

# ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

Owner of the Declaration	Verband der Deutschen Holzwerkstoffindustrie e.V.
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
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Valid to	18.04.2019

**Particle board, raw**

**Verband der Deutschen**

**Holzwerkstoffindustrie e.V. (VHI)**

Association of the German Wood-based Panel Industry



[www.bau-umwelt.com](http://www.bau-umwelt.com) / <https://epd-online.com>



## General Information

### Verband der Deutschen Holzwerkstoffindustrie e.V.

#### Programme holder

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Germany

#### Declaration number

EPD-VHI-20130001-CBG1-EN

#### This Declaration is based on the Product Category Rules:

Wood based panels, 07.2014  
(PCR tested and approved by the SVR)

#### Issue date

19.04.2013

#### Valid to

18.04.2019



Prof. Dr.-Ing. Horst J. Bossemayer  
(President of Institut Bauen und Umwelt e.V.)



Dr. Burkhard Lehmann  
(Managing Director IBU)

### Particle board, raw

#### Owner of the Declaration

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#### Declared product / Declared unit

1m<sup>3</sup> particle board, raw

#### Scope:


Approx. 3.5 million m<sup>3</sup> raw particle boards were manufactured in Germany in 2009, of which more than 75 % was accounted for by members of the VHI. The contents of this Declaration are based on the information from 81 % of the members, whereby the technology represented here is representative of all members. This document is translated from the German Environmental Product Declaration into English. It is based on the German original version EPD-VHI-20130001-CBG1-DE. The verifier has no influence on the quality of the translation. The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

#### Verification

The CEN Norm /EN 15804/ serves as the core PCR

Independent verification of the declaration  
according to /ISO 14025/

internally  externally



Dr. Frank Werner  
(Independent verifier appointed by SVR)

## Product

### Product description

Raw, uncoated particle boards are board-shaped wood-based panels. They consist mainly of small-scale wooden particles such as chips and sawdust, and are pressed using duroplastic binding agents. They are not coated.

### Application

Particle boards can be used in decorative interior work, furniture construction and wood construction as well as in exhibition stands and shop fitting.

### Technical Data

#### Requirements in line with EN 312 (simplified presentation for board types P1 - P7)

##### Technical construction data

Name	Value	Unit
Bending strength (longitudinal) [EN 310]	7 - 22	N/mm <sup>2</sup>
Bending strength (transverse) [EN 319]	0.14 - 0.75	N/mm <sup>2</sup>
E-module (longitudinal) [EN 310]	1.2 - 3.35	N/mm <sup>2</sup>
Material dampness at delivery [EN 310]	5 - 13	%

322]		
Thermal conductivity	0.12	W/(mK)
24h swelling [EN 317]	7 - 13	%

### Base materials / Ancillary materials

Raw particle boards consist of small-scale wood particles, binding agents and other additives. The binding agents used are mainly urea formaldehyde binding agents (UF), melamine-urea-formaldehyde binding agents (MUF), phenol-formaldehyde binding agents (PF) and polymeric diphenylmethane diisocyanate binding agents (PMDI). Paraffins are used for the hydrophobic treatment of the wood particles.

67 % of the wood used comes from fresh softwood, 13 % from fresh hardwood, and 20 % from used timber.

The percentage shares established for the Environmental Product Declaration comprise:

- wood, mainly softwood 84.89 %
- water 5.94 %
- UF 7.51 %

- MUF 0.80 %
- PF 0.07 %
- PMDI 0.14%
- paraffins 0.39 %
- urea 0.22 %
- flame retardants 0.04 %

retardants are phosphate and nitrogen compounds.

#### Reference service life

Resistance during the condition of use depends on the application classes (EN 312).

The product has an average bulk density of 633.32 kg/m<sup>3</sup>. The functional chemical groups of the flame

## LCA: Calculation rules

### Declared Unit

The declared unit under ecological review is the provision of 1m<sup>3</sup> raw particle board with a mass of 633.32 kg/m<sup>3</sup>, a water content of 5.9 % and a glue content of 9.2 %. The composition complies with the weighted average by production volume.

### Declared unit

Name	Value	Unit
Declared unit	1	m <sup>3</sup>
Conversion factor to 1 kg	0.001578	-
Mass reference	-	kg/m <sup>3</sup>

### System boundary

The Declaration complies with an EPD "from cradle to plant gate, with options". It includes the production stage, i.e. from provision of the raw materials through to production (cradle to gate, Modules A1 to A3), and parts of the end-of-life stage (Modules C2 to C4). It also contains an analysis of the benefits and loads over and beyond the product's entire life cycle (Module D).

Module A1 analyses the provision of wood from forestry or in the form of ancillary products from the wood industry, the provision of other improved wood products and the provision of glues and other ingredients. Transport of these substances is considered in Module A2. Module A3 comprises the provision of fuels, resources and electricity as well as the production processes on site. Essentially, these involve the preparation, drying, sorting and compression of raw materials.

