ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

Owner of the Declaration	Odenwald Faserplattenwerk GmbH
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-OWA-20250208-IBA1-EN
Issue date	06.06.2025
Valid to	05.06.2030

OWAcoustic RAW

Odenwald Faserplattenwerk GmbH

Institut Bauen und Umwelt e.V.

ECO PLATFORM EPD VERIFIED

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1. General Information

Odenwald Faserplattenwerk GmbH

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number

EPD-OWA-20250208-IBA1-EN

This declaration is based on the product category rules:

Mineral panels, 01.08.2021
(PCR checked and approved by the SVR)

Issue date

06.06.2025

Valid to

05.06.2030

Dipl.-Ing. Hans Peters
(Chairman of Institut Bauen und Umwelt e.V.)

Florian Pronold
(Managing Director Institut Bauen und Umwelt e.V.)

OWAcoustic RAW

Owner of the declaration

Odenwald Faserplattenwerk GmbH
Dr.-F.-A.-Freund-Str. 3
63916 Amorbach
Germany

Declared product / declared unit

1 m^2 OWAcoustic Raw mineral ceiling tiles with a surface weight of 5,655 kg/m².

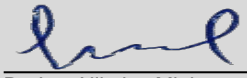
Scope:

This document refers to 1 m² OWAcoustic Raw mineral ceiling tiles (average product) with a surface weight of 5.655 kg/m², manufactured at the production facility in Amorbach, Germany under the brand names OWAcoustic Raw. 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. The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as EN 15804. 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.

The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as *EN 15804*.

Verification

The standard EN 15804 serves as the core PCR
Independent verification of the declaration and data according to ISO 14025:2011
☐ internally ☒ externally



Dr.-Ing. Nikolay Minkov,
(Independent verifier)

2. Product

2.1 Product description/Product definition

Mineral boards are factory-produced boards by the wet-felt process (raw boards or finished boards.) They meet the requirements of *DIN 18177, EN 13964* and the *regulation (EU) no. 1272/2008/EU* as well as German legislation on hazardous substances. Mineral boards (wetfelt) consist of mineral wool, fillers and binders. They are mixed with water (auxiliary) to form a paste before being shaped as a panel and dried. The OWAcoustic Raw mineral tiles are available in a wide range of different surface designs and product properties. The surface finish of the mineral board is optionally coated with watersoluble dispersion paint. Depending on the design the ceiling tiles are available in different dimensions and edge configurations.

This EPD applies to the following products: Raw, Minowa, Fire box.
For the placing on the market of the product in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) *Regulation (EU) No. 305/2011 (CPR)* applies. The product needs a declaration of performance taking into consideration *EN 13964:2014*, title and the CE-marking. For the application and use the respective national provisions apply.

2.2 Application

OWA mineral boards (wet-felt) are typically used as aesthetic lay-in for suspended ceiling construction. They are used for sound absorption and sound insulation, fire resistance, clean rooms, high hygiene requirements and low emission applications. They can also be used as door inserts.

2.3 Technical Data

OWAcoustic wet-felt mineral boards are regulated by *EN 13964* and have the according labelling and declaration of performance.

Constructional data (acc. to DIN 18177 and EN 13964)

Name	Value	Unit
Gross density	283	kg/m^3
Reaction to fire EN 13501-1	A2, s1-d0	
Resistance to fire EN 13501-2	-	
Sound absorption acc. to EN ISO 354 and EN ISO 11654	70	%
Airborne sound reduction acc. to ISO 10848-2 and DIN EN ISO 717-1	33	dB
Durability/flexural tensile strenght En 13964	C/199	N/mm²

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *EN 13964:2014*, suspended ceiling requirements and test methods (not part of CE-marking).

2.4 Delivery status

The EPD is valid for 20 mm thick boards with variable length and width dimensions.

2.5 Base materials/Ancillary materials

Composition wet-felt mineral board:

Name	Value	Unit
Mineral fibre	25 - 85	%
Fillers (Clay, Perlite)	0 - 35	%
Binder (Starch)	4 - 11	%
Cellulose fibre	0 - 2	%
Other	0 - 5	%

Dispersion paints and optional glass fiber decor fleece are additionally used for the surface finish as well as water during the production process. Flame retardants are not added. The recycled content is up to 52 %.

