

Result summary

Density (EN15804)

MOSO

Calculation number:	EPD-NIBE-20210322-18246
Generation on:	14-03-2022
Issue date:	14-03-2022
Valid until:	14-03-2027
Status:	verified

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1 Density (EN15804)

1.1 COMPANY INFORMATION / DECLARATION OWNER

Manufacturer: MOSO

Production Location: Manufacturing plant CN

Address: Adam Smithweg 2, 1689 ZWZwaag

E-mail: info@moso.eu

Website: www.moso-bamboo.com

1.2 EPD INFORMATION

Calculation number: EPD-NIBE-20210322-18246

Date of issue: 14-03-2022

End of validity: 14-03-2027

Version NIBE's EPD Application: v2.0

Version database: v3.07 (2021-11-08)

PCR: EN15804+A2:2019

1.3 VERIFICATION OF THE DECLARATION

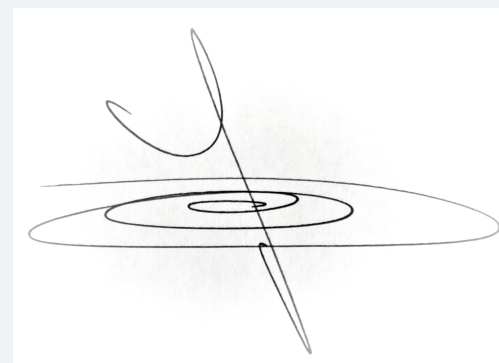
CEN standard EN 15804:2012 serves as the core PCR.

Independent verification of the declaration. according to EN ISO 14025:2010.

Internal External

I hereby confirm that, following detailed examination as independent 3rd party verifier, I have not been able to trace any relevant deviations by the report concerning bamboo products by MOSO, and by its project report from the requirements outlined in the corresponding product category regulations based on the EN 15804:2019 and as PCR, the Dutch Assessment (Determination) Method version 1.0 July 2020, including the amendments Hereby the report meets also the standards given in ISO 14040/44 and ISO 21930.

A.K. Jeeninga is recognized by NMD as verifier.



Third party verifier: Anne Kees Jeeninga, Advieslab

1.4 DECLARED UNIT

1 m3 Bamboo

1 m3 Bamboo produced in China and used for the Dutch market.

It is a semi-finished product, therefore this EPD considers Cradle to Gate with options. The following stages have been declared: A1-A4, C2-C4 and D.

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1.5 SCOPE OF DECLARATION

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

(X = included, MND = module not declared)

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1.6 PRODUCT DESCRIPTION

MOSO® High Density® products are made of rough bamboo strips, which are put in resin (phenol formaldehyde) after which, under high compression, they are cold-pressed in moulds, which are activated in ovens, to form High Density® Beams and (toplayers for) Flooring and Solid Panels. The result is an extremely hard material with a look that is hardly distinguished from tropical hardwood. It is a semi-finished material which can be applied in several indoor applications such as flooring, panelling, window frames, stairs, etc. Due to the extreme hardness it is ideally used in applications where this hardness is utilized, such as (top layers of) flooring, stairs and panels for table tops. MOSO® High Density® products consists for 95-96 % of rough strips made from the giant bamboo species "Phyllostachus Pubescens (Edulis)" from China (diameter up to 15 cm, length up to 15 meters) and about 4-5% of glue (phenol formaldehyde), and is also available with FSC certificate on request.

Dimensions

Various sizes depending on final product

Indoor emissions (formaldehyde)

Class E1 (< 0.124 mg/m³) (EN 717-1)

Hardness (Brinell)

> 9,5 kg / mm² (EN 1534)

Reaction to fire

Class C-s1-d0 (EN 13501-1)

Biogenic CO2

Density of material kg/m ³ (u=12%)	ρ	1.050
glue content	%	3,8%
carbon content	%	50,24%
Bamboo without glue kg/m ³	Pw	1.010
Density without 12% moisture content kg/m ³	$Pw \times Vw^{*1,12}$	902
kg carbon / m ³	$cf \times Pw \times Vw^{*1,12}$	453
kg CO ₂ / m ³	44/12	1.662,33

For more information see:

- <https://www.moso-bamboo.com/bamboo/how-bamboo-products-are-made/high-density-bamboo-production/>
- Technical datasheet MOSO® Solid Beam <https://www.moso-bamboo.com/product/bamboo-solid-beam/>

Substances of very high concern

The product does not contain any substances listed in the "Candidate List of Substances" of Very High Concern (SVHC) for authorisation" exceeding 0.1% of the weight of the product.

