Environmental Product Declaration

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

Palm Strand Board (PSB)

EPD of multiple product: thickness range 10-45 mm, all products included

from

DesertBoard LTD

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-12052
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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
E-mail:	info@environdec.com

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 v. 1.2.5* I.S. EN 16449:2014 Wood and wood-based products – Calculation of the biogenic carbon content of wood and conversion to carbon dioxide
PCR review was conducted by: *PCR review was conducted by The Technical Committee of the International EPD® System. See www.environdec.com/TC 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: *IMQ eAmbiente S.r.l.*
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 verifier: IMQ SpA Approved by: The 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 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.

Company information

Owner of the EPD: DesertBoard LTD

Contact: info@desertboard.ae

Description of the organisation: DesertBoard is located in Kizad, Abu Dhabi and they are the world's first Palm Fronds Oriented Strand Board manufacturer. With over 56.000 m^2 of innovation, the production plant is capable of producing 2,2 million boards per year using only 15% of the abounded 500.000 tons of the UAE palm waste materials.
The company has a vision to foster a more sustainable world has led to the creation of Palm Strain Board (PSB) made out of recycled palm waste otherwise disposed in landfilled or burnt.

Product-related or management system-related certifications: DesertBoard is certified by ISO 9001:2015, ISO 14001:2015, and ISO 45001:2018, and the processes are approved by the Forest Stewardship Council, Emirates Green Building Council, and a United Nations signatory of the Global Compact initiative.

Name and location of production site(s):
DesertBoard LTD, Khalifa Industrial Zone – KP04 – Kizad, Abu Dhabi, UAE

Product information

Product name: PSB – Palm Strand Board.

Product description: PSB is an eco-friendly board and is crafted from upcycled palm waste, offering a sustainable alternative to conventional plywood. With its smooth surface and reliable strength, PSB Standard is a versatile solution for various applications in the construction industry such as structural or design applications, such as furniture, cabinets, doors, etc
The PSB analysed is a wooden board with dimensions of 1,22m x 2,44m, and with thickness range 10-45 mm

UN CPC code: 31432 - Oriented strand boards

Geographical scope: UAE, RoW/GLO for modules A1-A3; RoW/GLO for modules C1-C4.

Product identification: This EPD relates to PSB products made by DesertBoard Ltd at its production sites in Kizad, Abu Dhabi, UAE, which are supplier to global customers.

The typical material composition of DesertBoard PSB is given below:

Table 1 – PSB composition

Component	Composition (%)
Palm leaves	85,49%
Resin	5,71%
Wax emulsion	3,68%
Release agent	0,13%
Moisture (water)	5,00%

LCA information

Functional unit / declared unit: 1 m^3 of PSB. Density is 800 kg/m^3 on average.

Time representativeness: data refer to year 2022.

Database(s) and LCA software used: Ecoinvent 3.9 database, SimaPro 9.5.0.2

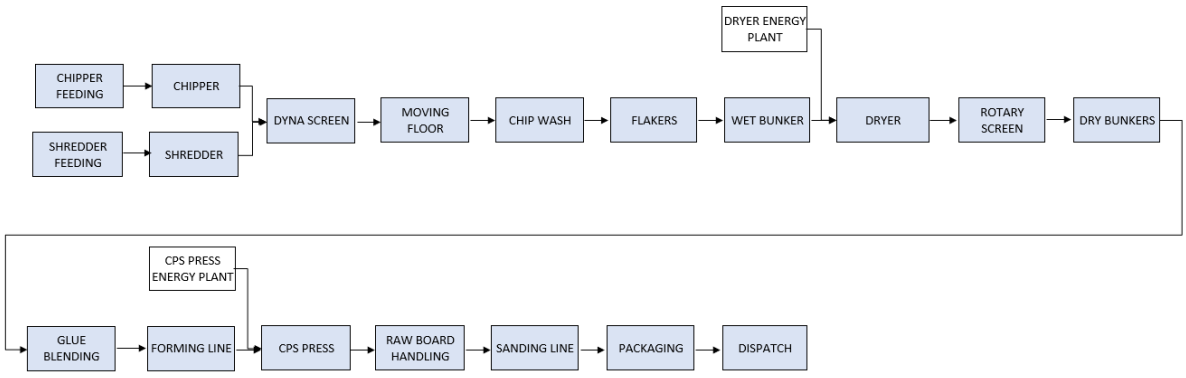
Description of system boundaries: According to PCR 2019:14 Construction products v. 1.2.5, the life cycle boundaries chosen for PSB is cradle to gate with modules C1–C4 and module D (A1–A3 + C + D):

