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	0.00E+00	0.00E+00	1.38E-04	1.38E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-hazardous waste disposed	kg	0.00E+00	0.00E+00	1.38E-04	1.38E-04	0.00E+00	9.60E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Radioactive waste disposed	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

Output flow indicators

Results per functional or declared unit												
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**A5**	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
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
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.00E-01	9.00E-01	9.00E-01	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
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

According to section 4.10.1 of PCR, the range of the content of the included products should be included in the content declaration. The option of “declaration of the average results of the included products” is chosen in this EPD, and the calculation of this average considers the production volumes of the included product.
The differences between the declared results and the lowest and highest results of the environmental impact indicators are shown in the table below. All the results are below 10%.

Differences between the declared results and the lowest and highest results (Mandatory parameters describing environmental impacts)										
Indicators	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**
GWP-fossil	+0.02%/ -2.77%	+0.03%/ -4.88%	+0.43%/ 0.00%	+0.01%/ -1.96%	0.00%/ -0.22%	+1.30%/ -0.01%	0.00%/ 0.00%	+0.06%/ 0.00%	0.00%/ 0.00%	0.00%/ 0.00%
GWP-biogenic	+0.02%/ 0.00%	+0.03%/ -4.69%	+0.00%/ -0.05%	+0.07%/ 0.00%	0.00%/ -0.69%	+0.66%/ 0.00%	0.00%/ 0.00%	+0.06%/ 0.00%	0.00%/ 0.00%	0.00%/ 0.00%
GWP-LULUC	+0.74%/ -0.01%	+0.03%/ -4.86%	+0.36%/ 0.00%	+0.58%/ 0.00%	+0.01%/ -1.28%	+0.78%/ -0.01%	0.00%/ 0.00%	+0.06%/ 0.00%	0.00%/ 0.00%	0.00%/ 0.00%
GWP-total	+3.32%/ -0.02%	+0.03%/ -4.88%	+0.14%/ 0.00%	+0.04%/ -6.29%	0.00%/ -0.23%	+0.70%/ 0.00%	0.00%/ 0.00%	+0.06%/ 0.00%	0.00%/ 0.00%	0.00%/ 0.00%
ODP	+0.01%/ -0.94%	+0.03%/ -4.69%	+0.33%/ 0.00%	+0.01%/ -0.94%	+1.54%/ -0.01%	+0.70%/ 0.00%	0.00%/ 0.00%	+0.06%/ 0.00%	0.00%/ 0.00%	0.00%/ 0.00%
AP	+0.03%/ -4.72%	+0.03%/ -4.84%	+0.24%/ 0.00%	+0.02%/ -2.94%	0.00%/ -0.11%	+0.71%/ 0.00%	0.00%/ 0.00%	+0.06%/ 0.00%	0.00%/ 0.00%	0.00%/ 0.00%
EP-freshwater	+0.01%/ -1.86%	+0.03%/ -4.91%	+0.24%/ 0.00%	+0.01%/ -1.27%	+0.01%/ -1.66%	+0.74%/ -0.01%	0.00%/ 0.00%	+0.06%/ 0.00%	0.00%/ 0.00%	0.00%/ 0.00%
EP-marine	+0.03%/ -3.69%	+0.03%/ -4.82%	+0.21%/ 0.00%	+0.02%/ -2.32%	0.00%/ -0.04%	+0.71%/ 0.00%	0.00%/ 0.00%	+0.06%/ 0.00%	0.00%/ 0.00%	0.00%/ 0.00%
EP-terrestrial	+0.04%/ -5.08%	+0.03%/ -4.82%	+0.23%/ 0.00%	+0.02%/ -3.13%	0.00%/ -0.04%	+0.71%/ 0.00%	0.00%/ 0.00%	+0.06%/ 0.00%	0.00%/ 0.00%	0.00%/ 0.00%
POCP	+0.02%/ -2.45%	+0.03%/ -4.74%	+0.33%/ 0.00%	+0.01%/ -2.05%	0.00%/ 0.00%	+0.70%/ 0.00%	0.00%/ 0.00%	+0.06%/ 0.00%	0.00%/ 0.00%	0.00%/ 0.00%
ADP-M&M	+0.03%/ -4.11%	+0.04%/ -5.44%	+0.33%/ 0.00%	+0.02%/ -3.34%	0.00%/ -0.05%	+0.72%/ -0.01%	0.00%/ 0.00%	+0.06%/ 0.00%	0.00%/ 0.00%	0.00%/ 0.00%
ADP-fossil	+0.01%/ -1.24%	+0.03%/ -4.77%	+0.62%/ 0.00%	+0.01%/ -1.12%	0.00%/ -0.11%	+0.71%/ 0.00%	0.00%/ 0.00%	+0.06%/ 0.00%	0.00%/ 0.00%	0.00%/ 0.00%
WDP	+0.04%/ -6.00%	+0.03%/ -4.43%	+0.16%/ 0.00%	+0.02%/ -2.81%	+0.01%/ -0.84%	+0.86%/ -0.01%	0.00%/ 0.00%	+0.06%/ 0.00%	0.00%/ 0.00%	0.00%/ 0.00%

