Environmental Product Declaration

In accordance with ISO 14025 and EN 15804:2012+A2:2019 for:

Cement bonded particle boards

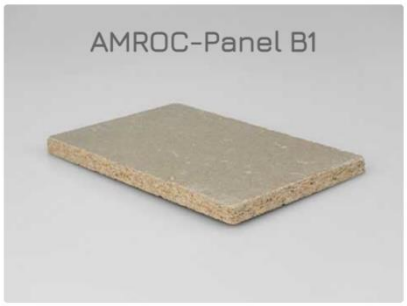
- AMROC-Panel B1
- AMROC-Color Primed
- AMROC-Rustikal
- AMROC-Acoustic
- AMROC-Floor Boards

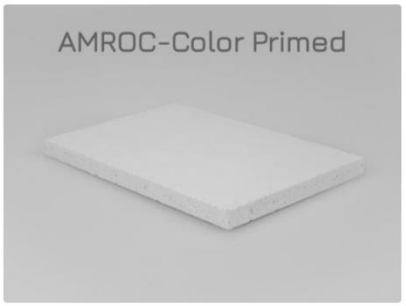
from

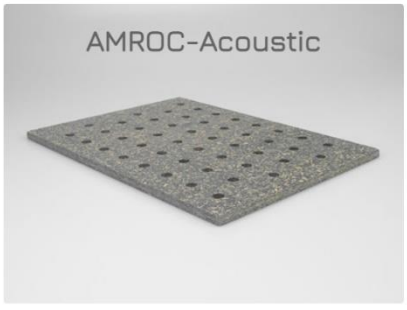
AMROC Baustoffe GmbH

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-07427
Publication date:	2023-02-07
Valid until:	2028-02-06

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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CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): Product Category Rules (2021) Construction Products, PCR 2019:14, Version 1.11 from 2021-02-05, Valid Until: 2023-03-31. UN CPC code: 3143 Particle board and similar board of wood or other ligneous materials Complementary product category rules (c-PCR) to PCR 2019:14: Wood and wood-based products for use in construction (EN 16485:2014), c-PCR-006, Version: 2019-12-20, UN CPC 031, 311, 312, 313, 314, 315, 316, 319
PCR review was conducted by: Martin Erlandsson, IVL Swedish Environmental Research Institute, martin.erlandsson@ivl.se
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ Internal ☒ External covering ☐ EPD process certification ☒ EPD verification
Third party verifier: *Matthias Schulz, Schulz Sustainability Consulting, Germany* 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: AMROC Baustoffe GmbH, Am Zweigkanal 7b, 39126 Magdeburg, Germany
Contact: Markus Wahl, mwa@amroc.de

Description of the organisation:

The enterprise AMROC Baustoffe GmbH was formed on December 1, 1997. The company headquarters and the production facility are located to the North of Magdeburg, 2.5 km from the freeway BAB 2 Berlin-Hannover, alongside port basin I of the industrial port.

The cement bonded particle boards are produced on our production system, which was modernized to the latest process technology in 2007, and is located in a building complex with a floor space of 16,000 m².

External monitoring in combination with the in-house quality control system ensure consistently high product quality.

AMROC supplies its products to more than 200 customers in more than 25 countries. Dealers, importers and contractors are located in Germany, Scandinavia, BENELUX, France, Switzerland, Austria, Italy, England, the United States, and in the South Pacific region in New Zealand and Australia.

Product-related or management system-related certifications:
AMROC Baustoffe GmbH including the related site for this EPD, are ISO 9001 and ISO 50001 compliant. AMROC Baustoffe GmbH is also certified according to PEFC.

Name and location of production site(s):
AMROC Baustoffe GmbH, Am Zweigkanal 7b, 39326 Magdeburg, Germany.

Product information

Product name:
- AMROC-Panel B1
- AMROC-Color primed
- AMROC-Rustikal
- AMROC-Acoustic
- AMROC-Floor Boards

This EPD is valid for multiple products and is based on average results. The average was calculated based on production amounts of the year 2020. Best-case and Worst-case scenarios were calculated to observe the variability between products. The variability lays between -0,5 and 0,4% among all 5 products.