The Production stage:
- A1: supply of raw materials
- A2: transportation
- A3: manufacturing

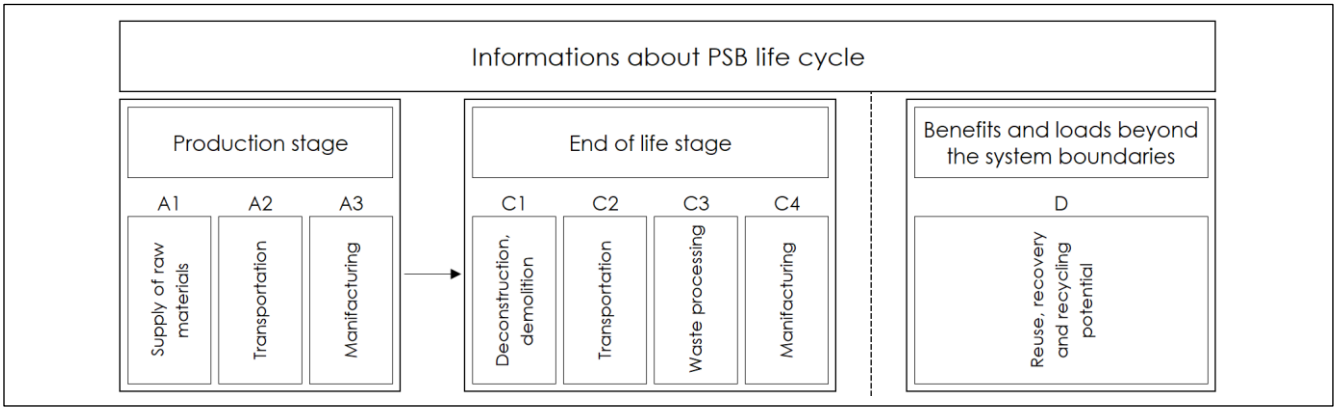
The End-of-life stage:
- C1: deconstruction, demolition
- C2: transportation
- C3: waste processing
- C4: disposal

Benefits and loads beyond the system boundaries:
- D: reuse, recovery and recycling potential

Flow chart of the production process:



System diagram:



In this study, all inputs to the analysed product system were included.

The following processes have been excluded from the evaluation, according to the reference PCR:
- infrastructure and machinery construction;
- internal transport of the packaging;
- employee commuting to and from the production plant;
- business travels;
- marketing and communication activities;
- R&D activities.

Consumption impacts for the assembly of minor components were also excluded as they were considered insignificant.

More information: more information can be found at DesertBoard website: https://www.desertboard.ae/
As it emerges from the results of the environmental performance indicators, purchased electricity used in the manufacturing process of module A3 accounts for more than 30% of the GWP-GHG results of modules A1-A3. As such, according to EN 15804, energy source of the purchased electricity is reported by annual percentages as following:

Solar: 4,4%
Gas: 70,1%
Nuclear: 25,5%

resulting in the following emission factor:
Electricity, supplier mix - medium voltage | *Cut-off, U*: 0,3554 kg CO_2 eq/kWh.