This product/article/at least one partial article contains substances listed in the *ECHA*-candidate list (date: 27.06.2024) exceeding 0.1 percentage by mass: No

This product/article/at least one partial article contains other carcinogenic mutagenic reprotoxic (CMR) substances in categories 1A or 1B which are not on the candidate list, exceeding 0.1 percentage by mass: No

Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the *(EU) Ordinance on Biocide Products No. 528/2012)*: No.

In-can preservatives are used in the production process; however, they are not part of the products and are therefore not within the scope of the Ordinance on Biocide Products.

2.6 Manufacture

The described mineral boards are produced using the traditional wet-felt process by the manufacturer OWA. The initial materials are mixed with water to a homogenous suspension that is then pumped onto a belt conveyer (Fourdrinier). The water is removed both mechanically (gravity and vacuum) and by evaporation in a drying oven. The process water is reused as much as possible. It is treated and refeeds into the process water circuit. The boards are optionally painted, patterned or peforated depending on the required appearance. Production waste and dust are reused in the production process.

2.7 Environment and health during manufacturing

OWA complies with all European regulations for the production of mineral tiles:
• The manufacturing plant is certified according to *ISO 9001, ISO 14001, ISO 45001* and *ISO 50001*
• The production has an almost closed water cycle.
• In the production process, low-dust and low-noise production procedures are respected.
• The exhaust air streams are externally monitored.
• Production generates no waste, all resulting blanks, dust and rejects are reused to 100 %
• Exclusive use of mineral fibres according to *Regulation (EU) No.1272/2008 Note Q*
• Prohibition of the production and use of biopersistent fibres (Ordinance on Hazardous Substances, Annex II,No. 5)
• Prohibition of placing biopersistent fibres on the market (Chemicals Prohibition Order, No. 23 of the Annex to §1)
• Not subject to declaration according to *REACH*

2.8 Product processing/Installation

There are no recognised systemic hazards associated with the installation of ceiling tiles. It is recommended that materials are handled in a manner that minimises dust generation. Cut

boards with sharp knives only. Workers should wear appropriate personal protective equipment. Equipment such as gloves, goggles and dust masks are recommended to minimise exposure to dust and prevent skin irritation. For further information see our Product Data Sheet (chapter 7.1).

2.9 Packaging

The tiles are packed in cardboard cartons and sealed with polyethylene film. These cartons are stacked on chemically untreated wooden pallets. The so-formed pallets are wrapped with polyethylene stretch film. Film, cardboard and wood can be forwarded to the usual and local recycling systems. Further information see chapter 13.1 of the Product Data Sheet.

2.10 Condition of use

When used properly, the mineral boards maintain their mechanical and physical properties for their entire useful life. Direct contact with water should be avoided due to the water-soluble binder starch. For further information see our installation guide, chapter 2.1.

2.11 Environment and health during use

When correctly installed no dust/particles will be released during the period of use.
There is no content of harmful substances according to CLP *regulation (EU) No.1272/2008* and to *REACH*.
Emissions were tested according to and comply with *EN 16516, ISO 16000-3-6-9-11, ASTM D5116, DE-UZ 132, EN 717-1.*

2.12 Reference service life

The service life of the mineral tiles (wet-felted) is up to 50 years, depending on the area of use, exposure and level of maintenance. Within the framework of the conditions of use, no ageing effects are to be expected apart from visual discolouration caused by air circulation.

2.13 Extraordinary effects

Fire

The declared products have the building material class A2-s1,d0 according to *EN 13501-1*. They are therefore designated by lots of European and the German national building regulations as 'non combustible' with negligible smoke development and no burning droplets in the case of fire. Further, they comply with national standards like e.g. *ASTM E 84* (class 1) and *AS 5637.1:2015* (group 1).

Fire protection

Name	Value
Building material class EN 13501-1	A2, s1-d0
Building material class ASTM E84	Class A
Building material class CAN/ULC-S102	
Building material class AS 5637.1:2015	Group 1
Building material class AS ISO 9705:2003 (R2016) and C/VM2	Group 1-S

Water

Prolonged contact with water dissolves the starch binder which can lead to a loss of structure. Should the soluble components be carried into the sewage system they are biodegradable, increasing chemical oxygen demand (COD) and biological oxygen demand (BOD).