Product identification:
Cement bonded particle boards according to EN 13986.

Product description:

AMROC boards are versatile construction panels with a smooth, hard surface, which combine fire, acoustic and moisture protection requirements in one.

AMROC boards are produced from coniferous wood chips and Portland Cement in combination with mineralization agents and water. A special process mixes, distributes and compresses the material

under high pressure. The product is cut to size after the curing and conditioning stages. Edge profiles, custom cuts, surface sanding and coatings can be performed to customer specifications.

AMROC boards do not contain formaldehyde, toxins or hazardous materials of any kind, and are resistant to rodents, mold and termites.

AMROC boards can be easily machined with carbide or diamond-tipped tooling (cutting, drilling, milling). The panels can be fastened with screws, nails, staples or adhesives.

AMROC boards can be used for new construction, modernization of old structures, industrial construction, commercial construction, for agricultural construction, modular construction and for prefabricated homes. Uses include:

- Timber frame construction
- Floors
- Interior walls and ceilings
- Partition walls and supporting structures
- Wet room lining
- Fire protection construction
- Soundproof construction
- Composite acoustic building systems
- Sports buildings.
- Prefabricated homes.

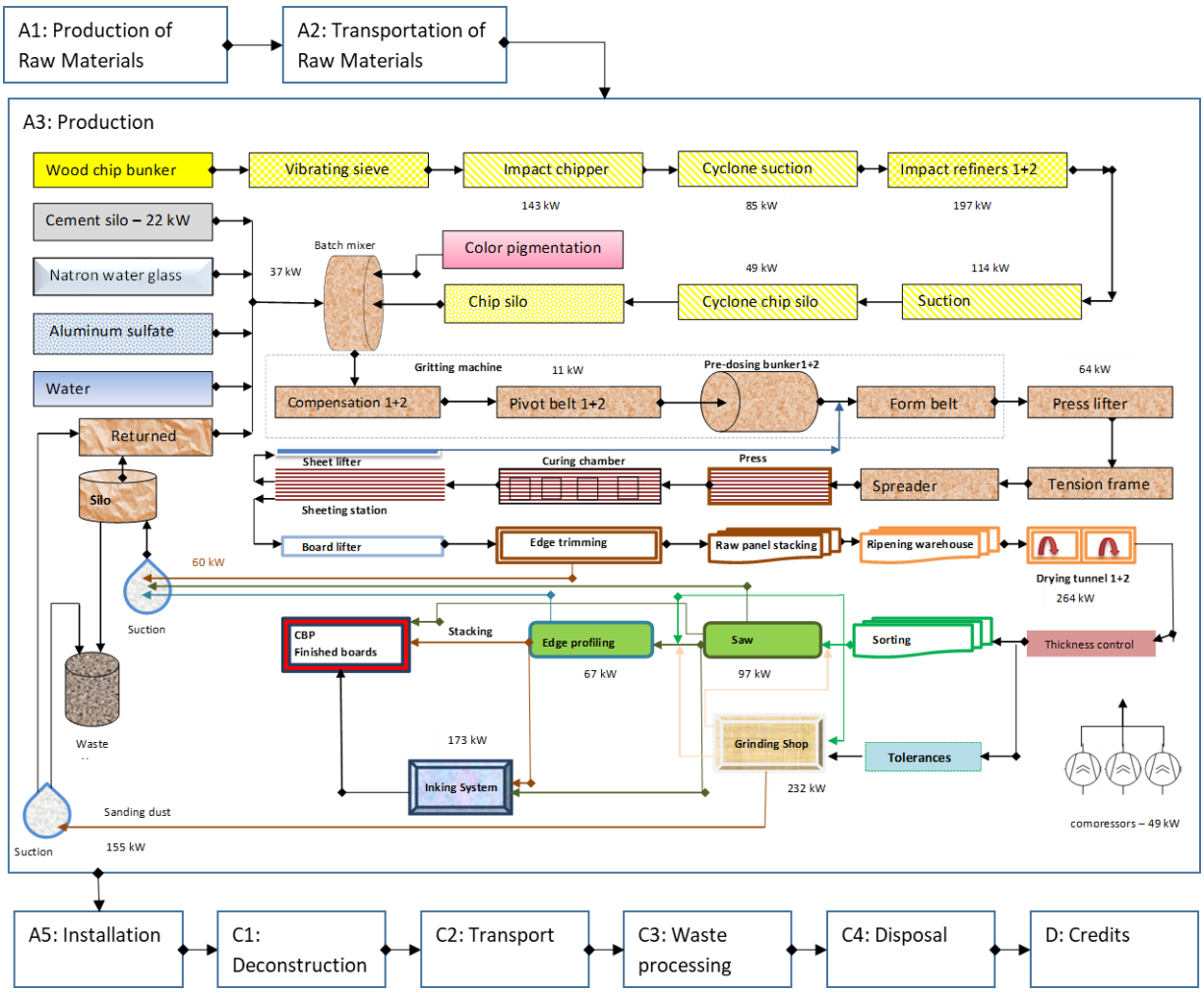
AMROC boards are weather and icing resistant, resistant to rot and animal waste and chemical cleaning agents in animal shelters. The technical information of the AMROC panels is included as an annex in the present EPD document.

