ENVIRONMENTAL PRODUCT DECLARATION

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

Owner of the Declaration	Bundesverband der Gipsindustrie e.V. / Industriegruppe Estrichstoffe
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-BVG-20230136-IBE1-EN
Issue date	29 August 2023
Valid until	28 August 2028

Calcium Sulphate Flowing Screed and Conventional Calcium Sulphate Screed

Bundesverband der Gipsindustrie / Industriegruppe Estrichstoffe

Institut Bauen und Umwelt e.V.

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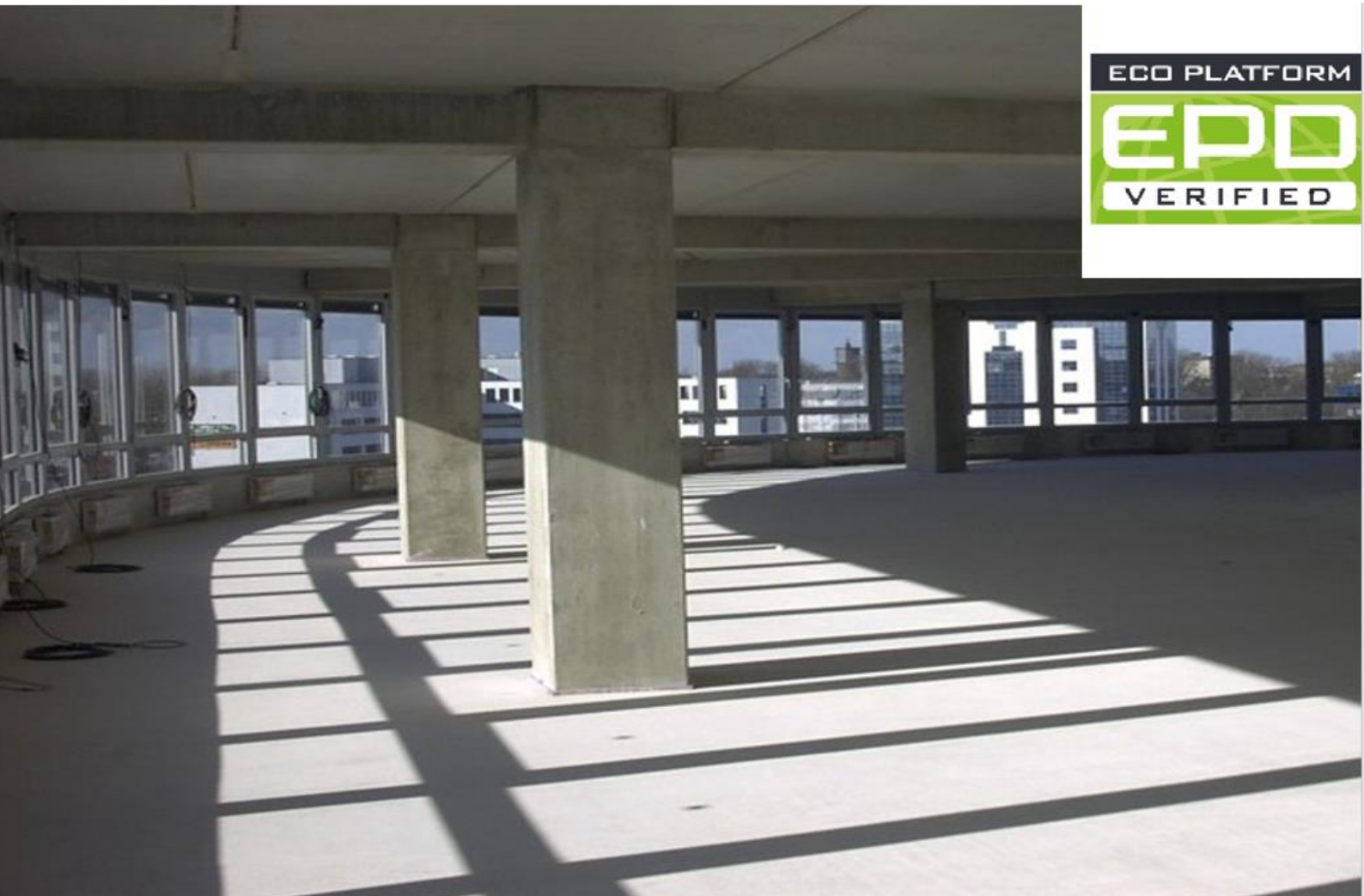