Mechanical destruction

The mineral boards (wet-felt) can be broken by hand and also the surface finishes can be damaged, whereby low dust emission can be caused.

2.14 Re-use phase

Correctly demounted boards can be reinstalled. Lightly damaged boards can be used as cut-to-size tiles. With our OWA green circle (Germany), correctly sorted mineral boards with sufficient material quality can be returned to the production process. For further information see our OWA guideline at OWA green circle www.owa.de/de/owa-green-circle. The recyclability is 100 %.

2.15 Disposal

The waste code number for mineral boards at construction site is according to the *European Waste Index* is 17 06 04.
Please contact our customer service under +49 9373 201-999 for possibilities using the take-back scheme "OWA green circle (Germany)".

2.16 Further information

Additional information is available at www.owa.de.

3. LCA: Calculation rules

3.1 Declared Unit

This declaration refers to 1 m² of OWAcoustic Raw, mineral board with a thickness of 20 mm and a nominal density of 282.75 kg/m³. The EPD applies to Raw, Minowa and Fire box. The weight of the product is 5.655 kg/m².

Declared unit and mass reference

Name	Value	Unit
Declared unit	1	m^2
Grammage	5.655	kg/m^2
Gross density	282.75	kg/m^3
Layer thickness of the panels	0.02	m

The average product is defined by production-weighted average of the annual outputs. The products are grouped according to their similarities in thickness, composition and technical properties.

3.2 System boundary

Type of EPD: cradle to gate with options. The EPD considers the modules A1-A3, A4, A5, C1-C4 and D.
Module A1-A3 considers the provision of all raw materials including the transportation to the production site. It also covers the manufacturing of the product including provision of electricity (0.85 kg CO_2-eq./kWh - German residual grid mix) and thermal energy from natural gas. Manufacturing losses are reused in the production.
Module A4 considers a 100 km truck transport to the construction site.
Module A5 considers the treatment and disposal of packaging materials. Credits for potential avoided burdens due to energy substitution of electricity and thermal energy generation are declared in module D.
Module C1 considers the manual deconstruction (burden-free) of the product at End of life.
Module C2 considers the transportation to waste processing by truck.
Two scenarios are considered in the End--of--life: recycling (1) and landfilling (2).
Module C3 (Scenario 1) calculates the recycling processing efforts, in which the entire product is processed and a material credit for input material is applied in module D. For C3/1 the results are '0'.
Module C4/1 (Scenario 2) considers landfilling of the product. For C4 the results are '0'.

Module D includes potential benefits for the thermal and electrical energy generated in module A5 due to packaging treatment and also the material credit due to the product processing in module C3. Avoided burdens have been calculated by the inversion of electricity grid mix and thermal energy from natural gas. The material credit is calculated by using a generic data set for gravel.

3.3 Estimates and assumptions

The following assumptions are included in the EPD:

- It is assumed that packaging materials are disposed of via incineration (wooden pallets) and recycling (cardboard).

3.4 Cut-off criteria

The packaging of the raw materials, as well as their disposal, is not considered in the scope of this study.

3.5 Background data

The background data has been taken from the latest available *Sphera LCA FE* (former GaBi database).
The requirements for data quality and background data correspond to the specifications of the *PCR Part A*.

3.6 Data quality

All primary data are collected for the reference year 2023. All secondary data come from the *Sphera LCA FE* (GaBi) databases and are representative of the years 2022--2026. As the study intended to compare the product systems for the reference year, temporal representativeness is good.
The overall technological and geographical representativeness is also considered to be good.

3.7 Period under review

The period under review for the collection of production data is the year 2023.

3.8 Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product´s lifespan: Europe

3.9 Allocation

The production process does not deliver any co-products. The applied software model does not contain any allocation.

3.10 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. The background data are taken from the *Sphera LCA FE* (former GaBi database), *CUP 2024.1*.

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

Biogenic carbon is present in the product and the packaging material.