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	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	x
Geography	RoW/GLO	UAE	UAE	ND	ND	ND	ND	ND	ND	ND	ND	ND	RoW/GLO	RoW/GLO	RoW/GLO	RoW/GLO	-
Specific data used	>90%			ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-
Variation – products	<10%			ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-

X: module included, ND: module not included; RoW: Rest of the World; GLO: global; UAE: United Arabs Emirates

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Palm leaves	737,3	100%	0,54
Resin	25,8	0%	0
Wax emulsion	15,8	0%	0
Release agent	0,5	0%	0
Moisture (water)	20,5	0%	0
TOTAL	800,0	0%	0,50
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/kg**
PVC Strap	0,1	0,01%	0
Pallet block	18,6	2.32%	0,50
TOTAL	18,7	2,33%	0,50

Results of the environmental performance indicators

Mandatory impact category indicators according to EN 15804

Results per 1 m³ of PSB (800 kg/m³)										
Indicator	**A1**	**A2**	**A3**	**TOT A1-A3**	**C1**	**C2**	**C3**	**C4**	**TOT C1-C4**	**D**
GWP-fossil	8,62E+02	2,81E+01	1,84E+02	**1,07E+03**	0,00E+00	1,25E+01	0,00E+00	0,00E+00	**1,25E+01**	0,00E+00
GWP-biogenic	-1,54E+03	4,29E-02	1,10E+02	**-1,43E+03**	0,00E+00	1,78E-02	1,46E+03	0,00E+00	**1,46E+03**	0,00E+00
GWP-luluc	6,04E-01	1,44E-02	1,11E-02	**6,29E-01**	0,00E+00	6,44E-03	0,00E+00	0,00E+00	**6,44E-03**	0,00E+00
GWP-total	**-6,79E+02**	**2,82E+01**	**2,95E+02**	**-3,56E+02**	**0,00E+00**	**1,26E+01**	**1,46E+03**	**0,00E+00**	1,47E+03	**0,00E+00**
ODP	1,22E-04	4,33E-07	1,21E-06	**1,24E-04**	0,00E+00	1,90E-07	0,00E+00	0,00E+00	**1,90E-07**	0,00E+00
AP	2,78E+00	1,20E-01	9,97E-02	**3,00E+00**	0,00E+00	5,84E-02	0,00E+00	0,00E+00	**5,84E-02**	0,00E+00
EP-freshwater	1,18E-01	2,25E-03	2,87E-03	**1,23E-01**	0,00E+00	1,02E-03	0,00E+00	0,00E+00	**1,02E-03**	0,00E+00
EP-marine	7,96E-01	4,38E-02	8,20E-02	**9,22E-01**	0,00E+00	2,20E-02	0,00E+00	0,00E+00	**2,20E-02**	0,00E+00
EP-terrestrial	5,79E+00	4,68E-01	3,89E-01	**6,65E+00**	0,00E+00	2,36E-01	0,00E+00	0,00E+00	**2,36E-01**	0,00E+00
POCP	1,67E+00	1,16E-01	1,02E-01	**1,89E+00**	0,00E+00	5,83E-02	0,00E+00	0,00E+00	**5,83E-02**	0,00E+00
ADP-minerals&metals*	6,15E-03	8,93E-05	3,57E-05	**6,28E-03**	0,00E+00	3,82E-05	0,00E+00	0,00E+00	**3,82E-05**	0,00E+00
ADP-fossil*	2,05E+04	3,88E+02	2,21E+02	**2,11E+04**	0,00E+00	1,75E+02	0,00E+00	0,00E+00	**1,75E+02**	0,00E+00
WDP*	2,50E+02	1,66E+00	6,94E+01	**3,21E+02**	0,00E+00	8,06E-01	0,00E+00	0,00E+00	**8,06E-01**	0,00E+00
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									

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*
**Disclaimer: the additional environmental impacts indicators from prospect for 4 (particulate matter, human toxicity etc) have been calculated in the LCA study according to EN 15804, but are not declared in this EPD.*
**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.*

Additional mandatory and voluntary impact category indicators

Results per 1 m^3 of PSB (800 kg/m^3)											
Indicator	**Unit**	**A1**	**A2**	**A3**	**TOT A1-A3**	**C1**	**C2**	**C3**	**C4**	**TOT C1-C4**	**D**
GWP-GHG[1]	kg CO_2 eq.	**8,62E+02**	**2,81E+01**	**1,84E+02**	**1,07E+03**	0,00E+00	**1,25E+01**	0,00E+00	0,00E+00	**1,25E+01**	**0,00E+00**