UN CPC code: 3143 Particle board and similar board of wood or other ligneous materials.

LCA information

Declared unit: 1 m^3 cement bonded particle board
Conversion factor to mass: 1217 kg/m^3
Reference service life: 50 years
Time representativeness: Based on yearly manufacturing data from 01/01/2020 until 31/12/2020
Database(s) and LCA software used: GaBi Software version 10.6. and Database version 2022.01 some datasets from ecoinvent 3.6.
Description of system boundaries:
b) Cradle to gate with options, modules C1–C4, module D and with optional module (A5).

System diagram:



More information: www.amroc.de
Name and contact information of LCA practitioner: brands & values GmbH, Tel.: +49 421 70908433, Altenwall 14, 28195 Bremen.

All life cycle stages are considered, except for Transport to construction site (A4). A reliable measurement of distance travelled from the gate to construction site was not possible. The use stages (B1-B7) are not considered, as there are no additional inputs during use which may cause environmental impact.

The electricity in module A3 accounts for more than 30% of the total energy in stage A1 to A3. 43% of energy use in A3 comes from the residual energy mix in Germany, with a GWP-Total of 636g CO_2 eq./kWh. 57% of energy use in A3 comes from thermal energy from natural gas in Germany, with a GWP-Total of 234g CO_2 eq./kWh.

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

	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	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	DE	DE	DE	ND	DE	ND	ND	ND	ND	ND	ND	ND	DE	DE	DE	DE	DE
Specific data used	<90%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	<0,5%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	Not relevant					-	-	-	-	-	-	-	-	-	-	-	-

All processes depicted in the system diagram are included within the system boundaries. All inputs for the production were modelled, including assumptions for the installation and dismantling at the EoL. Module A1-A3 includes the production and transportation of all raw materials, such as cement, woodchips, aluminum sulfate, water glass and colorants, as well as the production of electricity, heat and diesel used during production. The materials for packaging and treatment of production waste are also included. Module A4 was not considered, since the 5 different AMROC products are delivered to numerous construction sites in Germany and Europe, this calculation would require rough assumptions that would affect the accuracy of the study. Module A5 regards the treatment of packaging and an estimate of the materials necessary for installation. Modules B1-B7 are not declared, since the product does not require maintenance, cleaning or any operational input. Modules C1-C4 are modelled to calculate the environmental impact of dismounting and disposing of the product at the EoL, in this case the AMROC product is landfilled. Module D includes the benefits received for the incineration of the packaging, as thermal and electricity credits in the German scenario.