1.7 DESCRIPTION OF THE MANUFACTURING PROCESS

Rough bamboo strips are put in resin (phenol formaldehyde) after which, under high compression, they are cold-pressed in moulds, which are activated in ovens, to form High Density® Beams and (toplayers for) Flooring and Solid Panels.

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1.8 RESULTS

Environmental effects	Unit	A1	A2	A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D	Total
AP	mol H+ eqv.	1.82E+0	1.59E-1	1.07E+0	3.34E+0	3.46E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.21E-1	3.07E-1	3.91E-3	-1.93E+0	5.23E+0
GWP-total	kg CO2 eqv.	-1.32E+3	2.75E+1	1.92E+2	1.60E+2	5.01E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.09E+1	1.68E+3	8.81E+1	-6.28E+2	2.64E+2
GWP-b	kg CO2 eqv.	-1.66E+3	1.27E-2	-1.63E+1	-7.12E-2	6.58E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	9.65E-3	1.58E+3	8.74E+1	-6.87E+0	-2.28E+1
GWP-f	kg CO2 eqv.	3.41E+2	2.75E+1	2.08E+2	1.60E+2	4.94E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.09E+1	9.99E+1	6.57E-1	-6.20E+2	2.87E+2
GWP-luluc	kg CO2 eqv.	1.24E-1	1.01E-2	7.74E-2	1.70E-1	2.03E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.66E-3	2.44E-3	1.15E-4	-7.16E-1	-3.04E-1
ETP-fw	CTUe	1.06E+4	3.69E+2	5.25E+3	1.84E+3	1.02E+3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.81E+2	2.41E+2	9.78E+0	-3.67E+3	1.60E+4
PM	disease incidence	2.33E-5	2.47E-6	1.40E-5	9.21E-6	2.72E-6	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.88E-6	2.48E-6	8.24E-8	-5.02E-6	5.12E-5
EP-m	kg N eqv.	3.96E-1	5.61E-2	2.37E-1	8.56E-1	8.81E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.27E-2	1.43E-1	2.89E-3	-2.91E-1	1.53E+0
EP-fw	kg P eqv.	9.35E-3	2.77E-4	4.66E-3	1.37E-3	8.31E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.11E-4	1.82E-4	6.87E-6	-3.23E-2	-1.55E-2
EP-T	mol N eqv.	4.38E+0	6.19E-1	2.62E+0	9.50E+0	9.79E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.71E-1	1.64E+0	1.59E-2	-3.50E+0	1.67E+1
HTP-c	CTUh	9.40E-7	1.20E-8	2.29E-7	1.29E-7	8.76E-8	0.00E+0	0.00E+0	0.00E+0	0.00E+0	9.12E-9	4.00E-7	3.01E-10	-9.75E-8	1.71E-6
HTP-nc	CTUh	4.29E-6	4.04E-7	2.40E-6	1.90E-6	5.59E-7	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.07E-7	1.25E-6	1.16E-8	-2.93E-6	8.20E-6
IR	kBq U235 eqv.	5.44E+0	1.74E+0	2.11E+0	9.10E+0	1.04E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.32E+0	2.37E-1	5.53E-2	-5.69E+1	-3.59E+1
SQP	Pt	2.03E+5	3.59E+2	2.78E+4	1.01E+3	1.16E+4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.73E+2	3.13E+1	3.06E+1	-1.68E+3	2.43E+5
ODP	kg CFC 11 eqv.	1.76E-5	6.06E-6	5.06E-6	3.23E-5	3.60E-6	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.61E-6	1.16E-6	1.64E-7	-7.07E-5	-1.72E-7
POCP	kg NMVOC eqv.	1.37E+0	1.77E-1	7.31E-1	2.55E+0	2.74E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.34E-1	4.28E-1	5.77E-3	-9.53E-1	4.72E+0
ADP-f	MJ	4.65E+3	4.14E+2	2.13E+3	2.17E+3	5.00E+2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.15E+2	9.49E+1	1.20E+1	-1.14E+4	-1.11E+3
ADP-mm	kg Sb-eqv.	3.30E-3	6.96E-4	1.01E-3	3.16E-3	4.54E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	5.30E-4	5.83E-5	3.99E-6	-7.56E-4	8.46E-3

