

ENVIRONMENTAL PRODUCT DECLARATION

in accordance with *ISO 14025* and *EN 15804+A2*

Owner of the Declaration	Bundesverband der Gipsindustrie e.V.
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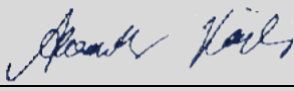

SOLID GYPSUM BLOCKS in accordance with **DIN EN 12859**

Bundesverband der Gipsindustrie e.V.

www.ibu-epd.com / <https://epd-online.com>



1. General information

<p>Bundesverband der Gipsindustrie e.V.</p> <hr/> <p>Programme holder IBU – Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany</p> <hr/> <p>Declaration number EPD-BVG-20220073-IAG1-EN</p> <hr/> <p>This Declaration is based on the product category rules: Plasterboards, 01.2019 (PCR checked and approved by the independent Expert Council (SVR))</p> <hr/> <p>Issue date 04 April 2022</p> <hr/> <p>Valid until 03 April 2027</p> <hr/> <p></p> <hr/> <p>Dipl.-Ing. Hans Peters (Chairman of Institut Bauen und Umwelt e.V.)</p> <hr/> <p></p> <hr/> <p>Dr Alexander Röder (Managing Director Institut Bauen und Umwelt e.V.)</p>	<p>SOLID GYPSUM BLOCKS in accordance with DIN EN 12859</p> <hr/> <p>Holder of the Declaration Bundesverband der Gipsindustrie e.V. Kochstrasse 6-7 10969 Berlin</p> <hr/> <p>Declared product / Declared unit Sold Gypsum Blocks in accordance with /DIN EN 12859/ 1 m² (84 kg)</p> <hr/> <p>Scope: The EPD applies for all member companies of the Bundesverband der Gipsindustrie e.V. in accordance with the current list of members on https://www.gips.de/epd-ansprechpartner/gips-wandbauplatten/ for products manufactured in Germany. The Life Cycle Assessment takes specific information from the manufacturer into account. The EPD covers the entire life cycle from raw material extraction to disposal. The owner of the Declaration shall be liable for the underlying information and proof; IBU shall not be liable with respect to manufacturer information, life cycle assessment data, or proof. This EPD was drawn up in accordance with the specifications of the EN 15804+A2. This standard is referred to as EN 15804 hereinafter.</p> <hr/> <p>Verification</p> <p>The EN 15804 European standard serves as the core PCR.</p> <p>Independent verification of the Declaration and information provided in accordance with ISO 14025:2010</p> <p><input type="checkbox"/> internally <input checked="" type="checkbox"/> externally</p> <hr/> <p></p> <hr/> <p>Dr.-Ing. Wolfram Trinius (Independent verifier)</p>
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2. Product

2.1 Product description / Product definition

The Declaration covers 1 m² of solid gypsum blocks with a surface weight of approx. 84 kg/m² (gross density approx. 850 kg/m³).

(EU) Directive No. 305/2011 (CPR) applies for placing the product on the market in the EU/EFTA (with the exception of Switzerland). The product requires a Declaration of Performance taking consideration of DIN EN 12859:2011-05, Gypsum blocks – Definitions, requirements and test methods, and CE marking. Use is governed by the respective national regulations.

2.2 Application

Solid gypsum blocks are used in the construction of non-load-bearing interior partitions in accordance with /DIN 4103-2/ in the area of residential and non-residential buildings.

Apart from single- and double-layer partitions with high levels of sound insulation, other possible applications for gypsum blocks include installation walls, shaft walls, facing layers and cladding upright supports. They can be used in buildings for public, private or commercial applications.

2.3 Technical data

Technical information is available in the information supplied by the manufacturers. Due to continuous updating of technical standards or approvals, such information is not listed within the framework of the Environmental Product Declaration.

Details on essential requirements can be taken from the CE mark and/or Declaration of Performance (Construction Products Regulation).

The latest technical information is available from the manufacturers of solid gypsum blocks listed on the <https://www.gips.de/epd-ansprechpartner/gips-wandbauplatten/> website.