ECO PLATFORM EPD VERIFIED

GIPS
Bundesverband der Gipsindustrie e.V.
Industriegruppe Estrichstoffe

1. General Information

Bundesverband der Gipsindustrie / Industriegruppe Estrichstoffe

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

Declaration number
EPD-BVG-20230136-IBE1-EN

This Declaration is based on the product category rules:
Mineral factory mortar, 01.08.2021
(PCR checked and approved by the independent Expert Council (SVR))

Issue date
29 August 2023

Valid until
28 August 2028

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

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

Calcium sulphate flowing screed and conventional calcium sulphate screed

Holder of the Declaration
Bundesverband der Gipsindustrie e.V. /
Industriegruppe Estrichstoffe
Kochstrasse 6-7
10969 Berlin
Germany

Declared product/unit
1 kg screed (dry, prior to adding water), delivered in bulk in a silo, truck mixer or mobile mixer

Scope:
This EPD is an association EPD for all member companies of the Bundesverband der Gipsindustrie e.V. and the Industriegruppe Estrichstoffe in accordance with the list of members on www.gips.de.

The LCA results comprise the manufacture of screed with calcium sulphate binding agents in Germany and can be used in particular for planning purposes prior to awarding contracts. The market for screeds with calcium sulphate as a binding agent is well covered by the members of the Bundesverband der Gipsindustrie e.V. and the Industriegruppe Estrichstoffe.

The technical data was taken from the publications of the Bundesverband der Gipsindustrie e.V. and the Industriegruppe Estrichstoffe currently available as well as the manufacturers represented there.

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 standard. This standard is referred to as *EN 15804* hereinafter.

Verification

The EN 15804 European standard serves as the core PCR.
Independent verification of the Declaration and information provided in accordance with ISO 14025:2011
☐ internally ☒ externally

Angela Schindler
(Independent verifier)

2. Product

2.1 Product description / Product definition

This Declaration describes calcium sulphate flowing screeds and conventional calcium sulphate screeds based on standard recipes and standard manufacturing processes.

The declared unit is 1 kg of the dry mixture prior to adding water on the construction site. This dry mixture has a dry density > 1500 kg/m³.

The primary binding agent is represented by bindable calcium sulphate which is hydrated as flowing screed (liquid) or conventional screed (moist) by adding water on the construction site, independent of the processing consistency.

This Declaration also applies independent of delivery for premixed dry mortars, ready-mixed mortars or binder compounds only requiring the addition of aggregate or water.

Regardless of the fact that cement can also be added as an aggregate, this Declaration does not apply for cementitious screed where cement is used as the primary binding agent.

This Declaration only applies for screed and binding compounds delivered in bulk in transport containers (silos), i.e. not in bags. Directive (EU) No 305/2011 (*Construction Products Regulation*) applies for placing the product on the market in the EU/EFTA (with the exception of Switzerland).
The products require a Declaration of Performance taking consideration of the harmonised *DIN EN 13813:2002 – Screed material and floor screeds – Screed materials – Properties and requirements*, and *CE marking*.
Application of the products is subject to the respective national guidelines.

2.2 Application

Calcium sulphate flowing screeds and conventional calcium sulphate screeds are used in the installation of large screed surfaces without joints. These products can be used for various screed constructions, e.g. as bonded screed (*DIN 18560-3*), screed on separated layer (*DIN 18560-4*), screed on insulation layer (*DIN 18560-2*), heated screed (*DIN 18560-2*), or screed on hollow floors (*DIN EN 13213*).