Information on describing the biogenic carbon content at factory gate

Name	Value	Unit
Biogenic carbon content in product	0.12	kg C
Biogenic carbon content in accompanying packaging	0.082	kg C

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

The following technical information is a basis for the declared modules.

Transport to the building site (A4)

Module A4 considers a 100 km truck transport from the manufacturing plant in Germany to an average European customer site.

Name	Value	Unit
Litres of fuel	0.0142	l/100km
Transport distance	100	km
Capacity utilisation (including empty runs)	61	%

Installation into the building (A5)

The installation of the board is done manually.
The packaging material treatment and disposal are also considered in module A5.

Name	Value	Unit
Output substances following waste treatment on site (PE-Film)	0.022	kg
Output substances following waste treatment on site (Cardboard)	0.042	kg
Output substances following waste treatment on site (wooden pallets)	0.1564	kg

The useful reference life of the mineral boards (wet-felt) is up to 50 years depending on application, loading and level of maintenance, based on the experience of OWA with products being in use for more than 50 years.

End of life (C1-C4)

The deconstruction (C1) is assumed to be done manually (no environmental impact).
The transport to waste processing (C2) is assumed to be 50 km.
Scenario 1: Recycling (C3, C4)
Scenario 2: Landfill (C3/1, C4/1)

Name	Value	Unit
Collected as mixed construction waste	5.655	kg
Recycling (Scenario 1)	5.655	kg
Landfilling (Scenario 2)	5.655	kg

Reuse, recovery and/or recycling potentials (D), relevant scenario information

Module D includes potential benefits in form of energy recovery of the incineration process in A5 (incineration of packaging waste) and C3 (recycling of the product).
Module D/1 includes the potential benefits in form of energy recovery of the incineration process in A5 (incineration of packaging waste).

5. LCA: Results

The following tables display the environmentally relevant results according to EN 15804+A2 for 1 m² of OWAcoustic RAW.
Two end-of-life scenarios are declared in the EPD:
The recycling scenario (EoL 1) shows the corresponding results in C3, for C3/1 the results are '0'.
The landfilling scenario (EoL 2) shows the results in C4/1, for C4 the results are '0'.
Module D considers the benefits of packaging treatment (from Module A5) and material credit after waste processing (from Module C3).
Module D/1 considers the benefits of packaging treatment (from Module A5) only.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

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	X	X	MND	MND	MNR	MNR	MNR	MND	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m² OWAcoustic RAW

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C3/1	C4	C4/1	D	D/1
GWP-total	kg CO_2 eq	3.59E+00	4.54E-02	3.45E-01	0	2.19E-02	5.02E-01	0	0	5.26E-01	-3.23E+00	-1.02E-01
GWP-fossil	kg CO_2 eq	4.33E+00	4.43E-02	5.67E-02	0	2.13E-02	6.1E-02	0	0	8.47E-02	-3.22E+00	-1.02E-01
GWP-biogenic	kg CO_2 eq	-7.42E-01	2.54E-04	2.88E-01	0	1.22E-04	4.41E-01	0	0	4.41E-01	6.2E-04	-7.1E-04
GWP-luluc	kg CO_2 eq	4.51E-03	8.52E-04	1.9E-05	0	4.1E-04	1.52E-05	0	0	5.08E-04	-8.08E-03	-1.22E-05
ODP	kg CFC11 eq	6.96E-12	1.4E-14	5.98E-14	0	6.74E-15	3.01E-15	0	0	2.31E-13	-1.08E-11	-1.31E-12
AP	mol H^+ eq	1.63E-02	5.33E-05	7.68E-05	0	2.56E-05	6.89E-05	0	0	6.01E-04	-2.96E-02	-9.79E-05
EP-freshwater	kg P eq	1.04E-05	1.21E-07	1.62E-08	0	5.81E-08	5.98E-09	0	0	1.93E-07	-2.09E-05	-2.65E-07
EP-marine	kg N eq	3.22E-03	1.91E-05	2.3E-05	0	9.21E-06	2.17E-05	0	0	1.55E-04	-5.91E-03	-3.53E-05
EP-terrestrial	mol N eq	5.71E-02	2.28E-04	3.64E-04	0	1.1E-04	2.37E-04	0	0	1.7E-03	-1.01E-01	-3.75E-04
POCP	kg NMVOC eq	7.54E-03	5.35E-05	6.05E-05	0	2.57E-05	6.08E-05	0	0	4.74E-04	-7.99E-03	-9.31E-05
ADPE	kg Sb eq	2.24E-07	7.54E-09	6.47E-10	0	3.63E-09	3.76E-10	0	0	5.5E-09	-4.06E-07	-1.02E-08
ADPF	MJ	6.05E+01	5.82E-01	9.55E-02	0	2.8E-01	7.1E-01	0	0	1.12E+00	-3.86E+01	-1.54E+00
WDP	m^3 world eq deprived	1.36E-01	3.18E-04	3.64E-02	0	1.53E-04	2.85E-04	0	0	9.66E-03	-1.86E-01	-1.4E-03