The product's performance values correspond with the Declaration of Performance in terms of its essential properties in accordance with DIN EN 12859 2011-05, Gypsum blocks – Definitions, requirements and test methods.

2.4 Delivery status

Gypsum blocks are supplied in various dimensions, thicknesses and gross densities. Tables 1 and 2 provide an overview:

Table 1: Gross density class, gross density in accordance with DIN EN 12859 (excerpt)

Board type	Gross density class	Gross density (kg/m ³)
Medium gross density	M (medium)	800 ≤ ρ < 1,100
Medium gross density, water-repellent		
High gross density	D (dense)	1,100 ≤ ρ < 1,500
High gross density, water-repellent		

Table 2: Dimensions, colour coding in accordance with DIN EN 12859 (excerpt)

Board type	Thickness ¹⁾ (mm)	Format ¹⁾ (mm)	Colouring
Medium gross density	100, 80, 60	666 x 500	natural white
Medium gross density, water-repellent			blueish
High gross density		400/500 x 500	reddish
High gross density, water-repellent			blueish

¹⁾ preferred sizes for the German market

2.5 Base materials / Ancillary materials

Gypsum blocks are manufactured in automated production plants. A homogeneous, free-flowing mass is produced from plaster and water in firing, dosing and mixing units, which sets quickly in stainless steel moulding boxes. The boards are then dried. They are delivered to the construction site in packages.

Details on SVHC, CMR substances cat. 1A or 1B, and biocides:

The product contains substances from the ECHA candidate list of Substances of Very High Concern (SVHC) (date: 16 April 2021) exceeding 0.1% by mass /ECHA 2021/: no

The product contains other CMR substances in categories 1A or 1B which are not on the candidate list exceeding 0.1% by mass in at least one partial product: 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) Regulation on Biocide Products No 528/2012): no

2.6 Manufacture

Gypsum blocks are manufactured in automated production plants. Stucco plaster is first produced from gypsum by calcination. A homogeneous, free-flowing mass is produced from stucco plaster and water in metering and mixing units, which sets quickly in stainless steel moulding boxes. The boards are then

dried. They are delivered to the construction site in pallet packages /Gypsum Data Book/.

The manufacturing companies have implemented a quality management system and are certified to /DIN EN ISO 9001/.

2.7 Environment and health during manufacturing

Solid gypsum blocks are manufactured in plants permitted by emission laws in accordance with the specifications of the Federal Immission Control Act. The plants have implemented an energy management system in accordance with /DIN EN ISO 50001/.

2.8 Product processing / Installation

Products are processed in accordance with the relevant Codes of Practice of the Bundesverband der Gipsindustrie e.V. and the manufacturers.

During the cutting, sawing or grinding processes for gypsum products, the occupational exposure limit value of 6 mg/m² alveolar dust (A-dust) must be observed for calcium sulphate as a time-weighted average in accordance with /TRGS 900/.

2.9 Packaging

Solid gypsum blocks are supplied unpackaged or in foil-wrapped, waterproof packages on Euro pallets. Delivery without packaging is taken into account in this Environmental Product Declaration.

2.10 Condition of use

The useful life of the solid gypsum blocks for interior applications reviewed here generally complies with the overall useful life of the building. They are not subject to any exterior exposure.

2.11 Environment and health during use

During the use phase, no hazardous substances are emitted which exceed the limit values of the /AgBB/ evaluation scheme.

Solid gypsum blocks have been examined by the Fraunhofer Institut für Bauphysik /Fraunhofer IBP/. The test result indicates that the solid gypsum blocks are not associated with any adverse effects on indoor air quality.

2.12 Reference service life

Reference service lives depend on the respective applications.