2.3 Technical data

Technical construction data can be derived from information supplied by the manufacturers and the designated screed construction, e.g. regarding the nominal screed thickness. As the declared unit refers to delivery to the construction site, this technical data is not listed here. Reference is made to the Code of Practice “Calciumsulfat-Fließestriche” (Calcium sulphate flowing screeds) which provides information for planning (*IGE Planning*).
The general technical data is outlined in the following overview from the *Gypsum Data Book*:

		Calcium sulphate screed CA (moist application)	Calcium sulphate flowing screed CAF
Density	kg/dm³	1.8 - 2.1	1.8 - 2.1
Modulus of elasticity	N/mm²	approx. 20,000	15,000 - 20,000
Water vapour diffusion resistance coefficient		approx. 10	approx. 10
Thermal conductivity	W/mK	approx. 1.2	1.2 - 1.8
Coefficient of thermal expansion	mm/mK	approx. 0.010	0.010 - 0.016
Reaction to fire		Non-combustible (building material class A1 acc. to DIN 4102). In the event of a fire, calcium sulphate offers additional fire resistance on account of the evaporated water of crystallisation.	

2.4 Delivery status

The declared unit is 1 kg of the dry mixture prior to adding water on the construction site. This dry mixture has a dry density > 1500 kg/m³. Delivery to the construction site is in the form of ready-made screed or separately as binding compound and aggregate.

2.5 Base materials / Ancillary materials

This Declaration refers to calcium sulphate flowing screeds and conventional calcium sulphate screeds. As a general rule, they comprise binding agents, aggregates and additives. Calcium sulphate flowing screeds are delivered to the construction site as ready-mixed mortar or dry mortar or separately as binding agent and aggregate, which are mixed at the construction site, e.g. using a mobile mixer. Conventional screeds are supplied with separate binding agent and aggregate, which are then mixed on the construction site.

The primary binding agent at approx. 30% by weight is represented by bindable calcium sulphate, which is hydrated as flowing screed or conventional screed by adding water on the construction site, independent of the processing consistency. Various calcium sulphate raw materials of natural or synthetic origin can be used and various manufacturing methods applied for achieving the binding capacity. These are outlined in the Code of Practice “Die Rohstoffe für Calciumsulfat-Fließestriche” (Raw materials for calcium sulphate flowing screeds) (IGE raw materials).

This Declaration takes consideration of all primary binding agents, i.e. natural anhydrite, alpha-hemihydrate, thermal anhydrite and HF anhydrite, and their upstream chains (FGD gypsum as a by-product of electricity production and HF anhydrite as a by-product of hydrofluoric acid production).

Limestone grit, aggregate particles (incl. natural anhydrite) and sand can be used as aggregates with approx. 70% by weight and cement as an additive with 1.0-1.5% by weight.

Additives are applied to the products under review in percentages < 1% by weight in total and/or < 0.02% by weight in terms of individual additives in relation to the total mass of the dry mixture.

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: 07.03.2023) exceeding 0.1% by mass (*ECHA*): 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

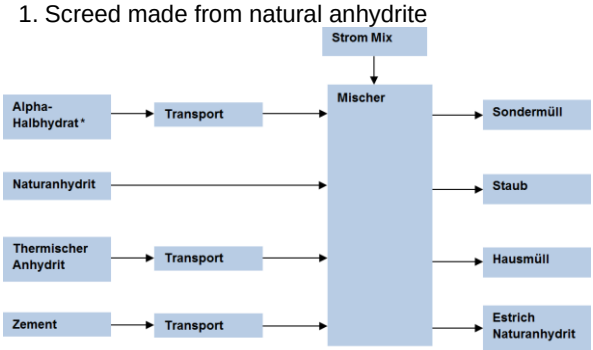
This Declaration does not apply to so-called cement screeds with cement as the main binder, irrespective of the fact that small quantities of cement may be added as an additive.

2.6 Manufacture

Various manufacturing processes can be used for the products. The plant with the greatest capacity for using natural anhydrite, alpha-hemihydrate, thermal anhydrite and HF anhydrite, respectively, as primary binding agents was modelled for this EPD.