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; WDP = Water (user) deprivation potential)

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m² OWAcoustic RAW

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C3/1	C4	C4/1	D	D/1
PERE	MJ	-4.31E-01	6.44E-02	3.6E+00	0	3.1E-02	1E+01	0	0	1.95E-01	-1.91E+01	-6.29E-01
PERM	MJ	1.36E+01	0	-3.57E+00	0	0	-1E+01	0	0	0	0	0
PERT	MJ	1.32E+01	6.44E-02	3E-02	0	3.1E-02	2.95E-03	0	0	1.95E-01	-1.91E+01	-6.29E-01
PENRE	MJ	5.96E+01	5.82E-01	1.04E+00	0	2.8E-01	7.1E-01	0	0	1.12E+00	-3.86E+01	-1.54E+00
PENRM	MJ	9.46E-01	0	-9.46E-01	0	0	0	0	0	0	0	0
PENRT	MJ	6.05E+01	5.82E-01	9.55E-02	0	2.8E-01	7.1E-01	0	0	1.12E+00	-3.86E+01	-1.54E+00
SM	kg	9.09E-01	0	0	0	0	0	0	0	0	4.82E+00	0
RSF	MJ	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0
FW	m^3	1.71E-02	6.02E-05	8.57E-04	0	2.9E-05	1.03E-04	0	0	2.95E-04	-1.28E-02	-2E-04

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 – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m² OWAcoustic RAW

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C3/1	C4	C4/1	D	D/1
HWD	kg	1.66E-08	2.83E-11	6.72E-11	0	1.36E-11	6.09E-12	0	0	2.8E-10	-1.38E-08	-1.46E-09

NHWD	kg	4.97E-01	9.84E-05	3.94E-03	0	4.74E-05	2.19E-04	0	0	5.66E+00	-9.96E-01	-8.78E-04
RWD	kg	1.24E-03	9.26E-07	2.58E-06	0	4.46E-07	3.42E-05	0	0	1.15E-05	-1.06E-03	-5.61E-05
CRU	kg	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	5.66E+00	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	3.69E-01	0	0	0	0	0	0	0	0
EET	MJ	0	0	8.6E-01	0	0	0	0	0	0	0	0

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; EET = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional:
1 m² OWAcoustic RAW

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C3/1	C4	C4/1	D	D/1
PM	Disease incidence	1.61E-07	5.1E-10	4.21E-10	0	2.45E-10	6.98E-10	0	0	7.54E-09	-2.14E-07	-6.92E-10
IR	kBq U235 eq	1.58E-01	9.77E-05	2.74E-04	0	4.7E-05	2.65E-03	0	0	1.32E-03	-1.61E-01	-5.97E-03
ETP-fw	CTUe	1.16E+01	4.52E-01	4.15E-02	0	2.17E-01	9.07E-02	0	0	6.43E-01	-2.24E+01	-2.29E-01
HTP-c	CTUh	4.79E-09	9.01E-12	2.73E-12	0	4.33E-12	3.03E-12	0	0	1.52E-11	-4.65E-09	-1.65E-11
HTP-nc	CTUh	5.67E-08	3.79E-10	6.43E-11	0	1.83E-10	1.98E-10	0	0	5.87E-10	-8.31E-08	-5.93E-10
SQP	SQP	6.94E+01	3.87E-01	3.66E-02	0	1.86E-01	8.62E-03	0	0	3.18E-01	-7.95E+01	-4.11E-01