In accordance with the BBSR "Nutzungsdauern von Bauteilen für Lebenszyklusanalysen nach dem Bewertungssystem Nachhaltiges Bauen (BNB)" (Useful lives of components for LCAs in accordance with the Sustainable Building evaluation system (BNB)), last revised 22 February 2017, amounts to > 50 years for walls, for example, in accordance with code number 342.511 "Nichttragende Innenwände – Gips-Wandbauplatten" (Non-load-bearing interior walls – Solid gypsum blocks) /BBSR service life/.

There are no influences on ageing when the recognised rules of technology are applied.

2.13 Extraordinary effects

Fire

Partition walls made of solid gypsum blocks are characterised by their homogeneous structure made of

the fire protection building material gypsum. All boards are classified as construction product class A1 (non-combustible) in accordance with /DIN 4102-1/. Single-layer partitions with a thickness of 60 mm achieve fire-resistance level F 30 (half an hour), while 80 mm corresponds with F 120 (2 hours) and 100 mm corresponds with F 180 (3 hours).

Double-layer partitions are regarded as two individual single-layer partitions with the result that the thicker single layer determines the respective level of fire resistance. Due to the homogeneous structure of the walls, the fire resistance applies to an exposure to fire from both sides.

Water

All gypsum products must be protected from permanent moisture penetration unless expressly designated by the manufacturer for this purpose. A Code of Practice is available from the Bundesverband der Gipsindustrie e.V. on restoration of components made of gypsum after flood damage /Code of Practice Flooding/.

Mechanical destruction

As a general rule, mechanical damage can be compensated for using gypsum-based jointing compound thanks to the ease of repair associated with solid gypsum blocks without impairing their functional use.

Solid gypsum blocks can be easily replaced with new blocks in the event of major damage.

No environmental consequences are to be anticipated in the event of unforeseen mechanical destruction.

2.14 Reuse phase

Reuse

Solid gypsum blocks cannot be reused for the same application without undergoing some change. Segregation from other building materials is recommended on site for any other applications involving reuse or disposal.

Further use

In agreement with the customer, new solid gypsum blocks (e.g. offcuts) can be used as recultivation material in mining, for recycling on landfill sites, as soil conditioner, fertiliser component or setting agent for cement in compliance with official regulations.

Recycling

After treatment in special recycling plants for gypsum waste, recycled gypsum can be added to the manufacturing process for new boards following crushing. Alternatively, the recycled gypsum can be used in the areas outlined for further use. These recycling facilities for gypsum waste also ensure separation of typical contamination associated with construction (metal, tiles, wallpaper etc.).

2.15 Disposal

Disposal in accordance with the waste code: /17 08 02 Gypsum-based building materials/ other than those mentioned in 17 08 01

Gypsum-based building materials adhere to the disposal conditions from landfill class 1 of the Landfill Ordinance in the case of landfilling.

2.16 Further information

www.gips.de

3. LCA: Calculation rules

3.1 Declared unit

Declared unit

Designation	Value	Unit
Declared unit	1	m ²

3.2 System threshold

EPD type in accordance with /EN 15804/: Cradle to gate, with

- options (A4–A5),
- Modules C1–C4 and
- Module D

(A1–A3 + C + D and additional modules: A4 and A5)

Modules A1–A3 (Product stage) include the production of raw materials taking consideration of framework conditions inherent in Germany and transport thereof, the provision of energy (German electricity mix), and the manufacturing processes required for the production of all components for the solid gypsum block product.

Module A4 comprises transport to the construction site.

Module A5 includes manual installation on the construction site.

Module C1 declares the manual deconstruction process.

Module C2 concerns transport to the recycling site.

Module C3 comprises the shredding and preparation of gypsum products.

Module C4 is generally not considered, as the Commercial Waste Ordinance provides for solid gypsum blocks to be sent for recycling. In this LCA, a landfill scenario is also calculated in order to cover legal exceptions to the Commercial Waste Ordinance.

Module D contains potential credits from gypsum recycling.

3.3 Estimates and assumptions

Approximations and estimates for the processes and materials were made in the corresponding modules for modelling the scenarios in the life cycle.