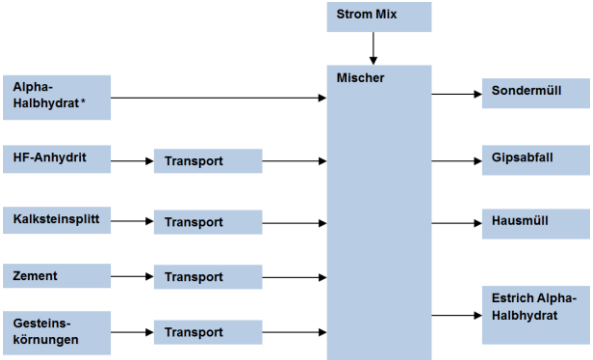
The following (simplified) manufacturing processes were selected:

1. Screed made from natural anhydrite



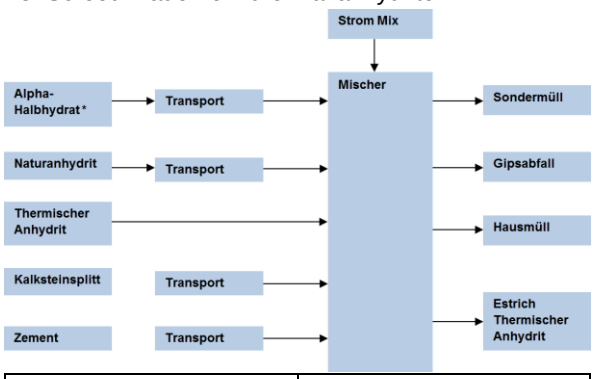
[Legende:]	[Legend:]
Alpha-Halbhydrat	Alpha-hemihydrate
Naturanhydrit	Natural anhydrite
Thermischer Anhydrit	Thermal anhydrite
Zement	Cement
Transport	Transport
Strom Mix	Electricity mix
Mischer	Mixer
Sondermüll	Hazardous waste
Staub	Dust
Hausmüll	Household waste
Estrich Naturanhydrit	Screed made from natural anhydrite

2. Screed made from alpha-hemihydrate



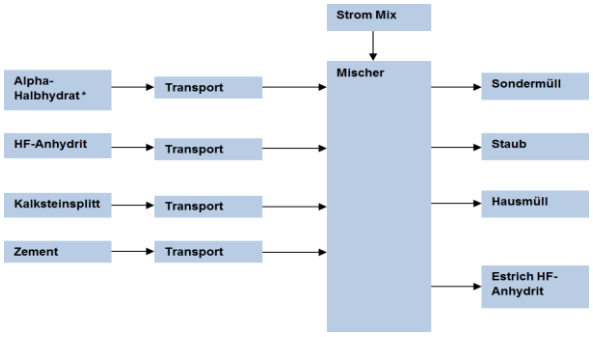
[Legende:]	[Legend:]
Alpha-Halbhydrat	Alpha-hemihydrate
HF-Anhydrit	HF anhydrite
Kalksteinsplitt	Limestone grit
Zement	Cement
Gesteinskörnungen	Aggregate particles
Transport	Transport
Strom Mix	Electricity mix
Mischer	Mixer
Sondermüll	Hazardous waste
Gipsabfall	Gypsum waste
Hausmüll	Household waste
Estrich Alpha-Halbhydrat	Screed made from alpha-hemihydrate

3. Screed made from thermal anhydrite



[Legende:]	[Legend:]
Alpha-Halbhydrat	Alpha-hemihydrate
Naturanhydrit	Natural anhydrite
Thermischer Anhydrit	Thermal anhydrite
Kalksteinsplitt	Limestone grit
Zement	Cement
Transport	Transport
Strom Mix	Electricity mix
Mischer	Mixer
Sondermüll	Hazardous waste
Gipsabfall	Gypsum waste
Hausmüll	Household waste
Estrich Thermischer Anhydrit	Screed made from thermal anhydrite

4. Screed made from HF anhydrite



[Legende:]	[Legend:]
Alpha-Halbhydrat	Alpha-hemihydrate
HF-Anhydrit	HF anhydrite
Kalksteinsplitt	Limestone grit
Zement	Cement
Transport	Transport
Strom Mix	Electricity mix
Mischer	Mixer
Sondermüll	Hazardous waste
Staub	Dust
Hausmüll	Household waste
Estrich HF-Anhydrit	Screed made from HF anhydrite

2.7 Environment and health during manufacturing

The products are manufactured in plants approved according to the Federal Immission Control Act (*BImSchG*) or the Federal Mining Act (*BBergG*). Health protection is ensured via occupational health and safety management systems.