ABBREVIATIONS

Abbreviation	Definition
General Abbreviations	
EN	European Norm (Standard)
EPD	Environmental Product Declaration
EF	Environmental Footprint
GPI	General Programme Instructions
ISO	International Organization for Standardization
LCA	Life Cycle Assessment
PCR	Product Category Rules
c-PCR	Complementary Product Category Rules
CEN	European Committee for Standardization
CLC	Co-location centre
CPC	Central product classification
GHS	Globally harmonized system of classification and labelling of chemicals
GRI	Global Reporting Initiative
Environmental Impact Indicators (EN 15804)	
GHG	Greenhouse gas
GWP	Global Warming Potential (kg CO_2 eq.)
GWP-fossil	Global Warming Potential from fossil sources (kg CO_2 eq.)
GWP-biogenic	Global Warming Potential from biogenic sources (kg CO_2 eq.)
GWP-luluc	Global Warming Potential from land use and land use change (kg CO_2 eq.)
GWP-total	Total Global Warming Potential (kg CO_2 eq.)
GWP-GHG	Global Warming Potential for greenhouse gases (kg CO_2 eq.)
ODP	Ozone Depletion Potential (kg CFC-11 eq.)
AP	Acidification Potential (mol H^+ eq.)
EP	Eutrophication Potential
EP-freshwater	Freshwater eutrophication potential (kg P eq.)
EP-marine	Marine eutrophication potential (kg N eq.)
EP-terrestrial	Terrestrial eutrophication potential (mol N eq.)
POCP	Photochemical Ozone Creation Potential (kg NMVOC eq.)
ADP	Abiotic Depletion Potential
ADP-minerals&metals	Abiotic depletion potential for non-fossil resources (kg Sb eq.)
ADP-fossil	Abiotic depletion potential for fossil resources (MJ)
WDP	Water Deprivation Potential (m^3)
Resource Use Indicators	
PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials (MJ)
PERM	Use of renewable primary energy resources used as raw materials (MJ)
PERT	Total use of renewable primary energy resources (MJ)
PENRE	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (MJ)
PENRM	Use of non-renewable primary energy resources used as raw materials (MJ)
PENRT	Total use of non-renewable primary energy resources (MJ)
SM	Use of secondary material (kg)
RSF	Use of renewable secondary fuels (MJ)
NRSF	Use of non-renewable secondary fuels (MJ)
FW	Use of net fresh water (m^3)
Waste Indicators	
HW	Hazardous Waste (disposed) (kg)
NHW	Non-Hazardous Waste (disposed) (kg)
RW	Radioactive Waste (disposed) (kg)
Output Flow Indicators	
CFR	Components for Reuse (kg)
MR	Material for Recycling (kg)

MER	Materials for Energy Recovery (kg)
EEE	Exported Energy, Electricity (MJ)
EET	Exported Energy, Thermal (MJ)
Lifecycle Stages / Modules	
A1	Raw material supply
A2	Transport
A3	Manufacturing
A4	Transport to site
A5	Construction/Installation
B1	Use
B2	Maintenance
B3	Repair
B4	Replacement
B5	Refurbishment
B6	Operational energy use
B7	Operational water use
C1	Deconstruction/Demolition
C2	Transport to waste processing
C3	Waste processing
C4	Disposal
D	Reuse-Recovery-Recycling potential
Other Relevant Terms	
SVHC	Substances of Very High Concern
EC No.	European Community Number
CAS No.	Chemical Abstracts Service Number
MJ	Megajoule
kg	Kilogram
m^3	Cubic Meter
NMVOC	Non-Methane Volatile Organic Compounds
Sb eq.	Antimony Equivalents
P eq.	Phosphorus Equivalents
N eq.	Nitrogen Equivalents
CFC-11 eq.	Chlorofluorocarbon-11 Equivalents
CO_2 eq.	Carbon Dioxide Equivalents
kg C	Kilograms of Carbon
kg CO_2 eq.	Kilograms of Carbon Dioxide Equivalent
ND	Not Declared
…	

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REFERENCES

a) EPD International PCR 2019:14 Construction products v2.0.1
b) ISO 14040:2019 Environmental management - Life cycle assessment - Principles and framework
c) ISO 14044:2006+A1:2018+A2:2020(2020) Environmental management - Life cycle assessment - Requirements and guidelines
d) EN 15804:2012+A2:2019/AC: 2021, Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products.
e) General Programme Instructions for the international EPD system (v5.0.1)
f) PEFCR (2018) Product Environmental Footprint Category Rules Guidance (Version 6.3)
g) ecoinvent Database, Version 3.11
h) SimaPro Software, Version 10.2.0
i) Liu, Zhijia, et al. "Effects of carbonization conditions on properties of bamboo pellets." Renewable Energy 51.MAR. (2013):1-6

VERSION HISTORY

Data quality description revised, 2025-10-24, EPD-IES-0025793:002
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EPD
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