For Module C1, loss-free (100%) manual removal with hand-held tools is assumed. No losses (e.g. collection losses) during deconstruction are taken into account in the calculation of the end-of-life phase. The entire quantity produced is processed within the recycling process (scenario 1). In a further scenario, a landfill scenario is declared (scenario 2).

Packaging materials are not considered in the LCA; data applies to unpackaged products.

3.4 Cut-off criteria

In accordance with the target definition, all relevant input and output flows that occur in connection with the

product under consideration were identified and quantified.

All available data from the production process is therefore taken into account in the LCA, i.e. all of the raw materials used, the thermal energy used, and the electricity consumption.

This also takes into account material and energy flows that contribute less than 1% of the mass or energy.

The requirement that a maximum of 5% of the energy and mass input may be neglected is therefore complied with.

3.5 Underlying data

The data sets used are taken from the /GaBi/ databases.

The underlying database is based on the /GaBi/ 2021, Service Pack 40/CUP 2020.1 version. The /GaBi/ database provides the life cycle inventory data for raw and process materials, transport and energy.

3.6 Data quality

The data quality of the life cycle inventories is assessed based on their precision (measured, calculated, literature values or estimated), completeness (e.g. unreported emissions), consistency (degree of uniformity of the methods used), and representativeness (geographical, temporal, technological).

In order to comply with these aspects and thus ensure reliable results, first-hand industry data was used together with consistent underlying data from the /GaBi/ 2021 databases.

3.7 Period under review

The primary data recorded refers to 2021.

3.8 Allocation

The allocation methods used in underlying data (materials and energy) originating from the /GaBi/ databases are documented online at <http://www.gabi-software.com>.

All incineration processes are depicted by partial flow analyses of the respective materials.

An R1 factor of greater than 0.6 is assumed for all waste incineration plants.

Environmental loads from combustion processes in the construction, utilisation and disposal stages are allocated to the module in which they arise. Potential benefits from these processes are allocated to Module D.

The potential credits arising from energy substitution are awarded via average German data for electric energy and thermal energy from natural gas.

3.9 Comparability

As a general rule, EPD data can only be compared or evaluated when all of the data records to be compared have been drawn up in accordance with *EN 15804* and the building context and/or product-specific characteristics are taken into consideration.

The /GaBi/ ts underlying database was used (SP40).

4. LCA: Scenarios and additional technical information

Characteristic product features

Biogenic carbon

Information describing the biogenic carbon content at the plant gate

Designation	Value	Unit
Biogenic carbon in the product	0	kg C

Technical information on the application forms the basis for developing specific scenarios within the context of a building evaluation.

Construction installation process (A5)

Installation in the building is manual and therefore not associated with environmental loads.

Transport to construction site (A4)

Designation	Value	Unit
Transport distance	100	km
Capacity utilisation (including empty runs)	60	%

The EPD declares a transport distance of 100 km for A4. This permits easy conversion of specific transport distances at building level.

End of Life (C1-C4)

The solid gypsum blocks are removed manually and transported by truck to a recycling plant (scenario 1) or to landfill (scenario 2). Module C2 is calculated at 50 km in each case.

Designation	Value	Unit
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Waste type collected separately	84	kg
For recycling scenario 1:	84	kg
For landfill scenario 2:	84	kg

Reuse, recovery and recycling potential (D), relevant scenario information

Module D contains potential credits for the substitution of natural gypsum from the recycling process (Module C3).

5. LCA: Results

The following table depicts the LCA results for the life cycle of 1 m² solid gypsum blocks. It should be noted that two scenarios are calculated at the disposal stage for the solid gypsum blocks, which start after the same deconstruction stage (C1) for both scenarios and differ in terms of disposal costs:

Scenario 1 includes the assumption of a 100% recycling scenario with steps **C2**, **C3/1** and **D/1**. In this scenario, no landfilling takes place, so there are no contributions to indicators in C4/1 (disposal), which are listed as zero in the table below.

Scenario 2 includes complete disposal in a landfill with steps **C2** and **C4/2**. No waste treatment is required for landfilling, which is why Module C3/2 has a zero value for all indicators and is listed as such in the table below. Similarly, there are no credits in Module D/2, which is therefore also shown as zero.