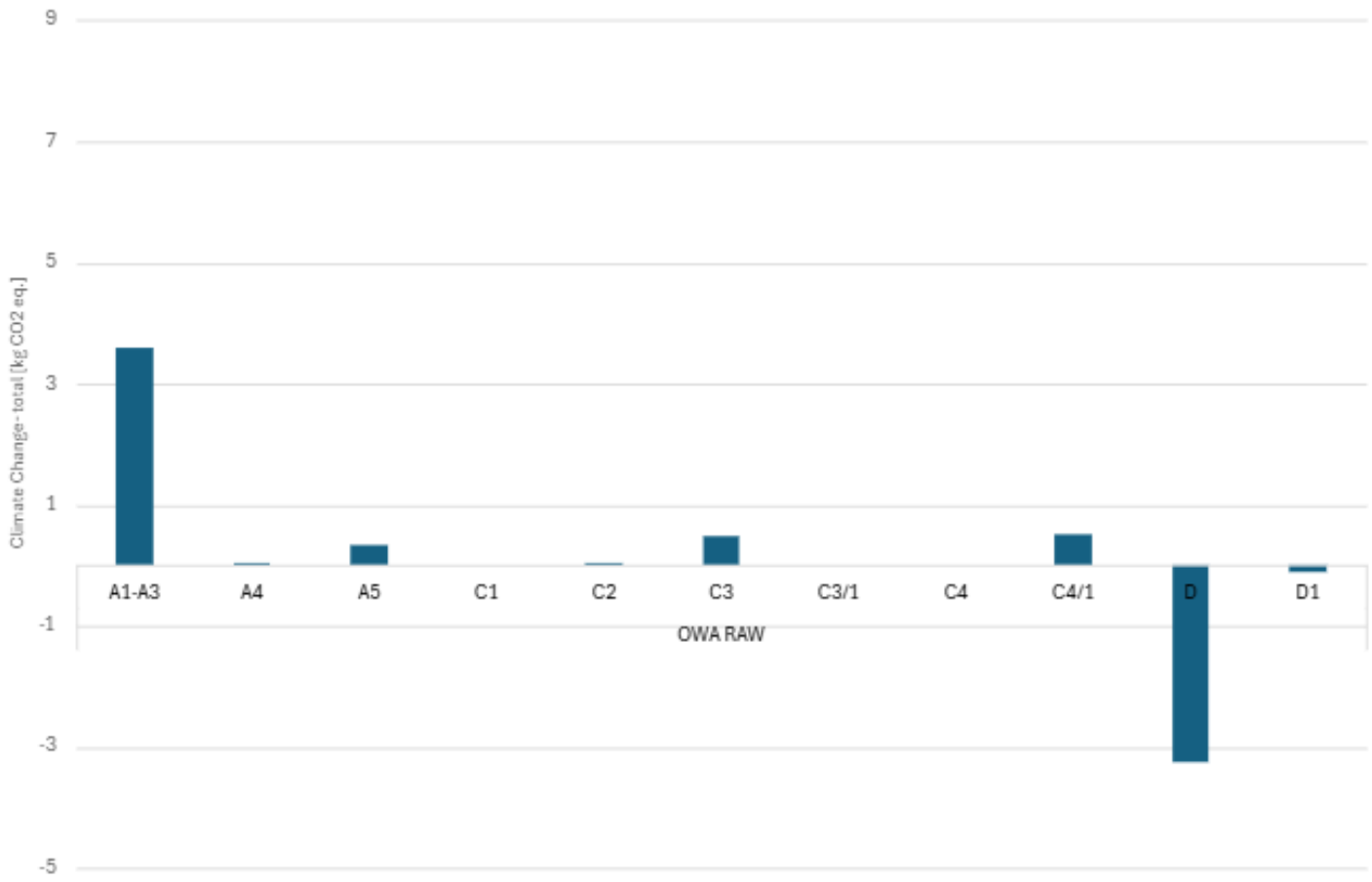
PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index

Disclaimer 1 – for the indicator “Potential Human exposure efficiency relative to U235”. 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 or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators “abiotic depletion potential for non-fossil resources”, “abiotic depletion potential for fossil resources”, “water (user) deprivation potential, deprivation-weighted water consumption”, “potential comparative toxic unit for ecosystems”, “potential comparative toxic unit for humans – cancerogenic”, “Potential comparative toxic unit for humans - not cancerogenic”, “potential soil quality index”. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.