Module C2 considers transport to the disposing company while Module C3 handles preparation and sorting of waste wood; Module D analyses thermal utilisation and the ensuing benefits in the form of a system extension.

### Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to /EN 15804/ and the building context, respectively the product-specific characteristics of performance, are taken into account.

## LCA: Scenarios and additional technical information

The scenarios on which the Life Cycle Assessment is based are described in detail below.

### End of Life (C1-C4)

After demolition of the building, it is assumed for waste wood removed from it that it is initially transported across a distance of 20 km to the next user (C2) where it is crushed and sorted (C3). Waste wood is recycled (D) and not disposed of. No expenses are therefore incurred in Module C4.

Name	Value	Unit
Electricity generated (per t atro waste wood)	1231	kWh
Waste heat used (per t atro waste wood)	2313	kWh

Name	Value	Unit
Energy recovery , waste wood	633.32	kg

### Re-use, recovery and recycling potential (D), relevant scenario information

The product is recycled in the form of waste wood in the same composition as the declared unit at the end-of-life stage. Thermal recovery in a biomass power plant with an overall degree of efficiency of 35 % and electrical efficiency of 23 % is assumed, whereby incineration of 1 tonne wood (atro) (at 18 % wood moisture content) generates approx. 1231 kWh electricity and 2313 MJ useful heat. The exported energy substitutes fuels from fossil sources, whereby it is assumed that the thermal energy is generated from natural gas and the substituted electricity complies with the German power mix for 2009.

## LCA: Results

### DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	MND	MND	MND	MNR	MNR	MNR	MND	MND	MND	X	X	X	X

### RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1m<sup>3</sup> particle board, raw

Parameter	Unit	A1	A2	A3	C2	C3	C4	D
GWP	[kg CO <sub>2</sub> -Eq.]	-8.58E+2	4.06E+0	8.56E+1	5.85E-1	9.89E+2	0.00E+0	-4.06E+2
ODP	[kg CFC11-Eq.]	7.00E-6	8.11E-9	1.73E-5	1.17E-9	1.19E-6	0.00E+0	-9.25E-5
AP	[kg SO <sub>2</sub> -Eq.]	2.56E-1	1.74E-2	2.25E-1	2.51E-3	6.98E-3	0.00E+0	-4.15E-1
EP	[kg (PO <sub>4</sub> ) <sup>3-</sup> -Eq.]	1.06E-1	4.04E-3	4.18E-2	5.82E-4	5.89E-4	0.00E+0	-3.94E-3
POCP	[kg ethene-Eq.]	2.85E-2	1.89E-3	2.17E-1	2.72E-4	4.64E-4	0.00E+0	-2.78E-2
ADPE	[kg Sb-Eq.]	3.87E-5	8.56E-8	1.76E-4	1.23E-8	1.23E-7	0.00E+0	-6.98E-6
ADPF	[MJ]	2.62E+3	5.72E+1	9.83E+2	8.25E+0	4.62E+1	0.00E+0	-4.54E+3

Caption GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources

### RESULTS OF THE LCA - RESOURCE USE: 1m<sup>3</sup> particle board, raw

Parameter	Unit	A1	A2	A3	C2	C3	C4	D
PERE	[MJ]	3.13E+1	7.58E-2	5.33E+2	1.09E-2	4.70E+0	0.00E+0	-4.01E+2
PERM	[MJ]	8.25E+3	0.00E+0	4.34E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	[MJ]	8.28E+3	7.58E-2	5.77E+2	1.09E-2	4.70E+0	0.00E+0	-4.01E+2
PENRE	[MJ]	2.29E+3	5.75E+1	1.58E+3	8.29E+0	8.78E+1	0.00E+0	-1.03E+4
PENRM	[MJ]	5.80E+2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PENRT	[MJ]	2.87E+3	5.75E+1	1.58E+3	8.29E+0	8.78E+1	0.00E+0	-1.03E+4
SM	[kg]	1.10E+2	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	1.15E+3	0.00E+0	0.00E+0	0.00E+0	5.49E+3
NRSF	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
FW	[m <sup>3</sup> ]	1.61E+3	1.08E+0	9.11E+2	1.55E-1	4.99E+1	0.00E+0	3.77E+3

Caption 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 resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

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

#### 1m<sup>3</sup> particle board, raw

Parameter	Unit	A1	A2	A3	C2	C3	C4	D
HWD	[kg]	2.82E-1	0.00E+0	5.56E-2	0.00E+0	0.00E+0	0.00E+0	1.65E+0
NHWD	[kg]	1.51E-2	0.00E+0	1.11E-2	0.00E+0	0.00E+0	0.00E+0	5.02E-5
RWD	[kg]	8.44E-2	1.01E-4	2.14E-1	1.46E-5	1.49E-2	0.00E+0	-1.16E+0
CRU	[kg]	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	0.00E+0	0.00E+0	0.00E+0
MER	[kg]	0.00E+0	0.00E+0	2.25E+0	0.00E+0	6.33E+2	0.00E+0	0.00E+0
EEE	[MJ]	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	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0

Caption HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy

## References

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