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Wood chips spruce	397,52	0,0%	32,7%
Portland cement (CEM II / A LL 42,5)	743,32	0,0%	0,0%
Aluminum sulfate	29,37	0,0%	0,0%
Water glass	46,45	0,0%	0,0%
Colorant, iron oxide	0,52	0,0%	0,0%
TOTAL	1.217,18	0,0%	32,7%

Packaging materials	Weight, kg	Weight-% (versus the product)
Block pallets	2,608	0,21%
Pallets	1,470	0,12%
Squared timber	16,540	1,36%
Construction foil	0,301	0,02%
Hand stretch film	0,003	<0,001%
Packaging corners	0,013	0,001%
PET strapping	14,202	1,17%
TOTAL	35,139	2,89%

Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Weight-% per functional or declared unit
No substances			

Environmental Information

Potential environmental impact – mandatory indicators according to EN 15804

Results per declared unit: 1m³ AMROC cement bonded particle board

Indicator	Unit	A1	A2	A3	Total A1-A3	A5	C1	C2	C3	C4	D
GWP-fossil	kg CO_2 eq.	6,81E+02	1,71E+01	2,36E+02	9,34E+02	9,80E+01	0,00E+00	1,04E+01	3,21E+00	3,35E+01	-2,54E+01
GWP-biogenic	kg CO_2 eq.	-6,92E+02	0,00E+00	0,00E+00	-6,92E+02	3,41E+01	0,00E+00	0,00E+00	0,00E+00	6,57E+02	0,00E+00
GWP-luluc	kg CO_2 eq.	1,35E-01	1,16E-01	2,85E-02	2,80E-01	1,61E-02	0,00E+00	7,07E-02	1,49E-02	0,00E+00	-4,44E-03
GWP-total	kg CO_2 eq.	-1,01E+01	1,72E+01	2,36E+02	2,43E+02	1,32E+02	0,00E+00	1,05E+01	3,22E+00	6,91E+02	-2,54E+01
ODP	kg CFC 11 eq.	5,44E-06	1,69E-12	3,73E-09	5,44E-06	2,26E-10	0,00E+00	1,03E-12	4,78E-12	7,82E-09	-2,67E-10
AP	mol H^+ eq.	1,77E+00	1,04E-01	2,39E-01	2,12E+00	2,27E-01	0,00E+00	6,30E-02	1,66E-02	1,30E-01	-2,51E-02
EP-freshwater	kg PO_4^{3-} eq.	1,01E-01	1,89E-04	2,55E-04	1,02E-01	2,97E-04	0,00E+00	1,15E-04	2,83E-05	1,21E-03	-1,68E-04
EP-freshwater	kg P eq.	3,30E-02	6,16E-05	8,30E-05	3,32E-02	9,67E-05	0,00E+00	3,75E-05	9,23E-06	3,95E-04	-5,46E-05
EP-marine	kg N eq.	4,51E-01	5,05E-02	8,46E-02	5,86E-01	3,64E-02	0,00E+00	3,07E-02	7,59E-03	3,68E-02	-9,12E-03
EP-terrestrial	mol N eq.	5,09E+00	5,60E-01	9,22E-01	6,58E+00	4,20E-01	0,00E+00	3,40E-01	8,37E-02	3,97E-01	-9,73E-02
POCP	kg NMVOC eq.	1,36E+00	9,74E-02	2,36E-01	1,69E+00	1,11E-01	0,00E+00	5,92E-02	2,06E-02	1,14E-01	-2,37E-02
ADP-minerals &metals*[1]	kg Sb eq.	4,60E-03	1,74E-06	1,21E-05	4,61E-03	9,45E-04	0,00E+00	1,06E-06	3,56E-06	6,20E-07	-6,31E-06
ADP-fossil*[1]	MJ	4,07E+03	2,27E+02	3,60E+03	7,89E+03	1,16E+03	0,00E+00	1,38E+02	6,29E+01	2,36E+02	-3,69E+02
WDP*[1]	m^3	6,45E+01	1,93E-01	-9,83E-01	6,37E+01	1,34E+01	0,00E+00	1,17E-01	6,20E-01	-1,91E+01	-2,91E-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										