6. LCA: Interpretation

The interpretation is based on the assumptions and limitations described in the background report, both with regard to the methods and the data. A dominance analysis is used for interpretation. The following figure shows the results of the individual modules as an example of the global warming potential.



The main points are:

- the manufacturing phase dominates the product system (energy consumption and raw material production);
- the transport modules (A4 and C2) have a negligible influence;
- the manual construction (A5) and deconstruction (C1) are negligible;
- the two EoL scenarios lead to very similar impacts in modules C3 and C4/1, the associated benefits differ significantly.

The variation for all included panels is within +/-1 %.

7. Requisite evidence

7.1 Bio-persistence
The mineral wool used for the production of mineral ceiling tiles complies with the requirements of Annex IV, no. 22 of the Ordinance on Hazardous Substances and section 23 of the Annex to § 1 Chemicals Prohibition Ordinance. Evidence is given by the RAL seal (GZ 388).

7.2 Formaldehyde and VOC emissions:
Emissions were tested according to and comply with *EN 16516, ISO 16000-3-6-9-11, ASTM D5116, RAL DE-UZ 132, EN 717-1.*

DE-UZ 132 (28 Days)
The table summarizes the emission values after 28 days from the following test reports 392-2020-00376101_K8_EN.

Name	Value	Unit
TVOC (C6 - C16)	< 5	µg/m^3
Sum SVOC (C16 - C22)	< 5	µg/m³
R (dimensionless)	-	-
VOC without NIK	<1	µg/m^3
Carcinogenic Substances	< 1	µg/m^3
Formaldehyde	< 3	µg/m³
Acetaldehyde	< 3	µg/m³
Acetic Acid	< 5	µg/m³

7.3 Radioactivity
Measurements of radioactivity did not reveal any evidence of artificial radioactivity outside the natural background radiation.
Measuring point: Prüfstelle für Strahlenschutz, Zentralstelle Nürnberg.
Test Number: S26829E

8. References

Standards

DIN 18177
DIN 18177:2012, Mineral tiles manufactured in the factory by the wet felt process - Characteristic values and test methods.

EN 13501-1
DIN EN 13501-1:2019, Classification of construction

productsand building ele ments according to their reaction to fire, Part 1: Classification with the results of tests on the reaction to fire of construction products.

EN 13501-2
DIN EN 13501-2:2023-12, Fire classification of construction products and building elements - Part 2: Classification using the results of fire resistance tests, with the exception of ventilation systems.

EN 13964
DIN EN 13964:2014, Suspended ceilings - Requirements and test methods.

ISO 14025 EN
ISO 14025:2011, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.

EN 15804
EN 15804:2012+A2:2019+AC:2021, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.

ISO 354
DIN EN ISO 354:2003-12, Acoustics - Measurement of sound absorption in reverberant rooms.

ISO 717-1
DIN EN ISO 717-1:2013-06, Acoustics - Assessment of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation.

ISO 10848-2
DIN EN ISO 10848-2:2006-08, Acoustics - Measurement of airborne and impact sound transmission between adjacent rooms in test stands - Part 2: Application to lightweight components where the connection has a minor influence.

ISO 11654
DIN EN ISO 11654:1997-07, Acoustics - Sound absorbers for ISO 16000-6 use in buildings - Evaluation of sound absorption.

ISO 9001
DIN EN ISO 9001:2015-11,Quality management systems - Requirements.

ISO 14001
DIN EN ISO 14001:2015-11, Environmental management systems - Requirements with guidance for use.

ISO 45001
DIN ISO 45001:2018-06, Occupational health and safety management systems - Requirements with guidance for use.

ISO 50001
DIN EN ISO 50001:2011-12, Energy management systems - Requirements with guidance for use.

ISO 14025
EN ISO 14025:2011, Environmental labels anddeclarations — Type III environmental declarations — Principles and procedures.