Important:

EP freshwater: This indicator was calculated as "kg P equiv." in accordance with the characterisation model (EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe; <http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml>).

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

Product stage			Construction process stage		Use stage							End-of-life stage				Benefits and loads beyond the system thresholds
Raw material supply	Transport	Manufacturing	Transport from the manufacturer to the site	Assembly	Use / Application	Maintenance	Repairs	Replacement	Renewal	Operational energy use	Operational water use	Deconstruction / Demolition	Transport	Waste treatment	Landfilling	Reuse, recovery or recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	ND	ND	MNR	MNR	MNR	ND	ND	X	X	X	X	X

LCA RESULTS – ENVIRONMENTAL IMPACTS according to EN 15804+A2: 1 m² = 84 kg solid gypsum blocks

Core indicator	Unit	A1-A3	A4	A5	C1	C2	C3/1	C3/2	C4/1	C4/2	D/1	D/2
GWP total	[kg CO ₂ equiv.]	1.86E+1	1.56E+0	0.00E+0	0.00E+0	5.28E-1	1.02E+2	0.00E+0	0.00E+0	1.28E+0	-4.53E+2	0.00E+0
GWP fossil	[kg CO ₂ equiv.]	1.86E+1	1.56E+0	0.00E+0	0.00E+0	5.05E-1	1.01E+2	0.00E+0	0.00E+0	1.27E+0	-4.51E+2	0.00E+0
GWP biogenic	[kg CO ₂ equiv.]	5.23E-2	4.40E-3	0.00E+0	0.00E+0	2.32E-2	3.38E-1	0.00E+0	0.00E+0	5.31E-5	1.68E+0	0.00E+0
GWP luluc	[kg CO ₂ equiv.]	1.01E-2	8.48E-4	0.00E+0	0.00E+0	1.20E-5	1.47E-1	0.00E+0	0.00E+0	3.67E-3	-3.28E+0	0.00E+0
ODP	[kg CFC11 equiv.]	1.14E-13	9.61E-15	0.00E+0	0.00E+0	5.31E-17	2.23E-12	0.00E+0	0.00E+0	4.72E-15	-8.71E-13	0.00E+0
AP	[mol H+ equiv.]	1.71E-2	1.44E-3	0.00E+0	0.00E+0	4.74E-4	2.24E-1	0.00E+0	0.00E+0	9.14E-3	-1.67E+0	0.00E+0
EP freshwater	[kg PO ₄ equiv.]	1.72E-5	1.44E-6	0.00E+0	0.00E+0	1.08E-7	2.71E-4	0.00E+0	0.00E+0	2.19E-6	-1.54E-3	0.00E+0
EP marine	[kg N equiv.]	5.93E-3	4.98E-4	0.00E+0	0.00E+0	1.44E-4	4.97E-2	0.00E+0	0.00E+0	2.35E-3	-6.98E-1	0.00E+0
EP terrestrial	[mol N equiv.]	6.46E-2	5.43E-3	0.00E+0	0.00E+0	1.61E-3	5.23E-1	0.00E+0	0.00E+0	2.59E-2	-7.96E+0	0.00E+0
POCP	[kg NMVOC equiv.]	1.69E-2	1.42E-3	0.00E+0	0.00E+0	4.20E-4	1.36E-1	0.00E+0	0.00E+0	7.12E-3	-1.78E+0	0.00E+0
ADPE	[kg Sb equiv.]	2.20E-6	1.85E-7	0.00E+0	0.00E+0	1.51E-8	2.94E-5	0.00E+0	0.00E+0	1.14E-7	-4.39E-5	0.00E+0
ADPF	[MJ]	2.81E+2	2.36E+1	0.00E+0	0.00E+0	7.13E+0	1.78E+3	0.00E+0	0.00E+0	1.67E+1	-6.21E+3	0.00E+0
WDP	[m ³ world equiv., extracted]	4.00E-1	3.36E-2	0.00E+0	0.00E+0	9.85E-4	2.21E+1	0.00E+0	0.00E+0	1.34E-1	-2.71E+1	0.00E+0