2.8 Product processing / Installation

Flowing screed is generally processed manually. Depending on the processing consistency, a distinction is made between flowing screed and conventional screed which is moist to flowing on installation. Water is added and mixed using suitable metering and conveyor pumps for dry, pasty or liquid substances.

Flowing screed is generally self-levelling and can be applied without any notable distribution or compression. Conventional screed must be distributed, compressed, levelled and possibly smoothed by hand using suitable tools.
During the construction planning, a joint plan must be drawn up prior to application of the screed, which indicates the position and design of any requisite structural, edge and expansion joints (*IGE M5 joints*).

2.9 Packaging

Flowing screed is usually filled into silos and delivered. The silos are reusable and are delivered by truck to the construction site or production facility processing the screed. No packaging waste is incurred in such cases or when delivered in a truck mixer or mobile mixing plants.

2.10 Condition of use

The mortars under review are intermediate products to which water is added on the construction site. After achieving the respective readiness for application, various coatings or topcoats can be applied.

Please refer to the Code of Practice “Calciumsulfat-Fließestriche in Feuchträumen” (Calcium sulphate flowing screed in wet rooms) (*IGE M1 Wet rooms*) for using screed in wet rooms.
Screed should be protected by sealants in the case of floor drains and in basements and structural areas with ground contact. The screeds are not suited for wet rooms according to *DIN 18195-1*.

2.11 Environment and health during use

If used as designated, no particular hazard for humans and the environment is to be expected during mixing and further production. In the event of an alkaline product, setting regulations in hazardous substances must be observed if the mortar is mixed with water and contact with skin or eyes is possible. A safety data sheet is available for these products.

2.12 Reference service life

According to the table “Nutzungsdauern von Bauteilen für Lebenszyklusanalysen nach dem Bewertungssystem Nachhaltiges Bauen (BNB)” (Useful life of components for the LCA according to the Sustainable Building assessment system), the useful life is > 50 years in line with code number 352.111 (flowing screeds: anhydrite screeds ...) or 352.113 (screeds as wear floors) (*BNB service life*).

2.13 Extraordinary effects

Fire

Calcium sulphate screeds are non-combustible; they correspond with construction product class A1 according to *DIN 4102-1*. In the event of a fire, they also offer additional fire resistance in the form of evaporated water of crystallisation.

Water

Calcium sulphate screeds must be protected from moisture. Temporary moisture penetration, e.g. following water damage, will not result in any damage to these screeds provided they are able to desiccate again afterwards. More extensive or recurrent moisture penetration can cause the coating to crumble, while moisture penetration over long periods of time can diminish the strength of these screeds.

Mechanical destruction

Unforeseen mechanical destruction does not cause any environmental damage.

2.14 Reuse phase

Reuse depends on the plans for the screed component, e.g. as screed on an insulation layer, heating screed or screed on hollow floors. As preparation for use/reuse, screeds must be separated where possible from other components and non-mineral coatings, and directed to processing plants capable of producing recycled construction materials.

2.15 Disposal

Waste code: 17 08 02 Gypsum-based construction materials not contaminated by hazardous substances

2.16 Further information

Additional information is available at www.gips.de.

3. LCA: Calculation rules

3.1 Declared unit

These calculations refer to the arithmetic mean of data initially recorded separately for:

- 1 kg screed made from natural anhydrite
- 1 kg screed made from alpha-hemihydrate
- 1 kg screed made from thermal anhydrite
- 1 kg screed made from HF anhydrite

Details on declared unit

Name	Value	Unit
Declared unit	1	kg
Conversion factor [mass/declared unit]	-	-

3.2 System threshold

EPD type: in accordance with *EN 15804*:
cradle-to-gate

- 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 based on 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 product. As the products are transported in bulk to the construction site, no packaging is taken into consideration.
Module A4 comprises transport to the construction site.
Module A5 concerns installation at the construction site, including disposal of any packaging taking consideration of framework conditions inherent in Germany.
Module C1 declares the deconstruction process (mechanical).
Module C2 concerns transport to the recycling or disposal site.
Module C4 declares landfilling.
Module D contains potential credit notes as a result of energetic recycling of packaging (in Module A5). In this case, this is "0", as the product is distributed in bulk form.