Resource use indicators

Results per 1 m^3 of PSB (800 kg/m^3)											
Indicator	**Unit**	**A1**	**A2**	**A3**	**TOT A1-A3**	**C1**	**C2**	**C3**	**C4**	**TOT C1-C4**	**D**
PERE	MJ	5,06E+02	5,04E+00	7,99E+00	**5,20E+02**	0,00E+00	2,30E+00	0,00E+00	0,00E+00	**2,30E+00**	0,00E+00
PERM	MJ	2,64E-01	0,00E+00	0,00E+00	**2,64E-01**	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**	0,00E+00
PERT	MJ	5,07E+02	5,04E+00	7,99E+00	**5,20E+02**	0,00E+00	2,30E+00	0,00E+00	0,00E+00	**2,30E+00**	0,00E+00
PENRE	MJ	2,16E+04	4,12E+02	2,45E+02	**2,22E+04**	0,00E+00	1,86E+02	0,00E+00	0,00E+00	**1,86E+02**	0,00E+00
PENRM	MJ	5,00E+02	0,00E+00	-1,03E+01	**4,90E+02**	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**	0,00E+00
PENRT	MJ	2,21E+04	4,12E+02	2,35E+02	**2,27E+04**	0,00E+00	1,86E+02	0,00E+00	0,00E+00	**1,86E+02**	0,00E+00
SM	kg	1,51E+03	0,00E+00	0,00E+00	**1,51E+03**	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
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
FW	m^3	6,83E+00	5,49E-02	1,63E+00	**8,51E+00**	0,00E+00	2,59E-02	0,00E+00	0,00E+00	**2,59E-02**	0,00E+00
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										

[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.

Waste indicators

Results per 1 m³ of PSB (800 kg/m³)											
Indicator	**Unit**	**A1**	**A2**	**A3**	**TOT A1-A3**	**C1**	**C2**	**C3**	**C4**	**TOT C1-C4**	**D**
Hazardous waste disposed	kg	6,30E-02	2,55E-03	1,23E-03	**6,68E-02**	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**	0,00E+00
Non-hazardous waste disposed	kg	5,79E+01	1,81E+01	2,96E+01	**1,06E+02**	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**	0,00E+00
Radioactive waste disposed	kg	5,68E-02	7,95E-05	1,33E-04	**5,70E-02**	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**	0,00E+00

Output flow indicators

Results per 1 m³ of PSB (800 kg/m³)											
Indicator	**Unit**	**A1**	**A2**	**A3**	**TOT A1-A3**	**C1**	**C2**	**C3**	**C4**	**TOT C1-C4**	**D**
Components for re-use	kg	0,00E+00	0,00E+00	1,13E+00	**1,13E+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	4,00E+02	0,00E+00	**4,00E+02**	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	2,54E-01	**2,54E-01**	0,00E+00	0,00E+00	4,00E+02	0,00E+00	**4,00E+02**	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
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

Other environmental performance indicators

Results per 1m³ PSB (800kg/m³)		
BIOGENIC CARBON CONTENT	**Unit**	**QUANTITY**
Biogenic carbon content in product	kg C	3,97E+02
Biogenic carbon content in packaging	kg C	9,21E+00

Note:1 kg biogenic carbon is equivalent to 44/12 kg CO_2

References

General Programme Instructions of the International EPD® System. Version 4.0.

PCR 2019:14. *Construction products*. *v. 1.2.5.*

cPCR 006 (to PCR 2019:14) Wood and wood-based products for use in construction v.2019-12-20.

ISO 14040:2006/A1:2020 Environmental management - Life cycle assessment - Principles and framework.

ISO 14044:2006/A2:2020 Environmental management - Life cycle assessment - Requirements and guidelines.

ISO 14025:2006 Environmental labels and declarations — Type III environmental declarations — Principles and procedures.

ISO 14067:2018 Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification.

UNI EN 15804:2021, Sustainability of buildings - Environmental product declarations - Development framework rules by product category.

I.S. EN 16449:2014 Wood and wood-based products – Calculation of the biogenic carbon content of wood and conversion to carbon dioxide.

LCA study of palm strand boards (PSB), 2023.11.15, IMQ eambiente

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