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WDP	m3 world eqv.	9.11E+1	1.48E+0	7.69E+1	7.29E+0	9.38E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.13E+0	2.69E+0	7.41E-2	-6.94E+1	1.21E+2
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AP=Acidification (AP) | **GWP-total**=Global warming potential (GWP-total) | **GWP-b**=Global warming potential - Biogenic (GWP-b) | **GWP-f**=Global warming potential - Fossil (GWP-f) | **GWP-luluc**=Global warming potential - Land use and land use change (GWP-luluc) | **ETP-fw**=Ecotoxicity, freshwater (ETP-fw) | **PM**=Particulate Matter (PM) | **EP-m**=Eutrophication marine (EP-m) | **EP-fw**=Eutrophication, freshwater (EP-fw) | **EP-T**=Eutrophication, terrestrial (EP-T) | **HTP-c**=Human toxicity, cancer (HTP-c) | **HTP-nc**=Human toxicity, non-cancer (HTP-nc) | **IR**=Ionising radiation, human health (IR) | **SQP**=Land use (SQP) | **ODP**=Ozone depletion (ODP) | **POCP**=Photochemical ozone formation - human health (POCP) | **ADP-f**=Resource use, fossils (ADP-f) | **ADP-mm**=Resource use, minerals and metals (ADP-mm) | **WDP**=Water use (WDP)

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Parameter	Unit	A1	A2	A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D	Total
PERE	MJ	2.71E+2	5.19E+0	2.17E+2	2.69E+1	2.72E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.95E+0	4.09E+0	4.60E-1	-1.10E+3	-5.40E+2
PERM	MJ	1.41E+4	0.00E+0	1.92E+3	0.00E+0	8.02E+2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.68E+4
PERT	MJ	1.44E+4	5.19E+0	2.14E+3	2.69E+1	8.30E+2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.95E+0	4.09E+0	4.60E-1	-1.13E+3	1.63E+4
PENRE	MJ	4.17E+3	4.40E+2	2.05E+3	2.31E+3	4.81E+2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.35E+2	1.02E+2	1.27E+1	-1.23E+4	-2.38E+3
PENRM	MJ	7.94E+2	0.00E+0	2.10E+2	0.00E+0	5.02E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-3.37E+0	1.05E+3
PENRT	MJ	4.96E+3	4.40E+2	2.26E+3	2.31E+3	5.32E+2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.35E+2	1.02E+2	1.27E+1	-1.23E+4	-1.33E+3
SM	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	0.00E+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	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	0.00E+0	0.00E+0
FW	M3	2.32E+0	5.05E-2	1.88E+0	2.39E-1	2.62E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.84E-2	4.73E-1	1.47E-2	-5.31E+0	-2.70E-2
HWD	Kg	2.67E-3	1.05E-3	9.95E-4	3.89E-3	5.09E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.99E-4	3.72E-4	1.48E-5	-8.59E-3	1.71E-3
NHWD	Kg	3.23E+1	2.63E+1	2.36E+1	6.58E+1	1.19E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.00E+1	7.80E+0	5.26E+1	-2.19E+1	2.18E+2
RWD	Kg	5.56E-3	2.72E-3	2.22E-3	1.44E-2	1.41E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.07E-3	2.85E-4	7.80E-5	-4.80E-2	-1.92E-2
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	0.00E+0
MFR	Kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.34E-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	1.34E-1
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	0.00E+0	0.00E+0
EET	MJ	0.00E+0	0.00E+0	-1.72E+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	-4.46E+3	-4.48E+3
EEE	MJ	0.00E+0	0.00E+0	-1.00E+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	-2.59E+3	-2.60E+3
SP	s€	s€ 0,00	s€ 0,00	s€ 0,00	s€ 0,00	s€ 0,00	s€ 0,00	s€ 0,00	s€ 0,00	s€ 0,00	s€ 0,00	s€ 0,00	s€ 0,00	s€ 0,00	s€ 0,00

PERE=renewable primary energy ex. raw materials | PERM=renewable primary energy used as raw materials | PERT=renewable primary energy total | PENRE=non-renewable primary energy ex. raw materials | PENRM=non-renewable primary energy used as raw materials | PENRT=non-renewable primary energy total | SM=use of secondary material | RSF=use of renewable secondary fuels | NRSF=use of non-renewable secondary fuels | FW=use of net fresh water | 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 | EET=Exported Energy Thermic | EEE=Exported Energy Electric

1.9 ADDITIONAL INFORMATION

Allocation

There is no allocation applied for the environmental profiles / datasets used in this LCA.