3.3 Estimates and assumptions
Packaging materials for powder products to be delivered were not considered. As a general rule, the products can be delivered in bags or in bulk in silos, truck mixers or mobile mixers.

3.4 Cut-off criteria
In accordance with the target definition, all relevant input and output flows > 1% by weight that occur in connection with the product under consideration were identified and quantified. All relevant data from the production process is therefore taken into account in the LCA, i.e. the raw materials used, the thermal energy used, and the electricity consumption. The requirement that a maximum of 5% of the energy and mass input may be neglected is 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 period under review for the data refers to the annual average. The primary data recorded refers to 2020.

3.8 Geographical representativity
Country or region in which the declared product system is manufactured and possibly utilised and treated at its end of life: Germany

3.9 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.

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.

3.10 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 of biogenic carbon

Information describing the biogenic carbon content at the plant gate

Name	Value	Unit
Biogenic carbon in the product	-	kg C

The product does not contain any biogenic carbon.

The following technical information forms the basis for the declared modules or can be used for developing specific scenarios in the context of a building evaluation if modules are not declared (MND).

Modules A4 and A5 are considered as follows:

Transport to the construction site (A4) per kg screed (dry, prior to adding water)

Name	Value	Unit
Transport distance	100	km
Capacity utilisation (including empty runs)	60	%
Density of products transported	1500	kg/m³

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

Installation in the building (A5) per kg screed (dry, prior to adding water)

Name	Value	Unit
Water consumption	0.0003	m³
Power consumption	0.00016	kWh

End of Life (C1-C4)
Mechanical deconstruction is assumed for C1.
The screed is then transported to the landfill by truck (Module C2, 50 km).

Name	Value	Unit
Waste type collected separately 170802	1.3	kg
For landfilling	1.3	kg

The higher mass of waste for landfill compared to the declared unit takes into account the increase due to the addition of water at the construction site.

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

The scenarios assumed here (unpackaged goods, landfill) do not allow any credits in D from A5 and C3.

5. LCA: Results

The following table depicts the LCA results for the life cycle. It should be noted that landfilling is assumed at the disposal stage and the corresponding LCA results are shown in the column for Module C4. Column C3 (recycling) appears in the results with the numerical values “0”.

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

LCA RESULTS – ENVIRONMENTAL IMPACTS according to EN 15804+A2: 1 kg screed (dry, prior to adding water)

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP total	kg CO_2 equiv.	8.05E-02	1.26E-02	1.2E-04	8.3E-04	6.29E-03	0	1.52E-02	0
GWP fossil	kg CO_2 equiv.	7.95E-02	1.2E-02	1.16E-04	8.29E-04	6.01E-03	0	1.52E-02	0
GWP biogenic	kg CO_2 equiv.	9.27E-04	5.53E-04	3.54E-06	1.21E-06	2.77E-04	0	6.33E-07	0
GWP luluc	kg CO_2 equiv.	5.54E-05	2.85E-07	2.51E-07	1.89E-08	1.42E-07	0	4.37E-05	0
ODP	kg CFC11 equiv.	4.8E-16	1.26E-18	2.96E-18	8.38E-20	6.32E-19	0	5.62E-17	0
AP	mol H^+ equiv.	1.82E-04	1.13E-05	1.88E-07	3.92E-06	5.64E-06	0	1.09E-04	0
EP freshwater	kg P equiv.	7.89E-08	2.56E-09	3.83E-09	1.7E-10	1.28E-09	0	2.6E-08	0
EP marine	kg N equiv.	4.39E-05	3.42E-06	6.91E-08	1.84E-06	1.71E-06	0	2.8E-05	0
EP terrestrial	mol N equiv.	4.8E-04	3.83E-05	5.94E-07	2.02E-05	1.92E-05	0	3.08E-04	0
POCP	kg NMVOC equiv.	1.29E-04	1E-05	1.47E-07	5.22E-06	5E-06	0	8.48E-05	0
ADPE	kg Sb equiv.	8.48E-09	3.59E-10	3.71E-11	2.38E-11	1.79E-10	0	1.36E-09	0
ADPF	MJ	1.13E+00	1.7E-01	1.5E-03	1.13E-02	8.48E-02	0	1.99E-01	0
WDP	m^3 world equiv., extracted	2.95E-03	2.34E-05	1.29E-02	1.56E-06	1.17E-05	0	1.59E-03	0