ISO 16000-3
DIN ISO 16000-3:2023-12 Indoor air - Part 3: Determination of formaldehyde and other carbonyl compounds in indoor and test chamber air - Active sampling method.

ISO 16000-6
DIN ISO 16000-6:2022-03, Indoor air - Part 6: Determination of organic compounds (VVOC, VOC, SVOC) in indoor and test chamber air by active sampling on sorbent tubes, thermal desorption and gas chromatography using MS or MS FID.

ISO 16000-9
DIN ISO 16000-9:2008-04, Indoor air - Part 9: Determination of the emission of volatile organic compounds from building products and furnishing - Emission test chamber method.

ISO 16000-11
DIN ISO 16000-11:2006, Indoor air - Part 11: Determination of the emission of volatile organic compounds from building products and furnishing — Sampling, storage of samples and preparation of test specimens.

ASTM E 84-24
Standard Test Methods for Surface Burning Characteristics of Building Materials.

AS 5637.1:2015
Determination of fire hazard properties Wall and ceiling linings

ASTM D5116-10
Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products

DE-UZ 132
Blauer Engel, DE-UZ 132; Low-emission thermal insulation materials and suspended ceilings for interior applications

EN 717-1
Wood-based panels - Determination of formaldehyde release - Part 1: Formaldehyde emission by the chamber method; German version EN 717-1:2004

EN 16516
DIN EN 16516:2020-10, Construction products: Assessment of release of dangerous substances - Determination of emissions into indoor air.

CAN/ULC-S102
Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies

AS ISO 9705:2003 (R2016) and C/VM2
Verification Method C/VM2 Framework for Fire Safety Design

Further References

AVV, German List of Wastes Ordinance
Regulation on the European Waste List.

Chemicals Prohibition Ordinance
Chemicals Prohibition Ordinance (German designation: Chemikalien-Verbotsverordnung – ChemVerbotsV) of 20 January 2017 (Federal Law Gazette I p. 94; 2018 I p. 1389), last amended by Article 300 of the Ordinance of 13 February 2024 (Federal Law Gazette I No. 43).

ECHA-candidate list
List of substances of very high concern (SVHC) for authorisation (ECHA Candidate List), 04.07.2024, published under Article 59(10) of REACH. Helsinki: European Chemicals Agency.

Eurofins Product Testing A/S
Test report: VOC emission test report (15.10.2020), Number:

392-2020-00376101_K8_EN, 392-2020-00382401_K8_EN, 392-2020-00371701_K8_EN, 392-2020-00415301_K8_EN.

Ordinance on Biocide Products
Regulation (EU) No 528/2012 of the European Parliament and of the Council of 22 May 2012 concerning the making available on the market and use of biocidal products.

Ordinance on Hazardous Substances
Ordinance on Hazardous Substances, of 26 November 2010 (Federal Law Gazette I p. 1643, 1644), last amended by Article 2 the Law of 21 July 2021 (Federal Law Gazette I p. 3115).

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Institut Bauen und Umwelt e.V.: General Instructions for the EPD programme of Institut Bauen und Umwelt e.V., Version 2.0, Berlin: Institut Bauen und Umwelt e.V., 2021www.ibu-epd.com

PCR Part A
Institut Bauen und Umwelt e.V. (IBU), 2024. Product Category Rules for Building-Related Products and Services. Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report. Version 1.4.

PCR Part B: Mineral panels
Institut Bauen und Umwelt e.V. (IBU), 2024. Product Category Rules for Building-Related Products and Services. Part B: Requirements on the EPD for Mineral panels. Version 1.11., 01.08.2024.

RAL Mineral Wool Quality Seal -RAL-GZ 388
GGM members with the right to use the RAL quality mark including plants and fibre types, as of January 2021. Home - English (ral-mineralwolle.de)

REACH
Regulation (EC) No 1907/2006 of the European Parliament and Council from 18 December 2006, Regulation concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

Regulation (EU) Nr. 305/2011(CPR)
Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC Text with EEA relevance.

Regulation (EU) Nr.1272/2008
Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006.

Product Data Sheet, chapter 7.1/13.1
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Installation guide, chapter 2.1
DS 9801_Installation guide. (owa.de)

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Publisher

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