Legend: GWP = Global warming potential; ODP = Ozone depletion potential; AP = Acidification potential of soil and water; EP = Eutrophication potential; POCP = Photochemical ozone creation potential; ADPE = Abiotic depletion potential – non-fossil resources (ADP substances); ADPF = Abiotic depletion potential – fossil fuels (ADP fossil fuels); WDP = Water deprivation potential (users)

LCA RESULTS – INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m² = 84 kg solid gypsum blocks

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3/1	C3/2	C4/1	C4/2	D/1	D/2
PERE	[MJ]	2.70E+1	2.27E+0	0.00E+0	0.00E+0	2.25E-2	7.90E+2	0.00E+0	0.00E+0	2.19E+0	-6.42E+2	0.00E+0
PERM	[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
PERT	[MJ]	2.70E+1	2.27E+0	0.00E+0	0.00E+0	2.25E-2	7.90E+2	0.00E+0	0.00E+0	2.19E+0	-6.42E+2	0.00E+0
PENRE	[MJ]	2.81E+2	2.36E+1	0.00E+0	0.00E+0	7.13E+0	1.78E+3	0.00E+0	0.00E+0	1.67E+1	-6.24E+3	0.00E+0
PENRM	[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

PENRT	[MJ]	2.81E+2	2.36E+1	0.00E+0	0.00E+0	7.13E+0	1.78E+3	0.00E+0	0.00E+0	1.67E+1	-6.24E+3	0.00E+0
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
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
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
FW	[m³]	8.37E-2	7.03E-3	0.00E+0	0.00E+0	4.03E-5	9.14E-1	0.00E+0	0.00E+0	4.22E-3	-8.85E-1	0.00E+0

Legend: PERE = Renewable primary energy as primary energy carrier; PERM = Renewable primary energy resources as material utilisation; PERT = Total use of renewable primary energy resources; PENRE = Non-renewable primary energy as energy carrier; PENRM = Non-renewable primary energy as material utilisation; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary materials; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

LCA RESULTS – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m² = 84 kg solid gypsum blocks

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3/1	C3/2	C4/1	C4/2	D/1	D/2
HWD	[kg]	1.49E-7	1.25E-8	0.00E+0	0.00E+0	6.92E-10	7.38E-7	0.00E+0	0.00E+0	2.55E-7	-3.15E-4	0.00E+0
NHWD	[kg]	1.20E-1	1.00E-2	0.00E+0	0.00E+0	7.29E-4	1.27E+0	0.00E+0	0.00E+0	8.41E+1	-1.32E+0	0.00E+0
RWD	[kg]	3.90E-3	3.28E-4	0.00E+0	0.00E+0	7.66E-6	2.71E-1	0.00E+0	0.00E+0	1.90E-4	-1.11E-1	0.00E+0
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
MFR	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	5.71E+4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
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
EEE	[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
EET	[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

Legend: HWD = Hazardous waste for disposal; NHWD = Non-hazardous waste for disposal; RWD = Radioactive waste for disposal; CRU = Components for reuse; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

LCA RESULTS – Additional impact categories acc. to EN 15804+A2 – optional: 1 m² = 84 kg solid gypsum blocks