Potential environmental impact – additional mandatory and voluntary indicators

Results per declared unit: 1m³ AMROC cement bonded particle board

Indicator	Unit	A1	A2	A3	Total A1-A3	A5	C1	C2	C3	C4	D
GWP-GHG[1]	kg CO_2 eq.	6,81E+02	1,72E+01	2,36E+02	9,34E+02	9,80E+01	0,00E+00	1,05E+01	3,22E+00	3,35E+01	-2,54E+01
PM	Occurrence of diseases	3,22E-05	3,88E-07	2,19E-06	3,48E-05	3,14E-06	0,00E+00	2,36E-07	3,15E-07	1,64E-06	-1,84E-07
IR*[2]	kBq U235-eq.	2,74E+01	6,37E-02	1,72E+01	4,47E+01	2,08E+00	0,00E+00	3,87E-02	1,36E-01	4,08E+00	-1,36E+00
ETP-fw*[1]	CTUe	4,65E+03	1,61E+02	6,42E+02	5,45E+03	4,50E+02	0,00E+00	9,76E+01	4,20E+01	4,36E+02	-6,21E+01
HTP-c*[1]	CTUh	2,19E-07	3,31E-09	2,25E-08	2,45E-07	9,92E-06	0,00E+00	2,01E-09	9,03E-10	1,52E-08	-3,91E-09
HTP-nc*[1]	CTUh	1,64E-05	1,92E-07	1,48E-06	1,81E-05	2,21E-06	0,00E+00	1,16E-07	4,82E-08	1,84E-06	-1,77E-07
SQP*[1]	dimensionless	1,49E+04	9,59E+01	3,73E+01	1,51E+04	9,72E+01	0,00E+00	5,83E+01	1,42E+01	1,41E+01	-8,42E+01

[1]The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

**[1] 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.*

**[2] Disclaimer: This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.*

Use of resources

Results per declared unit: 1m³ AMROC cement bonded particle board

Indicator	Unit	A1	A2	A3	Total A1-A3	A5	C1	C2	C3	C4	D
PERE	MJ	2,74E+03	1,57E+01	6,80E+01	2,83E+03	4,62E+02	0,00E+00	9,54E+00	5,05E+00	1,75E+01	-1,24E+02
PERM	MJ	6,77E+03	0,00E+00	0,00E+00	6,77E+03	-3,34E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	9,52E+03	1,57E+01	6,80E+01	9,60E+03	1,28E+02	0,00E+00	9,54E+00	5,05E+00	1,75E+01	-1,24E+02
PENRE	MJ	3,72E+03	2,27E+02	3,60E+03	7,55E+03	1,51E+03	0,00E+00	1,38E+02	6,30E+01	2,36E+02	-3,69E+02
PENRM	MJ.	3,44E+02	0,00E+00	0,00E+00	3,44E+02	-3,44E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	4,07E+03	2,27E+02	3,60E+03	7,89E+03	1,17E+03	0,00E+00	1,38E+02	6,30E+01	2,36E+02	-3,69E+02
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
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	1,86E+00	1,81E-02	6,94E-01	2,57E+00	4,11E-01	0,00E+00	1,10E-02	1,76E-02	-4,44E-01	-5,05E-02

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 production and output flows

Waste production

Results per declared unit: 1m³ AMROC cement bonded particle board											
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1-A3**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	1,59E-07	1,20E-09	4,14E-07	5,75E-07	6,85E-08	0,00E+00	7,31E-10	7,88E-10	0,00E+00	-6,43E-08
Non-hazardous waste disposed	kg	4,81E+00	3,71E-02	1,58E+02	1,63E+02	3,97E+00	0,00E+00	2,25E-02	1,67E-02	1,19E+03	-2,16E-01
Radioactive waste disposed	kg	1,24E-01	4,22E-04	2,16E-01	3,41E-01	2,05E-02	0,00E+00	2,57E-04	8,30E-04	4,16E-03	-1,37E-02