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 kg screed (dry, prior to adding water)

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	1.34E-01	5.35E-04	7.02E-04	3.55E-05	2.68E-04	0	2.61E-02	0
PERM	MJ	0	0	0	0	0	0	0	0
PERT	MJ	1.34E-01	5.35E-04	7.02E-04	3.55E-05	2.68E-04	0	2.61E-02	0
PENRE	MJ	1.13E+00	1.7E-01	1.5E-03	1.13E-02	8.49E-02	0	1.99E-01	0
PENRM	MJ	0	0	0	0	0	0	0	0
PENRT	MJ	1.13E+00	1.7E-01	1.5E-03	1.13E-02	8.49E-02	0	1.99E-01	0
SM	kg	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m^3	1.63E-04	9.6E-07	3.01E-04	6.37E-08	4.8E-07	0	5.02E-05	0

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 kg screed (dry, prior to adding water)

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	1.69E-09	1.65E-11	1.4E-12	1.09E-12	8.24E-12	0	3.03E-09	0
NHWD	kg	5.06E-04	1.74E-05	8.65E-05	1.15E-06	8.68E-06	0	1E+00	0
RWD	kg	3.07E-05	1.82E-07	1.07E-07	1.21E-08	9.11E-08	0	2.26E-06	0

CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0
EEE	MJ	5.19E-06	0	0	0	0	0	0	0
EET	MJ	1.22E-05	0	0	0	0	0	0	0

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 kg screed (dry, prior to adding water)

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	Disease incidences	7.17E-09	6.12E-11	2.09E-12	4.42E-11	3.06E-11	0	1.35E-09	0
IR	kBq U235 equiv.	4.21E-03	2.6E-05	1.02E-05	1.73E-06	1.3E-05	0	2.32E-04	0
ETP-fw	CTUe	4.28E-01	1.2E-01	1.01E-03	7.98E-03	6.01E-02	0	1.14E-01	0
HTP-c	CTUh	1.35E-11	2.26E-12	3.77E-14	1.5E-13	1.13E-12	0	1.68E-11	0
HTP-nc	CTUh	6.48E-10	9.67E-11	2.59E-12	7.73E-12	4.84E-11	0	1.86E-09	0
SQP	SQP	1.15E-01	4.36E-04	6.31E-04	2.89E-05	2.18E-04	0	4.15E-02	0

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 for the indicator “Potential impact of human exposure 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.

Transport to the construction site (A4) and landfilling also play a role. The other modules are negligible.

The LCA within the manufacturing phase is broken down as follows:

- A1 contains the contributions of the raw materials and their upstream chains.
- A2 shows the emissions from transport to the production site.
- A3 contains the emissions from energy consumption in the production plant.

Phases A1-A3 are summarised.

- A4 comprises transport to the construction site.
- A5 includes installation on the construction site. Disposal of any packaging is not required here (unpackaged product on reusable pallets).

C1 declares the mechanical deconstruction.

C2 concerns transport to the disposal site (landfill).

C3 is shown as zero due to the scenario.

C4 is calculated as a landfill scenario.

D is shown as zero, as the product was accounted for as non-packaged (omission of contributions from A5) and no recycling at the end of the life cycle was modelled (A3 shown as zero).

7. Proof

7.1 Leaching

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 lower than the allocation criteria for landfill class I. The waste producer is responsible for proper disposal, which depends on parameters such as use, sorting depth during deconstruction, collection (separately or together with other construction waste) and waste treatment.

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* test scheme are complied with in terms of all existing test items (*Fraunhofer IBP*):

$TVOC_3$ < 10 mg/m³
Carcinogens3 EU cat. 1 and 2 ≤ 0.01 mg/m³
$TVOC_{28}$ < 1.0 mg/m³
$SVOC_{28}$ ≤ 0.1 mg/m³
Carcinogens28 EU cat. 1 and 2 ≤ 0.001 mg/m³
Total VOC_{28} excl. LCI ≤ 0.1 mg/m³
Total VOC incl. LCI $R = \Sigma C_i / LCI_i < 1$

8. References

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CE marking
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