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3/1	C3/2	C4/1	C4/2	D/1	D/2
PM	[Disease incidences]	5.89E-7	4.95E-8	0.00E+0	0.00E+0	2.57E-9	1.88E-6	0.00E+0	0.00E+0	1.13E-7	-7.58E-4	0.00E+0
IRP	[kBq U235 equiv.]	3.52E-1	2.96E-2	0.00E+0	0.00E+0	1.09E-3	4.44E+1	0.00E+0	0.00E+0	1.95E-2	-2.03E+1	0.00E+0
ETP-fw	[CTUe]	3.81E+1	3.20E+0	0.00E+0	0.00E+0	5.05E+0	7.63E+2	0.00E+0	0.00E+0	9.55E+0	-4.37E+3	0.00E+0
HTP-c	[CTUh]	2.51E-9	2.11E-10	0.00E+0	0.00E+0	9.50E-11	2.11E-8	0.00E+0	0.00E+0	1.42E-9	-9.45E-8	0.00E+0
HTP-nc	[CTUh]	1.08E-7	9.07E-9	0.00E+0	0.00E+0	4.06E-9	7.76E-7	0.00E+0	0.00E+0	1.56E-7	-5.29E-6	0.00E+0
SQP	[-]	2.45E+1	2.06E+0	0.00E+0	0.00E+0	1.83E-2	5.68E+2	0.00E+0	0.00E+0	3.48E+0	-1.95E+3	0.00E+0

Legend: PM = Potential incidence of disease due to particulate matter emissions; IR = Potential effect of human exposure to U235; ETP fw = Potential toxicity comparison unit for ecosystems; HTP c = Potential toxicity comparison unit for humans (carcinogenic effect); HTP nc = Potential toxicity comparison unit for humans (non-carcinogenic effect); SQP = Potential soil quality index

Limitation note 1 – applies to the indicator “Potential impact of exposure to people to U235”: This impact category mainly addresses the potential impact of low-dose ionising radiation on human health in the nuclear fuel cycle. This does not consider impacts attributable to possible nuclear accidents and occupational exposure, nor to the disposal of radioactive waste in underground facilities. Potential ionising radiation from soil, radon and some building materials is also not measured by this indicator.

Limitation note 2 – applies for the indicators: “Potential for Abiotic Resource Depletion – Non-Fossil Resources”, “Potential for Abiotic Resource Depletion – Fossil Fuels”, “Water Depletion Potential (User)”, “Potential Ecosystem Toxicity Comparison Unit”, “Potential Human Toxicity Comparison Unit – Carcinogenic Effect”, “Potential Human Toxicity Comparison Unit – Non-Carcinogenic Effect”, “Potential Soil Quality Index”. The results of this environmental impact indicator must be used with caution, as the uncertainties in these results are high or there is only limited experience with the indicator.

6. LCA: Interpretation

The juxtaposition of the declared modules shows that the manufacturing phase (A1-A3) dominates the Life Cycle Assessment. Greenhouse gas emissions also play a role in Module C3.

Transport to the construction site (A4) and to recycling or landfill (C2) at the end of life are of minor importance.

Module D shows the potential credits from the recycling process.

7. Proof

7.1 Leaching (sulphate + heavy metals)

On analysis according to the Landfilling Ordinance, the product displays the sulphate concentration in the saturation range which is typical for gypsum (approx.

1500 mg/l), resulting in disposal options only from landfill class I upwards.

Gypsum is classified as a listed substance in Water Hazard Class 1 (slightly hazardous for water).

Heavy metal content is significantly below the corresponding criteria for landfill class I.

Proper disposal in accordance with the parameters which can depend on use, sorting depth during deconstruction, collection (separately or together with other construction waste) and treatment, and must be determined by the responsible waste producer.

7.2 Radioactivity

The product can be used without restriction with overall dose contributions of significantly lower than 0.3 mSv/a, determined on the basis of the index calculation to RP 112 and the radon concentration /BfS report/.

7.3 VOC emissions

The requirements in accordance with the AgBB evaluation scheme are complied with in terms of all existing test items/ *Fraunhofer IBP*:

TVOC3 ≤ 10 mg/m³

Carcinogens 3 EU cat. 1 and 2 ≤ 0.01 mg/m³

TVOC28 < 1.0 mg/m³

SVOC28 ≤ 0.1 mg/m³

Carcinogens 28 EU cat. 1 and 2 ≤ 0.001 mg/m³

Total VOC28 excl. LCI ≤ 0.1 mg/m³

Total VOC incl. LCI $R = \sum Ci/LCii < 1$

8. References

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