Output flows

Results per declared unit: 1m³ AMROC cement bonded particle board											
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1-A3**	**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
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
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
Exported energy, electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,70E+01	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	2,04E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Information on biogenic carbon content

Results per declared unit: 1m3 AMROC cement bonded particle board		
BIOGENIC CARBON CONTENT	**Unit**	**QUANTITY**
Biogenic carbon content in product	kg C	179,28
Biogenic carbon content in packaging	kg C	9,30

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

Additional information

SCAN ME

Declaration of Performance for the product AMROC-Panel

DoP-Nr.: AMROC-1-23

other trade names: Cempanit / Cempanit +, Cemspan / Cemcolor, Kivex Base, AMROC Cementspanplader, AMROC Sementsponplater, Monorock, Containex-board

EN

1.	Identification code:	AMROC Panel acc. EN 634-2 ; 8 - 28mm
2.	Intended use:	Internal use as a structural component in dry and humid conditions and external use as a structural component
3.	Manufacturer:	Amroc Baustoffe GmbH Am Zweigkanal 7b 39126 Magdeburg
4.	System of Assessment and verification of constancy of performance(AVCP):	1
5.	Notified body:	HFB Engineering GmbH – 1034 –
	Certificate No.:	CE 1034–CPR–1283/1/2022
6.	Harmonized norm:	EN 13986:2004+A1:2015
7.	Declared performance	

Essential characteristics		Performance	Harmonised technical spec.
Bending strength parallel / perpendicular	(N/mm²)	> 9,0	EN 634-2
Bending stiffness (Modulus of Elasticity) parallel / perpendicular	(N/mm²)	> 4500	
Transverse tensile strength	(N/mm²)	> 0,5	
Density	(kg/m³)	> 1200	
Release of formaldehyde		E1	EN 13986 Annex B
Reaction to fire 8 - 28mm		A2-s1, d0	K-2302/519/22-MPA BS
Water vapour permeability		30 / 50	EN 13986 Tab. 9
Airbone sound isolation		NPD	EN 13986 5.10
Sound absorption		0,1 / 0,3	EN 13986 Tab. 10
Thermal conductivity		0,23	EN 13986 Tab. 11
Characteristics strength for use in structural design (N/mm²)			Characteristic values according EN 789
Bending	$f_{m,0°}$ / $f_{m,90°}$	7,4 / 7,0	
Tension	$f_{t,0°}$ / $f_{t,90°}$	3,5 / 3,4	
Compressing	$f_{c,0°}$ / $f_{c,90°}$	15,3 / 13,2	
Shear	f_v / f_r	235 / 264	
Characteristics stiffness (N/mm²)			
Bending	$E_{m,0°}$	5790	
	$E_{m,90°}$	5560	
Tension	$E_{t,0°}$	4170	
	$E_{t,90°}$	4220	
Compressing	$E_{c,0°}$	5420	
	$E_{c,90°}$	4930	
Shear	G_v	1920	
	G_r	1940	
Mechanical durability (medium duration of load)			EN 1995-1-1
Modification coefficient k_{mod}	Service class 1	0,65	
	Service class 2	0,45	
Deformation coefficient k_{def}	Service class 1	2,25	
	Service class 2	3,00	
Modification coefficient k_{mod}	Service class 3	0,45	Test report# Nr. 311001860/1/2014 01st JAN 2014 HFB Leipzig
Deformation coefficient k_{def}	Service class 3	9,13	

The performance of the product (products) is in conformity with the declared performance.
This declaration of performance is issued under the solo responsibility of the manufacturer.
Signed for and behalf of the manufacturer by:

Holger ARNOLD, Managing director (name and function)

Magdeburg, 01-JAN-2023 (place and date of issue)

signature

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